REPORT

Mary River Project

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

Submitted to:

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1663724-281-R-Rev1

18 August 2021

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Executive Summary

MARINE WATER QUALITY (CHAPTER 2.0)

To satisfy Project Certificate (PC) Conditions No. 76, 87, 89 and 99(a), the marine water quality component involved the collection of water quality samples at four sampling stations downstream from the primary effluent discharge point (MP-05) in Milne Port (distributed in a radial design up to 250 m from the discharge point) to monitor for potential changes in water quality due to site drainage and operational discharges (including iron ore stockpile run-off). Four additional water quality stations downstream from a second discharge point (MP-06) were monitored in the same way in 2020.

In 2020, reported analytical results for conventional water quality parameters — major ions, nutrients, metals, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs) — were generally within ranges observed during previous Marine Environmental Effects Monitoring Program (MEEMP) sampling programs (2015 to 2019) with no exceedances of Canadian Council of Ministers of the Environment (CCME) water quality guidelines. Consistent with previous programs, hydrocarbons and PAHs were not detected in the water samples collected in 2020. In addition, fecal coliform concentrations were not detected in the 2020 samples, suggesting that the treated effluent discharge collection system continues to be effective at limiting ingress to the marine environment. In fact, a substantial proportion of parameters analyzed in the water samples from Milne Inlet were not detected at all in downstream sampling stations.

Collectively, measured concentrations of parameters of potential concern (e.g., metals, nutrients, hydrocarbons) were either not detected or were present at low concentrations, such that adverse impacts to the biota in the Milne Inlet receiving environment are not expected. Increased iron deposition in the marine environment as a result of Project activities is an issue of concern for local Inuit. Since CCME marine water quality guidelines for iron have not been developed, 2020 data were compared to those collected during previous MEEMP programs performed between 2015 and 2019 to evaluate whether changes have been observed over time. Analysis shows that iron concentrations in the 2020 water samples remain well within the 2015 to 2019 range of detected concentrations.

Overall, results to date indicate that construction and operational activities at Milne Port do not appear to have resulted in adverse effects on marine water quality as measured concentrations remain below the applicable water quality guidelines or were found to be consistent with results from previous sampling years for those parameters without established guidelines (such as iron).

These results confirm that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected marine water quality. Moving forward, marine water quality monitoring for site drainage and treated effluent discharges is recommended to continue in order to monitor for potential changes in downstream water chemistry from these activities and provide continuity in the established analytical time series for the MEEMP.

MARINE SEDIMENT QUALITY (CHAPTER 3.0)

To satisfy PC Conditions No. 83(a) and 99(a), sediment samples were collected along four transects, including three transects (West, East, and Northwest) surveyed from 2014 to 2018, and an additional transect, the Northeast transect, added in 2019 to account for potential future changes to Milne Port infrastructure. The radial gradient sampling design enables effects to be monitored as a function of distance from the Ore Dock (potential point source), in consideration of potential contaminant issues (e.g., ore dust, hydrocarbon deposition) and/or physical impacts (sediment re-suspension and transportation) in the marine environment.

Analyses of the physical and chemical composition of sediments were conducted on samples collected from a total of 60 stations, as well as at two additional non-transect stations included for consistency to previous MEEMP programs. In general, concentrations of metals were determined to be less than applicable sediment quality guidelines, with few exceptions. Concentrations of volatile organic compounds, hydrocarbons, and polycyclic aromatic hydrocarbons were also mostly below the detection limits. Statistical correlation analysis of spatial trends did not suggest that sediment metal concentrations were accumulating at elevated levels in proximity to the Ore Dock relative to other locations sampled within Milne Inlet.

Minor exceedances of sediment quality guidelines were noted for arsenic and nickel but are not considered to be Project-related, as these metals are not associated with ore processing at Mary River and tended to increase with greater distance away from the Ore Dock. The variability in measured concentrations of both metals closer to Milne Port was well explained by the variability in percent fines, which was shown to increase with greater distance from the Ore Dock due to natural coastal sorting processes. The low magnitude exceedances of Interim Sediment Quality Guidelines (ISQGs) in some samples are most likely reflective of background conditions and related to physical sediment properties (i.e., percent fines), rather than contamination caused by Project activities.

Sediment grain size, particularly the percentage of fines, is an important measure of sediment quality because metals tend to accumulate to a greater degree in finer sediments as a result of both physical and chemical factors (e.g., increased surface area to volume ratio). Comparison of the percentage of fine sediment over time along the transects did not indicate statistically significant changes in fines content from the previous year (2020 vs. 2019), nor between the six-year period from 2014 and 2020.

Importantly, increased iron content in sediments – flagged as of concern to local Inuit due to the potential for increased deposition of iron ore in the form of dust or in runoff from storage stockpiles as a result of the Project – were rarely observed at concentrations greater than those observed during the 2014 baseline characterization program. Comparison of the iron sediment concentrations over time along the transects did not indicate statistically significant changes in iron content from the previous year (2020 vs. 2019) nor between 2014 and 2020.

Monitoring results for 2020 remained within the original Final Environmental Impact Statement (FEIS) predictions, which forecasted no significant residual effects on sediment quality but indicated the potential for minor localized increases in nutrient, metal, or hydrocarbon concentrations that would not exceed CCME sediment quality guidelines. The 2020 monitoring results and sediment monitoring results to date suggest that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected marine sediment within the Milne Inlet study area.

Overall, results to date indicate that construction and operational activities at Milne Port do not appear to have resulted in adverse effects on marine sediment quality, as measured parameters are generally consistent with previous years, remain within thresholds in the interim CCME sediment quality guidelines, and do not show spatial patterns attributable to Project activities.

Moving forward, it is recommended that monitoring of marine sediment quality within the study area should continue, but is not required annually, commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet.

BENTHIC INFAUNA (CHAPTER 4.0)

To satisfy PC Condition 99(a) and 99(c), the 2020 benthic infauna component involved the collection of 60 samples (co-located with sediment stations) along two Coastal Transects (East and West) and two Northern Offshore Transects (Northeast and Northwest) according to a radial study design. Samples were collected as a composite of three Van Veen sediment grabs from each station, processed in the field, and preserved for laboratory analysis. Infaunal organisms were subsequently identified to the lowest practical taxonomic level and enumerated by experienced marine benthic taxonomists at Biologica Environmental Services Ltd. (taxonomic laboratory).

As observed in 2018 and 2019, benthic infauna communities in Milne Inlet were mainly dominated by polychaetes. Malacostraca crustaceans were co-dominant with polychaetes along the Coastal Transects whereas further offshore in deeper waters, polychaetes co-existed with Malacostraca crustaceans, bivalves, and ostracods. Statistical analysis is focused on four key benthic infauna endpoints – invertebrate density, richness, diversity, and evenness – consistent with previous MEEMP years. Analysis of the data revealed spatial variability in community endpoints, particularly between nearshore and offshore environments, which is expected given that density and biomass of marine benthic infauna generally decreases with increasing water depth and distance from land. Spatial variability within the Coastal Transects was also observed, attributed to the coastal topography and processes, such as freshwater input from Phillips Creek. Invertebrate densities were either higher in 2020, or were not significantly lower relative to 2018 or 2019. Moreover, richness values along all four transects in 2020 were not significantly different to those calculated for 2018.

In 2020, benthic infauna communities were diverse throughout the study area and well established in both habitat types. There were no consistent differences between years (2020 vs 2019, or between 2020 vs 2018/2019) in benthic community indicators along the four transects and, in isolated instances where indicators were significantly different between years, endpoints tended to be higher in 2020. Statistical differences also tended to occur at greater distances from the Ore Dock compared to closer to the dock. These results do not align with the community response pattern typical of a toxicological impairment due to contaminant exposure, which manifests as a significant decrease in both density and richness as contaminant-sensitive taxa disappear or numbers are diminished, leaving more tolerant taxa to dominate the community. Rather, the 2020 results are more consistent with expected natural variability for these benthic habitat types within Milne Inlet, as there appears to be no evidence to suggest impairment of benthic communities related to the Project.

Monitoring results for 2020 remained within original FEIS predictions, which forecasted no significant adverse residual effects to Arctic char habitat. The 2020 results, in combination with those from sediment monitoring to date, suggest that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected benthic infaunal communities in the study area.

Overall, results to date indicate that construction and operational activities at Milne Port do not appear to have resulted in adverse effects on benthic infauna in the marine receiving environment. Existing benthic infaunal communities continue to be diverse and well established in both nearshore and offshore habitats.

Moving forward, it is recommended that monitoring of benthic infauna should continue moving forward, but on a reduced frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on both benthic communities and marine sediment quality within Milne Inlet.

SUBSTRATE, MACROFLORA AND BENTHIC EPIFAUNA (CHAPTER 5.0)

The study of substrate, macroflora, and benthic epifauna fulfills PC Condition No. 99(a), (c) and is relevant to PC Conditions 76, 83(a), 84 and 87. Surveys were modified in 2020 to replace belt transects previously deployed in the same general locations, which had been determined to be ineffective due to a high proportion becoming twisted, moved, or obscured within one year of deployment. Surveys consisted of dive surveys and underwater video monitoring within ten steel frame quadrats permanently installed on the sea floor; of these, five quadrats were established in the Project exposure area and the other five in a nearby reference area, outside of the zone of influence of project effects. The quadrats were analyzed to record percent (%) cover of substrate type, benthic macroflora and sessile benthic epifauna, according to the classification system outlined in the 2017 MEEMP report (Golder 2018), as well as taxonomic identification of benthic epifauna down to the lowest practical taxonomic level, species richness, their abundance (counts and% cover), and diversity (Simpsons Diversity Index).

Substrates documented within the quadrats are predominantly soft, dominated by silt and sand, consistent with what has been observed previously at Milne Port, and no significant differences in overall composition were observed between the Project exposure area and the reference area. Percent cover, abundance, species richness and diversity of macroflora, sessile epifauna and motile epifauna were variable within and between quadrats, with significant differences observed between survey areas for some metrics, which is expected in this dynamic environment.

As surveys in 2020 represented the first year of quadrat-based observations, comparative statistical analysis of annual changes in percent cover, abundance, richness, and diversity will be performed in subsequent survey years. Qualitative differences in taxonomic observations between survey years were minor and largely represented species seen in low abundances or species that were relatively motile.

Observed differences between survey years and survey areas are considered minor and are likely due to natural variability or within the range of error of survey methodology. Observations reveal no evidence of spatial or temporal trends that might be associated with the construction and operation of Milne Port.

Overall, 2020 results indicate that that construction and operational activities at Milne Port do not appear to have resulted in adverse effects on macrofloral and epifaunal benthic communities in the marine receiving environment.

FISHING EFFORTS AND CATCH DATA (CHAPTER 6.0)

To satisfy PC Condition No. 99(b)(ii), (c), 113, and 114, sampling was conducted throughout the Milne Port area to assess relative abundance of Arctic char and other fish species. Multiple sampling methodologies were employed to target different species and habitat types, including gill net, Fukui trap, hoop net, angling beach seine and otter trawl. Collected fish were identified to species before being released.

Fish captures in 2020, as in 2019, were higher relative to previous years which is attributed to the increased length of the sampling program, and corresponding higher fish sampling effort. Taxonomic composition of fish captures did not materially change from previous sampling years, with Arctic Char (*Salvelinus alpinus*), Fourhorn Sculpin (*Myoxocephalus quadricornis)* and Shorthorn Sculpin (*Myoxocephalus scorpius)* still comprising a majority of the total catch. Eight other species were caught, including Greenland Cod (*Gadus ogac*), Arctic Sculpin (*Myoxocephalus scorpioides*), Sandlance (*Ammodytes* sp.), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*), Fourline Snakeblenny (E*umesogrammus parecisus*), Polar Cod (*Arctogadus glacialis*), *Triglops* sculpin (*Triglops* sp.) and unidentified sculpin species (Cottidae indet.). Polar Cod and *Triglops* sculpin represent the first occurrence of these taxa in MEEMP surveys.

Relative taxonomic composition of fish captures differed from previous survey years. In 2020 Fourhorn Sculpin, Shorthorn Sculpin, and Arctic Char comprised 71% of the total catch, in contrast to previous survey years where these species comprised over 99% of the total catch. This change does not reflect a change in species composition, but rather is a reflection of the change in efforts and methodology that led to higher captures of species that were rare or unobserved under previous efforts.

No single fishing method was effective at capturing all species observed in Milne Port fishing surveys. Gill net surveys were the most effective, capturing seven taxa, followed by hoop nets and Fukui traps with six taxa. Gill nets also remain the most effective method for monitoring Arctic Char, accounting for 97% of all Char captured in 2020 fish surveys. Hoop nets were added to the fishing surveys following a trial in 2019; this method is being evaluated as a replacement for Fukui traps, which have historically yielded low catches. In 2020, hoop nets captured a total of 84 fish, representing six species including Greenland Cod, which had not been represented in fish surveys since 2014, compared to 43 fish in Fukui traps. Catch Per Unit Effort (CPUE) for hoop nets was higher than Fukui traps, indicating this method is a suitable replacement.

Statistical comparison of CPUE, species composition and relative abundances is not possible under current methodologies due to variations in total efforts and fishing locations. It is recommended that these fishing efforts be standardized in the future to facilitate the ability to make comparisons between survey years.

Overall, the similarities observed across sampling years for both species occurrence and relative abundance suggests that construction and operational activities at Milne Port do not appear to have resulted in changes to local fish communities to date based on qualitative assessment. Annual fish sampling has yielded comparable numbers and proportional representation of the dominant fish species in Milne Port (Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin) with no indication of Project-related impacts on the local fish community in Milne Port.

FISH HEALTH AND TISSUE CHEMISTRY (CHAPTER 7.0)

In 2020, 680 fish belonging to seven species were captured, measured and weighed. Similar to previous years, the fish community was dominated by Arctic Char (*Salvelinus alpinus*), Fourhorn Sculpin (*Myoxocephalus quadricornis*) and Shorthorn Sculpin (*Myoxocephalus Scorpius*), indicating no notable changes to the overall fish community in the Milne Port area. Fish health and tissue chemistry data collected in 2020 were compared to results from the two previous years of monitoring (i.e., 2018 and 2019). Differences were observed among years in fish size; however, these differences were small and inconsistent among years and likely reflect natural variability in these fish populations over time, rather than effects due to the Project. Stomach contents of captured fish suggest Arctic Char and Fourhorn Sculpin are generalists; the diet of these species appears to be adaptable, reflecting the catchability of prey items at the time rather than a strict adherence to a specific diet.

Detailed fish health data were collected for Fourhorn Sculpin and *H. arctica* in 2020 to align fish sampling methods with future monitoring requirements under the Metal and Diamond Mine Effluent Regulations (MDMER; Government of Canada 2002). Based on internal and external examinations, Fourhorn Sculpin from the Milne Port area appear to be healthy. Sample timing was appropriate for evaluating reproduction in Fourhorn Sculpin, meaning adequate gonad development had occurred to assess gonad endpoints (e.g., gonadosomatic index).

The sample timing may not be optimal for the wrinkled rock-borer (*Hiatella arctica)* reproductive endpoints because gonad tissue could not be readily collected from the *H. arctica*. As 2020 was the first year, detailed fish health data were collected for sentinel species in the Milne Port area, no comparisons to previous years are provided in this report.

Fish tissue chemistry results for Arctic Char sampled in 2020 were similar to historical data collected for the Milne Port area since 2010. Results for Fourhorn Sculpin and *H. arctica* were also similar to data collected in recent years for most metals. Statistically significant increases were observed since 2018 for some contaminants of potential concern in Arctic Char and *H. arctica* (e.g., aluminum and magnesium); however, differences were small and often inconsistent, likely reflecting natural variability in both the bioavailability and subsequent uptake of metals, reflected in the reported tissue concentrations.

All tissue samples for Arctic Char, Fourhorn Sculpin and *H. arctica* collected from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline (Health Canada 2015) and below the British Columbia Ministry of Environment fish tissue guidelines for selenium (BC MOE 2014).

Impact predictions in the original FEIS (Baffinland 2012) forecasted the potential for low magnitude changes in some ecological parameters, such as water quality and Arctic Char tissue chemistry, but characterized these changes as not significant. **Overall, monitoring data from 2020 align with these predictions, as any observed changes have generally been minor, either within established guidelines or consistent with baseline conditions. At present, monitoring indicates that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not resulted in adverse effects on the marine ecosystem. To date, construction and operational activities at Milne Port do not appear to have negatively affected fish health or tissue chemistry in the Milne Port area.**

NIS/AIS MONITORING (CHAPTER 8.0)

Comprehensive sampling occurs in the marine environment to monitor for the presence of non-indigenous species (NIS) and aquatic invasive species (AIS), fulfilling PC Conditions No. 87, 89, and 91; NIS is any species that exists outside the region where it originated naturally with the potential to become harmful whereas AIS are essentially NIS that become harmful or are known to cause harm elsewhere. The program includes targeted sampling efforts such as zooplankton tows and ship hull surveys, in addition to screening all species identified through the other marine sampling programs in Milne Port such as fish and benthic infauna surveys and offset habitat monitoring. All species are compared to a taxonomic inventory for Milne Inlet – developed using data from previous surveys, including pre-Project baseline data, and updated annually. Any taxa that are not part of the inventory are assessed further through literature reviews to determine if their range on record includes north Atlantic, Arctic and/or Canadian Arctic waters, and are cross-referenced against both global and domestic databases of known invasive taxa (e.g., Molnar et al. 2008; Casas-Monroy et al. 2014). Any taxa identified as potentially non-indigenous or invasive are sent to a DFO-endorsed laboratory at Université Laval for independent verification. Results and rationale for the independent verifications are reviewed and taxa that are not determined to be "no risk" undergo a detailed information gathering stage and, ultimately, either placed on the "Watchlist" or the "Trigger List"; the Watchlist is comprised of taxa that are considered to be low risk (i.e., not listed on AIS databases but Canadian Arctic not part of accepted range on record) or high risk (i.e., listed on AIS databases and/or Canadian Arctic not part of accepted range on record) but not attributable to the Project while the Trigger List is comprised of high risk taxa introduced via Project shipping activities.

Sixty stations were sampled for benthic infauna in 2020, representing the highest sampling effort for this component to date. A total of 369 different taxa were identified in 2020, including 33 taxa that showed no previous record on the existing taxonomic inventory for Milne Port (i.e., had not been observed in previous surveys). While four of the newly identified taxa (*Ammodytes hexapterus, Hesperonoe* sp., *Ampharete petersenae*, and *Amphitrite birulai*) do not have clear records of occurrence in the Canadian Arctic, none are listed on the AIS databases. Accordingly, these four taxa are considered low risk and have been placed on the project 'Watchlist'. Additionally, 2020 benthic infauna samples included three taxa (*Pseudofabricia aberrans*, *Sosane wireni* and *Marenzelleria viridis*) that were flagged in previous years due to uncertainties in their natural range or because they were listed on an AIS database. Similar to previous years, these three specimens were sent to the Université Laval for independent verification and remain on the project 'Watchlist'. The majority of identified taxa in benthic infauna samples collected at Milne Port and Ragged Island were not considered NIS or AIS.

Eight macroflora, benthic epifauna, and zooplankton taxa that had not been identified previously in surveys at Milne Port were identified in 2020 sampling. All newly observed taxa have described ranges that include the Canadian Arctic and none are listed on AIS databases, and therefore are not considered to be of concern for Milne Inlet.

Presence of a NIS fish taxa, the Pacific Sandlance (*Ammodytes hexapterus*), was confirmed through genetic analysis; however, scientific literature indicates this is a range expansion induced by climate change rather than a Project-related introduction (Falardeau et al. 2017). Accordingly, this species has been added to the project 'Watchlist'.

Ship hull biofouling monitoring has been included in the NIS/AIS program since 2018 and consists of conducting underwater video surveys of the hulls of ore carriers using an ROV-based underwater video system. Video footage is subsequently reviewed by qualified biologists to identify potential biofouling species to the lowest practical taxonomic level. In 2020, a total of three ore carriers were surveyed, and time spent surveying each ship increased since 2019, due to a greater focus on surveying whole sides of the vessels at anchor. Two of the ore carriers showed extensive biofouling and organisms observed include barnacles of indeterminate species, calcareous tube worms of indeterminate species, unidentifiable encrusting organisms, and an unidentifiable filamentous taxon. The taxonomic resolution of biofouling organisms did not improve in the third year of monitoring, despite the inclusion of a high-resolution camera and having a biologist with local Arctic fauna knowledge present with the ROV operator. No taxa were not resolved to species level due to the difficulty of identification of encrusting or small-bodied taxa without a voucher specimen.

The NIS/AIS program represents the most comprehensive monitoring program for NIS/AIS conducted by a marine port in Canada. Approximately 800 taxa have been identified in Milne Inlet through NIS/AIS monitoring to date, and include macroflora, zooplankton, benthic invertebrates and fish. The identification and flagging of individual taxa out of the hundreds identified in Milne Inlet indicate this surveillance program is effective and functioning as intended. The vast majority of these taxa have been designated as "No Risk" and are not considered to be of concern. Independent verification and directed literature review of flagged specimens from 2020 have resulted in four taxa (3 benthic invertebrates and 1 fish) requiring increased monitoring effort and/or investigation, such as review by external taxonomic specialists and/or DNA analysis. To date, no Project-related introduction of a NIS/AIS species have been documented at Milne Port and the requirement for a rapid response has not been triggered.

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ᑕᕆᐅᖅ ᐃᒪᖅ ᖃᓄᐃᓐᓂᖓ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 2.0)

ᓈᒻᒪᒃᓯᓂᐊᕐᓗᒍ ᐱᓯᕆᐊᖃᖅᑐᑦ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᓯᕆᐊᓕᖕᓄᑦ ᓈᓴᐅᑏᑦ 76, 87, 89 ᐊᒻᒪᓗ 99(a), ᑕᕆᐅᕐᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᑲᑎᖅᓯᐃᓯᕆᐊᖃᖃᑦᑕᖅᑐᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᓂᒃ ᑎᓴᒪᓂᑦ ᐆᒃᑐᕋᐃᕝᕕᖕᓂᑦ ᑰᓪᓛᖅᑐᒥᑦ ᑯᕕᕝᕕᐅᓗᐊᖅᑐᒥᑦ (MP-05) ᕿᓐᖑᐊᓂᑦ ᐃᒃᓭᕙᖕᒥᑦ (ᓇᓗᙵᐅᑎᑕᐅᔪᑦ ᕿᑎᐊᓂᑦ ᐊᖓᓗᖅᑐᒥᑦ 250 ᒦᑕᓄᑦ ᑎᑭᕐᓗᒍ ᑯᕕᕝᕕᐅᔫᒥᑦ ᐱᒋᐊᖅᐳᓂ) ᖃᐅᔨᓴᕐᓗᒋᑦ ᐊᓯᐊᙳᖅᑐᖃᑕᐊᒃᓴᖏᓐᓂᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐃᓂᐅᔫᒥᑦ ᑯᕕᔪᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑦᑎᓂᕐᓄᑦ ᑯᕕᔪᓂᑦ (ᐃᓚᐅᐸᓗᑎᒃ ᓴᕝᕚᐃᑦ ᐅᔾᕋᒃᑕᖅᑕᐅᔪᓂᑦ ᑲᑎᓯᒪᔪᓂᑦ ᑯᕕᔪᑦ). ᑎᓴᒪᐃᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᕆᔭᖓᓄᑦ ᖃᐅᔨᓴᐃᕝᕕᒃᑳᓐᓂᑦ ᑰᓪᓛᖅᑐᒥᑦ ᑐᓵᐊᓂᑦ ᑯᕕᕝᕕᐅᔪᒥᑦ (MP-06) ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᔾᔨᖓᒍᑦ 2020-ᒥᑦ.

2020-ᒥᑦ, ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᖃᓄᐃᖓᓂᐅᔪᓂᑦ ᐊᑐᖅᑕᐅᔪᓄᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᑭᒡᓕᒋᓴᐅᔪᓄᑦ - ᐊᖏᔪᑦ ᐊᐃᐋᓐ (major ions), ᑎᒥᒧᑦ ᐱᑦᑕᐅᔪᑦ, ᓴᕖᑦ, Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon), ᐊᒻᒪᓗ polycyclic aromatic hydrocarbons (PAHs) - ᑭᒡᓕᒋᓴᐅᔫᒥᓚᐅᖅᑐᑦ ᓯᕗᓂᐊᒍᑦ ᑕᕆᐅᑉ ᐊᕙᑎᖓᓄᑦ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᕐᒧᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ (MEEMP) ᐆᒃᑐᕋᐃᓂᕐᓄᑦ (2015-ᒥᑦ 2019-ᒧᑦ) ᐅᖓᑕᐅᑦᑎᓂᖅᑕᖅᙱᕐᓗᓂ ᑲᓇᑕᒥᑦ ᑲᑎᒪᔩᑦ ᒥᓂᔅᑕᐅᑏᑦ ᐊᕙᑎᒧᑦ (CCME) ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᖏᓐᓂᑦ. ᐊᔾᔨᑭᐸᓗᒋᑦ ᓯᕗᓂᐊᓂᑦ ᐆᒃᑐᕋᐃᓂᐅᓚᐅᖅᑐᑦ, Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon) ᐊᒻᒪᓗ PAH ᐱᑕᖃᓚᐅᖏᑦᑐᑦ ᐃᒪᕐᒥᑦ ᐆᒃᑐᕋᐃᓂᕐᓂᑦ ᑲᑎᑕᐅᔪᑦ 2020-ᒥᑦ. ᐃᓚᒋᔭᐅᐸᓗᓂ, ᐊᓇᕋᓗᐃᑦ ᑲᑎᓯᒪᔪᑦ ᖃᐅᔨᔭᐅᓚᐅᖏᑦᑐᑦ 2020-ᒥᑦ ᐆᒃᑐᕋᐃᓂᕐᓂᑦ, ᐅᖃᖅᑐᖅ ᐱᓕᕆᐊᖑᓯᒪᔪᖅ ᑯᕕᔪᖅ ᑲᑎᑎᕝᕕᖓᒥᑦ ᐊᑑᑎᖃᖅᑐᖅ ᓱᓕ ᑕᕆᐅᑉ ᐃᒪᖓᓄᐊᖅᑐᖃᓗᐊᖏᕐᓗᓂ. ᐊᖏᔪᒥᑦ ᐊᕝᒃᓯᒪᔪᓂᑦ ᑭᒡᓕᐅᔪᑦ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᔪᑦ ᐃᒪᕐᒥᑦ ᐆᒃᑐᕋᐃᓂᕐᓂᑦ ᕿᓐᖑᐊᓂᑦ ᖃᐅᔨᔭᐅᓚᐅᖏᑦᑐᑦ ᑕᒪᓗᒃᑖᖅ ᑰᓪᓛᕐᒥᑦ ᐆᒃᑐᕋᐃᕝᕕᐅᔪᓂᑦ.

ᐊᑕᐅᑦᑎᒃᑯᑦ, ᐆᒃᑐᕋᖅᑕᐅᔪᑦ ᑲᑎᓯᒪᔪᑦ ᑭᒡᓕᒋᓴᐅᔪᓂᑦ ᐃᓱᒪᒌᑕᐅᔪᓐᓇᖅᑐᓄᑦ (ᓲᕐᓗ, ᓴᕖᑦ, ᑎᒥᒧᑦ ᐱᑦᑕᐅᔪᑦ, Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon) ᖃᐅᔨᔭᐅᓚᐅᖏᑦᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑕᐃᒪᑕᖃᓚᐅᖏᑦᑐᑦ ᑲᑎᓯᒪᔪᖄᕐᔪᒃᑐᓂᑦ, ᐊᖏᔪᒥᒃ ᐊᒃᑐᖅᓯᓂᖃᕐᓂᖓᓄᑦ ᐆᒪᓂᖃᖅᑐᓄᑦ ᕿᓐᖑᐊᓂᑦ ᑕᕆᐅᕐᒥᑦ ᓂᕆᐅᒋᔭᐅᖏᑦᑐᖅ. ᐊᖏᒡᓕᒋᐊᕐᓂᖓ ᓴᕝᕴᖅ ᑕᕆᐅᕐᒧᐊᕐᓂᖓᓄᑦ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᖏᓐᓄᑦ ᐱᔪᓂᒃ ᐃᓱᒪᒌᑕᐅᔪᖅ ᓄᓇᓕᖕᒥᐅᓄᑦ ᐃᓄᖕᓄᑦ. CCME ᑕᕆᐅᕐᒥᑦ ᐃᒪᖓᑕ ᖃᓄᐃᓐᓂᖓᓄᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᖏᑦ ᓴᕝᕴᒧᑦ ᐱᓕᕆᐊᖑᓚᐅᖏᑦᑐᑦ ᓱᓕ, 2020 ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᖃᓄᐃᓐᓂᖅᓴᐅᓂᖏᓐᓃᖅᑕᐅᓚᐅᖅᑐᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᓄᑦ ᓯᕗᓂᐊᓂᑦ MEEMP-ᒧᑦ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ 2015 ᐊᒻᒪᓗ 2019 ᕿᒥᕈᓂᐊᕐᓗᒋᑦ ᐊᓯᐊᙳᕐᒪᖔᑕ ᐅᐸᓗᓂᑦ ᐊᓂᒍᖅᑐᓂᑦ ᐱᕙᓪᓕᐊᐸᓗᑎᒃ. ᖃᐅᔨᓴᐃᕐᓂᕐᒥᑦ ᑕᑯᔅᓴᐅᔪᖅ ᓴᕝᕴᐃᑦ ᑲᑎᓯᒪᔪᑦ 2020-ᒥᑦ ᐃᒪᕐᒥᒃ ᐆᒃᑐᕋᐅᑕᐅᔪᓂᑦ 2015-ᒥᑦ 2019-ᒧᑦ ᐊᔾᔨᒋᔭᕐᓚᖓᓃᖏᓐᓇᖅᑐᑦ ᖃᐅᔨᔭᐅᔪᓂᑦ ᑲᑎᓯᒪᔪᑦ.

ᑕᒪᐃᓐᓄᖓᔪᒃᑯᑦ, ᖃᓄᐃᖓᓃᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᕐᓗᒍ ᓇᓗᓇᐃᖅᓯᔪᑦ ᓴᓇᕙᓕᐊᓂᕐᒥᑦ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑎᓗᒋᑦ ᕿᓐᖑᐊᓂᑦ ᐊᖏᔪᒥᑦ ᖃᓄᐃᓕᓂᖃᓗᐊᖅᑑᔭᙱᑦᑐᑦ ᑕᕆᐅᕐᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐆᒃᑐᕋᖅᑕᐅᔪᑦ ᑲᑎᓯᒪᔪᑦ ᐊᑖᓂᒻᒪᑕ ᓱᓕ ᐊᑐᖅᑕᐅᓯᓇᐊᖅᑐᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᒪᓕᒃᑕᐅᓯᓇᐊᓕᖕᓂᑦ ᐅᕙᓘᓐᓃᑦ ᐊᔾᔨᓯᖏᑦ ᖃᓄᐃᖓᓂᐅᓚᐅᖅᑐᓄᑦ ᓯᕗᓂᐊᒍᑦ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᐅᑭᐅᖑᓚᐅᖅᑐᓂᑦ ᑭᒡᓕᐅᔪᓄᑦ ᒪᓕᒃᑕᐅᓯᓇᐊᓕᒃᑕᖃᙱᕐᓗᑎᒃ (ᓲᕐᓗ ᓴᕝᕴᑎᑐᑦ).

ᑖᑉᑯᐊ ᖃᓄᐃᖓᓂᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᔪᑦ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᑦ ᐊᔪᙱᑦᑐᑦ ᐱᓯᕆᐊᖃᖅᑕᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᐊᐅᓚᑕᐅᐸᓗᑎᒃ ᐊᖏᔪᒥᒃ ᐊᒃᑐᖅᓯᓂᖃᙱᕐᓗᑎᒃ ᑕᕆᐅᕐᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ. ᓯᕗᓪᒧᑦ, ᑕᕆᐅᑉ ᐃᒪᖓᑕ ᖃᓄᐃᓐᓂᖓᓃᒃ ᖃᐅᔨᓴᐃᓂᖅ ᐃᓂᐅᔪᒥᑦ ᑯᕕᔪᒧᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᖑᓯᒪᔪᖅ ᑯᕕᔪᖅ ᐊᑐᖅᑕᐅᖁᔭᐅᔪᖅ ᑲᔪᓯᓂᐊᕐᓗᓂ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᒋᑦ ᐊᓯᐊᙳᑐᐃᓇᓇᐊᕆᑦ ᑰᓪᓛᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓕᐅᕐᓂᓴᖏᑦ ᐱᓕᕆᓂᐅᔪᓂᑦ ᐊᒻᒪᓗ ᑲᔪᓯᓗᒍ ᖃᐅᔨᓴᐃᓂᐅᔪᑦ MEEMP-ᒧᑦ.

ᑕᕆᐅᑉ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖓ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 3.0)

ᓈᒻᒪᒃᓯᓂᐊᕐᓗᒍ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᓯᕆᐊᓕᖕᓄᑦ ᓈᓴᐅᑏᑦ 83(a) ᐊᒻᒪᓗ 99(a), ᐊᓗᐊᓄᐊᖅᑐᑦ ᐆᒃᑐᕋᐅᑏᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᑦ ᑎᓴᒪᓂᑦ ᑲᑎᓐᓂᐅᔪᓂᑦ, ᐃᓚᐅᐸᓗᑎᒃ ᐱᖓᓱᐃᑦ ᑲᑎᓐᓃᑦ (ᐱᖓᖓᓇᒥᑦ, ᑲᓇᖓᓇᒥᑦ, ᐊᒻᒪᓗ ᐅᐊᖓᓇᖅᐸᓯᖕᒥᑦ ᐱᖓᖓᓇᖅᐸᓯᖕᒥᑦ ᖃᐅᔨᓴᖅᑕᐅᔪᑦ 2014-ᒥᑦ 2018-ᒧᑦ, ᐊᒻᒪᓗ ᐃᓚᔭᐅᒃᑲᓂᓚᐅᖅᑐᖅ ᑲᑎᓐᓂᐅᔪᖅ, ᐅᐊᖓᓇᖅᐸᓯᖕᒥᑦ ᐱᖓᖓᓇᖅᐸᓯᖕᒥᑦ ᑲᑎᓐᓂᖅ, ᐃᓚᔭᐅᓚᐅᖅᑐᖅ 2019-ᒥᑦ ᓯᕗᓂᒃᓴᒥᑦ ᐊᓯᐊᙳᖅᑐᖃᕋᔭᖅᐸᑦ ᕿᓐᖑᐊᓂᑦ ᐃᒃᓴᕙᖕᒥᑦ ᐱᖁᑎᖏᓐᓄᑦ. ᕿᑎᐊᓂᑦ ᐱᒋᐊᖅᐳᓂ ᐊᔾᔩᙵᖏᓐᓂᕐᒥᒃ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᓂᖓᔪᖓ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᕐᓂᒃ ᖃᐅᔨᓴᐃᑎᑦᑎᔪᖅ ᐅᖓᓯᖕᓂᖓᓂᑦ ᐅᔾᕋᒃᑕᖅᑕᐅᔪᓄᑦ ᐃᒃᓴᕙᖕᒥᑦ (ᐱᒋᐊᕝᕕᐅᔪᖕᓇᖅᑐᖅ), ᐃᓱᒪᒋᐸᓗᒋᑦ ᐱᑦᑕᐅᖏᑦᑐᓂᒃ ᐱᔾᔪᑎᖃᖅᑐᑦ (ᓲᕐᓗ, ᐅᔾᕋᒃᑕᖅᑕᐅᔪᓂᑦ ᐳᔪᖃᑖᒃ, Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon) ᓇᓗᙵᕐᓂᖓ) ᐊᒻᒪᓗ ᐅᕝᕙᓘᓐᓃᑦ ᐊᒃᑐᖅᓯᓂᐅᔪᑦ (ᐊᓗᐊᓄᐊᖅᑐᑦ ᓄᖅᑲᖅᑎᑕᐅᒃᑳᓂᖅᑐᑦ ᐊᒻᒪᓗ ᐊᓯᖅᑕᐅᔪᑦ) ᑕᕆᐅᕐᒥᑦ ᐃᒪᕐᒥᑦ.

ᖃᐅᔨᓴᐃᓃᑦ ᐃᒪᕐᒥᑦ ᐊᒻᒪᓗ ᐊᑯᑉᓕᖅᑎᕈᑏᑦ ᐃᓗᐊᓃᑦᑐᑦ ᐊᓗᐊᓄᐊᖅᑐᓂᑦ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᑦ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᑲᑎᑕᐅᔪᓂᑦ ᑲᑎᕝᕙᒥᑦ 60 ᖃᐅᔨᓴᐃᑉᕚᖕᓂᑦ, ᐊᒻᒪᓗ ᒪᕐᕉᒃ ᐃᓚᔭᐅᒃᑳᓂᖅᕙᑎᒃ ᑲᑎᓐᓂᐅᖏᑦᑐᓂᑦ ᖃᐅᔨᓴᐃᑉᕚᑦ ᐃᓚᐅᑎᑕᐅᔪᑦ ᐊᔾᔨᒋᓂᐊᕐᓗᒋᑦ ᓯᕗᓂᐊᓂ MEEMP ᑐᕌᖓᔪᓄᑦ. ᐃᒪᓐᓇᐃᓚᐅᖅᑐᖅ, ᑲᑎᓯᒪᔪᑦ ᓴᐅᑦ ᖃᐅᔾᔭᐅᓚᐅᖅᑐᑦ ᑐᖖᓃᓚᐅᖅᑐᑦ ᐊᑐᖅᑕᐅᔪᓂᒃ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔾᔮᓂᑦ, ᖃᑉᓯᐊᕐᔪᐃᑦ ᐊᑐᖅᑎᑕᐅᖏᕝᕙᑎᒃ. ᑲᑎᓯᒪᔪᑦ ᐸᓂᖅᐸᓪᓕᐊᑉᓗᑎᒃ ᓄᓇᒥᑦ ᐱᔪᓂᑦ, Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon), ᐊᒻᒪᓗ polycyclic aromatic hydrocarbons-ᓂᑦ (PAHs) ᑕᒪᓗᒃᑖᕐᓚᒃ ᐊᑖᓃᓚᐅᕐᒥᐅᔪᑦ ᖃᐅᔨᑎᑦᑎᔾᔪᑎᓄᑦ ᑭᒡᓕᐅᔪᓂᑦ. ᓈᓴᐅᓯᕆᓂᕐᓄᑦ ᐱᓕᕆᖃᑎᒌᒃᑐᓄᑦ ᖃᐅᔨᓴᐃᓂᖅ ᐃᓂᐅᔪᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑎᑦᑐᖅ ᐊᓗᐊᓄᐊᖅᑐᓂᒃ ᓴᕝᖓᓂᑦ ᑲᑎᓯᒪᔪᑦ ᑲᑎᑉᐸᓪᓕᐊᓂᖏᓐᓄᑦ ᖁᑦᑎᒃᓯᓯᒪᔫᒃᑯᑦ ᖃᓂᑕᖓᓂᑦ ᐅᔭᖃᒃᑕᖅᑕᐅᔪᓄᑦ ᐃᒃᓴᖅᕹᐅᑉ ᐊᓯᖏᓐᓂᑦ ᖃᓂᑦᑐᓂᑦ ᐃᓂᐅᔪᓂᑦ ᐆᒃᑐᕋᐃᑉᕚᐅᔪᓂᑦ ᕿᙳᐊᓂᑦ.

ᒥᑭᔪᓂᒃ ᐅᖓᑕᐅᑦᑎᓃᑦ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔭᕆᐊᓕᖕᓄᑦ ᖃᐅᔾᔭᐅᓚᐅᖅᑐᑦ ᐋᓯᓂᒃ-ᒧᑦ (arsenic) ᐊᒻᒪᓗ ᓂᑯᓪ-ᒧᑦ (nickel) ᑭᓯᐊᓂ ᐃᓱᒪᒋᔭᐅᖏᑦᑐᑦ ᐱᓕᕆᐊᕐᒥᑦ-ᐱᖓᑕ, ᓴᐃᑦ ᐱᔾᔪᑎᖃᖏᑦᑐᑦ ᐅᔭᖃᒃᑕᖅᑕᐅᔪᓕᕆᓂᕐᓄᑦ ᓄᓘᔭᓂᑦ ᐊᒻᒪᓗ ᐊᖏᓪᓕᒋᐊᔭᒃᑐᑦ ᐅᖓᓯᒃᑎᒋᓂᖅᓴᐅᔪᓂᑦ ᐅᔭᖃᒃᑕᖅᑕᐅᔪᓄᑦ ᐃᒃᓴᖅᕚᖏᑦ. ᐊᔾᔨᒌᖏᓐᓂᐅᔪᑦ ᐆᒃᑐᕋᖅᑕᐅᔪᓂᑦ ᑲᑎᓯᒪᔪᓂᑦ ᑕᒪᐃᓐᓂᑦ ᓴᐃᑦ ᖃᓐᓂᖅᓴᐅᔪᑦ ᕿᙳᐊᓄᑦ ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᔾᔨᒌᖏᓐᓂᐅᔪᖅ ᐳᓴᓐᑎᒃᑯᑦ, ᑕᒃᓴᐅᑎᑦᑎᑉᓗᑎᒃ ᐊᖏᓪᓕᒋᐊᖅᑐᑦ ᐅᖓᓯᖕᓂᖅᓴᐅᔪᒥᑦ ᐅᔭᖃᒃᑕᖅᑕᐅᔪᓄᑦ ᐃᒃᓴᖅᕚᖏᑦ ᓄᓇᒥᑦ ᓯᓪᔭᖓᑕ ᖃᓄᐃᓕᐅᕐᓂᕆᔭᖓ ᐱᔾᔪᑎᒋᑉᓗᒍ. ᐊᑦᑎᒃᑑᑉ ᐊᖏᑎᒋᓂᕆᔭᖓ ᐅᖓᑕᐅᑦᑎᓂᕐᓄᑦ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓂᕆᔭᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔾᔮᓴᐃᑦ ᐃᓚᖏᓐᓂᑦ ᐆᒃᑐᕋᐃᓂᕐᓄᑦ ᑕᑯᒃᓴᐅᑎᑦᑎᔾᔮᓴᐅᔪᑦ ᖃᓄᐃᖓᓂᐅᔪᓄᑦ ᐊᒻᒪᓗ ᐊᓗᐊᓄᐊᖅᑐᑦ ᐃᓗᐊᓃᑦᑐᓂᑦ (ᓱᕐᓗ, ᐳᓴᓐᑎᒃᑯᑦ), ᐱᐅᖏᑦᑐᖅᑕᖃᕐᓂᖅ ᐱᑎᑕᐅᖏᕐᓗᓂ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ.

ᐊᓗᐊᓄᐊᖅᑐᑦ ᐊᖏᑎᒋᓂᖓ, ᐱᓗᐊᖅᑐᒥᑦ ᐳᓴᓐᑎᒃᑯᑦ, ᐱᒻᒪᕆᐅᔪᖅ ᐆᒃᑐᕋᖅᑕᐅᓂᖓ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᑦ ᓴᐃᑦ ᑲᑎᑉᐸᓪᓕᐊᔭᖓᑕ ᐊᖏᓂᖅᓴᐅᔪᒧᑦ ᒥᑭᔫᑎᐅᓂᖅᓴᐅᓗᑎᒃ ᐊᓗᐊᓄᐊᖅᑐᑦ ᐱᔪᓂᒃ ᑕᒪᐃᓐᓂᑦ ᐃᒪᕐᒥᑦ ᐊᒻᒪᓗ ᐊᑯᑉᓕᖅᑎᕈᑎᓂᒃ ᐱᔾᔪᑕᐅᔪᓄᑦ (ᓱᕐᓗ, ᖁᖓᓃᑦᑐᖅ ᐊᖏᓪᓕᒋᐊᖅᑐᖅ ᐃᒪᐅᑉ ᐊᖏᑎᒋᓂᖓᓂᐅᖓᓂᑦ). ᑕᐅᑐᙵᖅᑲᕆᑦ ᐳᓴᓐᑎᒃᑯᑦ ᐊᓗᐊᓄᐊᖅᑐᑦ ᐅᑉᓗᕐᓂᑦ ᐊᓂᒍᖅᐸᓪᓕᐊᔪᓂᑦ ᑲᑎᓐᓂᒃᑯᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑎᑦᑐᖅ ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᐊᖏᔪᒥᒃ ᐊᓯᐊᙱᕐᓂᐅᔪᓂᒃ ᒥᑭᔫᑎᐅᔪᑦ ᐃᓗᐊᓃᑦᑐᓂᒃ ᓯᕗᓂᐊᒍᑦ ᐅᑭᐅᖑᓚᐅᖅᑐᓂᑦ (2020 ᑕᐅᑐᙳᖅᓯᒍ 2019), ᐊᑯᓂᖏᓐᓂᓗᓈᑦ ᐊᕝᕙᓃᓪᓚᑦ ᐅᑭᐅᓂᑦ 2014-ᒥᑦ ᐊᒻᒪᓗ 2020-ᒥᑦ.

ᐱᓪᓚᕆᐅᔪᖅ, ᐊᖏᓪᓕᒋᐊᖅᑐᑦ ᓴᕙᒃᓴᓕᒃ ᐊᓗᐊᓄᐊᖅᑐᓂᑦ - ᓇᓗᓇᐃᖅᑕᐅᔪᖅ ᐃᓱᒫᓘᑎᒋᔭᐅᓂᖓᓄᑦ ᓄᓇᓕᖕᒥᐅᓂᑦ ᐃᓄᖕᓄᑦ ᐊᒥᓯᙳᕈᖕᓇᕐᓂᖏᓐᓄᑦ ᓴᕙᒃᓴᐃᑦ ᐅᔭᖃᒃᑕᖅᑕᐅᔪᓂᑦ ᐳᔪᖃᑖᙳᕐᓗᑎᒃ ᐅᕝᕙᓘᓈᑦ ᑯᕙᓂᕐᒥᙵᕐᓗᑎᒃ ᑐᖁᖅᓯᓯᒪᑉᕚᖕᓂᑦ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓂᒃ - ᑕᑯᔭᐅᓚᔪᙱᑦᑎᐊᖅᑐᑦ ᑲᑎᓯᒪᑉᓗᑎᒃ ᐊᖏᓂᖅᓴᐅᔪᒥᑦ ᑕᑯᔭᐅᒃᑲᑦᑕᖅᓯᒪᔪᓂᑦ 2014-ᒥᑦ ᑭᒡᓕᒋᔭᐅᔪᓄᑦ ᖃᓄᐃᓕᐅᖅᑐᓕᕆᓂᕐᒥᑦ. ᑕᐅᑐᙳᖅᓯᒍ ᓴᕙᒃᓴᐃᑦ ᐊᓗᐊᓂᑦ ᑲᑎᓯᒪᔪᑦ ᐅᐸᓗᕐᓂᑦ ᐊᓂᒍᖅᐸᓪᓕᐊᔪᓂᑦ ᑲᑎᓐᓂᐅᔪᓂᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑎᑦᑐᑦ ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᐊᖏᔪᒥᒃ ᐊᓯᐊᙱᕐᓂᖏᓐᓄᑦ ᓴᕙᒃᓴᖃᕐᓂᖓᓄᑦ ᐅᑭᐅᓂᑦ ᐊᓂᒍᖅᑐᓂᐅᖓᓂᑦ (2020 ᑕᐅᑐᙳᖅᓯᒍ 2019) ᐊᑯᓂᖏᓐᓂᓘᓈᑦ 2014 ᐊᒻᒪᓗ 2020.

ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ 2020-ᒧᑦ ᓱᕐᑯᓯᖅᓯᒪᙱᑦᑐᑦ ᑭᖑᓕᖅᐹᖅ ᐊᕙᑎᒥᒃ ᐊᒃᑐᖅᓯᓂᕐᒧᑦ ᑎᑎᖅᑲᐅᑎᒥᑦ ᓇᓚᐅᑦᑖᖅᑕᐅᓚᐅᖅᑐᓄᑦ, ᓇᓚᐅᑦᑖᕆᓚᐅᖅᑐᑦ ᐊᖏᔪᒥᒃ ᕿᒪᒃᑎᑦᑐᓂᑦ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᖃᕐᓂᐊᖏᓪᓗᓂ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᑭᓯᐊᓂ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᒥᑭᔪᒥᒃ ᖃᓂᑦᑐᒥᑦ ᐊᖏᓪᓕᒋᐊᕐᓂᐊᕐᓂᖓ ᑎᒥᒧᑦ ᐱᑦᑕᐅᔪᖅ, ᓴᕕᒃ, ᐅᕙᓘᓈᑦ Hᐊᐃᑐᕈᑳᐸᓐ (hydrocarbon) ᑲᑎᓯᒪᔪᑦ ᐅᖓᑕᐅᑦᑎᓇᔭᙱᖏᓐᓗᑎᒃ CCME-ᑯᑦ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔾᔮᖏᓐᓂᑦ. 2020-ᒥᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ ᐊᒻᒪᓗ ᐊᓗᐊᓄᐊᖅᑐᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᖕᓗᒍ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᒨᖓᔪᑦ ᐊᔾᔨᒋᓪᓚᑕ ᑕᐃᒪᓐᓇᐃᕐᑯᔭᐅᓂᖓᑐᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᐊᐅᓚᑕᐅᑉᓗᑎᒃ ᐊᖏᔪᒥᒃ ᐊᒃᑐᖅᓯᓂᖃᙱᖏᓐᓗᑎᒃ ᑕᕆᐅᕐᒥᑦ ᐊᓗᐊᓄᐊᖅᑐᓄᑦ ᕿᙳᐊᓂᑦ ᖃᐅᔨᓴᐃᑉᕚᐅᔪᒥᑦ.

ᑕᒪᐃᓐᓅᖓᔪᒃᑯᑦ, ᖃᓄᐃᖓᓃᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᖕᓗᒍ ᓇᓗᓇᐃᖅᓯᔪᑦ ᖃᓄᐃᖓᓃᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᖕᓗᒍ ᓇᓗᓇᐃᖅᓯᔪᑦ ᓴᓇᕗᓪᓕᐊᓂᕐᒥᑦ ᐊᒻᒪᓗ ᐊᐅᓚᖅᑎᑎᓪᓗᒋᑦ ᕿᙳᐊᓂᑦ ᐊᖏᔪᒥᑦ ᖃᓄᐃᓕᓂᖃᓗᐊᖅᑑᔭᙱᑦᑐᑦ ᑕᕆᐅᕐᒥᑦ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ, ᐆᒃᑐᖅᑕᐅᔪᓄᑦ ᑭᒡᓕᐅᔪᑦ ᐊᔾᔨᕐᓚᒋᔭᖏᑦ ᓱᓕ ᐅᑭᐅᓂᑦ ᐊᓂᒍᖅᑐᓂᑦ, ᑎᑭᐅᑎᓯᒪᓂᕐᓃᑦᑐᑦ CCME ᐊᓗᐊᓄᐊᖅᑐᓄᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔾᔮᖏᓐᓂᑦ, ᐊᒻᒪᓗ ᑕᑯᔭᐅᔪᖃᙱᑦᑐᖅ ᐃᓂᐅᔪᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᒃ ᐱᔾᔪᑎᖃᖅᑐᒃ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ.

ᓯᕗᓪᓕᒧᑦ, ᖃᐅᔨᓴᐃᓂᖅ ᑕᕆᐅᑉ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓂᒃ ᖃᐅᔨᓴᐃᑉᕚᐅᔪᒥᑦ ᑲᔪᓯᑯᔭᐅᔪᖅ, ᑭᓯᐊᓂ ᐊᕐᕌᒍᑕᓖᒃᑰᕆᐊᖃᙱᑦᑐᖅ, ᐱᒋᐊᕐᓗᑎᒃ ᐊᑦᑎᑑᓗᓂ ᐊᖏᓂᖓ ᐊᒻᒪᓗ ᖃᓂᑦᑐᒥᑦ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᐅᔪᑦ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓂᒃ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᓐᓄᑦ ᕿᙳᐊᓂᑦ.

ᑕᕆᐅᑉ ᐊᓗᐊᓄᑦ ᐳᓚᓖᑦ ᐆᒪᔪᕋᓛᑦ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 4.0)

ᓈᒻᒪᒃᓯᓂᐊᕐᓗᒍ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᔭᕆᐊᓕᖕᓄᑦ ᓈᓴᐅᑏᑦ 99(a) ᐊᒻᒪᓗ 99(c), 2020-ᒥᑦ ᐊᓗᐊᓄᑦ ᐳᓚᓖᑦ ᐆᒪᔪᕋᓛᓂᒃ ᑲᑎᖅᓱᐃᓂᖃᓚᐅᖅᑐᑦ 60-ᓂᒃ ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᓂᒃ (ᐃᓂᒦᖃᑕᐅᔪᑦ ᐊᓗᐊᓄᐊᖅᑐᓄᑦ ᖃᐅᔨᓴᐃᑉᕚᖕᓂᑦ) ᒪᕐᕉᒃ ᓯᓪᔭᒥᑦ ᑲᑎᓐᓂᐅᔪᓂᑦ (ᑲᓇᖕᓇᖓ

ᐊᒻᒪᓗ ᐱᖓᖕᓇᖓ) ᐊᒻᒪᓗ ᒪᕐᕉᒃ ᐅᐊᖕᓇᖅᐸᓯᖓᓂᑦ ᐃᒪᕐᒥᑦ ᑲᑎᖕᓂᐅᔪᓂᑦ (ᐅᐊᖕᓇᖅᐸᓯᖕᒥᑦ ᑲᓇᖕᓇᖅᐸᓯᖕᒥᑦ ᐊᒻᒪᓗ ᐅᐊᖕᓇᖅᐸᓯᖕᒥᑦ ᐱᖓᖕᓇᖅᐸᓯᖕᒥᑦ) ᒪᓕᒃᓱᒋᑦ ᕿᑎᐊᓂᑦ ᐱᒋᐊᖅᑐᒥᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᔪᖅ. ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᑦ ᐊᔾᔨᐸᓗᒋᑦ Van Veen ᐊᓗᐊᓄᐊᖅᑐᓂᒃ ᑎᒍᓯᔾᔪᑏᑦ ᐊᑐᓂ ᖃᐅᔨᓴᐃᖃᐅᔪᓂᑦ, ᐱᓕᕆᐊᖑᐸᓗᑎᒃ ᐱᓕᕆᖃᒋᔭᐅᔪᒥᑦ, ᐊᒻᒪᓗ ᐊᓯᐅᔾᑕᐃᓕᐸᓗᒋᑦ ᖃᐅᔨᓴᐃᖃᖕᒥᑦ ᖃᐅᔨᓴᖅᑕᐅᓂᐊᕐᓗᑎᒃ. ᐆᒪᔪᕋᓛᑦ ᐃᓕᑕᕆᔭᐅᓕᓚᐅᖅᑐᑦ ᐊᑦᑎᓛᖑᐸᓗᓂ ᖃᓄᐃᑦᑑᓂᖏᓐᓄᑦ ᐃᓕᑕᕆᔭᐅᓴᖕᓂᖃᖅᑐᑦ ᐊᒻᒪᓗ ᓈᓴᖅᑕᐅᐸᓗᑎᒃ ᐱᓕᕆᕚᒃᑐᓄᑦ ᑕᕝᓇᐅᕐᒥᑦ ᐆᒪᔪᕋᓛᓂᒃ ᐃᓕᑕᖅᓯᔾᑯᓐᓄᑦ Biologica Environmental Services Ltd. (ᓇᓕᐊᒃ ᐆᒪᔫᖕᒪᖔᑦ ᐃᓕᑕᖅᓯᓂᐊᕐᓗᑎᒃ ᖃᐅᔨᓴᐃᖃᒃ).

ᖃᐅᔨᓴᐅᓚᐅᕐᓂᖓᑐᑦ 2018-ᒥᑦ ᐊᒻᒪᓗ 2019-ᒥᑦ, ᑕᕝᓇᐅᑉ ᐊᓗᐊᓄᑦ ᐳᓚᕐᔫᑦ ᕿᓐᖑᐊᓂᑦᑐᑦ ᖁᐱᕈᐃᑦ ᐊᒥᓲᓛᖑᒍᓚᐅᖅᑐᑦ. ᓯᑎᔪᓂᑦ ᖄᓖᑦ ᓂᐅᖃᐅᖅᓱᑎᒃ ᑐᓪᓕᕆᔭᐅᐸᓗᑎᒃ ᓯᓪᔭᖕᒋᓐᓂᑦ ᑲᑎᖕᓂᕐᓂᑦ ᐃᒪᐃᓐᓇᕐᒥᐅᖓᓂᑦ ᐃᑎᓂᕐᓂᓪᓕ, ᖁᐱᕈᐃᑦ, ᓯᑎᔪᓂᒃ ᖄᓖᑦ, ᐊᒻᒪᓗ ᐺᖅᑲᓗᐃᑦ. ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᖃᐅᔨᓴᐃᓂᖅ ᑕᐅᑐᒐᖃᓚᐅᖅᑐᖅ ᓯᑕᒪᓂᒃ ᑕᕝᓇᐅᑉ ᐊᓗᐊᓂᕐᒥᐅᑕᓂᑦ ᐃᓯᐊᓄᑦ ᐱᔪᓂᒃ - ᑭᖑᐃᑦ ᐊᒥᔮᑎᒋᓂᖏᑦ, ᐱᑕᖃᕐᓂᖏᑦ, ᐊᔾᔨᙱᑦᑑᑕᐅᓂᖏᑦ, ᐊᒻᒪᓗ ᐊᔾᔨᖏᖕᓂᖏᓐᓂᒃ - ᐊᔾᔨᐸᓗᓂᐅᒃ ᓯᕗᓂᐊᓂᑦ MEEMP-ᒧᑦ ᐅᑭᐅᕐᓂᑦ. ᖃᐅᔨᓴᐃᓂᕐᒥᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᖃᐅᔨᓚᐅᖅᑐᑦ ᐃᓂᐅᔪᑦ ᐊᔾᔨᙱᓐᖏᓐᓂᖏᑦ ᐃᓱᐊᓂᑦ ᐱᔪᓂᒃ, ᐱᓗᐊᖅᑐᒥᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ ᓄᓇᐃᑦ ᖃᓂᑕᖏᓐᓂᑦ ᐊᒻᒪᓗ ᐃᒪᐃᓐᓇᕐᒥᑦ, ᓂᕆᐅᒋᔭᐅᔪᖅ ᐱᑕᖃᐅᕐᓂᖏᑦ ᐊᒻᒪᓗ ᐆᒪᓂᖏᑦᑕ ᐊᖏᓂᖏᑦ ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ ᐊᒥᓲᖏᓐᓂᖅᓴᐅᓕᖃᑦᑕᕐᒪᑕ ᐃᑎᓂᖅᓱᒧᐊᖅᐸᓪᓕᐊᐸᓗᓂ ᐊᒻᒪᓗ ᐅᖓᓯᒃᑎᒋᓂᖓ ᓄᓇᒥᑦ. ᐃᓂᐅᔪᒥᑦ ᐊᔾᔨᙱᓐᖏᓂᖃᕐᓂᖓ ᓯᓪᔭᓂᑦ ᑲᑎᖕᓂᕐᓂᑦ ᖃᐅᔨᓴᐅᓚᐅᕐᒥᔪᖅ, ᐱᔾᔪᑕᐅᔪᖅ ᓯᓪᔭᐅᑉ ᓄᓇᖓᑕ ᐋᖅᑭᐅᒪᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐱᕙᓕᐊᓂᕐᓄᑦ, ᔫᕐᓗ ᐃᒪᑦᑎᐊᕙᖕᒥᑦ ᐱᖃᑦᑕᕐᓂᖓ Phillips Creek. ᑭᖑᒐᓗᐃᑦ ᐱᑕᖃᐅᕐᓂᖏᑦ ᖁᑦᑎᖕᓂᖅᓴᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ, ᐅᕝᕙᓘᓐᓃᑦ ᐊᑦᑎᖕᓂᖅᓴᐅᓗᐊᓚᐅᖏᑦᑐᑦ 2018-ᒥᑦ ᐅᕝᕙᓘᓐᓃᑦ 2019-ᒥᐅᖓᓂᑦ. ᐊᒻᒪᓗ, ᐱᑕᖃᐅᕐᓂᖓᓄᑦ ᓈᓴᐅᑏᑦ ᑎᓴᒪᐅᔪᓂᑦ ᑲᑎᖕᓂᕐᓂᑦ 2020-ᒥᑦ ᐊᔾᔨᐅᖏᓗᐊᓚᐅᖏᑦᑐᑦ ᓈᓴᐅᓯᓇᔾᔭᐅᓚᐅᖅᑐᓄᑦ 2018-ᒥᑦ.

2020-ᒥᑦ, ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᑦ ᐊᔾᔨᙱᓐᖏᑦᑑᑎᐅᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᐃᖃᐅᔭᒥᓗᒃᑖᖅ ᐊᒻᒪᓗ ᑕᐃᒪᑕᖃᐅᖅᓱᑎᒃ ᑕᒪᐃᓐᓂᑦ ᐃᓃᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓂᑦ. ᐊᔾᔩᒃᑐᒃᑯᑦ ᐊᔾᔮᙱᓐᓂᖅᑕᖃᓚᐅᖏᑦᑐᖅ ᐊᑯᓐᓂᖏᓐᓂᑦ ᐅᑭᐅᑦ (2020-ᒥᑦ 2019-ᒥᐅᖓᓂᑦ, ᐅᕝᕙᓘᓐᓃᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ 2020-ᒥᑦ 2018/2019-ᒥᐅᖓᓂᑦ) ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ ᐆᒪᔪᕋᓛᓄᑦ ᓇᓗᓇᐃᖅᓯᔾᔪᑎᓂᑦ ᑎᓴᒪᐅᔪᓂᑦ ᑲᑎᖕᓂᕐᓂᑦ ᐊᒻᒪᓗ, ᐃᓚᖏᓐᓂᑦ ᓇᓗᓇᐃᖅᓯᔾᔪᑏᑦ ᐊᔾᔨᙱᓐᓂᖅᑲᖅᐸᑕ ᐊᑯᓐᓂᖏᓐᓂᑦ ᐅᑭᐅᑦ, ᐃᓱᐊᓂᑦ ᐱᒋᐊᕐᕖᑦ ᖁᑦᑎᖕᓂᖅᓴᐅᖃᑦᑕᓚᐅᖅᑐᑦ 2020-ᒥᑦ. ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᐊᔾᔨᙱᓐᖏᓐᓃᑦ ᑕᐃᒪᐅᓚᔪᖕᓂᖅᓴᐅᖃᑦᑕᓚᐅᖅᑐᑦ ᐅᖓᓯᖕᓂᖅᓴᓂᑦ ᐅᔭᕋᑦᖅᑕᐅᔪᓄᑦ ᐃᒃᓴᕝᕙᖕᒥᑦ ᑕᐅᑐᖕᖔᖅᓱᓂ ᖃᓂᓐᓂᖅᓴᐅᔪᒥᑦ ᐃᒃᓴᕝᕙᖕᒧᑦ. ᖃᓄᐃᖓᓂᐅᔪᑦ ᑎᑯᓕᐊᙱᑦᑐᑦ ᓄᓇᓕᖕᒥᑦ ᕿᐅᔾᔪᑕᐅᔪᓄᑦ ᐃᓕᑦᑕᙱᓐᓂᖕᓂᖕᓄᑦ ᐱᐅᖏᑦᑐᒧᑦ ᐊᒃᑐᖅᓯᒪᓂᕐᒥᑦ ᐱᔪᓄᑦ, ᑕᑯᒃᓴᐅᑎᑦᑎᔪᖅ ᒥᒃᓵᕝᓕᖅᑐᓂᒃ ᑕᒪᐃᓐᓂᑦ ᐊᒥᔫᓂᖏᓐᓂᒃ ᐊᒻᒪᓗ ᐱᑕᖃᐅᕐᓂᖏᓐᓂᒃ ᐱᐅᖏᑦᑐᖅᑕᐅᓕᖓᒧᑦ-ᐃᒃᐱᒋᓴᕋᐃᓐᓂᖅ ᐆᒪᔪᓄᑦ ᐱᑕᖃᕈᓐᓃᖃᑦᑕᕐᒪᑦ ᐅᕝᕙᓘᓐᓃᑦ ᖃᐸᐅᓂᖏᑦ ᓄᖑᓪᓗᑎᒃ, ᐆᒪᔪᓂᒃ ᐊᔪᙱᓐᓂᖅᓴᐅᔪᓂᒃ ᐱᑕᖃᐅᕐᓂᖅᓴᐅᓕᖅᓱᓂ ᑖᐸᑯᓇᓂ. ᐃᒪᓐᓇᐃᖁᖅᑐᖅ, 2020-ᒥᑦ ᖃᓄᐃᖓᓃᑦ ᐊᔾᔨᓂᖅᓴᐅᔭᖏᑦ ᓂᕆᐅᒋᔭᐅᔪᓄᑦ ᐃᖕᒥᓂᒃ ᐊᓯᐊᙴᖃᑦᑕᖅᑐᓄᑦ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᑦ ᐃᓂᖏᑦᑕ ᖃᓄᐃᑦᑑᓂᖏᑦ ᕿᓐᖑᐊᓂᑦ, ᖃᐅᔨᓇᖅᑐᖃᖅᑑᔾᔮᖏᓪᓚᑦ ᓈᒻᒪᙱᑦᑐᖃᕐᓂᖓᓂᒃ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᓄᑦ ᐱᓕᕆᐊᖅ ᐱᔾᔪᑕᐅᓗᓂ. ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ 2020-ᒧᑦ ᓱᖁᓯᖅᓯᒪᙱᑦᑐᑦ ᑭᖑᓪᓕᖅᐹᖅ ᐊᕙᑎᒥᑦ ᐊᒃᑐᖅᓯᓂᕐᒧᑦ ᑎᑎᖅᑲᒥᑦ (FEIS) ᓇᓚᐅᑦᑖᖅᑕᐅᔪᓂᑦ, ᓇᓚᐅᑦᑖᖅᑕᐅᓚᐅᖅᑐᖅ ᐊᖏᔪᒥᒃ ᕿᒪᒃᑎᑦᑐᓂᒃ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᖃᕐᔾᔮᖏᓪᓚᑦ ᐃᖃᓗᒃᐲᑦ ᐃᓂᖏᓐᓄᑦ. 2020-ᒥᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ, ᐊᑕᐅᑦᑎᒃᑯᑦ ᐃᓚᐅᐸᓗᑎᒃ ᐊᓗᐊᓂᑦ ᖃᐅᔨᓴᖅᑕᐅᔪᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᕝᕗᒍ, ᐅᖃᖅᑐᑦ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᔫᖓᔪᑦ ᐊᔪᙱᑦᑐᑦ ᑕᐃᒪᓐᓇ ᐱᖁᔭᐅᓯᒪᓂᖏᑎᑐᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᐊᐅᓚᑕᐅᐸᓗᑎᒃ ᐊᖏᔪᒃ ᐊᒃᑐᖅᓯᓂᖃᙱᖦᓱᓂ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᓂᑦ ᖃᐅᔨᓴᐃᖃᐅᔪᒥᑦ.

ᖃᓄᐃᖓᓃᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᖦᖢᒍ ᓇᓗᓇᐃᖅᓯᔪᑦ ᓴᓇᕙᓪᓕᐊᓂᕐᒥᑦ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑦᑐᒋᑦ ᕿᓐᖑᐊᓂᑦ ᐊᖏᔪᒥᑦ ᖃᓄᐃᓕᓂᖃᓗᐊᖅᑑᔾᔮᙱᑦᑐᑦ ᐆᒪᔪᒃ ᑕᕝᓇᐅᑉ ᐊᓗᐊᓄᑦ ᐳᓚᖃᑦᑕᖅᑐᓄᑦ. ᑕᕝᓇᐅᕐᒥᑦ ᐊᓗᐊᓄᐊᖃᑦᑕᖅᑐᑦ ᐊᔾᔨᙱᑦᑑᑕᐅᖏᓐᓇᖅᑐᑦ ᓯᓕ ᐊᒻᒪᓗ ᑕᐃᒪᐅᖏᓐᓇᖅᓱᑎᒃ ᑕᒪᐃᓐᓂᑦ ᓄᓇᒧᑦ ᖃᓂᑦᑐᓂᑦ ᐊᒻᒪᓗ ᐃᒪᕐᒥᑦ ᐃᓂᒋᔭᖏᓐᓂᑦ.

ᓯᕗᓪᓕᐅᓪᓗᓂ, ᖃᐅᔨᓴᐃᓂᖅ ᑕᕝᓇᐅᑉ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᓂᒃ ᑲᔪᓯᔭᕆᐊᖃᖅᑐᖅ ᓯᕗᓪᓕᐅᑎᓪᓗᑕ, ᑭᓯᐊᓂ ᐊᒥᓱᐃᖅᑕᙳᕐᓂᖅᓴᐅᓗᒍ (ᔫᕐᓗ, 2-3 ᐅᑭᐅᑕᓖᒃᑯᑦ), ᐱᒋᐊᕐᓗᓂ ᐊᑦᑎᒃᑐᒥᑦ ᐊᖏᓂᕐᒥᑦ ᐊᒻᒪᓗ ᖃᓂᑦᑐᒥᑦ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᕐᓂᑦ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓂᒃ ᑕᒪᐃᓄᑦ ᐆᒪᔪᕋᓛᓄᑦ ᐊᒻᒪᓗ ᑕᕝᓇᐅᕐᒥᑦ ᐃᒪᐅᑉ ᐊᓗᐊᓄᐊᖅᑐᑦ ᖃᓄᐃᓐᓂᖏᑦ ᕿᓐᖑᐊᓂᑦ.

ᖃᓕᓈᒃᑐᑦ ᐃᓚᖓ, ᐊᖏᔪᑦ ᐱᕈᖅᑐᐃᑦ ᐊᒻᒪᓗ ᐆᒪᔪᕋᓛᑦ ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 5.0)

ᖃᐅᔨᓴᐃᓂᖅ ᖃᓕᓈᒃᑐᑦ ᐃᓚᖓᓂᑦ, ᐊᖏᔪᑦ ᐱᕈᖅᑐᓂᒃ, ᐊᒻᒪᓗ ᐆᒪᔪᕋᓛᑦ ᐊᓗᐊᓂᕐᒥᐅᑕᓂᒃ ᐱᐊᓂᒃᓯᔪᖅ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᓯᔭᕆᐊᖃᕐᓂᕐᒧᑦ ᓈᓴᐅᑎᒥᒃ 99(a), (c) ᐊᒻᒪᓗ ᐊᑐᖅᓱᓂ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᓯᔭᕆᐊᖃᕐᓂᕐᓄᑦ 76, 83(a), 84 ᐊᒻᒪᓗ 87. ᖃᐅᔨᓴᐃᓃᑦ ᐋᖅᑭᐊᖅᑕᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ ᐃᓇᖏᕐᓂᐊᕐᓗᒋᑦ ᑲᑎᖕᓂᐅᔪᑦ ᓯᕗᓂᐊᓂᑦ ᐃᓕᓴᐅᓚᐅᖅᑐᑦ ᖃᓂᑕᖓᓄᑦ ᐃᓕᓴᐅᓚᐅᖅᑐᓂᑦ, ᖃᐅᔨᓴᐅᓚᐅᖅᑐᑦ ᐊᑑᑎᖃᙱᖕᓂᖏᖕᓄᑦ ᐊᒥᓱᐃᑦ ᐊᒃᑐᕈᑎᓗᐊᕐᓂᖏᖕᓄᑦ, ᓅᓂᖏᖕᓄᑦ, ᐅᕝᕙᓘᓐᓃᑦ

ᑕᑯᒃᓴᐅᔪᓐᓂᖅᑎᑕᐅᓂᖏᓐᓄᑦ ᐅᑭᐅᑉ ᐃᓗᐊᓂᑦ ᐃᓕᔭᐅᖅᑳᖅᑎᓪᓗᒋᑦ. ᖃᐅᔨᓴᐃᓂᖃᓚᐅᖅᑐᑦ ᐊᖅᑲᐅᒪᑉᓗᑎᒃ ᐊᒻᒪᓗ ᐃᒪᐅᑉ ᐃᓗᐊᓂᑦ ᐊᐅᓚᔪᓕᐅᖅᓱᑎᒃ ᖃᐅᔨᓴᐃᑉᓗᑎᒃ ᖁᓕᑦ ᓴᕖᑦ ᐊᕙᓗᔭᐅᓯᒪᔪᓂᑦ ᐃᓕᔭᐅᓯᒪᐃᓐᓇᖅᑐᑦ ᑕᕆᐅᑉ ᐊᓗᐊᓄᑦ; ᑖᑉᑯᓇᖕᖓᑦ, ᑕᓪᓕᒪᓂᑦ ᐊᕙᓗᓯᒪᔪᑦ ᐃᓕᔭᐅᓚᐅᖅᑐᑦ ᐱᓕᕆᐊᕐᒥᑦ ᐊᑦᑐᖅᑕᐅᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᐱᖃᑎᖏᑦ ᑕᓪᓕᒪᐃᑦ ᖃᓂᑦᑐᒥᑦ ᐅᖃᐅᓯᐅᔪᒥᑦ, ᓯᓚᑖᓂᑦ ᑭᒡᓕᓕᐅᖅᑕᐅᓯᒪᔹᑉ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᖃᖅᑐᓂᑦ. ᐊᕙᓗᓃᑦᑐᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ ᑎᑎᕋᐅᓯᕆᓂᐊᕐᓗᒋᑦ ᐳᓭᓐᑎᖏᑦ (%) ᖃᓄᐃᑦᑑᓂᖓᑕ ᖃᓕᓈᒃᑐᑦ ᐃᓚᖓᑕ, ᐊᖏᔪᑦ ᐱᕈᖅᑐᐃᑦ ᐊᒻᒪᓗ ᐆᒪᔪᕋᓛᑦ ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ, ᒪᓕᒃᓱᒋᑦ ᐃᓂᓕᐅᖅᑕᐅᓯᒪᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᔪᑦ ᑎᑎᕋᖅᓯᒪᔪᖅ 2017 MEEMP-ᒧᑦ ᐅᓂᑉᑳᒥᑦ (Golder 2018), ᐊᒻᒪᓗ ᐃᓕᑕᕆᓂᐊᕐᓗᒋᑦ ᓇᓕᖏᑦ ᐆᒪᔪᕋᓛᑦ ᐊᑦᑎᓛᒧᑦ ᐃᓕᑕᖅᓯᔪᖕᓇᕐᓂᕐᒧᑦ, ᐆᒪᔪᐃᑦ ᐱᑕᖃᐅᕐᓂᖏᑦ, ᐊᒥᓲᑎᒋᓂᖏᑦ (ᓈᓴᖅᑕᐅᔪᑦ ᐊᒻᒪᓗ %-ᓕᕆᔾᔪᑕᐅᔪᑦ), ᐊᒻᒪᓗ ᐊᔾᔨᒌᙱᑦᑑᑕᐅᓂᖏᑦ (Simpsons Diversity Index).

ᖃᓕᓈᒃᑐᑦ ᐃᓚᖓᓄᑦ ᑎᑎᕋᐅᓯᐅᔪᑦ ᐊᕙᓗᓃᑦᑐᑦ ᐱᑕᖃᐅᕐᓂᖅᓴᐅᔪᑦ, ᒪᕋᒡᓚᒃᑕᖃᐅᖅᑲᑎᒃ ᐊᒻᒪᓗ ᓯᐅᕋᕐᒥᑦ, ᐊᔾᔨᒋᔭᖓ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᖅ ᕿᙵᐊᓂᑦ, ᐊᒻᒪᓗ ᐊᔾᔨᒌᙱᓐᓂᖃᕈᐊᖏᑦᑐᑦ ᑕᒪᐃᓐᓄᑦ ᐋᖅᑭᐅᒪᓂᕆᔭᖏᓐᓄᑦ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ ᐱᓕᕆᐊᕐᒧᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐊᒻᒪᓗ ᐅᖃᐅᓯᐅᔪᖅ ᐃᓂᐅᔪᒥᑦ. ᐳᓭᓐᑎᒃᑯᑦ, ᐊᒥᓲᓂᖏᑦ, ᐆᒪᔪᖅᑕᖃᐅᕐᓂᖓ ᐊᒻᒪᓗ ᐊᔾᔨᒌᙱᑦᑑᑕᐅᓂᖏᑦ ᐊᖏᔪᑦ ᐱᕈᖅᑐᐃᑦ, ᐊᓗᐊᓂᑦ ᓄᖅᑲᖓᓲᑦ ᐆᒪᔪᕋᓛᑦ ᐊᒻᒪᓗ ᐊᐅᓚᓲᑦ ᐆᒪᔪᕋᓛᑦ ᐊᔾᔨᒌᙱᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᐊᕙᓗᐃᑦ ᐊᑯᓐᓂᖏᓐᓃᓐᖔᖅᑎᒃ, ᐊᖏᔪᒥᒃ ᐊᔾᔨᒌᙱᓐᓂᖃᖅᓗᑎᒃ ᖃᐅᔨᓴᐅᔪᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ ᖃᐅᔨᓴᐃᕙᐅᔪᑦ ᐃᓚᖏᓐᓄᑦ, ᓂᕆᐅᒋᔭᐅᔪᖅ ᐊᔾᔨᒌᙱᓐᓂᖃᖅᑐᒥᑦ ᐊᕙᑎᐅᔪᒥᑦ.

2020-ᒥᑦ ᖃᐅᔨᓴᐃᓂᐅᓚᐅᖅᑐᑦ ᓯᕗᓪᓕᕐᓂᑦ ᐊᕙᓗᒦᑦᑐᓂᒃ ᖃᐅᔨᔭᐅᔪᓂᒃ, ᖃᓄᐃᓂᖅᓴᐅᓂᖏᓐᓄᑦ ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᖃᐅᔨᓴᐃᓐᓂᑦ ᐊᕐᕋᒍᑕᒫᖅ ᐊᓯᙳᕐᓂᐅᔪᓄᑦ ᐳᓭᓐᑎᒃᑯᑦ, ᐊᒥᓲᓂᖏᓐᓄᑦ, ᐱᑕᖃᐅᕐᓂᖏᓐᓄᑦ, ᐊᒻᒪᓗ ᐊᔾᔨᒌᙱᑦᑑᑕᐅᓂᖏᓐᓄᑦ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᑦ ᑭᖑᓂᐊᒍᑦ ᖃᐅᔨᓴᐃᓂᐅᔪᓂᑦ. ᖃᓄᐃᓂᖏᓐᓄᑦ ᐊᔾᔨᒌᙱᓂᐅᔪᑦ ᓇᓕᖏᐅᓂᖏᓐᓄᑦ ᖃᐅᔨᔭᐅᔪᓂᑦ ᐊᑯᓂᖏᓐᓂᑦ ᖃᐅᔨᓴᐃᓂᐅᔪᓂᑦ ᒥᑭᔫᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᑕᐃᒪᑕᖃᐅᖅᑲᑎᒃ ᐆᒪᔪᐃᑦ ᑕᑯᔭᐅᔪᑦ ᐊᒥᓲᙱᑦᑐᓂᑦ ᐅᑉᐸᓚᐅᓐᓂᑦ ᐆᒪᔪᐃᑦ ᐊᐅᓚᖃᑦᑕᖅᑐᓂᑦ.

ᖃᐅᔨᔭᐅᔪᑦ ᐊᔾᔨᒌᙱᓂᐅᔪᑦ ᐊᑯᓐᓂᖏᓐᓂᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐅᑭᐅᖑᔪᓂᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᐃᕙᐅᔪᓂᑦ ᐃᓱᒪᒋᔭᐅᔪᑦ ᒥᑭᔫᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐱᔾᔪᑕᐅᔫᒃᓴᐅᔪᑦ ᐃᖕᒥᓂᑦ ᐊᔾᔨᒌᙱᓕᒃᑦᑕᕐᓂᕐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑖᒻᒫᔅᓯᒪᓂᖓᓄᑦ ᐊᑐᖅᑕᐅᔪᖅ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ. ᖃᐅᔨᔭᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᙪᕆᑦᑐᑦ ᐃᓂᐅᔪᒥᑦ ᐊᓂᒍᖅᐸᓪᓕᐊᓂᒥᓃᓐᓂᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓂᒃ ᐱᔾᔪᑎᖃᑐᐃᓐᓇᕆᐊᖃᖅᑐᓂᒃ ᓴᓇᔭᐅᕙᓪᓕᐊᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐊᐅᖀᖅᑎᑦᑎᓂᕐᒧᑦ ᕿᙵᐊᓂᑦ.

ᑕᒪᐃᓐᓅᖓᔪᒃᑯᑦ, 2020-ᒥᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᔪᑦ ᓴᓇᔭᐅᕙᓪᓕᐊᓂᖓᓂᑦ ᐊᒻᒪᓗ ᐊᐅᖀᖅᑎᑦᑎᓂᕐᓄᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖏᑦ ᐊᖏᔪᒥᒃ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᖅᑑᔭᙱᑦᑐᑦ ᐊᖏᔪᑦ ᐱᕈᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᓂᑦ ᑕᕆᐅᕐᒧᐊᖅᑐᓂᑦ.

ᐃᖃᓗᒃᓯᕐᓃᑦ ᐊᒻᒪᓗ ᐃᖃᓗᒃᑕᐅᔪᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 6.0)

ᓈᒻᒪᒃᓯᓂᐊᕐᓗᒍ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᔭᕆᐊᓕᖕᓄᑦ ᓈᓴᐅᑏᑦ 99(b)(ii), (c), 113, ᐊᒻᒪᓗ 114, ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᓂᒃ ᐱᓕᕆᐊᖃᓚᐅᖅᑐᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖏᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᒋᑦ ᐱᑕᖃᐅᕐᓂᖏᑦ ᐃᖃᓗᒃᐲᑦ ᐊᓯᖏᓪᓗ ᐃᖃᓗᐃᑦ. ᐊᑕᐅᓯᐅᖏᑦᑐᒥᒃ ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᓄᑦ ᐊᑐᓚᐅᖅᑐᑦ ᐊᔾᔨᒌᙱᑦᑐᓄᑦ ᐆᒪᔪᓄᑦ ᐊᒻᒪᓗ ᐃᓂᐅᔪᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓄᑦ, ᐃᓚᐅᔪᑦ ᐊᑐᖅᑕᐅᔪᓂᑦ ᒪᑎᑕᐅᑏᑦ, ᕿᔪᖁᑏᑦ, ᑎᒍᓯᔾᔪᑏᑦ, ᓯᒃᓯᒥᑦ ᐊᑐᖅᑕᐅᔪᑦ ᐊᒻᒪᓗ ᐊᒧᐊᖅᑕᐅᓲᑦ. ᑲᑎᑕᐅᓚᐅᖅᑐᑦ ᐃᖃᓗᐃᑦ ᖃᓄᐃᑦᑐᑦ ᐃᖃᓘᓂᖏᓐᓄᑦ ᐃᓕᑕᕆᔭᐅᖅᑳᖅᑲᐅᑉᓗᑎᒃ ᓴᐳᑕᐅᒃᑦᑕᓚᐅᖅᑐᑦ.

ᐃᖃᓗᒃᑕᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ, 2019-ᑎᑐᑦ, ᖁᑦᑎᙵᓂᖅᓴᐅᓚᐅᖅᑐᑦ ᓯᕗᓂᐊᓂᑦ ᐅᑭᐅᕐᓂᐅᙱᓂᑦ ᐱᔾᔪᑕᐅᔪᖅ ᐊᑯᓂᐅᓂᖅᓴᖅ ᐆᒃᑐᕋᐃᓂᖃᓚᐅᕐᓂᖏᓐᓄᑦ, ᐊᒻᒪᓗ ᐊᒥᓲᓂᖅᓴᓂᒃ ᐃᖃᓗᙵᓂᑦ ᐆᒃᑐᕋᐃᓂᕐᓄᑦ. ᓇᓕᐊᙳᓂᖏᓐᓄᑦ ᐃᖃᓗᒃᑕᐅᔪᑦ ᐊᓯᐊᙳᖅᓯᒪᓚᐅᖏᑦᑐᑦ ᓯᕗᓂᐊᒍᑦ ᐆᒃᑐᕋᐃᓂᐅᓚᐅᖅᑐᑦ ᐅᑭᐅᕐᓂᑦ, ᐃᖃᓗᒃᐱᖕᓄᑦ, ᑲᓇᔪᕐᓄᑦ ᐊᔾᔨᒌᙱᑦᑐᓄᑦ ᑲᑎᕝᕙᒋᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᒃᑖᙳᑉᓗᑎᒃ. 8 ᐊᓯᖏᑦ ᐃᖃᓗᐃᑦ ᐱᑕᖅᑕᐅᓚᐅᖅᑐᑦ, ᐃᓚᐅᔪᑦ ᐊᑯᑭᑦᑐᕐᒥᑦ ᐆᒥᐃᑦ, ᐅᑭᐅᖅᑕᖅᑐᒥᑦ ᑲᓇᔭᐃᑦ, ᑐᐊᑦᑐᕋᐅᔭᐃᑦ (eel), ᐊᖏᔪᑦ ᑲᓇᔪᐃᑦ, ᐅᑭᐅᖅᑕᖅᑐᒃᑖᕐᒥᑦ ᐆᒥᐃᑦ, ᐃᓕᑕᕆᔭᐅᓯᒪᙱᑦᑐᓗ ᐆᒥᐃᑦ. ᐅᑭᐅᖅᑕᖅᑐᒃᑖᕐᒧᑦ ᐆᒥᐃᑦ ᓯᕗᓪᓕᖅᐸᐅᓚᐅᖅᑐᑦ ᐃᓕᑕᕆᔭᐅᔪᓂᑦ MEEMP ᖃᐅᔨᓴᐃᓂᕐᓂᑦ.

ᓇᓕᐊᙳᓂᖏᓐᓄᑦ ᐃᖃᓗᐃᑦ ᐱᔭᐅᔪᓂᑦ ᐊᔾᔨᓚᐅᖏᑦᑕᖏᑦ ᓯᕗᓂᐊᓂᑦ ᖃᐅᔨᓴᐃᕙᐅᔪᓂᑦ. 2020-ᒥᑦ ᑲᓇᔪᐃᑦ ᒪᕐᕉᒃ ᐊᔾᔨᒌᙱᑦᑑᒃ, ᐊᒻᒪᓗ ᐃᖃᓗᒃᐲᑦ 71%-ᖑᓚᐅᖅᑐᑦ ᑲᑎᔪᕆᑦ ᐃᖃᓗᒃᑕᐅᔪᓂᑦ, ᑕᐅᑐᙳᖅᓱᕆᑦ ᓯᕗᓂᐊᓂᑦ ᖃᐅᔨᓴᐃᕙᐅᔪᑦ ᐅᑭᐅᕐᓂᑦ ᐆᒪᔪᐃᑦ 99% ᐅᖓᑖᓅᓚᐅᖅᑐᑦ ᑲᑎᔪᕆᑦ ᐱᑕᖅᑕᐅᔪᓂᑦ. ᐊᓯᐊᙳᕐᓂᐅᔪᖅ ᑕᑯᒃᓴᐅᑎᑦᑎᙳᕆᑦᑐᖅ ᐊᓯᐊᙳᕐᓂᖏᓐᓂᒃ ᐆᒪᔪᐃᑦ ᐋᖅᑭᐅᒪᓂᖏᓐᓄᑦ, ᑭᓯᐊᓂ ᑕᑯᒃᓴᐅᑎᑦᑎᖑᙵᖅᑐᖅ ᐊᓯᐊᙳᕐᓂᐅᔪᓂᒃ ᐱᑕᖃᐅᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐊᑐᖅᑕᐅᔪᓄᑦ ᑕᐃᒪᐃᓇᒧᑦ ᐊᒥᓲᓂᖅᓴᓂᒃ ᐃᖃᓗᒃᓱᑎᒃ ᐱᑕᖃᓗᐊᖅᐸᙱᑦᑐᓂᒃ ᐅᕝᕙᓘᓐᓃᑦ ᖃᐅᔨᔭᐅᓯᒪᓗᐊᖏᑦᑐᓂᒃ ᓯᕗᓂᐊᒍᑦ ᑕᐃᒪᓐᓇᐃᓕᐅᖅᑎᓪᓗᒋᑦ.

ᐊᑕᐅᓯᕐᒥᓗᐃᓐᓂᑦ ᐃᖃᓗᒃᓯᐅᕐᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᒥᒃ ᐊᔪᙱᑦᑐᖃᓚᐅᖏᑦᑐᖅ ᑕᒪᓗᒃᑖᖅ ᐊᔾᔨᒌᙱᑦᑐᑦ ᐃᖃᓗᖕᓄᑦ ᑕᑯᔭᐅᔪᓂᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖏᑦ ᐃᖃᓗᐃᑦ ᒥᒃᓵᓄᑦ ᖃᐅᔨᓴᐃᓂᕐᓂᑦ. ᒪᑦᑎᑕᐅᑎᓄᑦ ᖃᐅᔨᓴᐃᓐᓂᑦ ᐊᑑᑎᖃᓛᖑᓚᐅᖅᑐᑦ, 7-ᓂᒃ ᐊᔾᔨᒌᙱᑦᑐᓂᒃ ᐱᑉᓗᑎᒃ, ᑭᖑᓂᐊᒍᑦ ᑎᒍᒥᐊᖅᑕᐅᓂᑦ

ᐊᒻᒪᓗ ᕿᔪᖁᑎᑦ ᐊᕿᓂᓕᖕᓂᑦ ᐊᔾᔨᕆᑦᑐᓂᑦ ᐃᖃᓗᒃᓱᑎᒃ. ᒪᑎᑕᐅᑏᑦ ᐃᖃᓗᒍᓇᓛᖑᔪᑦ ᖃᐅᔨᓴᖅᑕᐅᓪᓗᑎᒃ ᐃᖃᓗᒃᐲᑦ, 97%-ᓂᒃ ᐃᖃᓗᒃᐱᒃᓱᑎᒃ ᐃᖃᓗᖕᓂᑦ ᖃᐅᔨᓴᐃᓂᖃᖅᑎᓪᓗᒋᑦ. ᑎᒍᒥᐊᕐᒪᐃᑦ ᐃᓚᔭᐅᓚᐅᖅᑐᑦ ᐃᖃᓗᖕᓂᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐆᒃᑐᕋᐃᓂᖃᖅᑳᖅᑎᓪᓗᒋᑦ 2019-ᒥᑦ; ᐊᑐᖅᑕᐅᔪᖅ ᕿᒥᕐᕈᔭᐅᔪᖅ ᐃᓇᖒᓂᐊᕐᓗᓂ ᕿᔪᖁᑎᓂᒃ, ᕿᔪᖁᑏᑦ ᐊᒥᓲᖏᑦᑐᓂᒃ ᐱᖃᑦᑕᖅᓯᒪᔪᑦ. 2020-ᒥᑦ, ᑎᒍᒥᐊᕐᒪᐃᑦ ᑲᑎᓐᓱᒋᑦ 84-ᓂᒃ ᐃᖃᓗᓚᐅᖅᑐᑦ, ᐊᕿᓂᓕᐅᑉᓗᑎᒃ ᐊᔾᔨᕖᒋᑦᑐᑦ ᐃᖃᓗᐃᑦ ᐃᓚᐅᑉᓗᑎᒃ ᐊᑯᑭᑦᑐᕐᒥᑦ ᐅᒫᖅ, ᑕᐃᒪᐅᓚᐅᖅᑦᑐᖅ ᐃᖃᓗᖕᓂᑦ ᖃᐅᔨᓴᐃᓂᖃᖃᑦᑕᖅᑎᓪᓗᒋᑦ ᑕᐃᒪᙵᓂᑦ 2014-ᒥᑦ, ᑕᐅᑐᖕᒫᖅᓱᒋᑦ 43 ᐃᖃᓗᒃᑕᐅᔪᑦ ᕿᔪᖁᑎᓂᒃ ᐊᑐᖅᓱᑎᒃ. ᐱᑕᖅᑕᐅᔪᑦ ᐊᑕᐅᓯᕐᒧᑦ ᐃᖃᓗᒃᓯᐅᖅᓱᑎᒃ ᑎᒍᒥᐊᒐᕐᓄᑦ ᖁᑦᑎᖕᓂᖅᓴᐅᓚᐅᖅᑐᖅ ᕿᔪᖁᑎᓂᐅᖕᒐᓂᑦ, ᓇᓗᓇᐃᖅᓯᔪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᓈᒻᒪᒃᑐᖅ ᐃᓇᖏᖅᓯᓂᐊᕐᓗᓂ.

ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᑕᐅᑐᙱᖅᓱᒋᑦ ᐱᑕᖅᑕᐅᔪᑦ ᐊᑕᐅᓯᕐᒧᑦ ᐃᖃᓗᒃᓯᐅᖅᓱᑎᒃ, ᐃᖃᓗᐃᑦ ᖃᓄᐃᑦᑑᓂᖏᑦ ᐊᒻᒪᓗ ᐊᒥᖅᑎᕆᓂᖏᑦ ᐊᔪᕐᓇᖅᑐᑦ ᒫᓐᓇ ᐊᑐᖅᑕᐅᔪᓄᑦ ᐊᔾᔨᙳᕐᓂᖏᓐᓄᑦ ᑲᑎᓐᓱᒋᑦ ᐃᖃᓗᒃᑕᐅᓇᓱᒃᑐᑦ ᐊᒻᒪᓗ ᐃᖃᓗᐃᑦ ᓇᓃᓐᓂᖏᓐᓄᑦ. ᐃᖃᓗᒃᓯᐅᕈᑕᐅᔪᑦ ᐊᑕᐅᓯᙳᖅᑎᑕᐅᖁᔭᐅᔪᑦ ᓯᕗᓂᒃᓴᒥᑦ ᖃᓄᐃᓐᓂᖅᓴᐅᓂᖏᓐᓅᖅᑕᐅᔪᓐᓇᕐᓂᐊᕐᓗᑎᒃ ᐊᑯᓐᓂᖏᓐᓂᑦ ᖃᐅᔨᓴᐃᓂᐅᔪᑦ ᐅᑭᐅᕐᓂᑦ.

ᑕᒪᐃᓐᓅᕐᒐᔪᒃᑯᑦ, ᐊᔾᔨᖕᓂᖏᑦ ᑕᑯᔭᐅᔪᑦ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᐅᑭᐅᕐᓂᑦ ᑕᒪᐃᓐᓄᑦ ᐆᒪᔪᖅᑕᖃᖃᑦᑕᕐᓂᕐᓄᑦ ᐊᒻᒪᓗ ᐊᒥᓲᑎᕆᓂᖏᓐᓄᑦ ᐅᖃᖅᑐᑦ ᓴᓇᔭᐅᕙᓕᓕᐊᓂᖕᒐ ᐊᒻᒪᓗ ᐊᐅᓚᖅᑎᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖕᒥᑦ ᖃᐅᔾᔭᓇᖅᑐᓂᒃ ᐊᓯᐊᙳᖅᑐᓂᒃ ᖃᐅᔾᔭᓐᓂᑦᑐᖅ ᖃᓂᑦᑐᓄᑦ ᐊᔾᔨᙳᕆᑦᑐᑦ ᐃᖃᓗᖕᓄᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᓱᒍ ᒪᓕᒃᓱᕆᑦ ᖃᓄᐃᓐᓂᕆᓄᑦ ᖃᐅᔨᓴᐃᓂᖅ. ᐊᕿᒍᑕᒫᖅ ᐃᖃᓗᖕᓂᒃ ᐆᒃᑐᕋᐅᑕᐅᓂᐊᖅᑐᑦ ᐱᔭᐅᓚᐅᖅᑐᑦ ᖃᓄᐃᓐᓂᖅᓴᐅᓗᒋᑦ ᖃᐸᐅᓂᕆᓄᑦ ᐊᒻᒪᓗ ᐃᓚᕆᓐᓂᑦ ᐱᑕᓕᖕᓄᑦ ᐃᖃᓗᐃᑦ ᐊᒥᓃᓂᖅᓴᐅᔪᓂᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖕᒥᑦ (ᐃᖃᓗᒃᐲᑦ, ᑲᓇᔪᐃᑦ ᐊᓯᖓᓗ ᑲᓇᔪᕐᓄᑦ) ᓇᓗᓇᐃᖅᓯᓂᖃᙱᓐᓱᓂ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓂᒃ ᐊᒃᑐᖅᓯᓂᐅᔪᓂᒃ ᖃᓂᑦᑐᑦ ᐃᖃᓗᖕᓄᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᖕᒥᑦ.

ᐃᖃᓗᐃᑦ ᐋᓂᐊᖃᖅᑕᐃᓕᒪᓂᖏᑦ ᐊᒻᒪᓗ ᓂᕿᖏᓐᓂᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 7.0)

2020-ᒥᑦ, 680 ᐃᖃᓗᐃᑦ 7-ᖑᐸᓗᑎᒃ ᐊᔾᔨᖑᑦᑐᑦ ᐃᖃᓗᐃᑦ ᐱᑕᖅᑕᐅᓚᐅᖅᑐᑦ, ᐆᒃᑐᕋᖅᑕᐅᐸᓗᑎᒃ ᐊᒻᒪᓗ ᐅᖁᒪᐃᓐᓂᖅᓯᐅᖅᑕᐅᐸᓗᑎᒃ. ᐊᔾᔨᕐᓚᖓ ᓯᕗᓂᐊᒍᑦ ᐅᑭᐅᕐᓂᑦ, ᐃᖃᓗᐃᑦ ᐊᒥᓲᓛᖑᓚᐅᖅᑐᑦ ᐃᖃᓗᒃᐲᑦ, ᑲᓇᔪᐃᑦ ᐊᒻᒪᓗ ᐱᖃᑎᖏᑦ ᑲᓇᔪᐃᑦ, ᓇᓗᓇᐃᖅᓯᐸᓗᑎᒃ ᐅᔾᔨᕐᓇᖅᑐᓂᒃ ᐊᓯᐊᙳᕐᓂᖏᓐᓄᑦ ᑕᒪᐃᓐᓅᕐᒐᔪᒃᑯᑦ ᐃᖃᓗᖕᓂᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᐅᑉ ᖃᓂᑕᖓᓂᑦ. ᐃᖃᓗᐃᑦ ᐋᓂᐊᖃᖅᑕᐃᓕᒪᓂᖏᑦ ᐊᒻᒪᓗ ᓂᕿᖏᑦᑕ ᖃᓄᐃᓕᐅᕐᓂᖏᓐᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ ᖃᓄᐃᓐᓂᖅᓴᐅᓂᖏᓐᓅᖅᑕᐅᓚᐅᖅᑐᑦ ᖃᓄᐃᖓᓂᐅᔪᓄᑦ ᒪᕿᖅᓂᑦ ᓯᕗᓂᐊᒍᑦ ᐅᑭᐅᕐᓂᑦ ᖃᐅᔨᓴᐃᓂᐅᓚᐅᖅᑐᓄᑦ (ᓰᕐᓗ, 2018 ᐊᒻᒪᓗ 2019). ᐊᔾᔨᖑᐃᓐᓂᐅᔪᑦ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᑦ ᐃᖃᓗᐃᑦ ᐊᖏᓂᖏᑦ; ᑭᓯᐊᓂ, ᐊᔾᔨᖑᐃᓐᓂᐅᔪᑦ ᒥᑭᔫᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᐊᔾᔨᖑᐃᓂᖅᓱᑎᒃ ᐅᑭᐅᖑᔪᓂᑦ ᖃᐅᔨᓴᐃᕝᕙᐅᓚᐅᖅᑐᓂᑦ ᐊᒻᒪᓗ ᐃᒥᖓᒃ ᐱᐸᓗᑎᒃ ᐊᔾᔨᖑᐃᓂᐅᔫᓴᐅᔪᑦ ᐃᖃᓗᖕᓄᑦ ᐅᐸᓗᐃᑦ ᐊᓂᒍᖅᐸᓕᓕᐊᓂᕐᒥᑦ, ᖃᓄᐃᖓᓕᖅᑎᑕᐅᓂᖏᓐᓅᙱᑦᑐᖅ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓄᑦ. ᐊᕿᐊᕈᕐᒥᐅᑕᖏᑦ ᐱᔭᐅᔪᓂᑦ ᐃᖃᓗᖕᓂᑦ ᖃᐅᔨᑎᑦᑎᔪᑦ ᐃᖃᓗᒃᐲᑦ ᐊᒻᒪᓗ ᑲᓇᔪᐃᑦ ᓱᓇᑐᐃᓐᓇᖅᑐᖅᑐᑦ; ᓂᕆᔭᖏᑦ ᐃᖃᓗᐃᑦ ᐊᔪᙱᓕᖃᑦᑕᖅᑑᔭᖅᑐᑦ, ᑕᑯᒃᓴᐅᔪᑦ ᐱᑕᖅᓯᔪᖕᓇᕐᓂᖏᑦ ᓂᕆᖃᑦᑕᖏᓐᓂᒃ ᓂᕆᔪᒪᔭᖏᓄᑐᐃᓐᓇᐅᖏᑦᑐᖅ.

ᓇᓗᓇᐃᔭᖅᓯᒪᔪᑦ ᐃᖃᓗᐃᑦ ᐋᓂᐊᖃᖅᑕᐃᓕᒪᓂᖏᓐᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᑲᑎᑕᐅᔪᑦ ᑲᓇᔪᕐᓄᑦ ᐊᒻᒪᓗ ᑎᑯᓕᐊᕐᓂᐊᕐᓗᒋᑦ ᐃᖃᓗᖕᓂᑦ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᑦ ᓯᕗᓂᒃᓴᒥᑦ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐱᔭᕆᐊᓕᖕᓄᑦ ᒪᓕᒃᓱᒋᑦ ᓴᕿᓄᑦ ᐊᒻᒪᓗ ᓯᑎᔪᓄᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᑯᕙᔪᓄᑦ ᒪᓕᒐᕋᓛᑦ(MDMER; ᑲᓇᑕᒥᑦ ᒐᕙᒪᒃᑯᑦ 2002). ᒪᓕᒃᓱᒋᑦ ᐃᓗᐊᓂᑦ ᐊᒻᒪᓗ ᓯᓚᑖᓂᑦ ᕿᒥᕈᓅᑦ, ᑲᓇᔪᐃᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᐅᑉ ᖃᓂᑕᖓᓂᑦ ᖃᓄᐃᑦᑑᔭᙱᑦᑐᑦ. ᐆᒃᑐᕋᐃᓂᖅ ᓈᒻᒪᓚᐅᖅᑐᖅ ᕿᒥᕈᓂᐊᕐᓗᒋᑦ ᐱᓕᐅᕆᒃᑲᓂᕈᖕᓇᕐᓂᖏᑦ ᑲᓇᔪᐃᑦ, ᑐᑭᖃᖅᑐᖅ ᓈᒻᒪᒃᑐᒃᑯᑦ ᐱᕙᓪᓕᐊᓂᖃᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᒋᑦ ᐱᐊᓖᓕᐅᕈᔾᔨᑎᖏᓐᓄᑦ ᐃᓱᐊᓂᑦ ᐱᒋᐊᕐᕖᑦ. (ᐆᒃᑑᑎᒋᓗᒍ, ᐱᓕᐅᕆᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᓇᓗᓇᐃᒃᑯᑕᖅ). ᐆᒃᑐᕋᐃᓂᐅᓚᐅᖅᑐᖅ ᓈᒻᒪᒋᑐᐃᓇᕆᐊᖃᖅᑐᖅ ᐊᒻᒫᒪᔪᕐᓚᖓᒧᑦ ᐱᓕᐅᕆᕙᓪᓕᐊᓂᖓᓄᑦ ᐃᓱᐊᓂᑦ ᐱᒋᐊᕐᕕᖓᓄᑦ ᐱᓕᐅᕆᕙᓪᓕᐊᓂᕐᒧᑦ ᓂᕿᖓᓂᑦ ᐱᑲᐅᑎᒋᓂᖅ ᐊᔪᕐᓇᓚᐅᕐᒪᑦ ᑖᕙᙵᑦ. 2020 ᐅᑭᐅᖅ ᓯᕗᓪᓕᖅᐸᐅᓚᐅᕐᒪᑦ, ᓇᓗᓇᐃᔭᖅᓯᒪᔪᖅ ᐃᖃᓗᐃᑦ ᐋᓂᐊᖃᖅᑕᐃᓕᒪᓂᖓᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᑲᑎᑕᐅᔪᑦ ᐋᓂᐊᖃᖅᑐᑦ ᐃᖃᓗᖕᓄᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᐅᑉ ᖃᓂᑖᓂᑦ, ᐊᓯᖏᓐᓂᒃ ᖃᓄᐃᓐᓂᖅᓴᐅᓚᐅᕐᓂᖏᓐᓄᑦ ᓯᕗᓂᐊᒍᑦ ᐅᑭᐅᕐᓂᑦ ᐱᑕᖃᙱᑦᑐᖅ ᐅᓂᒃᑳᒧᑦ.

ᐃᖃᓗᐃᑦ ᓂᕿᖏᑦᑕ ᖃᓄᐃᓕᐅᕐᓂᖏᓐᓄᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ ᐃᖃᓗᒃᐱᖕᓄᑦ ᐆᒃᑐᕋᐃᓂᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ ᐊᔾᔨᓕᕆᓚᐅᖅᑕᖏᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᓄᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕙᐅᑉ ᖃᓂᑕᖓᓄᑦ 2010-ᒥᑦ. ᖃᓄᐃᖓᓂᐅᔪᑦ ᑲᓇᔪᕐᓄᑦ ᐊᒻᒪᓗ ᐱᖃᑎᖏᓐᓄᑦ ᐊᔾᔨᕐᓕᕆᓚᐅᕐᒥᔭᖏᑦᑕᐅᖅ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᑲᑎᑕᐅᓚᐅᖅᑐᓄᑦ ᖃᖓᓃᖑᓚᐅᖅᑐᒧᑦ ᓴᕿᓗᒃᑖᕐᓚᖕᓄᑦ. ᓈᓴᐅᓯᕆᓂᒃᑯᑦ ᐊᖏᓪᓕᓂᐅᔪᑦ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᑦ ᑕᐃᒪᙵᓂᑦ 2018-ᒥᑦ ᐃᓚᖏᓐᓄᑦ ᐱᐅᖏᑦᑐᖅᑕᓕᖕᓄᑦ ᐃᓱᒫᓘᑕᐅᔪᖕᓇᖅᑐᓄᑦ ᐃᖃᓗᒃᐱᖕᓄᑦ ᐊᒻᒪᓗ ᑲᓇᔪᕐᓄᑦ (ᓰᕐᓗ, ᐊᓘᒥᓇᒻ (aluminum) ᐊᒻᒪᓗ ᒫᒃᓃᓯᐊᒻ (magnesium)); ᑭᓯᐊᓂ, ᐊᔾᔨᖑᐃᓐᓂᐅᔪᑦ ᒥᑭᔫᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᐊᔾᔨᖑᐃᓪᓚᔪᒃᓱᑎᒃ, ᐃᖅᒥᖕᓂᒃ ᐱᔪᒃᑯᑦ ᐊᔾᔨᖑᐃᓐᓂᐅᔫᓴᐅᔪᑦ ᑕᒪᐃᓐᓄᑦ ᐅᒪᓃᑦ ᒪᓂᒪᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᑭᖑᓂᐊᒍᑦ ᐱᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᓴᕙᖕᓂᑦ, ᑕᐃᒪᐅᔪᑦ ᐅᓂᒃᑳᐅᓯᐅᓯᒪᔪᑦ ᓂᕿᖏᓐᓂᑦ ᑲᑎᓯᒪᔪᓄᑦ.

ᓂᕿᖏᓐᓄᑦ ᐆᒃᑐᕋᐃᓂᓗᒃᑖᖑᓚᐅᖅᑐᑦ ᐃᖃᓗᒃᐱᖕᓄᑦ, ᑲᓇᔪᕐᓄᑦ ᐊᒻᒪᓗ ᐱᖃᑎᖏᓐᓄᑦ ᑲᑎᑕᐅᔪᓂᑦ 2018-ᒥᑦ 2020-ᒧᑦ ᐊᑖᓃᓚᐅᖅᑐᑦ ᑲᓇᑕᒥᑦ ᐋᓂᐊᖃᖅᑕᐃᓕᒪᔪᓕᖓᔾᒃᑯᑦ ᐊᖏᓛᒃᑯᑦ ᓇᓅᓂᖓᔭᖏᓐᓄᑦ ᐊᑯᐸᓕᖅᑎᕈᑎᓂᑦ ᐱᐅᖏᑦᑐᖅᑕᓕᖕᓄᑦ ᓂᕿᓂᑦ ᓄᖑᓯᐃᑦᑐᖅᑐᖅᓯᒪᓂᕐᒧᑦ (mercury)

ᒪᓕᒃᑕᐅᔪᒃᓴᖏᓐᓂᑦ (ᑲᓇᑕᒥᑦ ᐋᓐᓂᐊᖃᖅᑕᐃᓕᒪᔪᓕᕆᔩᒃᑯᑦ 2015) ᐊᒻᒪᓗ ᐊᑖᓃᔾᔪᑎᒃ ᐳᕆᑎᔅ ᑲᓚᒻᐱᔭᒥᑦ (British Columbia) ᐊᐥᑎᓕᕆᔩᒃᑯᖏᑦᑕ ᐃᖃᓗᐃᑦ ᓂᕿᖏᓐᓄᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᖏᓐᓂᑦ ᓯᓗᓂᐊᒻᒧᑦ (selenium) (BC MOE 2014).

ᐊᒃᑐᖅᓯᓂᕐᓄᑦ ᓇᓚᐅᑦᑖᖅᑕᐅᔪᑦ FEIS-ᖑᖅᑲᐅᑕᐅᓚᐅᖅᑐᒥᑦ (ᐹᕕᓐᓛᓐᑯᑦ 2012) ᓇᓚᐅᑦᑖᖅᑕᐅᔪᑦ ᐊᑦᑎᒃᑐᒥᑦ ᐊᖏᓂᖓᓄᑦ ᐊᓯᐊᙵᖅᑐᑦ ᐃᓚᖏᓐᓄᑦ ᐱᕈᖅᐸᓪᓕᐊᓂᖃᖃᑎᒌᒃᑐᓄᑦ ᑭᒡᓕᒋᔭᐅᔪᑦ, ᓱᕐᓗ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᕆᔭᖓ ᐊᒻᒪᓗ ᐃᖃᓗᒃᐸᑦ ᓂᕿᖏᑦᑕ ᖃᓄᐃᓕᐅᕐᓂᕆᔭᖏᑦ, ᑭᓯᐊᓂ ᐋᖅᑭᒃᓯᒪᔾᔪᑎᒃ ᐊᓯᐊᙵᖅᑐᑦ ᐊᖏᕚᖏᑦᑐᖅ. **ᑕᒪᐃᓐᓅᖓᔪᒃᑯᑦ, ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ 2020-ᒥᑦ ᑎᑯᓕᐊᖅᑐᑦ ᓇᓚᐅᑦᑖᖅᓯᒪᔪᓄᑦ, ᓇᓕᑐᐃᓐᓇᖏᓐᓂᑦ ᐊᓯᐊᙵᖅᑐᑦ ᒥᑭᔫᓯᒪᔪᑦ, ᓇᓕᑐᐃᓐᓇᖏᓐᓂᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᓂᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᔾᔨᒋᔾᔪᓂᐅᒃ ᑭᒡᓕᒋᔭᐅᔪᓄᑦ ᖃᓄᐃᓐᓂᐅᔪᓄᑦ. ᒫᓇᐅᔪᖅ, ᖃᐅᔨᓴᐃᓂᕐᒥᑦ ᓇᓗᓇᐃᖅᓯᔪᑦ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᔫᖓᔪᑦ ᐊᔪᙱᑦᑐᑦ ᑕᐃᒪᓐᓇᐃᑦᑐᒃᓴᐅᓂᖏᑎᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒥᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᐊᐅᓚᑕᐅᖓᑕ ᐊᖏᔪᒥᒃ ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᖅᗝᕐᔾᔪᑎᒃ ᑕᕆᐅᕐᒥᑦ ᐱᕈᖅᐸᓪᓕᐊᓂᖃᖃᑎᒌᒃᑐᓄᑦ. ᐅᐸᓗᒥᒧᑦ ᑎᑭᓪᓗᒍ, ᓴᓇᔭᐅᕙᓪᓕᐊᓂᕐᒥᑦ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᕿᙳᐊᓂᑦ ᐃᒃᓯᕙᕐᒥᑦ ᐱᐅᖏᑦᑐᕐᒥᒃ ᐊᒃᑐᖅᓯᓂᖅᑑᔾᔭᖏᑦᑐᑦ ᐃᖃᓗᐃᑦ ᐋᓐᓂᐊᖃᖅᑕᐃᓕᒪᓂᖏᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᓂᕿᖏᓐᓂᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕝᕕᐅᑉ ᖃᓂᑕᖓᓂᑦ.**

NIS/AIS ᖃᐅᔨᓴᐃᓂᖅ (ᑎᑎᖅᑲᒧᑦ ᐃᓚᖓ 8.0)

ᐃᓗᐃᑦᑑᖓᔪᒃᑯᑦ ᐆᒃᑐᕋᐃᓂᖃᓚᐅᖅᑐᑦ ᑕᓇᐅᑉ ᐃᒪᖓᓂᑦ ᖃᐅᔨᓵᓂᐊᕐᓗᒋᑦ ᑕᐃᒪᑕᒃᑲᒪᖕᒋᑕ ᑖᓂᕐᒥᐅᑕᐅᖏᑦᑐᓂᒃ ᐆᒪᔪᓂᒃ (NIS) ᐊᒻᒪᓗ ᑖᓂᕐᒥᐅᑕᐅᖏᑦᑐᑦ ᐃᒪᕐᒥᐅᑕᐃᑦ ᐆᒪᔪᓂᒃ (AIS), ᐱᓕᕆᐊᕆᐸᓗᒋᑦ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᕐᒥᑦ ᖃᓄᐃᖓᔭᕆᐊᖃᕐᓂᕐᒧᑦ ᓈᓴᐅᑏᑦ 87, 89, ᐊᒻᒪᓗ 91; NIS ᓱᓇᑐᐃᓐᓇᐃᑦ ᐆᒪᔪᐃᑦ ᑕᐃᒪᐅᔪᑦ ᓯᓚᑖᓂᑦ ᖃᓂᑦᑑᑉ ᐃᓂᖓᓂᑦ ᓇᕿᙵᕐᕕᒋᔭᖓᓂᑦ AIS-ᓕ NIS-ᖑᔪᑦ ᐅᓗᕆᐊᓇᖅᓯᐸᓗᒋᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐋᓐᓂᖅᓯᓂᖃᑦᑕᖅᑐᑦ ᐊᓯᐊᓂᑦ. ᐱᓕᕆᐊᖑᔪᒥᑦ ᐃᓚᐅᔪᑦ ᑐᕌᒐᐅᔪᓂᒃ ᐆᒃᑐᕋᐃᓂᕐᓂᒃ ᓱᕐᓗ ᐆᒪᔪᕋᓛᓂᒃ ᐊᒻᒪᓗ ᐅᒥᐊᕐᔪᐊᑉ ᐃᓗᐊᓃᑦᑐᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᓂᒃ, ᖃᐅᔨᓵᖅᑕᐅᓗᒃᑖᕐᓗᑎᒃ ᐆᒪᔪᐃᑦ ᐃᓕᑕᓴᐅᓯᒪᔪᑦ ᐊᓯᖏᑦᑎᒧᑦ ᑕᓇᐅᕐᒥᐅᑕᓂᒃ ᐆᒃᑐᕋᐃᓂᒃᑯᑦ ᕿᙳᐊᓂᑦ ᐃᒃᓯᕙᕐᒥᑦ ᓱᕐᓗ ᐃᖃᓗᐃᑦ ᐊᒻᒪᓗ ᐆᒪᔪᐃᑦ ᐊᓗᐊᓃᑦᑐᓂᒃ ᖃᐅᔨᓴᐃᓗᑎᒃ ᐊᒻᒪᓗ ᐋᖅᑭᒡᓗᒋᑦ ᐃᓂᒋᔭᐅᔪᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᔪᖅ. ᐆᒪᔫᒃᑖᑦ ᖃᓄᐃᓐᓂᖅᓴᐅᓂᖏᓐᓅᖅᑕᐅᑲᑦᑕᖅᑐᑦ ᓇᓕᖏᓐᓄᑦ ᐆᒪᔪᓂᒃ ᓈᓴᖅᑕᐅᔪᓂᒃ ᕿᙵᐊᓄᑦ - ᐊᑐᖅᔪᑎᒃ ᓈᓴᐅᑎᓂᒃ/ᑎᑎᖅᑲᓂᒃ ᓯᕗᓂᐊᒍᑦ ᖃᐅᔨᓴᐃᓂᐅᓚᐅᖅᑐᓂᒃ, ᐃᓚᐅᑉᐳᑎᒃ ᓯᕗᓂᐊᒍᑦ-ᐱᓕᕆᐊᕐᒧᑦ ᑭᒡᓕᒋᔭᐅᔪᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ, ᐊᒻᒪᓗ ᓄᑖᙶᖅᑎᖅᑕᐅᑲᑦᑕᖅᑐᑦ ᐊᕐᕌᒍᑕᒫᒃᑯᑦ. ᓱᓇᑐᐃᓐᓇᐃᑦ ᐆᒪᔪᑦ ᐃᓚᒋᔭᐅᖏᑦᑐᑦ ᓈᓴᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᒃᑳᓂᑲᑦᑕᖅᑐᑦ ᑎᑎᕋᐅᓯᐅᓯᒪᔪᓂᒃ ᕿᒥᕐᕈᓂᒃᑯᑦ ᖃᐅᔨᓂᐊᕐᓗᒋᑦ ᑎᑭᐅᑎᓯᒪᓂᖏᑦ ᑎᑎᖅᑲᐅᑎᕆᔭᐅᔪᓄᑦ ᐃᓚᐅᖕᒪᖕᒋᑕ ᐅᐊᖓᓐᖓᓂᑦ ᐊᑦᓛᓐᑎᒃᒥᑦ, ᐅᑭᐅᖅᑕᖅᑐᖅ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᑲᓇᑕᒥᑦ ᐅᑭᐅᖅᑕᖅᑐᒥᑦ ᐃᒪᖏᑦ, ᐊᒻᒪᓗ ᖃᐅᔨᓴᐃᓂᖅ ᑕᒪᐃᓐᓂᑦ ᓄᓇᕐᔪᐊᕐᒥᑦ ᐊᒻᒪᓗ ᖃᓂᑦᑐᒥᑦ ᖃᓇᑕᐅᔭᕐᒥᐅᑕᓇᔭᐅᔪᓂᑦ ᖃᐅᔨᒪᔭᐅᔪᓂᒃ ᑖᓂᕐᒥᐅᑕᑐᖃᐅᖏᓐᓂᖏᓐᓂᑦ ᐆᒪᔪᓂᒃ (ᓲᕐᓗ, Molnar et al. 2008; Casas-Monroy et al. 2014). ᓱᓇᑐᐃᓐᓇᐃᑦ ᐆᒪᔫᑦ ᖃᐅᔨᔭᐅᔪᑦ ᑖᓂᕐᒥᐅᑕᑐᖃᐅᖏᓐᓂᖏᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑖᓂᕐᒥᐅᑕᐅᖏᑦᑐᑦ ᐊᐅᓪᓚᖅᑎᑕᐅᑲᑦᑕᖅᑐᑦ ᐃᖃᓗᓕᕆᔩᒃᑯᓐᓄᑦ-ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᕐᒧᑦ ᖃᐅᔨᓴᐃᕝᕕᖓᓄᑦ Laval ᓯᓚᑦᑐᖅᓴᕐᕕᒡᔪᐊᕐᒧᑦ ᓇᓗᓇᐃᖅᑕᐅᓂᐊᕐᓗᑎᒃ. ᖃᓄᐃᖓᓂᐅᔪᑦ ᐊᒻᒪᓗ ᐊᑐᖅᑕᐅᔪᖅ ᓇᓗᓇᐃᖅᓯᓂᕐᒧᑦ ᕿᒥᕐᕈᔭᐅᑲᑦᑕᖅᑐᑦ ᐊᒻᒪᓗ ᐆᒪᔪᐃᑦ "ᐅᓗᕆᐊᓇᖅᑐᖅᑲᐅᖏᑦᑐᑦ" ᓇᓗᓇᐃᔭᖅᓯᒪᔪᒃᑯᑦ ᑐᑭᓯᐅᒪᔾᔪᑎᓂᒃ ᑲᑎᖅᓱᐃᓂᕐᒧᐊᖅᑕᐅᑲᑦᑕᖅᑐᑦ ᐊᒻᒪᓗ, ᐃᓕᔭᐅᔾᔪᑎᒃ "ᖃᐅᔨᓴᖅᑕᐅᔭᕆᐊᓖᑦ"-ᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ "ᐱᒋᐊᖅᑎᑦᑎᔾᔪᑎᓂᒃ ᑎᑎᕋᖅᓯᒪᔪᑦ"-ᒧᑦ; ᖃᐅᔨᓴᖅᑕᐅᔭᕆᐊᓖᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ ᐆᒪᔪᐃᑦ ᐃᑯᒪᒋᔭᐅᔪᑦ ᐅᓗᕆᐊᓇᖅᑐᖃᖏᑦᑐᑦ (ᓲᕐᓗ, ᑎᑎᕋᖅᓯᒪᖏᑦᑐᑦ AIS-ᒧᑦ ᖃᓇᑕᐅᔭᒥᑦ ᑭᓯᐊᓂ ᑲᓇᑐᐅᑉ ᐅᑭᐅᖅᑕᖅᑐᖓᓄᑦ ᐃᓚᒋᔭᐅᖏᑦᑐᑦ ᓈᒻᒪᒋᔭᐅᔪᓄᑦ ᑎᑭᐅᑎᓯᒪᓂᕐᓄᑦ) ᐅᕝᕙᓘᓐᓃᑦ ᐅᓗᕆᐊᓇᕐᓂᖃᖅᑐᑦ (ᓲᕐᓗ, ᑎᑎᕋᖅᑕᐅᓯᒪᔪᑦ AIS ᖃᓇᑕᐅᔭᒥᑦ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᑲᓇᑕᐅᑉ ᐅᑭᐅᖅᑕᖅᑐᖓᓄᑦ ᐃᓚᒋᔭᐅᔪᑦ ᓈᒻᒪᒋᔭᐅᔪᑦ ᑎᑭᐅᑎᓯᒪᓂᕐᒧᑦ ᑎᑎᖅᑲᐅᑎᓂᑦ) ᑭᓯᐊᓂ ᐱᔪᑎᖃᖅᔾᔪᑎᒃ ᐱᓕᕆᐊᕐᒥᑦ ᐱᔪᓂᒃ ᐱᒋᐊᖅᑎᑦᑎᔾᔪᑎᓄᑦ ᑎᑎᕋᖅᓯᒪᔫᓕ ᐅᓗᕆᐊᓇᖅᑐᐃᑦ ᐆᒪᔪᑦ ᐱᓕᕆᐊᕐᒧᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ ᑎᑭᑎᑕᐅᔪᑦ.

60 ᖃᐅᔨᓴᐃᕝᕕᑦ ᐆᒃᑐᕋᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᓇᐅᑉ ᐊᓗᐊᓂᑦ ᐆᒪᔪᕋᓛᓄᑦ 2020-ᒥᑦ, ᖁᑦᑎᓛᖑᐸᓗᑎᒃ ᐆᒃᑐᕋᐃᓂᕐᓂᑦ ᐅᐸᓗᒥᒧᑦ ᑎᑭᓪᓗᒍ. ᑲᑎᓪᓗᒋᑦ 369 ᐊᔾᔨᒌᙱᑦᑐᑦ ᐆᒪᔪᐃᑦ ᐃᓕᑕᓴᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ, ᐃᓚᐅᐸᓗᑎᒃ 33 ᐆᒪᔪᐃᑦ ᑎᑎᕋᐅᓯᐅᓯᒪᙱᓪᓗᑎᒃ ᑕᐃᒪᐅᔪᓂᒃ ᐆᒪᔪᓂᒃ ᓈᓴᖅᑕᐅᓯᒪᔪᓂᑦ ᕿᙳᐊᓂᑦ ᐃᒃᓯᕙᕐᒧᑦ (ᓲᕐᓗ, ᖃᐅᔨᓴᐅᓯᒪᙱᑦᑐᑦ ᓯᕗᓂᐊᒍᑦ ᖃᐅᔨᓴᐃᓂᕐᓂᑦ). ᑎᓴᒪᐃᑦ ᓄᑖᑦ ᖃᐅᔨᓴᐅᔮᖅᑐᑦ ᐆᒪᔪᐃᑦ ᓇᓗᓇᐃᖅᓯᒪᑦᑎᐊᖅᑐᓂᒃ ᑎᑎᖅᑲᐅᑎᑕᖅᑲᙱᑎᓪᓗᒋᑦ ᑕᐃᒪᐅᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᑲᓇᑕᐅᑉ ᐅᑭᐅᖅᑕᖅᑐᖓᓂᑦ, ᓇᓕᑐᐃᓐᓇᖏᑦ ᑎᑎᕋᖅᓯᒪᙱᑦᑐᑦ AIS ᖃᓇᑕᐅᔭᒥᑦ ᑐᖅᑯᖅᑕᐅᓯᒪᔪᓂᑦ. ᑕᐃᒪᓐᓇᒧᑦ, ᑎᓴᒪᐃᑦ ᐆᒪᔪᐃᑦ ᐃᑯᒪᒋᔭᐅᔪᑦ ᐊᑦᑎᒃᑑᓂᖓ ᐅᓗᕆᐊᓇᕐᒥᑦ ᐊᒻᒪᓗ ᐃᓕᔭᐅᔾᔪᑎᒃ ᐱᓕᕆᐊᕐᒧᑦ 'ᖃᐅᔨᓴᖅᑕᐅᔭᕆᐊᓖᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ'-ᒧᑦ. ᐃᓚᒋᔭᐃᑉᓗᓂ, 2020 ᐆᒪᔪᕋᓛᓂᒃ ᐆᒃᑐᕋᐃᓂᕐᒥᑦ ᐃᓚᐅᔪᑦ ᐱᖓᓱᑦ ᐆᒪᔪᐃᑦ ᓇᓗᓇᐃᒃᑯᑎᖅᑕᐅᓯᒪᐳᑎᒃ ᓯᕗᓂᐊᒍᑦ ᐅᑭᐅᓂᑦ ᓇᓗᓇᕐᓂᖓᓄᑦ ᓇᓂᕐᕈᑕᐅᓪᓗᐊᕝᕕᖏᓐᓄᑦ ᑎᑎᕋᖅᓯᒪᓚᐅᕐᒪᑕ AIS-ᒧᑦ ᖃᓇᑕᐅᔭᒥᑦ. ᐊᔾᔨᕐᓚᒋᔭᖓ ᐅᑭᐅᓂᑦ ᓯᕗᓂᐊᒍᑦ, ᐱᖓᓱᐃᑦ ᐆᒃᑐᕋᖅᑕᐅᔪᒃᓴᐃᑦ ᐊᐅᓪᓚᖅᑎᑕᐅᓚᐅᖅᑐᑦ Laval ᓯᓚᑦᑐᖅᓴᕐᕕᒡᔪᐊᕐᒧᑦ ᓇᓗᓇᐃᖅᑕᐅᓂᐊᕐᓗᑎᒃ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒧᑦ 'ᖃᐅᔨᓴᖅᑕᐅᔭᕆᐊᓖᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ'-ᒦᑦᑐᑦ. ᐊᒥᓲᓂᖅᓴᐃᑦ ᐃᓕᑕᓴᐅᔪᑦ ᐆᒪᔪᐃᑦ ᑕᓇᐅᑉ ᐊᓗᐊᓂᑦ ᐆᒃᑐᕋᐅᑕᐅᓂᐊᕐᓗᑎᒃ ᑲᑎᑕᐅᔪᑦ ᕿᙳᐊᓂᑦ ᐃᒃᓯᕙᕐᒥᑦ ᐊᒻᒪᓗ ᐃᒥᖓᑦᒥᑦ ᐃᑯᒪᒋᔭᐅᓚᐅᖏᑦᑐᑦ NIS-ᖑᓂᖏᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ AIS-ᖑᓂᖏᓐᓄᑦ.

8 ᐊᖏᔪᑦ ᐱᕈᖅᑐᐃᑦ, ᐊᒻᒪᓗ ᑕᓇᐅᑉ ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ, ᐊᒻᒪᓗ ᐆᒪᔪᕋᓛᑦ ᐃᓕᑕᓴᐅᓚᐅᖏᓐᓂᑦ ᓯᕗᓂᐊᒍᑦ ᖃᐅᔨᓴᐃᓂᕐᓂᑦ ᕿᙳᐊᓂᑦ ᐃᒃᓯᕙᕐᒥᑦ ᐃᓕᑕᓴᐅᓚᐅᖅᑐᑦ 2020-ᒥᑦ ᐆᒃᑐᕋᐃᓂᕐᓂᑦ. ᑕᒪᒃᑖᖅ ᓄᑖᑦ ᖃᐅᔨᓴᐅᔪᑦ ᐆᒪᔪᐃᑦ ᑎᑭᐅᑎᓯᒪᓂᖏᓐᓄᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᑦ ᐃᓚᐅᐸᓗᑎᒃ ᑲᓇᑕᐅᑉ

ᐅᑭᐅᖅᑕᖅᑐᖕᒐ ᐊᒻᒪᓗ ᓇᓕᑐᐃᓐᓇᖏᑦ ᑎᑎᕋᖅᓯᒪᙱᑦᑐᑦ AIS-ᒧᑦ ᖃᕆᑕᐅᔭᒥᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᖏᑦ, ᑕᐃᒪᓐᓇᒧᑦᓗ ᐃᓱᒪᒋᔭᐅᖏᑦᑐᑦ ᐃᓱᒫᓘᑕᐅᓂᖏᓐᓄᑦ ᕿᙵᐊᓄᑦ.

NIS-ᑕᖃᕐᓂᖏᑦ ᐃᖃᓗᐃᑦ ᓂᕿᖏᓐᓂᑦ, ᐃᖃᓗᐃᑦ (Pacific Sandlance), ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᖅ ᐃᖃᓗᒃ ᖃᐅᔨᓴᖅᑕᐅᑉᓗᓂ, ᑭᓯᐊᓂ, ᓱᓇᑐᐃᓐᓇᓕᕆᓂᒃᑯᑦ ᑎᑎᖅᑲᐃᑦ ᓇᓗᓇᐃᖅᑐᑦ ᐊᖏᕐᓕᕙᑦᓕᐊᓂᕐᒧᑦ ᑎᑭᐅᑎᓂᓯᒪᖕᒐ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᑦᓕᐊᓂᖕᒐ ᐱᔾᔪᑎᒋᑉᓗᒍ ᐱᓕᕆᐊᕐᒨᖕᒐᔪᒃᑯᑦ ᑎᑭᑎᑕᐅᓯᒪᓂᖕᒐᓃᙱᑦᑐᖅ (Falardeau et al. 2017). ᑕᐃᒪᓐᓇᒧᑦ, ᑕᐃᒪᓐᓇᐃᑦᑐᑦ ᐃᖃᓗᐃᑦ ᐃᓚᔭᐅᓯᒪᔪᑦ ᐱᓕᕆᐊᕐᒧᑦ 'ᖃᐅᔨᓴᖅᑕᐅᔭᕆᓖᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ'-ᒧᑦ

ᐅᒥᐊᕐᔪᐊᑉ ᓯᓚᑖ ᐆᒪᔪᑦ ᐃᒍᓇᖅᐸᓪᓕᐊᓂᖏᓐᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒥᑦ ᐃᓚᔭᐅᓚᐅᖅᑐᑦ NIS/AIS-ᓄᑦ ᐱᓕᕆᐊᓄᑦ ᑕᐃᒪᙵᓂᑦ 2018-ᒥᑦ ᐃᓚᐅᔪᑦ ᐃᒪᐅᑉ ᐊᑖᓂᑦ ᐊᔾᔨᓕᐅᕈᑎᒃᑯᑦ ᐊᐅᓚᔾᔪᑦ ᖃᐅᔨᓴᐃᓃᑦ ᐅᒥᐊᕐᔪᐊᑦ ᓯᓚᑎᖏᓐᓂᑦ ᐅᔭᕋᒃᑕᖅᑕᐅᔪᓂᒃ ᐅᓯᖃᑦᑕᖅᑐᓂᑦ.

ᐊᐅᓚᔪᓕᐅᕈᑎᒃᑯᑦ ᐊᔾᔫᑦ ᕿᒥᕐᕈᔭᐅᓕᓚᐅᖅᑐᑦ ᐊᔪᙱᓐᓂᖃᖅᑐᑦ ᐆᒪᔪᓕᕆᔨᓄᑦ ᐃᓕᑕᖅᓯᓂᐊᕐᓗᑎᒃ ᐃᒍᓇᖅᐸᓪᓕᐊᔪᓂᒃ ᐆᒪᔪᓂᒃ ᐊᑦᑎᖌᖑᔪᓂᑦ ᐆᒪᔪᐃᑦ ᓂᕿᖏᓐᓂᑦ. 2020-ᒥᑦ, ᑲᑎᕝᕙᒋᑦ ᐱᖓᓱᐃᑦ ᐅᔭᕋᒃᑕᖅᑕᐅᔪᓂᒃ ᐅᓯᖃᑦᑕᖅᑐᑦ ᐅᒥᐊᕐᔪᐊᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ, ᐊᒻᒪᓗ ᐊᑯᓂᐅᓂᖅᓴᖅ ᐊᑐᓂ ᐅᒥᐊᕐᔪᐊᓂᒃ ᖃᐅᔨᓴᐃᖃᑦᑕᓕᖅᕗᑎᒃ ᑕᐃᒪᙵᓂᑦ 2019-ᒥᑦ, ᑕᐅᑐᒐᖃᕐᓂᖅᓴᐅᓕᕐᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᐃᓗᐃᑦᑑᖕᒐᔪᒃᑯᑦ ᓴᓂᕋᖏᑦ ᐅᒥᐊᕐᔪᐊᑦ ᑭᓴᖅᓯᒪᑎᓪᓗᒋᑦ. ᒪᕐᕉᖕᓂᒃ ᐅᔭᕋᒃᑕᖅᑕᐅᔪᓂᒃ ᐅᓯᖃᑦᑕᖅᑐᑦ ᐅᒥᐊᕐᔪᐊᓂᑦ ᐱᑕᖃᓚᐅᖅᑐᖅ ᐃᒍᓇᖅᐸᓪᓕᐊᓂᖃᖅᑐᓂᒃ ᐊᒻᒪᓗ ᐆᒪᔪᕋᓛᑦ ᐃᒃᑲᓂᕐᒥᐅᑕᐅᒐᔪᒃᑐᑦ ᖃᐅᔨᒪᔭᐅᓗᐊᖏᑦᑐᑦ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᑦ, ᖁᐱᕐᕈᐃᑦ ᖃᐅᔨᒪᔭᐅᓗᐊᖏᑦᑐᑦ ᐆᒪᔪᐃᑦ, ᐃᓕᑕᕐᓇᙱᑦᑐᖅ ᖁᖃᖅᑐᑦ ᐆᒪᔪᕋᓛᑦ, ᐊᒻᒪᓗ ᐃᓕᑕᕐᓇᙱᑦᑐᖅ ᑐᖑᔪᖅᑯᑎᒃ ᐆᒪᔪᐃᑦ. ᐆᒪᔪᕐᓄᑦ ᑕᑯᒃᓴᐅᑦᑎᐊᕐᓂᖏᑦ ᐃᒍᓇᖅᐸᓪᓕᐊᔪᑦ ᐆᒪᔪᕋᓛᑦ ᐱᐅᓯᕚᓪᓕᓚᐅᖏᑦᑐᑦ ᐱᖓᔪᐊᓂᑦ ᐅᑭᐅᕐᒥᑦ ᖃᐅᔨᓴᐃᓂᕐᒥᑦ, ᐃᓚᐅᑎᑦᑎᒐᓗᐊᖅᑎᓪᓗᒋᑦ ᑕᑯᒃᓴᐅᑎᑦᑎᑦᑎᐊᖅᑐᒥᑦ ᐊᔾᔨᓕᐅᕈᑎᒥᒃ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔩᒥᒃ ᖃᓂᑦᑐᒥᑦ ᐅᑭᐅᖅᑕᖅᑐᒥᑦ ᐆᒪᔪᓂᒃ ᖃᐅᔨᒪᔭᒃᖅᑐᒥᒃ ᐱᖃᑎᖃᕋᓗᐊᖅᑎᓪᓗᒍ ᐊᔾᔨᓕᐅᕆᔩᒥᒃ. ᐆᒪᔪᓂᒃ ᓇᓃᓐᓂᕆᔭᖏᓐᓄᑦ ᐆᒪᔪᐃᑦ ᐋᖅᑭᒃᑕᐅᓂᖃᓚᐅᖏᑦᑐᑦ ᐊᔪᕐᓇᕐᓂᖏᓐᓄᑦ ᐃᓕᑕᕆᔭᕆᐊᒃᓴᖅ ᖃᖃᕐᓂᖏᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᑭᓐᓂᖏᓐᓄᑦ ᑕᒪᒃᑯᓄᙵ ᐅᒃᑐᕋᐅᑎᖃᙱᓪᓗᑎᒃ.

NIS/AIS-ᓄᑦ ᐱᓕᕆᐊᖑᔪᑦ ᑕᒪᓗᒃᑖᕐᓚᒃ ᐃᓗᐃᑦᑑᖕᒐᔪᒃᑯᑦ ᖃᐅᔨᓴᐃᓂᐅᓚᐅᖅᑐᖅ ᐱᓕᕆᐊᖑᕙᓗᓂ ᑕᕆᐅᕐᒥᑦ ᐃᒃᓴᕝᕕᖏᒥᑦ ᑲᓇᑕᒥᑦ. 800-ᓗᐊᑦ ᐆᒪᔪᐃᑦ ᐃᓕᑕᕆᔭᐅᓚᐅᖅᑐᑦ ᕿᙵᐊᓂᑦ NIS/AIS-ᓂᑦ ᖃᐅᔨᓴᐃᓂᐅᔪᓂᑦ ᐅᕙᓗᒥᒧᑦ ᑎᑭᖦᖢᒍ, ᐃᓚᐅᕙᓗᑎᒡᓗ ᐊᖏᔪᑦ ᐱᕈᖅᑐᐃᑦ, ᐆᒪᔪᕋᓛᑦ ᐊᒻᒪᓗ ᑕᕆᐅᑉ ᐊᓗᐊᓂᕐᒥᐅᑕᐃᑦ ᐊᒻᒪᓗ ᐃᖃᓗᐃᑦ. ᐃᓕᑕᖅᓯᓂᖅ ᐊᒻᒪᓗ ᓇᓗᓇᐃᕐᓗᒋᑦ ᐊᑕᐅᓯᒃᑰᖕᒐᓗᒋᑦ ᐆᒪᔪᐃᑦ Hᐊᓐᓇᖏᓐᓃᑦᑐᓂᑦ ᐃᓕᑕᕆᔭᐅᓯᒪᔪᓂᑦ ᕿᙵᐊᓂᑦ ᓇᓗᓇᐃᖅᓯᔪᖅ ᖃᐅᔨᓴᐃᓂᖅ ᐊᓃᑎᖃᕐᓂᖕᒐᓄᑦ ᐊᒻᒪᓗ ᐱᔭᒃᓴᐅᑎᖃᖅᑎᑕᐅᓂᖕᒐᓄᑦ ᑲᒪᑉᓗᓂ. ᐊᒥᓱᒐᓚᐃᑦ ᐆᒪᔪᐃᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ "ᐅᓗᕆᐊᓇᙱᑦᑐᑦ"-ᑎᑐᑦ ᐊᒻᒪᓗ ᐃᓱᒪᒋᔭᐅᖏᑦᑐᑦ ᐃᓱᒫᓘᑎᒋᔭᐅᔭᕆᐊᖃᕐᓂᖏᓐᓄᑦ. ᐊᑕᐅᓯᐅᑉᓗᒋᑦ ᓇᓗᓇᐃᖅᓯᓃᑦ ᐊᒻᒪᓗ ᑎᑎᖅᑲᐅᑎᓂᒃ ᕿᒥᕐᕈᓃᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᓂᒃ ᐆᒪᔪᓂᑦ 2020-ᒥᑦ ᓯᑕᒪᓂᒃ ᐆᒪᔪᓂᒃ (ᐱᖓᓱᑦ ᑭᖑᓪᓚᐃᑦ ᐊᒻᒪᓗ ᐊᑕᐅᓯᖅ ᐃᖃᓗᒃ) ᖃᐅᔨᓴᖅᑕᐅᒃᑲᓐᓂᕆᐊᖃᖅᑐᑦ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᕿᒥᕐᕈᔭᐅᑦᑎᐊᕐᓗᑎᒃ, ᓈᓗ ᓯᓚᑖᓂᑦ ᐆᒪᔪᐃᑦ ᕿᒥᕐᕈᔭᐅᓗᑎᒃ ᑕᒪᒃᑯᓂᙵᓕᕆᓂᐊᓄᑦ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᓇᑭᙶᕐᓚᑦᑖᕐᓂᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ. ᐅᑉᓗᒥᒧᑦ ᑎᑭᖦᖢᒍ, ᐱᓕᕆᐊᒥᑦ ᐱᔪᓂᒃ ᑎᑭᐅᑎᔭᐅᓯᒪᔪᓂᒃ NIS/AIS ᐆᒪᔪᓂᑦ ᑎᑎᕋᐅᓯᐅᓯᒪᔪᖃᙱᑦᑐᖅ ᕿᙵᐊᓂᑦ ᐃᒃᓴᕝᕕᖏᒥᑦ ᐊᒻᒪᓗ ᐱᔭᕆᐊᖃᕐᓂᐅᔪᖅ ᐱᐊᓚᔪᒃᑯᑦ ᐅᐸᓗᐊᓗᓂ ᐱᒋᐊᖅᑎᑦᑎᓂᖅᑕᖃᓚᐅᖏᖦᖢᓂ.

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TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
AIS	Aquatic Invasive Species
ARCH	Arctic Char
BACI	Before/After Control/Impact
Baffinland	Baffinland Iron Mines Corporation
BC	British Columbia
BC MOE	BC Ministry of Environment and Climate Change Strategy
BOD	Biological Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
CPUE	Catch Per Unit Effort
DFO	Fisheries and Oceans Canada
EEM	Environmental Effects Monitoring
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
FHSC	Fourhorn Sculpin
GPS	Global Positioning System
HIAT	Arctic Hiatella
Indet.	Indeterminate
ISQGs	Interim Sediment Quality Guidelines
ISSG	Invasive Species Specialist Group
Laval	The Benthic Ecology Lab at Université Laval
LSA	Local Study Area
LSI	Liver Somatic Index
m	Metres
MDMER	Metal and Diamond Mining Effluent Regulations
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environmental Working Group
mg/kg	Milligrams per Kilogram
mm	Millimetre
mtpa	million tonnes per annum
n	Sample Size
N/A	Not Applicable

Acronym or Abbreviation	Definition
NIRB	Nunavut Impact Review Board
NIS	Non-Indigenous Species
NIS/AIS	Non-Indigenous Species / Aquatic Invasive Species
No.	Number
PAHs	Polycyclic Aromatic Hydrocarbons
PC	Project Certificate
ROV	Remotely Operated Vehicle
SEM	Sikumiut Environmental Management Ltd.
SHSC	Shorthorn Sculpin
sp.	Species
sp. nr.	Species Near To
spp.	Species (plural)
TSS	Total Suspended Solids
VEC	Valued Ecosystem Components

Chapter 1.0 Introduction

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

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1663724-281-R-Rev1-34000

18 August 2021

1.0 INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) completed its sixth consecutive year of the marine ecological effects monitoring program (MEEMP) and non-indigenous/aquatic invasive species (NIS/AIS) monitoring program for the Mary River Project (the Project). This report presents the results for the 2020 programs conducted in Milne Inlet during the open-water season. Both programs were originally developed in 2015 following completion of marine baseline studies in Milne Port during 2013 and 2014. The MEEMP and NIS/AIS monitoring programs are intended to provide a primary means to identify and quantify potential Project-related changes in the marine environment. Where such changes occur, the programs assist in identifying appropriate modifications to, or mitigation of, Project operational activities to avoid and/or minimize potential adverse effects on the marine environment. Results from the MEEMP and NIS/AIS monitoring programs also provide information to the Nunavut Impact Review Board (NIRB) to support its annual review of the Mary River Project.

1.1 Project Context

The Mary River Project is an operating iron ore mine located in the Qikiqtani Region of North Baffin Island, Nunavut (Figure 1-1). Baffinland Iron Mines Corporation (Baffinland, the Company) is the owner and operator of the Project. The operating Mine Site is connected to a port at Milne Inlet (Milne Port) via the 100-km long Milne Inlet Tote Road. Undeveloped components of the Project include a South Railway connecting the Mine Station to a future port at Steensby Inlet (Steensby Port).

Baffinland is currently operating in the Early Revenue Phase (ERP) of the Project. Project Certificate No. 005, amended by the Nunavut Impact Review Board on 18 June 2020 (Amendment No. 03), authorizes the Company to mine up to 22.2 million tonnes per annum (mtpa) of iron ore from Deposit No. 1. Of the 22.2 mtpa, Baffinland is authorized to transport 6.0 mtpa of ore by truck to Milne Port for open water shipping through the Northern Shipping Route using chartered ore carrier vessels until December 31, 2021 (Condition 179(a)). The Company is also currently authorized to transport 18 mtpa by rail to Steensby Port for year-round shipping through the Southern Shipping Route (via Foxe Basin and Hudson Strait), as part of the currently undeveloped Project component.

Shipping of ore from Milne Inlet during the early revenue phase began in 2015 and is expected to continue for the life of the Project (20+ years). During the first year of ERP Operations in 2015, Baffinland shipped approximately 900,000 tonnes via 13 ore carrier voyages. The amount of ore shipped during the 2020 open-water season increased to approximately 5.5 million tonnes via 72 return ore carrier voyages.

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LEGEND

- MINE SITE
- PROJECT LOCATION
- MILNE INLET TOTE ROAD
- PROPOSED NORTH RAILWAY
- SHIPPING ROUTE
- WATERCOURSE
- EXISTING INFRASTRUCTURE
- EXISTING ORE DOCK
- PROPOSED FREIGHT DOCK AND CAUSEWAY
- INAC FORESHORE LEASE
- LOCAL STUDY AREA
- NUNAVUT SETTLEMENT AREA
- PDA / QIA COMMERCIAL LEASE
- REVISED PDA FOR PHASE 2 PROPOSAL
- WATERBODY

0 5 10
1:250,000 KILOMETRES

REFERENCE(S)

LOCAL STUDY AREA BOUNDARY DIGITIZED FROM THE MARY RIVER PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT (FEBRUARY 2012). FREIGHT DOCK DATA PROVIDED BY CLIENT, MAY 21, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE PROVIDED BY CLIENT, MAY 28, 2018 AND PROVIDED BY HATCH, JANUARY 25, 2017, RETRIEVED FROM KNIGHT PIESOLD LTD. FULCRUM DATA MANAGEMENT SITE MAY 19, 2017. HYDROGRAPHY AND TOPOGRAPHY DATA BY EAGLE MAPPING (2005), RETRIEVED FROM KNIGHT PIESOLD LTD. FULCRUM DATA MANAGEMENT SITE, MAY 2017. HYDROGRAPHY, POPULATED PLACE, AND PROVINCIAL BOUNDARY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT – MARINE ENVIRONMENTAL EFFECTS MONITORING PROGRAM 2020

TITLE
PROJECT LOCATION

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
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25mm

1.2 Background

As a part of regulatory commitments, Baffinland has developed and implemented a multi-disciplinary Marine Environmental Effects Monitoring Program (MEEMP). The MEEMP is designed to evaluate potential Project-related effects on the marine environment as predicted in the Final Environmental Impact Statement (FEIS; Baffinland 2013) and FEIS Addendum (Baffinland 2013); original FEIS predictions, associated mitigation measures, and current status are presented in Table 1-1 below.

The MEEMP includes monitoring of marine water and sediment quality, marine invertebrates, marine vegetation, and fish and fish habitat. The MEEMP sampling design is generally based on the Metal Mining Environmental Effects Monitoring guidelines (Environment Canada 2012) and includes statistical approaches for detecting potential Project-induced impacts on the marine environment. Non-indigenous species and AIS monitoring is an integral component of the MEEMP and is designed to address the potential risks of species introductions to the marine environment from ship ballast water and hull biofouling.

Sikumiut Environmental Management Ltd. (SEM) was originally retained by Baffinland to design and implement the MEEMP. The MEEMP program was first implemented in 2015, at which time monitoring efforts focused primarily on further characterization of baseline conditions in Milne Port prior to commencement of Project operations in 2015 (SEM 2015). Environmental effects monitoring was completed by SEM in 2015 and 2016. Golder completed environmental effects monitoring from 2017 through 2020, which included modifications to the 2014-2016 MEEMP and NIS/AIS sampling design to better address the objectives of the programs.

1.3 Objectives

This report presents the results of the MEEMP and NIS/AIS monitoring programs conducted at Milne Port and in Milne Inlet during the 2020 open-water season. The GPS/tidal gauge component for the monitoring of sea levels and storm surges is presented in a separate report, included as Appendix 1A.

In accordance with existing Terms and Conditions of Project Certificate (PC) No. 005, Baffinland is responsible for the establishment and implementation of the MEEMP, which comprises monitoring studies that are conducted over a defined time period with the following objectives:

- Assess the accuracy of effects predictions in the FEIS (Baffinland 2012) and Addendum 1 (Baffinland 2013).
- Assess the effectiveness of Project mitigation measures.
- Verify compliance of the Project with regulatory requirements, Project permits, standards and policies.
- Identify unforeseen adverse effects and provide early warnings of undesirable changes in the environment.
- Improve understanding of local environmental processes and potential Project-related cause-and-effect relationships.
- Provide feedback to the applicable regulators (e.g., NIRB) and advisory bodies (e.g., Marine Environmental Working Group [MEWG]) with respect to:
  - Potential adjustments to existing monitoring protocols or monitoring framework to allow for the most scientifically defensible synthesis, analysis, and interpretation of data.
  - Considerations for the modification of operational practices where and when necessary.

Table 1-1: Summary of FEIS/ERP Predictions for Milne Port, Associated Mitigation Measures, and Current Status

FEIS/ERP Predictions				Relevant MEEMP Sections	Current Status
VEC	**Activity**	**Impact/Significance**	**Associated Mitigation Measures**		
Water and Sediment Quality	Barge and ship traffic to/from Milne Inlet	Negligible effects to total suspended solids (TSS), nutrient, or metal concentrations in the water or sediment due to resuspension of substrates from propeller currents; expected that the new equilibrium state will be reached early within the operation phase of the Project.	• Environmental Monitoring and Mitigation Plan outlines measures such as use of silt curtains and drainage ditches, as well as treatment and testing of effluent/run-off prior to discharge, to mitigate potential effects to water and sediment quality. • Emergency Response and Spill Contingency Plan outlines measures to mitigate potential fuel spills. • Shipping Management Plan outlines measures to mitigate potential effects associated with vessel traffic such as a mandatory mid-ocean ballast water exchange and compliance with Anti-Fouling Systems Convention.	Chapter 2.0 Chapter 3.0, Chapter 5.0	No indications of impacted marine water or sediment quality. Measured metals concentrations are low, typically below applicable guidelines, and generally consistent with previous years. No observance of ore dust deposition in substrate.
		No anticipated increases in hydrocarbon concentrations in water or sediments through normal vessel operations.			
	Discharge of ballast water	Open-water season: no anticipated effects to water or sediment quality.			
		Ice-cover season: increases in temperature and nitrate concentrations in the water; increases in nitrogen concentrations in the sediment; no anticipated changes in the concentrations of metals or other nutrients in water or sediment.			
	Dispersion and deposition of dust from the ore stockpile	Increases in concentrations of TSS and metals (primarily iron) in the water.			
		Increases in concentrations of metals (primarily iron) in the sediment.			
	Discharge of wastewater and site run-off	Increases in biological oxygen demand (BOD) and concentrations of TSS, nutrients, metals, and hydrocarbons in the water.			
		Increases in concentrations of nutrients, metals, and hydrocarbons in the sediment.			
Marine Fish Habitat	Habitat Alteration (Sediment introduction and resuspension)	Wastewater discharge and site runoff may introduce TSS into the water column, increasing the amount of fine-grained sediments in the immediate vicinity of the discharge point.	• Environmental Monitoring and Mitigation Plan outlines measures such as use of silt curtains and drainage ditches, as well as treatment and testing of effluent/run-off prior to discharge, to mitigate potential effects to water and sediment quality. • Emergency Response and Spill Contingency Plan outlines measures to mitigate potential fuel spills	Chapter 2.0 Chapter 3.0 Chapter 4.0 Chapter 5.0, Chapter 8.0	No indications of impacted marine sediment quality. Measured metals concentrations are low, typically below applicable guidelines, and/or generally consistent with previous years. No observance of ore dust deposition in substrate
		Potential increases in concentrations of TSS in the water column and accumulation of fines in the sediments could alter the nearshore habitat, although tidal fluxes are expected to disperse the effluents and minimize effects on habitat.			
	Habitat Alteration	Sediment resuspension due to occasional (<1 per year) vessels and propeller-generated currents expected to lessen as fine-grained			

FEIS/ERP Predictions				Relevant MEEMP Sections	Current Status
VEC	**Activity**	**Impact/Significance**	**Associated Mitigation Measures**		
	(Substrate alteration)	sediments on seabed are removed and seabed sediment composition stabilizes.	• Shipping Management Plan outlines measures to mitigate potential effects associated with vessel traffic such as a mandatory mid-ocean ballast water exchange and compliance with Anti-Fouling Systems Convention. • Minimize vessel operations to the extent possible. • Mitigation by design and through compliance of Fisheries and Oceans Canada's (DFO) no net loss habitat policy.		No evidence of altered benthic infauna, epifauna, or macroflora community composition or productivity.
		Removal of fine-grained sediments may alter benthic community composition.			
	Habitat Alteration (Noise disturbance)	Intermittent noise disturbance due to occasional vessel operations and loading activities.			
	Habitat Alteration (Fugitive ore dust deposition)	Fugitive ore dust deposition to marine environment.			
		Possible change to water and sediment chemistry and seabed grain size composition.			
		Possible change to benthic productivity.			
Arctic Char (*Salvelinus alpinus*) Health	Sediment Resuspension	Increases in concentrations of TSS, nutrients, and metals in the water column as a result of sediment disturbance from propeller currents are expected infrequently during operation. Short-term exposure of arctic char to these conditions has minimum potential to affect fish health.	• Environmental Monitoring and Mitigation Plan outlines measures such as use of silt curtains and drainage ditches, as well as treatment and testing of effluent/run-off prior to discharge, to mitigate potential effects to water and sediment quality. • Emergency Response and Spill Contingency Plan outlines measures to mitigate potential fuel spills. • Shipping Management Plan outlines measures to mitigate potential effects associated with vessel traffic such as a mandatory mid-ocean ballast water exchange and compliance with Anti-Fouling Systems Convention.	Chapter 6.0 Chapter 7.0	No indications of changes in population or relative abundances of Arctic Char and other fish species. No notable trends observed in tissue concentrations of contaminants of concern (e.g., arsenic, cadmium, iron, lead, or mercury) over time.
		The redistribution of sediments near the docks is not expected to directly affect fish health or condition.			
	Discharge of ballast water	Slight reductions in nutrient concentrations and short-term, localized increases water temperature in Milne Inlet are expected to have negligible effects on fish health and condition.			
		Metal concentrations in water and fish tissues are not expected to change.			
	Discharge of wastewater, contact water, and site drainage	Potential increases in metal and hydrocarbon concentrations in fish tissues and reductions in fish health and condition are possible as a result of release of site drainage (with elevated BOD and concentrations of TSS, nutrients, metals, and hydrocarbons) to the marine environment.			
		Combined effluents will be tested to ensure that they are not acutely toxic.			

VEC = Valued Ecosystem Component

The MEEMP was developed in consideration of the anticipated and potential Project-related impacts to the marine environment as identified in the 2012 FEIS and subsequent ERP Addendum, as well as monitoring requirements outlined in several PC Terms and Conditions; relevant PC conditions are listed in Table 1-2, along with a description of how the conditions are addressed through the MEEMP/NIS/AIS program.

Table 1-2: PC Conditions Relevant to MEEMP Surveys

Condition #	Condition	Relevant MEEMP Chapter(s)
76	The Proponent shall develop a comprehensive Environmental Effects Monitoring Program to address concerns and identify potential impacts of the Project on the marine environment.	Chapter 2.0 Chapter 3.0 Chapter 4.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0
1 and 83	GPS/tidal gauge monitoring of sea levels and storm surges. Install tidal gauges at Steensby and Milne Port to monitor seas levels and storm surges.	Appendix 1A
83(a)	The Proponent shall conduct hydrodynamic modelling in the Milne Inlet Port area to determine the potential impacts arising from disturbance to sediments including re-suspension and subsequent transport and deposition of sediment. The modelling results shall be used to update the marine water and sediment quality monitoring and mitigation program to include activities associated with the construction and operation of the Milne Inlet Port. The monitoring program shall include an ongoing assessment of the potential introduction of metals that bio-accumulate in the marine food chain.	Chapter 3.0 Chapter 5.0 Chapter 7.0
84	The Proponent shall update its sediment redistribution modeling once ship design has been completed and sampling should be undertaken to validate the model and to inform sampling sites and the monitoring plan.	Chapter 3.0 Chapter 5.0
85	The Proponent shall develop a monitoring plan to verify its impact predictions associated with sediment redistribution resulting from propeller wash in shallow water locations along the shipping route. If monitoring detects negative impacts from sediment redistribution, additional mitigation measures will need to be developed and implemented.	Chapter 3.0
86	Prior to commercial shipping or iron ore, use more detailed bathymetry collected from Steensby and Milne Inlets to model anticipated ballast water discharges from ore carriers. This information should be used to update ballast water discharge impact predictions and sampling should be conducted to validate the model.	N/A
87	The Proponent shall develop a detailed monitoring program at a number of sites over the long term to evaluate changes to marine habitat and organisms and to monitor for non-native introductions resulting from Project-related shipping. This program needs to be able to detect changes that may have biological consequences and should be initiated several years prior to any ballast water discharge into Steensby Inlet and Milne Inlet to collect sufficient baseline data and should continue over the life of the Project.	Chapter 2.0 Chapter 3.0 Chapter 4.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0

Condition #	Condition	Relevant MEEMP Chapter(s)
89	The Proponent shall develop and implement an effective ballast water management program that may include the treatment and monitoring of ballast water discharges in a manner consistent with applicable regulations and/or exceed those regulations if they are determined to be ineffective for providing the desired and predicted results. The ballast water management program shall include, without limitation, a provision that requires ship owners to test their ballast water to confirm that it meets the salinity requirements of the applicable regulations prior to discharge at the Milne Port, and a requirement noting that the Proponent, in choosing shipping contractors will, whenever feasible, give preference to contractors that use ballast water treatment in addition to ballast water exchange.	Chapter 2.0 Chapter 8.0
91	The Proponent shall develop a detailed monitoring plan for Steensby Inlet and Milne Inlet for fouling that complies with all applicable regulatory requirements and guidelines as issued by Transport Canada, and includes sampling areas on ships where antifouling treatment is not applied such as the areas where non-native species are most likely to occur.	Chapter 8.0
99(a)	Establish shipping season, inter-annual baseline in Steensby Inlet and Milne Inlet that enables effective monitoring of physical and chemical effects of ballast water releases, sewage outfall, and bottom scour by ship props, particularly downslope and downstream from the docks. This shall include the selection and identification of physical, chemical, and biological community/indicator components. The biological indicators shall include both pelagic and benthic species but with emphasis on relatively sedentary benthic species (e.g., sculpins).	Chapter 2.0 Chapter 3.0 Chapter 4.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0
99(b)(ii)	The collection of additional baseline data in Milne Inlet on narwhal (*Monodon monoceros*), bowhead whale (*Balaena mysticetus*) and anadromous Arctic char abundance, distribution ecology and habitat use.	Chapter 6.0 Chapter 7.0
99(c)	Enhance baseline data on marine wildlife (fish, invertebrates, birds, mammals, etc.) and to provide more details on species abundance and distribution found in the Project area.	Chapter 3.0 Chapter 4.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0
113	The Proponent shall conduct monitoring of marine fish and fish habitat, which includes but is not limited to, monitoring for Arctic char stock size and health condition in Steensby Inlet and Milne Inlet, as recommended by the Marine Environment Working Group.	Chapter 6.0 Chapter 7.0
114	In the event of the development of a commercial fishery in the Steensby Inlet area or Milne Inlet-Eclipse Sound areas, the Proponent, in conjunction with the Marine Environment Working Group, shall update its monitoring program for marine fish and fish habitat to ensure that the ability to identify Arctic char stock(s) potentially affected by Project activities and monitor for changes in stock size and structure of affected stocks and fish health (condition, taste) is maintained to address any additional monitoring issues identified by the MEWG relating to the commercial fishery.	Chapter 6.0 Chapter 7.0
126	The Proponent shall design monitoring programs to ensure that local users of the marine area in communities along the shipping route have opportunity to be engaged throughout the life of the Project in assisting with monitoring and evaluating potential Project-induced impacts and changes in marine mammal distributions.	Chapter 4.0 Chapter 6.0

1.4 VECs and Indicators

1.4.1 VECs and Criteria for Magnitude Determination (FEIS)

The original MEEMP design was based on indicators and thresholds as presented in the FEIS, centred around three Valued Ecosystem Components (VECs): Marine Water and Sediment Quality, Marine Fish Habitat and Arctic Char Health.

Indicators used to determine the magnitude thresholds were based on guidelines, where available (Table 1-1). A reduction in productive capacity (measured as a proportion of lost or altered habitat to the total area of the Local Study Area, or LSA) was used as an indicator for the Marine Fish Habitat VEC (Baffinland 2012 and 2013). Thresholds were established based on degree of exceedance relative to guidelines. For certain parameters where no guidelines or quality criteria exist, the MEEMP used a significance criterion of two standard deviations of the baseline year as a threshold (Baffinland 2016).

The assessment predicted that Project activities may result in localized changes above threshold values for VECs, confined within the LSA. It was predicted that changes would not exceed thresholds for the Marine Fish Habitat VEC. All predicted residual environmental effects were rated as “Not Significant” since they were localized within the LSA (Table 1-1, Baffinland 2012 and 2013).

1.4.2 Indicators and Thresholds Currently Used for the MEEMP

Since 2016, the MEEMP and NIS/AIS program study design has evolved through consultation with regulatory agencies and Inuit organizations, as well as in response to recommendations made in previous survey years. Modifications to study design are discussed in Sections 1.5.3.1 and 1.5.4.1. Changes to the program also included updates or additions to the indicators and thresholds used to determine Project-related impacts to the environment in Milne Port. Sampling parameters and indicators used in 2020 are summarized in Table 1-3.

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Table 1-3: Sampling Parameters and Indicators for the 2020 MEEMP and NIS/AIS Monitoring Program

MEEMP Component	Indicator	Context
Marine Water Quality	Metals Total Suspended Solids Nutrients Hydrocarbons	Temporal
Marine Sediment Quality	Percent Fines Nutrients Metals Hydrocarbons	Spatial Temporal
Benthic Invertebrates	Total Density Taxa Richness Simpson's Diversity Index Simpson's Evenness Index	Spatial Temporal
Substrate, Macroflora, and Epifauna	Taxa Richness Relative Abundance Simpson's Diversity Index Abundance/Percent Cover	Spatial Temporal
Fish Population	Taxa Richness Relative Abundance Arctic Char Abundance Catch Per Unit Effort (CPUE)	Qualitative Temporal
Fish Health	Energy Use Energy Storage Supporting Endpoints (Various)	Temporal
Fish Tissue Chemistry	Total Metals Total Polycyclic Aromatic Hydrocarbons (PAHs)	Temporal
NIS/AIS	Presence of NIS or AIS	No Context

1.5 Study Design

1.5.1 Study Area

Consistent with previous years, the 2020 MEEMP and NIS/AIS field surveys were conducted primarily within the Local Study Area[1] (LSA) for the Marine Environment as defined in the FEIS and Addendum 1 (Baffinland 2012; 2013). The LSA includes all of Milne Port (Assomption Harbour) and extends north up to 4 km from the existing terminal (spanning the full width of Milne Inlet at the northern boundary; Figure 1-2). The southeast boundary of the LSA ends at the confluence of Milne Inlet with Phillips Creek.

In 2019, following feedback provided from MEWG members and the community during 2016 community workshops, additional NIS/AIS and physical oceanographic monitoring was conducted north of the LSA boundary extending to Ragged Island and Eclipse Sound (Figure 1-1). The 2020 MEEMP represented the fourth consecutive year of sampling at Ragged Island which is aimed at detecting potential Project effects from ore carriers when anchored in this area.

1.5.2 Inuit Participation

Inuit personnel have been integral to the overall success and safe execution of Baffinland's monitoring programs to date. The success of the MEEMP is greatly reliant on local expertise/knowledge and the continued participation of Pond Inlet community members with respect to study design, program implementation, and field logistics. In previous years, Inuit support has included onboard monitors, vessel operators, and support staff during sample processing. Unfortunately, the ongoing COVID-19 pandemic and associated public health orders precluded Inuit participation in the 2020 field program.

1.5.3 MEEMP

The MEEMP was initially designed in 2014 to evaluate potential Project-related impacts on the marine environment as predicted in the FEIS and subsequent FEIS Addendum (Baffinland 2013). The original sampling design for the MEEMP (Baffinland 2016; SEM 2015) was based on a radial gradient transect design extending out from the ore dock (Figure 1-2), which represents a potential point source for contaminants (e.g., ore dust, hydrocarbon release, wastewater, and site runoff) and physical perturbations (e.g., sediment re-suspension and transportation). The radial pattern was designed to detect potential Project-related effects based on a gradient of key components with numerical indicators (e.g., metal concentrations in sediment) along a series of transects with increasing distance from the point source.

The initial MEEMP design (excluding NIS/AIS monitoring) included the following study components:

- Marine sediment quality
- Benthic epifauna and epiflora dive surveys
- Fish

[1] The LSA includes all marine waters where there exists a reasonable potential for direct measurable effects from Project activities on the marine environment.

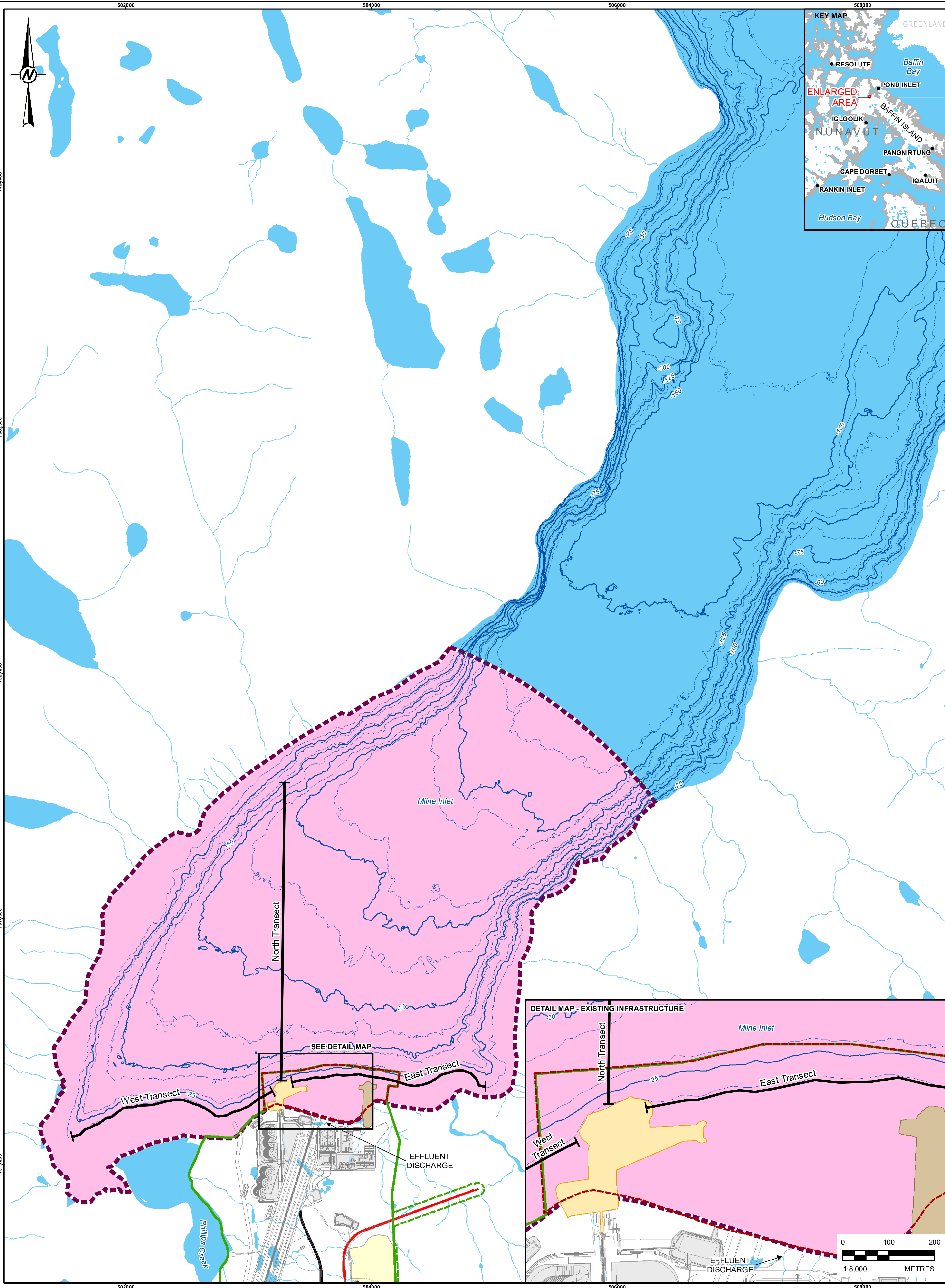
While the original radial gradient design has remained since 2014, the program has been updated to include more components and changes have been made to sampling methodologies and frequencies. Modifications to the MEEMP are summarized below in Section 1.5.3.1. Sampling efforts for the MEEMP in 2020 are summarized in Table 1-4.

Table 1-4: Summary of Sampling Efforts Performed in Milne Port as Part of MEEMP Surveys, 2020

MEEMP Component	Relevant PC Conditions	Collection Method	Sampling Effort	Sampling Frequency	Years of Data
Marine Water Quality	89 and 99 (a)	Vessel-based using 5.0L Niskin sampling bottles	8 stations	Annual; 5 sampling events/year (6 sampling events in 2019)	6
Marine Sediment Quality	76, 83 (a), 87, 99 (a), and 99 (c).	Vessel-based using Van Veen grab	62 stations	Annual	7
Benthic Infauna	99 (a), and 99 (c)	Vessel-based using Van Veen grab	60 stations	Annual	3
Substrate, Macroflora, & Epifauna	76, 83a, 84, 87, 99 (a) and (c)	Quadrat surveys by SCUBA divers and ROV video	10 Stations	Annual	1
Fish Population	99 (b)(ii), 99 (c), 113, and 114	Angling	20 hours	31 Stations	4
		Beach Seines	1.75 hours	18 Stations	3
		Fukui Traps	2,868 hours	27 Stations	8
		Gill Nets	93 hours	25 Stations	9
		Hoop Nets	1,692 hours	11 Stations	2
		Trawling	16 minutes	1 Station	1
Fish Health & Tissue Chemistry		See above for fish collection methods. Chemistry analyses completed by specialized laboratories.	8 ARCH 8 FHSC 8 HIAT	-	10 (ARCH) 2 (FHSC) 3 (HIAT)

ROV = Remotely Operated Video; ARCH = Arctic char; FHSC = Fourhorn sculpin (*Myoxocephalus quadricornis)*; HIAT = Arctic hiatella (*Hiatella arctica*)

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig1_2_2020MEEMP_RadialGradientStudyDesign_RevB.mxd PRINTED ON: 2021-08-03 AT: 12:01:17 PM



LEGEND

- BATHYMETRIC CONTOUR (15 m INTERVAL)
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- MILNE INLET TOTE ROAD
- PROPOSED NORTH RAILWAY
- TRANSECT
- WATERCOURSE
- AGGREGATE SOURCE (BORROW PIT OR QUARRY)
- EXISTING INFRASTRUCTURE
- EXISTING ORE DOCK
- PROPOSED FREIGHT DOCK AND CAUSEWAY
- LOCAL STUDY AREA
- PDA / QIA COMMERCIAL LEASE
- REVISED PDA FOR PHASE 2 PROPOSAL
- WATERBODY

0 500 1,000

1:30,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MAY 21, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE PROVIDED BY CLIENT, MAY 28, 2018 AND PROVIDED BY HATCH, JANUARY 25, 2017, RETRIEVED FROM KNIGHT PIESOLD LTD. FULCRUM DATA MANAGEMENT SITE MAY 19, 2017. HYDROGRAPHY AND TOPOGRAPHY DATA BY EAGLE MAPPING (2005), RETRIEVED FROM KNIGHT PIESOLD LTD. FULCRUM DATA MANAGEMENT SITE, MAY 2017. HYDROGRAPHY, POPULATED PLACE, AND PROVINCIAL BOUNDARY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT – MARINE ENVIRONMENTAL EFFECTS MONITORING PROGRAM 2020

TITLE
STUDY AREA FOR THE MARINE ENVIRONMENTAL EFFECTS MONITORING PROGRAM

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	1-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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1.5.3.1 Modifications to the Program

Since program inception, survey design has continually evolved based on refinements identified through consultation with regulatory agencies and Inuit organizations and recommendations made in previous survey years. Table 1-5 summarizes key changes to the program since 2014.

Table 1-5: Summary of Modifications to the MEEMP Study Design from 2014 to 2020

Year	MEEMP Component	Description of Modification
2015	Marine Water Quality	Addition of water quality component to monitor for potential changes associated with site drainage and treated effluent discharges to the marine environment (including iron ore stockpile run-off). Four water quality stations were established near the site discharge point for compliance monitoring; one station next to the site discharge point, and three stations located slightly offshore to the northeast, north and northwest of the source.
2017	Physical Oceanography	Addition of sea level monitoring (using a tidal gauge) and vertical physical profiles of physical oceanographic parameters at Milne Port.
2017/18	Fish Population	In 2017, fish sampling was limited to a two-week period in August, which was not necessarily representative of the entire open-water shipping season (late July to mid-October). In 2018, fish sampling was conducted throughout the duration of the MEEMP program (over four weeks, from the end of July to the end of August) for better representation of the shipping season. Fishing methods included gill netting and Fukui traps, with angling added in 2017, and beach seines added in 2018.
2018	Physical Oceanography	Sea level monitoring was expanded to include physical oceanographic monitoring throughout Milne Inlet including two sites at Milne Port and one at Bruce Head, and additional vertical physical profiles at select times and locations throughout Milne Inlet.
2018	Marine Sediment Quality	The number of sediment samples analyzed for hydrocarbon concentrations was reduced from three samples to one sample at each station, as hydrocarbon concentrations had been below detection limits (DL) in all samples to date. Additionally, two new sediment sampling stations were included along the East Transect to account for anticipated construction associated with the proposed Phase 2 ore dock and freight dock.
2018	Benthic Infauna	Addition of benthic infaunal sampling program, with input from MEWG. Previous years did not include infaunal sampling but, rather, evaluated changes to the benthic community using epifauna[2] and epiflora[3] as indicators using towed underwater video transect surveys – an approach that did not yield consistent nor reliable data primarily due to issues associated with video resolution.
2018	Epifauna and Epiflora	Study design was changed from one long video transect to a Before - After Control - Impact (BACI) approach with five belt transects (1 m x 5 m plots) permanently installed on the seabed in each of the exposure and reference areas; monitoring was conducted using a remotely operated vehicle underwater video system.

[2] benthic invertebrates living on the substrate

[3] marine vegetation attached to the substrate (e.g. kelp)

Year	MEEMP Component	Description of Modification
2018	Fish Health & Tissue Chemistry	Addition of local shellfish species, wrinkled rock borer (*Hiatella arctica)*, as an additional effects indicator in the event finfish species (Arctic char or sculpins) were sampled in insufficient numbers to adequately support statistical analyses. Measurement endpoints included body weight to length ratio and tissue (body burden) analysis. Prior to 2018, fish tissue sampling was limited to incidental Arctic char mortalities, which fluctuated from year to year and did not always yield enough samples for a meaningful statistical analysis.
2019	Physical Oceanography	Vertical physical profiles of water quality parameters including temperature, salinity, conductivity, turbidity, pH, chlorophyll-a, and dissolved oxygen were taken north of Ragged Island in Eclipse Sound in August and September 2019.
2019	Benthic Infauna/ Marine Sediment Quality	Following the results of a power analysis, sampling intensity for benthic infauna and marine sediment was increased from four transects with 5 stations, to five transects with 15 stations each to improve statistical power and the ability to detect Project-related effects. Unlike in previous years, separate NIS/AIS stations were not sampled due to the expansion of the benthic sampling program.
2019	Benthic Infauna	In previous years, 3 subsamples were taken at each benthic infauna sampling station. In 2019, the three subsamples were composited into a single sample for each station.
2019	Fish Health & Tissue Chemistry	Inclusion of sculpin (*Myoxocephalus sp*.) as a sentinel species and effects indicator due to the number of incidental mortalities being sufficient to support analyses.
2019	Fish Health & Tissue Chemistry	Instead of collecting length and weight measurements of *Hiatella arctica* samples in the field, *H. arctica* specimens were submitted for age analysis in addition to the tissue (body burden) analysis.
2019	Fish Population	Hoop nets were introduced to the fish sampling program to determine the capture efficiency of the method in Milne Port and to assess its potential as a replacement for Fukui trapping. Fukui traps will continue to be used in addition to hoop nets to meet commitments of continuing to sample at old locations for a minimum of three years to facilitate comparison of old and new methods/results.
2020	Marine Water Quality	Addition of a second water quality monitoring station at the discharge location of MP-06, consistent with the study design for the existing water quality monitoring station at the discharge location for MP-05.
2020	Marine Water Quality	The collection of water samples was scheduled to coincide with at least one active discharge event at each discharge. One collection event also coincided with a de-ballasting event along the Ore Dock.
2020	Marine Sediment Quality/Benthic Infauna	Following time constraints in 2019, the sampling effort was increased from 8 to 10 sampling stations per transect to 15 sampling stations per transect.
2020	Marine Sediment Quality/Benthic Infauna	Benthic infauna and sediment sampling methodology and equipment was standardized across all stations to ensure consistency and comparability of results.

Year	MEEMP Component	Description of Modification
2020	Marine Sediment Quality/Benthic Infauna	The Coastal Transect was removed from the sampling plan after being determined as not contributing to the radial gradient design of the sediment and benthic sampling components.
2020	Substrate, Macroflora, and Benthic Epifauna	Due to the previously deployed belt transects being moved, twisted, and obscured following a short deployment period, the belt transects were replaced with 10 steel quadrats that should be more robust under the local conditions.
2020	Substrate, Macroflora, and Benthic Epifauna	Following limitations in species identification in ROV footage on the belt transects, a dive team trained in the identification of marine biota were used in addition to ROV for survey of the quadrats.
2020	Fish Population	Based on input and recommendations by Inuit field personnel, fishing locations were selected, and modifications were made to the methodologies for Fukui traps and hoop nets. Modifications included setting the traps in deeper locations to target demersal species and improve capture efficiency.
2020	Fish Health and Tissue Chemistry	Fourhorn Sculpin were added as a targeted species for fish health and tissue chemistry/body burden analysis to monitor for impacts to resident fish species in Milne Port.
2020	Fish Health and Tissue Chemistry	Additional indicators were added to the fish health program to align with a Metal and Diamond Mining Effluent Regulations (MDMER) Environmental Effects Monitoring (EEM) program design. This included the addition of targeted lethal fish sampling to meet a minimum sample size.

1.5.4 NIS/AIS Monitoring

The NIS/AIS monitoring program was designed to detect for the potential introduction of non-native species from ballast water discharges and/or hull biofouling and focuses in areas with the highest likelihood of marine invasion. Due to ballast water releases occurring in Milne Port, NIS/AIS sampling largely focuses on southern Milne Inlet. The NIS/AIS Monitoring Program was conducted at a surveillance level, where detection of a single Project-related invasive species is the threshold for triggering of adaptive management measures (e.g., species rapid response plans) and/or potential corrective actions (e.g., measures to eradicate the NIS/AIS), if deemed feasible. The NIS/AIS monitoring program consists of data collected across multiple trophic levels (marine vegetation, zooplankton, benthic invertebrates and fish) to establish a comprehensive inventory of existing marine biota in the Project area that is intended to serve as a point of reference for any new species identified over time, and to evaluate potential changes in community structure that may be linked to NIS/AIS introductions. Sampling efforts that contribute to the NIS/AIS monitoring program are summarized in Table 1-6. NIS/AIS monitoring is recommended to be conducted annually until results of ballast water sampling are deemed satisfactory to recommend reducing the frequency of monitoring in the receiving environment.

Table 1-6: Summary of Sampling Efforts Performed in Milne Port as Part of NIS/AIS Monitoring Program Surveys, 2020

Relevant PC Conditions	Collection Method	Sampling Effort	Sampling Frequency	Years of Data
76, 87, 89, 91, 99 (a), and 99 (c)	Permanent Quadrats	10 Quadrats	Annual	3
	Zooplankton Tows	18 Stations	Annual	7
	Active Fish Sampling	114 Stations	Repetitive, Annually	9
	Fish Stomach Contents	33 Incidental Mortalities	Repetitive, Opportunistic, Annually	8
	Ship Hull Surveys	3 Ore Carriers	Opportunistic, Annually	3
	Benthic Infauna	62 Stations	Annual	9
	Incidental Specimen Collection	N/A	Opportunistic, Annually	2

1.5.4.1 Modifications to the Program

The initial NIS/AIS surveys were conducted in 2014 to enhance marine flora and fauna inventories collected during baseline sampling in 2008 and 2013. In subsequent years, NIS/AIS monitoring focused on identification of organisms not previously detected during the baseline program (as primary indicators of invasion). Equivalent NIS/AIS monitoring was continued in Milne Port area, although the program was expanded and modified based on refinements identified through consultation with regulatory agencies and Inuit organizations and recommendations made in previous survey years. Table 1-7 summarizes key changes to the program.

Table 1-7: Summary of Modifications to the NIS/AIS Monitoring Program Study Design from 2015 to 2020

Year	Program Component	Description of Modification
2015	Overall Program	Baskets were redeployed instead of being collected for annual analysis due to insufficient colonization on the substrate.
2015	Settlement Baskets	Baskets were redeployed instead of being collected for annual analysis due to insufficient colonization on the substrate.
2016	Settlement Baskets	New settlement baskets were deployed in Milne Port to replace sets previously lost.
2017	Benthic Infauna and Zooplankton	Four new sampling locations were added at Ragged Island to sample specifically for the NIS/AIS monitoring program in response to public concern over ships potentially discharging ballast water while occupying anchorage sites in this area.
2017	Zooplankton	Four new sampling locations were established in Milne Port for vertical zooplankton hauls, and two new locations for oblique zooplankton tows.
2017	Zooplankton	Modifications to the methodology for oblique zooplankton tows were made to target faster moving species and increase the total number of species identified.

Year	Program Component	Description of Modification
2018	ROV Surveys	ROV based surveys were made along the hulls of several ore carriers to assess for potential biofouling on vessels originating from outside of Canadian waters.
2019	Benthic Infauna	In 2019, no benthic infauna sampling occurred at the original NIS/AIS specific stations, due to the significant expansion of the benthic sampling program. A greater number of stations were sampled for identification of benthic infauna. NIS/AIS status was determined for all infauna identified in benthic sampling.
2019	Macroflora and Epifauna	A new NIS/AIS towed video survey transect was added east of the new freight dock at Milne Port to account for potential changes in shipping rates in Port.
2019	Zooplankton	Two oblique zooplankton tow sampling locations were added to the Ragged Island component.
2020	Overall Program	The program name was changed from AIS Monitoring to NIS/AIS monitoring to emphasize efforts to monitor for all potential species introductions to Milne Port, regardless of invasive status.
2020	ROV Surveys	Survey methodology was reviewed with the operator to ensure the methodology was aligned with the stratified survey design used in Sylvester and MacIsaac (2010).
2020	Ship Hull Monitoring	Performed ship hull monitoring on two ships at anchorage to avoid limitations with hull visibility and accessibility when ships are moored at the Ore Dock, increasing the total area and survey time for each ship.
2020	Settlement Baskets	Deployment of nine new sets of settlement baskets and plates along the Freight Dock, as well as 10 sets of settlement plates in other locations around Milne Port to increase monitoring of recruitment of encrusting biota.
2020	DNA Sampling	To improve taxonomic resolution, a DNA sampling component was added. Targeted sampling occurred at locations where potential NIS/AIS taxa had been observed previously, samples were preserved for DNA analysis at the Canadian Centre for DNA Barcoding at the University of Guelph. Incidentally-collected specimens were also selectively preserved for barcoding and taxonomic confirmation.

1.6 Conclusions

The MEEMP has been designed to meet the objectives of the various conditions associated with Project Certificate 005, as well as to evaluate whether Project activities have potentially impacted the marine environment over time. Original FEIS predictions indicated the potential for low magnitude changes in some ecological parameters, such as water quality and Arctic char tissue chemistry, but characterized these as “not significant”. Overall, monitoring data align with these predictions, as observed changes are typically minor and either within established guidelines or consistent with baseline levels. Thus, monitoring to date suggests that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected the marine ecosystem.

The main conclusions and recommendations based on the results of the 2020 MEEMP studies are as follows:

- **Marine Water Quality**
  - Relevant to PC No. 76, 87, 89, 99(a)
  - To date, construction and operation of Milne Port does not appear to have negatively affected water quality, as measured concentrations were generally consistent with previous years and remain below CCME water quality guidelines for the protection of aquatic life.
  - Laboratory analyses have not revealed an observed trend of increased levels of iron in water samples collected between 2017 and 2020.
  - Monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on water quality, but indicated the potential for minor localized increases in TSS, nutrient, metal, and hydrocarbon concentrations.
  - It is recommended that the water quality sampling program continue in 2021 to continue to monitor for potential changes in water chemistry resulting from Site operations.
- **Marine Sediment Quality**
  - Relevant to PC No. 76, 83 (a), 84, 85, 87, 99 (a), and 99 (c)
  - To date, construction and operation of Milne Port does not appear to have negatively affected sediment quality, as measured concentrations were low and generally consistent with previous years.
  - Minor exceedances of sediment quality guidelines were noted for arsenic and nickel but are not considered to be Project-related as these metals tended to increase with greater distance away from the Ore Dock. These exceedances are thus most likely reflective of background conditions and related to natural sediment transport and coastal sorting mechanisms rather than contamination caused by Project activities.
  - Similarly, exceedances were noted for a few organic constituents but these were rare, small in magnitude (i.e., not considered to be at levels that would represent harm to the aquatic environment), and were not concentrated around the Ore Dock in a way that would suggest a specific point source.
  - Comparison of the percentage of fine sediments over time indicates no statistically significant changes in fines content within the sediments between 2014 and 2020.
  - Comparison of the iron sediment concentrations over time along the transects did not indicate statistically significant changes in iron content from the previous year (2020 vs. 2019) nor between 2014 and 2020.
  - Monitoring results largely remain within original FEIS predictions, which forecasted no significant residual effects on sediment quality, but indicated the potential for minor localized increases in nutrient, metal, or hydrocarbon concentrations that would not exceed Canadian Council of Ministers of the Environment (CCME) sediment quality guidelines for the protection of aquatic life.
  - It is recommended that monitoring of sediment quality within the study area should continue, but at reduced frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet.

- **Benthic Infauna**
  - Relevant to PC No. 76, 99(a) and 99(c)
  - To date, construction and operation of Milne Port does not appear to have negatively affected benthic infaunal communities, which continue to be diverse and well established in both nearshore and offshore habitats.
  - Sampling in Milne Inlet revealed a high degree of spatial variability in invertebrate community indices, which is common in marine benthic habitats.
  - There were no consistent differences between years (2020 vs 2019, or between 2020 vs 2018/2019) in benthic community indicators along the four transects and, in isolated instances where indicators were significantly different between years, endpoints tended to be higher in 2020. The results of the 2020 Marine Environmental Effects Monitoring Program results are more consistent with expected natural variability for these benthic habitat types within Milne Inlet, as there appears to be no evidence to suggest impairment of benthic communities related to the Project.
  - It is recommended that monitoring of benthic infauna should continue, but on a reduced frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on both benthic communities and marine sediment quality within Milne Inlet.

- **Substrate, Macroflora and Benthic Epifauna**
  - Relevant to PC No. 76, 83 (a), 87, 99 (a), and 99 (c).
  - To date, construction and operation of Milne Port does not appear to have negatively affected substrate, macroflora, and benthic epifauna – differences between survey years (temporal differences) and areas (spatial differences) are considered minor and are likely due to natural variability or within the range of survey methodology error.
  - Surveys were modified in 2020 to install permanent steel quadrats to replace belt transects previously deployed in the same general locations, which had been determined to be ineffective due to a high proportion becoming twisted, moved, or obscured within one year of deployment.
  - Quadrats were surveyed by a mix of divers and ROV, adding a degree of resolution that had not previously been available in ROV surveys alone.
  - It is recommended that substrate, macroflora, and epifauna surveys continue in 2021 for monitoring for potential changes in benthic communities resulting from Site operations. It is also recommended that divers continue to be used to survey all quadrats to standardize the methodology and improve identification of substrate and taxonomic resolution.

- **Fishing Effort and Catch Data**
  - Relevant to PC No. 99 (b)(ii), (c), 113, and 114.
  - Construction and operation of Milne Port does not appear to have triggered detectable changes in local fish communities to date.

- Presence and diversity data collected in 2019 were comparable to previous years, including baseline years. Surveys were reliably capturing comparable abundances of the dominant species in Milne Port (Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin), and there is no indication that there are Project related impacts on their numbers or relative abundance.
- Monitoring results align with original FEIS predictions, which forecasted that the Project would have no significant effects on marine fish habitat, nor would it affect the size of Arctic char populations.
- It is recommended that fish sampling continue in 2021 with modifications to standardize methodologies and sampling locations to facilitate the ability to make comparisons between survey years:

- **Fish Health and Tissue Chemistry**
  - Relevant to PC No. 76, 83 (a), 87, 99 (a), 99 (b) (ii), 99 (c), 113, and 114.
  - Monitoring results remain well within original FEIS predictions, which indicated the potential for non-significant, low magnitude effects on Arctic Char health and body condition that are expected to be reversible. Observed changes have generally been small and either within established guidelines, or consistent with baseline conditions, and are thus considered to reflect natural variability rather than effects resulting from the Project.
  - Differences were observed among years in fish size; however, these differences were small and inconsistent among years and likely reflect natural variability in these fish populations over time.
  - Statistically significant elevations in tissue concentrations of metals were noted for the clam *H. arctica* and Arctic char in 2020 relative to concentrations in 2018 and 2019, however, these differences were small and often inconsistent, likely reflecting natural variability in both the bioavailability and subsequent uptake of metals, reflected in the reported tissue concentrations.
  - Continued monitoring of proposed MEEMP components is recommended to achieve continuity in established time series (e.g., Arctic Char) and to better characterize baseline data (e.g., sculpin and *H. arctica* tissue chemistry).

- **NIS/AIS Program**
  - Relevant to PC No. 76, 87, 89, 91, 99 (a), and 99 (c).
  - Hundreds of taxa (800+) have been documented to date, the vast majority of which are not NIS/AIS.
  - Taxa identified in 2020 surveys included 33 new benthic infauna taxa, eight of which were flagged and sent to a DFO-endorsed laboratory at Université Laval for independent verification.
  - Targeted sampling occurred at five locations in Milne Port to capture taxa designated as “High Risk” for DNA verification. No target species were found.
  - Eight macroflora, benthic epifauna, and zooplankton taxa that had not been previously identified in surveys at Milne Port were captured in 2020 surveys. All newly observed taxa have described ranges that include the Canadian Arctic Ocean, none of which are listed in AIS databases, and therefore are not considered to be of concern for Milne Inlet.

- Ship hull monitoring was performed on three ore carriers for evidence of biofouling. Two vessels showed extensive biofouling. Many taxa were not resolved to the species level due to the difficulty of identification of encrusting or small bodied taxa without a specimen.
- There are currently no taxa on the Trigger List and no taxa were added in 2020.
- Four taxa were added to the Watchlist (*Ammodytes hexapterus, Hesperonoe* sp., *Ampharete petersenae*, and *Amphitrite birulai*), bringing the list total to nine.
  - A NIS fish species was confirmed through genetic barcoding: *Ammodytes hexapterus*, the Pacific Sandlance, is undergoing a range expansion into the Canadian Arctic Ocean mediated by climate change and its presence in Milne Port is considered not linked to Project vectors such as biofouling and ballast water.
  - *Hesperonoe* sp., *Ampharete petersenae*, and *Amphitrite birulai* do not have clear records of occurrence in the Canadian Arctic Ocean, however, none are listed on AIS databases; accordingly, these taxa were considered “Low Risk”.
  - The other taxa on the Watchlist are *Pseudofabricia* sp. nr. *aberrans* (Low Risk), *Sosane wireni* (Low Risk), *Crassicorophium* sp. (Low Risk), *Marenzelleria viridis* (High Risk), and *Monocorophium* sp. (High Risk).
- The following recommendations are proposed:
  - Sampling across multiple trophic levels continue in 2021 and that all flagged specimens continue to be screened for known geographic ranges and NIS/AIS status.
  - Taxa continue to be assessed for corresponding risk category and placed on the Watchlist or Trigger List, where appropriate.
  - The inventory of known species documented in Milne Inlet continues to be built upon and developed.
  - Continued use of external accredited laboratories to confirm identifications of flagged specimens.
  - Continuation and expansion of the collection of benthic infauna samples for DNA analysis at locations where High Risk taxa on the Watchlist had been previously observed.
  - Further review performed on the invasive spionid polychaete *Marenzelleria viridis* to determine the risk of potential invasion, its known range, and to confirm its historic collection records in the Canadian Arctic.

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APPENDIX A

Tide Gauge Report

TECHNICAL MEMORANDUM

DATE 19 February 2021 **Reference No.** 1663724-262-TM-Rev0

TO Emma Malcolm, Lou Kamermans
Baffinland Iron Mines Corporation

CC Phil Rouget, Julia Horgan

FROM Evan Elder, David Hurley, Phil Osborne **EMAIL phil_osborne@golder.com**

BAFFINLAND MILNE PORT TIDE GAUGE DATA COLLECTION – 2020 ICE FREE SEASON

1.0 INTRODUCTION

In 2020, Baffinland Iron Mines Corporation (Baffinland) undertook water level measurements with a tide gauge stationed at the Milne Port Ore Dock. The tide gauge monitoring program is intended to satisfy requirements of the 2020 marine-based Ecological Effects Monitoring (EEM) programs and address Terms and Conditions No. 1, 76 and 83 of Project Certificate (PC) No. 005. This report presents the results of the tide gauge monitoring program during the 2020 season.

2.0 METHODOLOGY

2.1 Unit Conventions

All dates and times are reported in Coordinated Universal Time (UTC), four hours ahead of the local time zone, Eastern Daylight Time (EDT). All horizontal positions are reported in Universal Transverse Mercator (UTM) coordinates referenced to the North American Datum of 1983 (NAD83) and/or in decimal degrees. Elevations are referenced to the Canadian Geodetic Vertical Datum (CGVD).

2.2 Design

The approach to the tide gauge design for 2020 was identical to that of 2019 (Golder, 2019). This was necessary to keep a repeatable installation location and elevation from season to season, which is critical to support an inter-annual comparison of water level data.

An RBRconcerto CTD sensor (herein “RBR”) was used to measure conductivity, temperature, and water levels at the Milne Port Ore Dock. The RBR is designed to be a simple and self-contained CTD sensor capable of working in cold (rated to -5 ˚C) and corrosive (i.e. salty) environments. The RBR was mounted in an aluminum housing unit which was secured to the Milne Port ore dock ladder through two welded L-brackets. The ladder is typically installed during the open water period (July to October) The Ore Dock ladder was chosen as the sampling location as it provides a stable mounting point that can be reinstalled each year as part of standard port operations. The instrumentation on the RBR and the sampling specifications are summarized in Table 1.

Additional details on the tide gauge design, installation and recovery, and mounting hardware are provided in the Milne Port Tide Gauge Installation and Recovery Instructions (Attachment 1).

Table 1: Tide Gauge Instrumentation and Sampling Strategy

Instrumentation	Sampling Strategy	Instrument Accuracy
Sensor: RBRconcerto CTD	**Measurement Interval:** 300 s **Sampling Rate:** 1 Hz **Averaging Duration:** 60 s	**Temperature accuracy:** ±0.002˚C **Conductivity accuracy:** ±0.005 mS/cm **Pressure accuracy:** ±0.05% of full-scale range

2.3 Deployment and Recovery

Prior to deployment the RBR sensor was calibrated at the factory. The calibration certificates are included in Attachment 2. Additionally, the RBR sensor was visually inspected, programmed, and synchronized to UTC time. The deployment and recovery of the RBR sensor, attached to the Milne Port Ore Dock ladder, was conducted by Baffinland personnel with remote support provided by Golder personnel on July 09, 2020 and October 17, 2020, respectively. Post-deployment, a GPS RTK (real-time kinematic) survey was conducted to determine the elevation and position of the ladder top plate (Table 2). This involved surveying four points in close proximity on the ladder top plate and calculating an average elevation. It was noted by Baffinland survey personnel that GPS quality was poor at the time of the survey (Ritgen, 2020) and there was a range of 38 cm between the recorded top plate elevations. An overview of previous year RTK GPS survey results is presented in Attachment 1 the Tide Gauge Instructions.

Table 2: RTK GPS Survey 2020

Survey Point	Easting (m)	Northing (m)	UTM Zone	Elevation (m, CGVD)	Tide Gauge Elevation (m, CGVD)1	Tide Gauge Elevation (m, Chart Datum)
Point 01	503226.717	7976633.635	17W	3.694	-2.721	-1.521
Point 02	503227.448	7976633.193	17W	3.765	-2.650	-1.450
Point 03	503226.871	7976632.335	17W	3.504	-2.911	-1.711
Point 04	503226.126	7976632.794	17W	3.382	-3.033	-1.833
Average Elevation				**3.586**	**-2.829**	**-1.629**

Notes: CGVD=Canadian Geodetic Vertical Datum; Horizontal datum is UTM NAD 83, Zone 17W; Elevations assume Chart Datum is 1.2 m below CGVD; [1]Distance from the tide gauge pressure sensor to the surveyed steel ladder top plate is 6.415 m based on an email communication with Baffinland personnel (Ritgen, 2020)

Following recovery of the RBR sensor, the data was downloaded by Baffinland personnel and shipped to Golder for sensor inspection and demobilization. Upon downloading the data, it was observed that the RBR stopped recording data on September 10, 2020 due to an internal logger error. Golder has followed up with RBR regarding the data collection error and has taken steps to mitigate this for future deployments.

Figure 1: Left: RTK Survey of the ore dock ladder top plate. Right: Ore dock ladder following removal, with the tide gauge housing shown on the bottom right of the ladder. (Ritgen, 2020)

2.4 Data Processing

A preliminary review of the data recorded by the RBR was performed following the recovery. Quality checks included the following:

- Reviewing time series measured by the instruments, including various diagnostic parameters.
- Checking internal recorder and file status.
- Plotting and viewing the time series data.

The data from the RBR sensor was extracted from Raw instrument format to ASCII using the instrument specific software Ruskin®. Plots of measured water quality parameters were generated, and post-processing and quality-checking of data was completed using the MATLAB® (Mathworks, 2019) scientific computing software and included:

- Measurements made by the instrument while it was out of water, as determined from either the pressure or salinity gauge, were replaced with a -999 value.
- Data were filtered for values above a maximum water temperature and salinity. The maximum water temperature was defined as 15 ˚C and salinity as 36 PSU. Filtered values were replaced with a -999 value.
- Where applicable, data were filtered for periods when the change in pressure between consecutive samples exceeded 0.5 dbar (approximately 0.5 m of water). Filtered values were replaced with a -999 value.
- Flagged and missing data values, identified onboard the instrument, were replaced with a -999 value. Additional manual editing to remove or flag spurious data was performed as necessary.
- The instrument deployment and recovery dates and percentage of valid data from the deployment period is provided in Table 3. Quality Controlled (QC) data are provided in Attachment 3.

Table 3: Recorded Data Statistics for the RBR Sensor

Instrument	Date/Time Deployed (UTC)	Date/Time Recovered (UTC)	Total Records Recorded (#)	Total Records Expected (#)	Flagged and Missing Data (#)	Percent Valid Data (%)
RBRconcerto CTD	July 09, 2020, 22:03:00	October 18, 2020, 21:05:00	17620	29076	11456	60.60

3.0 DATA SUMMARY

3.1 Tide Gauge

Time series of temperature, conductivity, salinity, and water level referenced to CGVD as measured by the RBR at the Milne Port Ore Dock over the length of the deployment are shown in Figure 2. The red and blue dashed lines indicate the insets shown in Figure 3 and Figure 4. The tide gauge shows a distinct seasonal pattern for near-surface water in Milne Inlet. This pattern was observed in previous years and is discussed in more details below.

In the first week of the deployment the RBR measured large fluctuations in temperature and salinity: the temperature oscillated between approximately 0 and 12 ˚C and the salinity between approximately 0 and 30 PSU. This range is most likely the result of freshwater runoff from Phillips Creek during the spring freshet and the melting of sea ice in Milne Inlet near Milne Port. After the spring freshet, the temperature and salinity time series stabilize and exhibits a smaller diurnal fluctuation. It is likely that these fluctuations are driven by upwelling/downwelling at the ore dock during wind events and by tidal forcing and continued freshwater runoff. In the fall, temperatures in Milne Port begin to cool as air temperature decreases, and the surface layer becomes well mixed with the layers below because of increased winds due to fall storms. This results in generally colder and more saline surface waters and is clearly observable in the temperature and salinity measurements from September 04 to the end of the deployment in Figure 2.

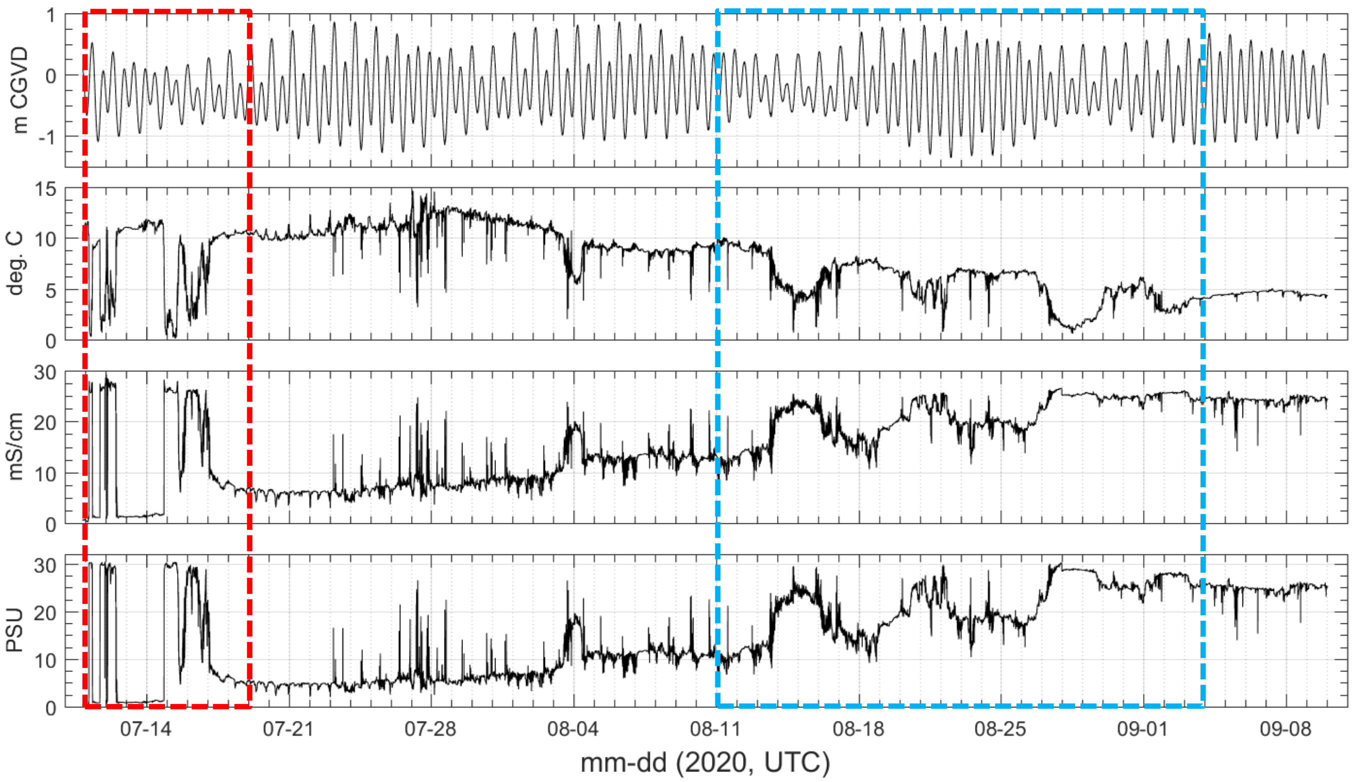

Figure 2: Time series of water level, temperature, conductivity, and salinity measured at Milne Port Tide Gauge by the RBR CTD from July 10 to September 09, 2020 in UTC. The red and blue dashed lines indicate the insets for Figure 3 and Figure 4.

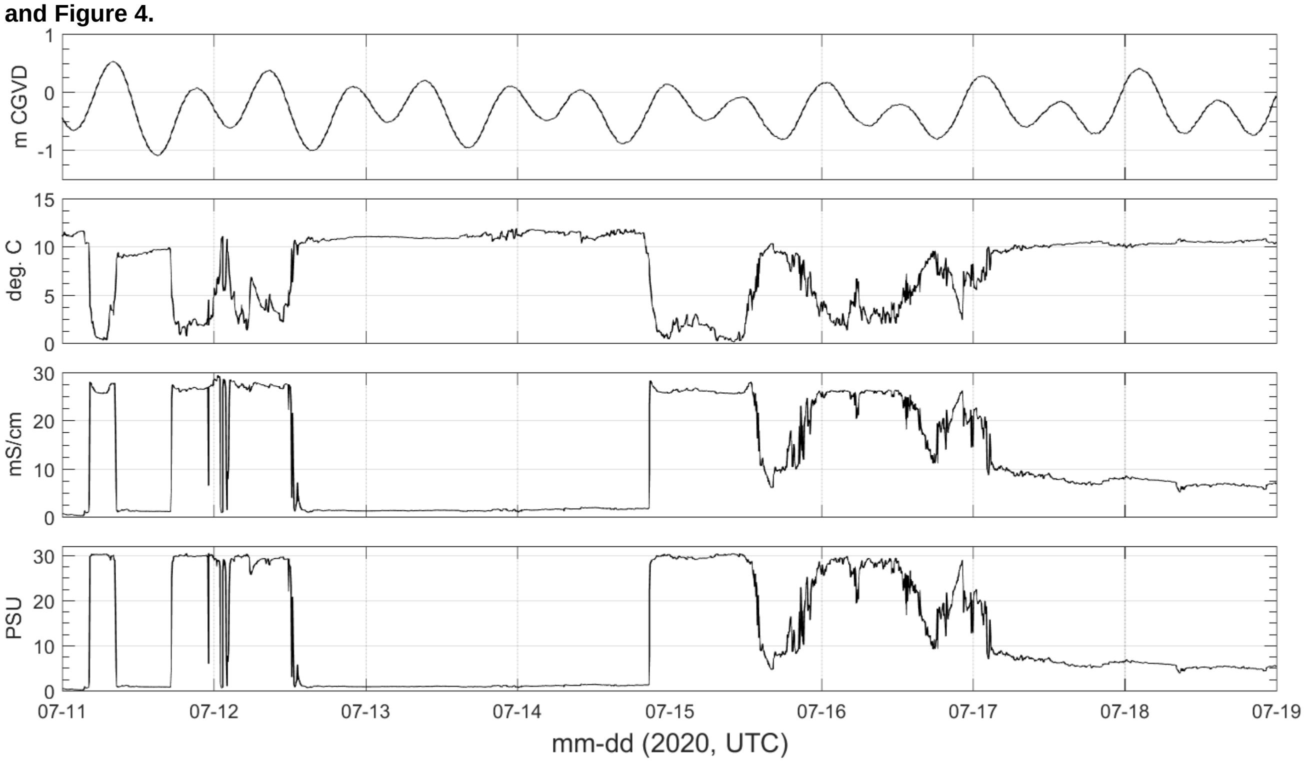

Figure 3: Time series of water level, temperature, conductivity, and salinity measured at Milne Port Tide Gauge by the RBR CTD from July 11 to July 19, 2020 in UTC.

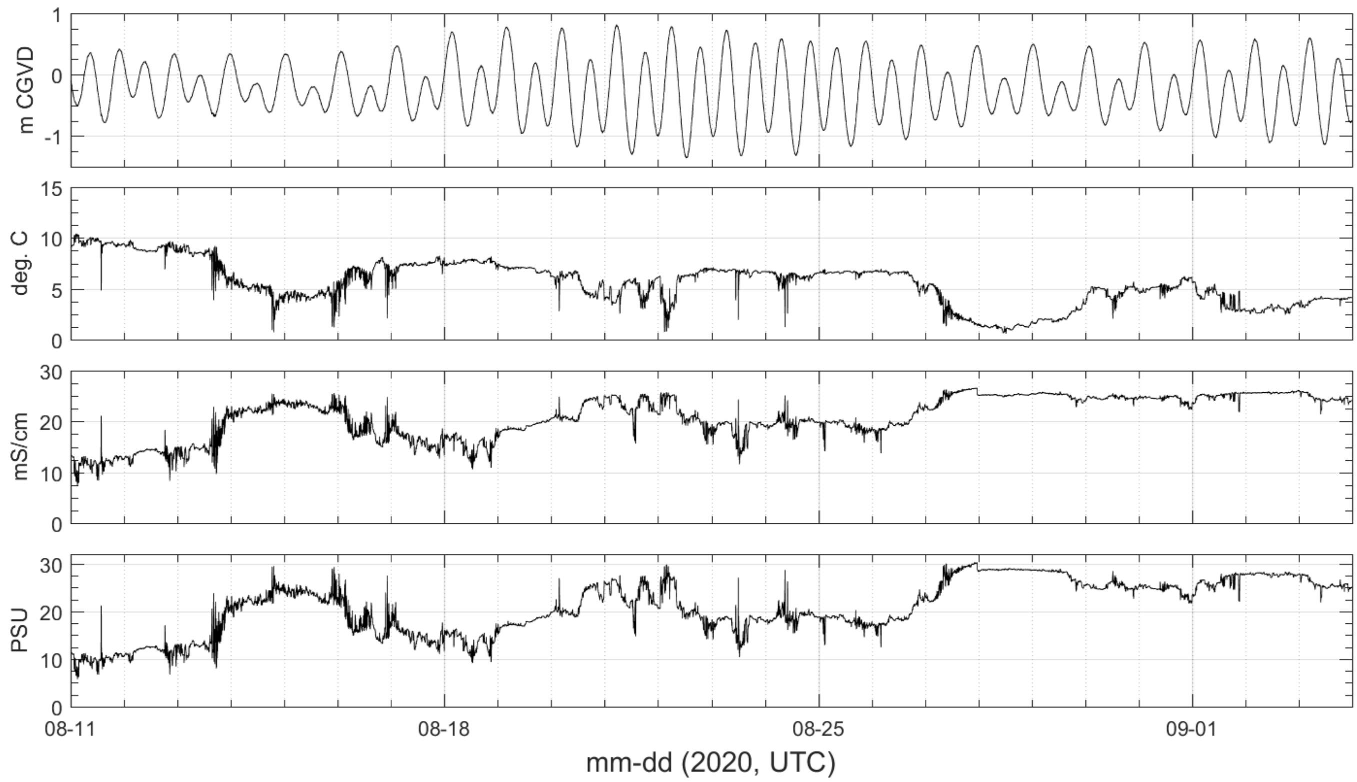

Figure 4: Time series of water level, temperature, conductivity, and salinity measured at Milne Port Tide Gauge by the RBR CTD from August 11 to September 04, 2020 in UTC.

4.0 RAW DATA

In addition to this report, Golder has provided the tide gauge data that was processed and quality checked following the methods described in Section 2.4. The data is provided as a text file in Attachment 3. All dates and times are reported in UTC time.

5.0 CLOSURE

This report presents the results of the 2020 Tide Gauge Monitoring Program for Milne Port. We trust the information contained in this report is sufficient for your present needs. Should you have any additional questions regarding the project, please do not hesitate to contact the undersigned.

Golder Associates Ltd.

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Evan Elder, MEM, EIT
Coastal Engineer-In-Training

Phil Osborne, PhD, PGeo
Principal, Senior Coastal Geomorphologist

EE/PO/lih

Attachments: Attachment 1 – Tide Gauge Installation Instructions
Attachment 2 – Calibration Documents
Attachment 3 – Raw Data

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ATTACHMENT 1

Tide Gauge Installation Instructions

TECHNICAL MEMORANDUM

DATE 19 February 2021 **Reference No.** 1663724-262-TM-Rev0 (ATT1)

TO Dominic Ritgen
Baffinland

FROM David Hurley **EMAIL david_hurley@golder.com**

MILNE PORT TIDE GAUGE INSTALLATION AND RECOVERY INSTRUCTIONS

Golder Associates Ltd. (Golder) was retained by Baffinland in 2020 to re-install the tide gauge, an RBR concerto CTD, first deployed in 2017 at Milne Port to provide water level monitoring on-site during the open-water season (typically July to October) of 2020. The objective of this technical memorandum is to provide installation instructions for the tide gauge at Milne Port and itemize the necessary consumables for installation.

1.0 ALUMINUM MOUNTING SYSTEM OVERVIEW

The tide gauge is housed inside a 26-inch long aluminum square tube (4-inch diameter) to provide protection from vessels and reduce wind and wave effects. The aluminum square tube is mounted to the ladder with two steel L brackets that will be welded to the side of the bottom of the steel ladder located on the ore dock (Figure 1).

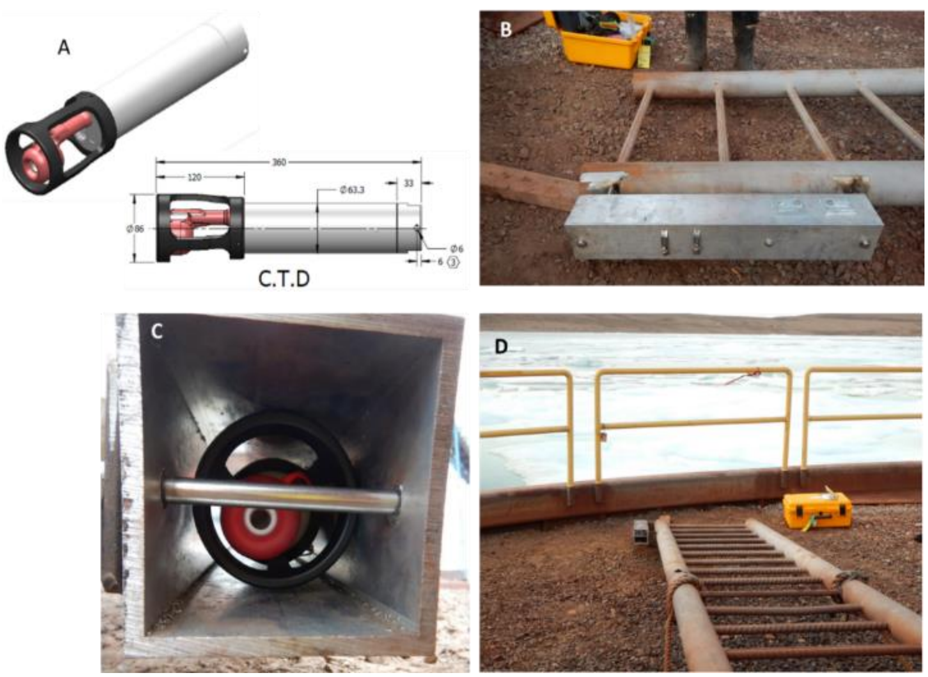

Figure 1: Overview of tide gauge installation

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2.0 TIDE GAUGE INSTALLATION

Step 1)

Two 1/4" diameter holes need to be drilled in the aluminum tube. These holes will be used to add a length of 3mm 316 stainless steel wire rope as redundant security against a hardware failure (Figure 2). On the outside of the aluminum tube two zinc anodes should be replaced with new anodes and secured with one stainless steel bolt (316 stainless 1/2" x 1") per anode (Figure 4).

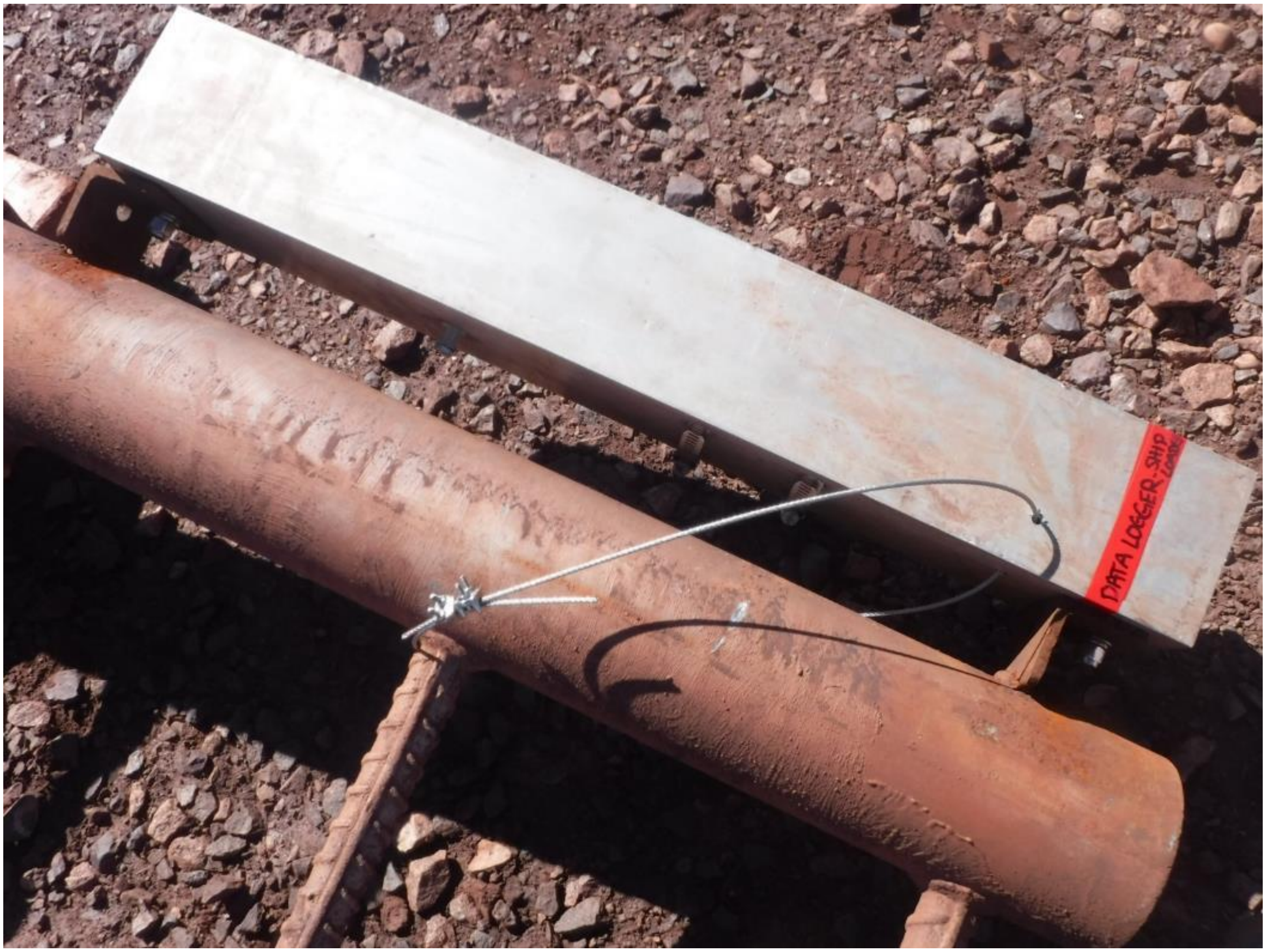


Figure 2: Hardware attaching aluminum tube to steel L brackets and wire rope for redundancy of the L bracket attachments.

Step 2)

The tide gauge (RBR concerto – white Delrin cylinder) should be mounted inside the aluminum square tube with one stainless steel bolt (316 stainless 1/4" x 4 1/2"), washer, nylon shoulder washer, lock nut (Figure 3) and two stainless steel hose clamps wrapping around the tide gauge body, using caution to not overtighten against the plastic housing. The bolt should be passed through the hole on the end cap of the tide gauge, making sure not to twist the end cap in the process, and secured to the square tube with nylon shoulder washers inserted in the drilled holes on the aluminium square tube (Figure 4).

Figure 3: Hardware attaching aluminum tube to L brackets and view of the tide gauge mounted in the tube. Arrow shows location of the ¼" bolt that should pass through the end cap of the tide gauge.

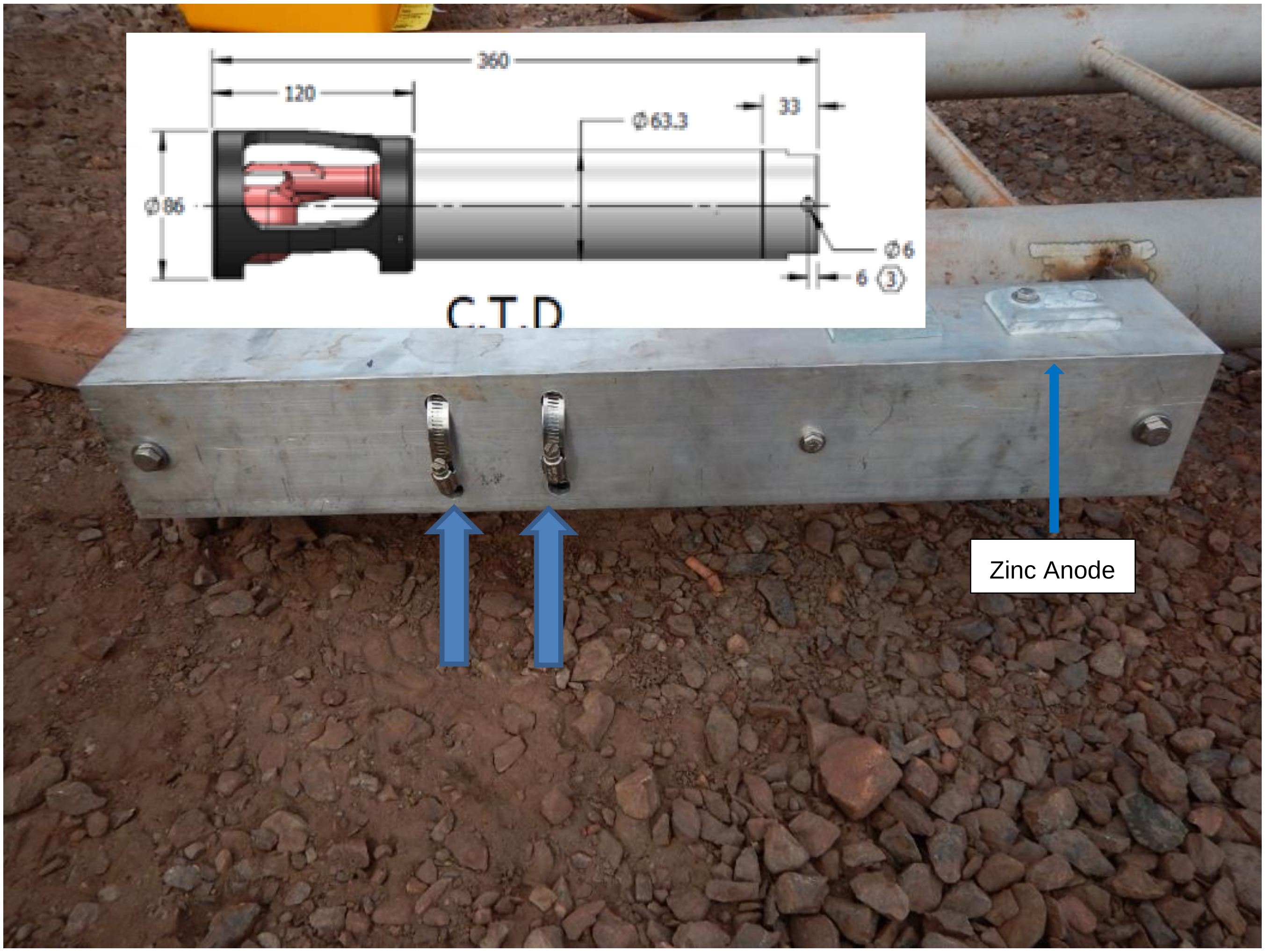


Figure 4: Hardware attaching tide gauge to tube. Arrows show the location of the hose clamps which mount the tide gauge to the square tube and the zinc anodes.

Step 3)

The aluminum square tube is mounted to the ladder at two steel L brackets that are welded to the side of the bottom of the steel ladder located on the ore dock. The tide gauge should be mounted such that the red and black end cap is pointing downwards towards the sea bed. The integrity of the welds on the ladder should be inspected before mounting the square tube. Mount the aluminum tube to the L brackets with stainless steel bolts (316 stainless 3/8" x 5"), washers, nylon shoulder washers, lock washers and lock nuts (Figure 5).

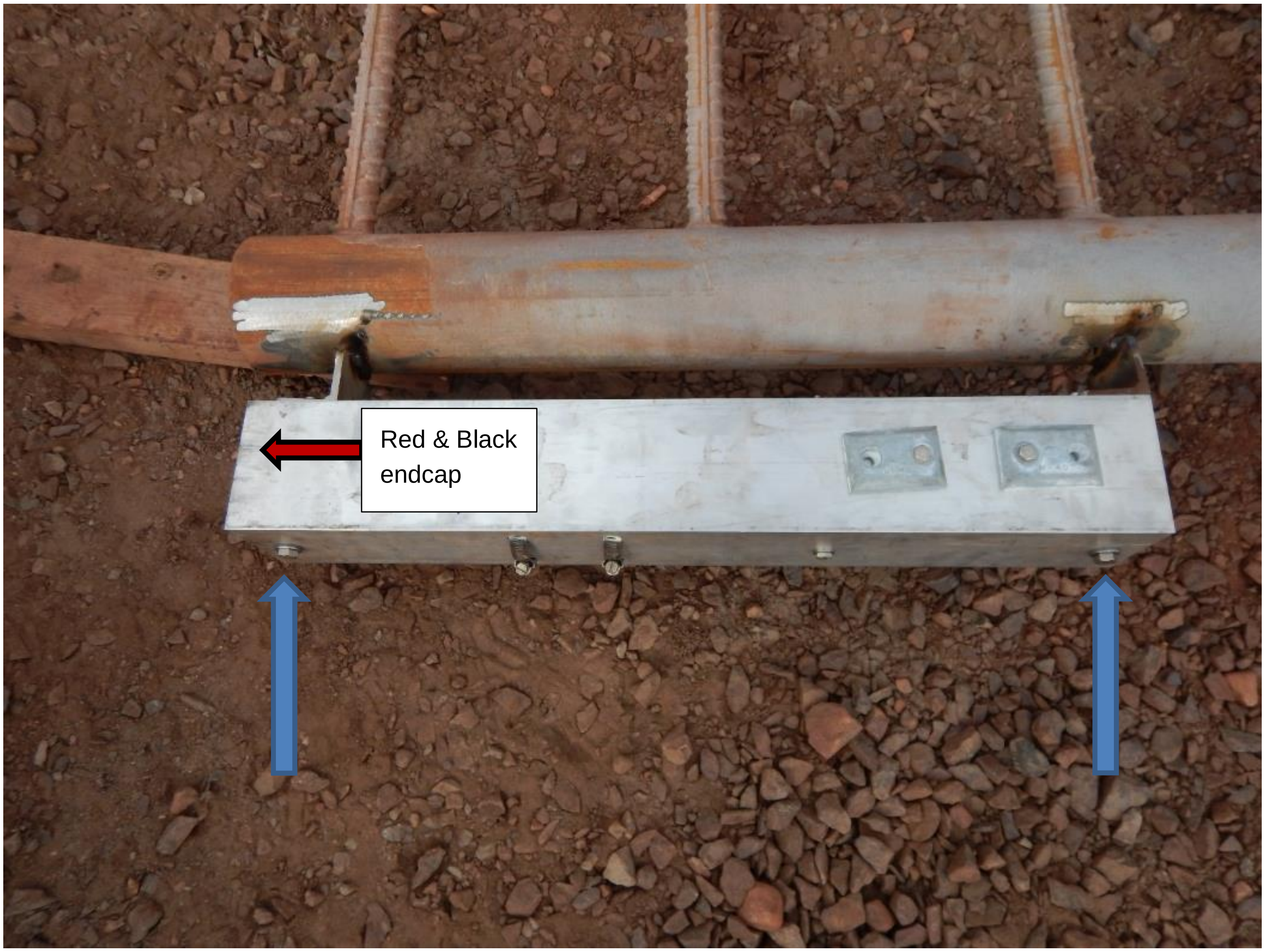


Figure 5: Aluminum square tube mounted to the bottom of the steel ladder located at the ore dock. Arrows show location of mounting bolts which attach the square tube to the welding tabs on the steel ladder.

Step 4)

Add a length of 3mm 316 stainless steel wire rope passed through the two holes on the square tube, and around the bottom ladder rung, and join wire rope together with 2 wire rope clips (1/8" stainless steel). This is to provide a redundant mounting system (Figure 2).

Step 5)

Take photos during each step of the installation process for documentation purposes and provide a record of hardware used and any changes to the above steps.

Step 6)

In 2019 the elevation and position of the ladder was surveyed using five survey points measured from an RTK GPS system. The following table provides the survey position and elevation of the pressure sensor in 2019. The pressure sensor is located behind the plastic sensor cover on the downward facing end of the instrument (Figure 6). The distance from the bottom of the aluminum tube to a point at the top plate of the ladder and from the pressure sensor to a point at the top plate of the ladder was measured as 7.49 m in 2019, respectively. Note, this measurement should be confirmed each year and a photo of the measurement taken.

An RTK GPS survey will need to be conducted in 2020 to reference the steel ladder top plate and provide a reference for instrument to a common datum (i.e. CGVD). Additionally, the distance from the pressure sensor to the ladder top plate and from the bottom of the aluminum tube to the ladder top plate should be measured.

Figure 6: Pressure sensor location, shown by the arrow, on the downward facing end of the tide gauge

Figure 7: RTK GPS survey conducted in 2019

3.0 PAST YEARS RTK GPS SURVEY

The following tables present the results of the 2017 through 2020 RTK GPS survey of the tide gauge. Note, the variation between the RTK measurements in multiple years. Baffinland survey personnel has noted this is due to poor satellite signal. Additionally, year over year the distance from the ladder top plate to the tide gauge sensor has varied. In future years this distance should be confirmed and this value used until changes to the mounting is made.

Table 1: RTK GPS Survey 2020

Survey Point	Easting (m)	Northing (m)	UTM Zone	Elevation (m, CGVD)	Tide Gauge Elevation (m, CGVD)1
Point 01	503226.717	7976633.635	17W	3.694	-2.721
Point 02	503227.448	7976633.193	17W	3.765	-2.650
Point 03	503226.871	7976632.335	17W	3.504	-2.911
Point 04	503226.126	7976632.794	17W	3.382	-3.033
Average Elevation				**3.586**	**-2.829**

Notes: CGVD=Canadian Geodetic Vertical Datum; Horizontal datum is UTM Nad 83, Zone 17W; [1]Distance from the tide gauge pressure sensor to the surveyed steel ladder top plate is 6.415 m based on an email communication with Baffinland personnel (Ritgen D., pers. comms., October 19, 2020)

Table 2: RTK GPS Survey 2019

Survey Point	Easting (m)	Northing (m)	UTM Zone	Elevation (m, CGVD)	Tide Gauge Elevation (m, CGVD)1
Point 01	503226.872	7976632.321	17W	3.566	-3.924
Point 02	503227.446	7976633.151	17W	3.558	-3.932
Point 03	503226.660	7976633.727	17W	3.541	-3.949
Point 04	503226.179	7976632.900	17W	3.538	-3.952
Point 05	503226.910	7976632.990	17W	3.638	-3.852
Average Elevation				**3.568**	**-3.921**

Notes: CGVD=Canadian Geodetic Vertical Datum; Horizontal datum is UTM Nad 83, Zone 17W; [1]Distance from the tide gauge pressure sensor to the surveyed steel ladder top plate is 7.49 m based on an email communication with Baffinland personnel (Ritgen D., pers. comms., September 01, 2019)

Table 3: RTK GPS Survey 2018

Survey Point	Easting (m)	Northing (m)	UTM Zone	Elevation (m, CGVD)	Tide Gauge Elevation (m, CGVD)1
Point 01	503227.211	7976633.252	17W	3.505	-2.915
Point 02	503227.205	7976633.246	17W	3.516	-2.904
Point 03	503227.205	7976633.242	17W	3.491	-2.93
Point 04	503227.197	7976633.241	17W	3.495	-2.925
Point 05	503227.215	7976633.268	17W	3.496	-2.924
Average Elevation				**3.501**	**-2.920**

Notes: CGVD=Canadian Geodetic Vertical Datum; Horizontal datum is UTM Nad 83, Zone 17W; 1Distance from the tide gauge pressure sensor to the surveyed steel ladder top plate is 6.57 m based on an email communication with Baffinland personnel (Ritgen D., pers. comms., October 29, 2018)

Table 4: RTK GPS Survey 2017

Survey Point	Northing (m)	Easting (m)	UTM Zone	Elevation (m, CGVD)	Tide Gauge Elevation (m, CGVD)1
Point 01	7976633.34	503226.98	17W	3.446	-2.866
Point 02	7976633.34	503227.00	17W	3.467	-2.845
Point 03	7976633.34	503227.00	17W	3.486	-2.826
Point 04	7976633.33	503226.99	17W	3.470	-2.842
Point 05	7976633.33	503227.00	17W	3.499	-2.813
Average Elevation				**3.474**	**-2.839**

Notes: CGVD=Canadian Geodetic Vertical Datum; Horizontal datum is UTM Nad 83, Zone 17W; 1Distance from the tide gauge pressure sensor to the surveyed steel ladder top plate is 6.31 m based on measurements by Golder personnel

4.0 HARDWARE LIST

The following is a list of necessary hardware to complete the tide gauge installation:

Item Description	Quantity
26” aluminum square tube	1
Stainless steel L-brackets	2
316 stainless steel hex bolt 5”- 3/8”	2
316 stainless steel lock nut 3/8”	2
316 stainless steel lock washer 3/8”	2
316 stainless steel washer 3/8”	4
Nylon shoulder washer 3/8”	4
316 stainless steel hex bolt 4 1/2”- 1/4”	2
316 stainless steel lock nut 1/4”	2
316 stainless steel washer 1/4”	4
Nylon shoulder washer 1/4"	2
Zinc anode	2
316 stainless steel hex bolt 1” – 1/2"	2
316 stainless steel washer 1/2"	2
316 stainless steel lock nut 1/2"	2
316 stainless steel ½” band width hose clamps 2 9/16”-3 1/2” diameter	2
3mm 316 stainless steel wire rope	1 roll
1/8” stainless steel wire rope clip	2

5.0 TIDE GAUGE RECOVERY

Upon recovery of the tide gauge from the ore dock ladder the following steps should be done.

Step 1)

The distance from the tide gauge pressure sensor (Figure 6) and the bottom of the aluminum tube to the steel ladder top plate (Figure 7) should be recorded and accompanied by a photo of the measurements (i.e. a photo of the tape measure).

Step 2)

If determined applicable, data from the tide gauge should be downloaded using the computer software program Ruskin before shipping. The software program Ruskin can be obtained from https://rbr-global.com/products/software. The following steps should be followed when using Ruskin:

- Unscrew the tide gauge end cap to expose the USB port and battery compartment.
- Plug one end of the Apple 30 pin cable, found in the tide gauge box, into the tide gauge and the remaining end into the computer (Figure 8)

- Open the software program Ruskin. The instrument should appear in the Navigator tab under the subheading Instruments.
- Click on the Download tab and select “download”. Save the .RSK file to a location on the local machine.
- Disconnect the USB cable from the logger and computer.
- Screw the tide gauge end cap back on.
- DO NOT select stop logging or enable logging.
- DO NOT remove the batteries from the instrument.

Figure 8: Apple 30 pin cable for tide gauge data download

ATTACHMENT 2

Tide Gauge Calibration Documents

Conductivity Calibration Certificate

RBRconcerto C.T.D|fast6 s/n: 60550

References: Autosal8400B#66289, MS-315#15506, SSW P162, RC#002

Reference Resistance (ohm)	Reference Conductivity (mS/cm)	Voltage Ratio, V	Measured Conductivity (mS/cm)	Calibration Error (mS/cm)
open	0.0000	-0.000165	0.0016	0.0016
694.027	6.2301	0.039081	6.2306	0.0004
331.920	13.0268	0.081899	13.0265	-0.0004
150.011	28.8237	0.181427	28.8232	-0.0005
100.007	43.2357	0.272223	43.2340	-0.0016
75.013	57.6416	0.362989	57.6400	-0.0016
55.511	77.8921	0.490594	77.8931	0.0010
47.018	91.9618	0.579242	91.9629	0.0011

Coefficients

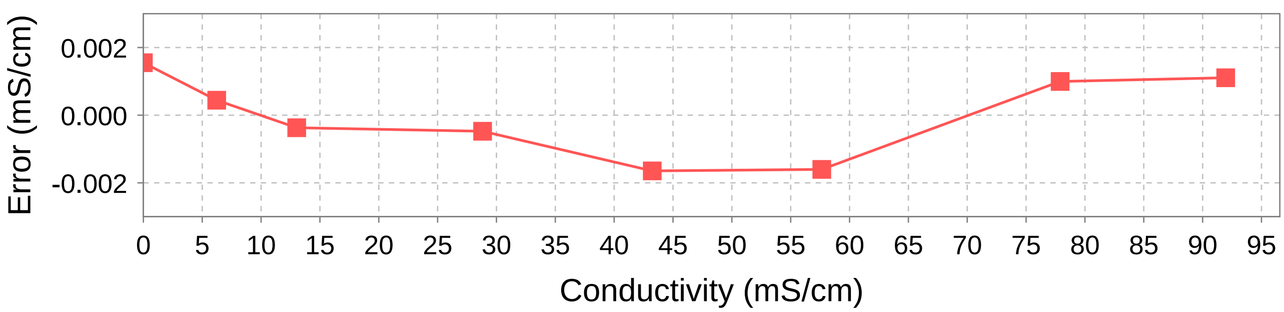
C0:	27.744088E-3
C1:	158.7164
X0:	325.48295E-6
X1:	-13.284071E-6
X2:	600E-9
X3:	14.930013
X4:	10

Bath	Voltage Ratio	Temperature (ITS-90)	Salinity (PSS-78)	Conductivity (mS/cm)
T15S35	0.2698404	14.93001	35.0065	42.8558
T25S35	0.3242621	23.48417	35.0020	51.4965

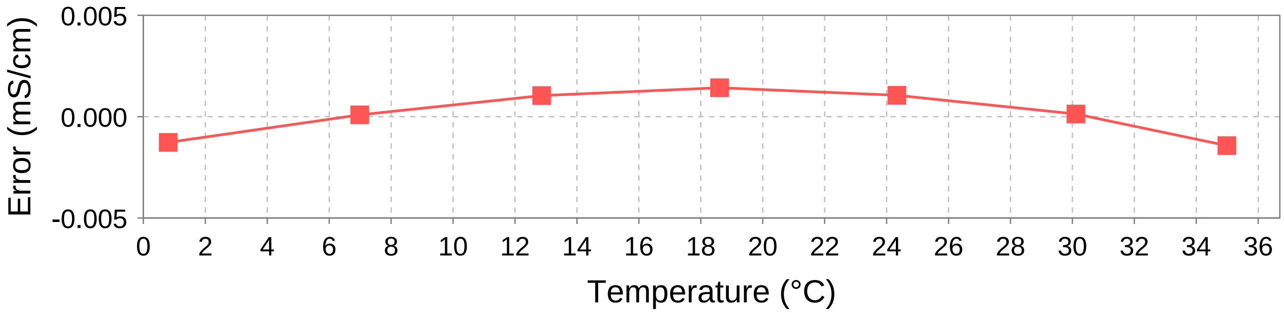
Cell Constant @T15S35 = 4.32387 1/cm

$$C_{cor} = \frac{C_0 + C_1 * V - X_0 * (T - X_3)}{1 + X_1 * (T - X_3) + X_2 * (P - X_4))}$$

Calibration error vs. Conductivity



Calibration error vs. Temperature



Calibration Date: 2020-06-15
Issue Date: 2020-06-15
File Name: 060550_20200615_1114C.rsk

Operator: ishkvorets

Approver: takuetteh

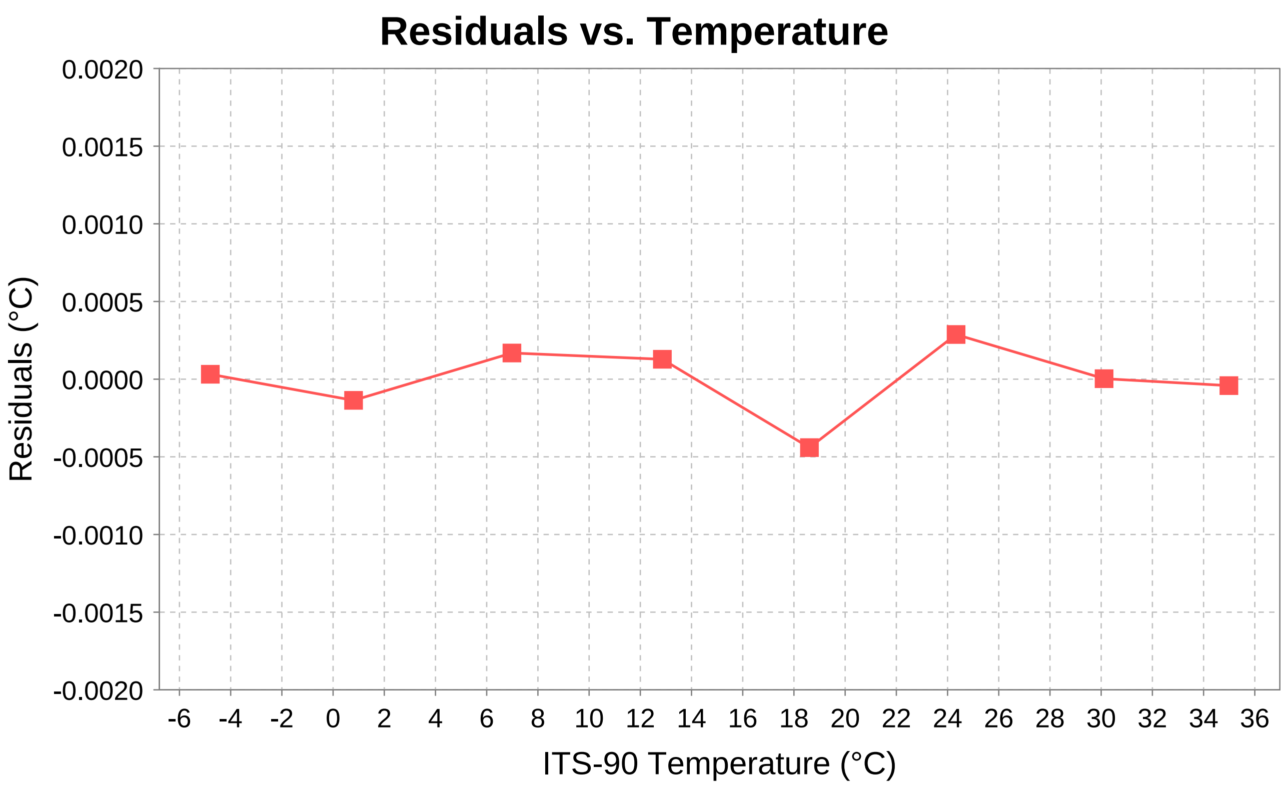
Temperature Calibration Certificate

Logger ID: RBRconcerto   Serial No: 60550   Channel No: 2

Reference Temperature, ITS-90	Voltage ratio, V	Measured Temperature, ITS-90	Calibration error
-4.79445	0.816209	-4.79442	0.00003
0.80058	0.768299	0.80045	-0.00014
6.98569	0.708355	6.98586	0.00017
12.86096	0.646222	12.86109	0.00013
18.60555	0.582622	18.60511	-0.00044
24.33259	0.518598	24.33288	0.00029
30.11328	0.455531	30.11328	0.00000
34.98857	0.404916	34.98853	-0.00004

Coefficients

C0:	3.3426418E-3
C1:	-253.72012E-6
C2:	2.3290124E-6
C3:	-95.64407E-9



Calibration Date: 2020-06-08
Issue Date: 2020-06-09
Calibration ID: 39815

Operator: kmalorny

Approver: kmalorny

Pressure Calibration Certificate

RBRconcerto C.T.D|fast6   s/n: 60550

Sensor rating: 50 dbar s/n: H130848

Nominal accuracy: 0.05%FS (0.025 dbar)

Reference instrument: Mensor CPC6000 s/n: 612676

Applied pressure, P_{app} (dbar)	Voltage ratio, V	Measured pressure, P_c (dbar)	Calibration error (dbar)
9.956	0.055869	9.9556	-0.0004
15.000	0.076451	14.9996	-0.0004
20.000	0.096855	20.0002	0.0002
25.000	0.117255	25.0002	0.0002
30.000	0.137653	30.0001	0.0001
35.000	0.158050	35.0000	0.0000
40.000	0.178446	40.0000	-0.0001
45.000	0.198842	44.9999	-0.0001
50.000	0.219238	49.9998	-0.0002
55.000	0.239636	55.0000	-0.0001
60.000	0.260035	59.9999	-0.0002

Coefficients

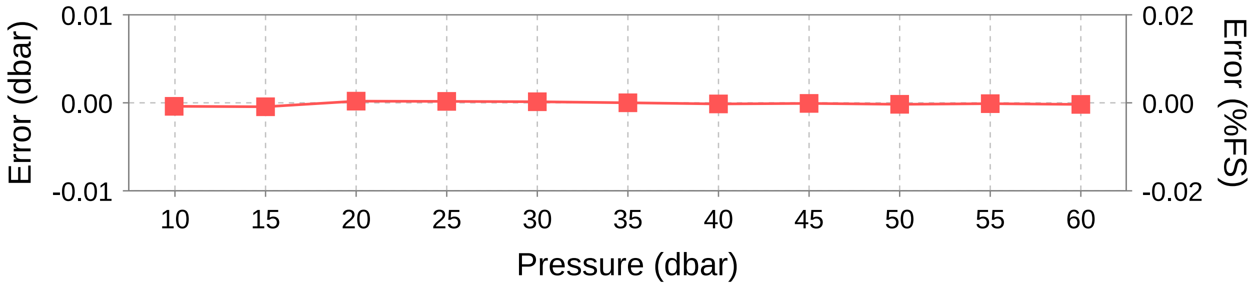
C0:	-3.272809
C1:	244.89221
C2:	1.3638068
C3:	-2.4486482
X0:	9.9539
X1:	19.21648E-3
X2:	85.04233E-6
X3:	109.35593E-9
X4:	189.42652E-6
X5:	22.545935

$$P_c = X_0 + \frac{P_m - X_0 - X_1(T - X_5) - X_2(T - X_5)^2 - X_3(T - X_5)^3}{1 + X_4(T - X_5)}$$

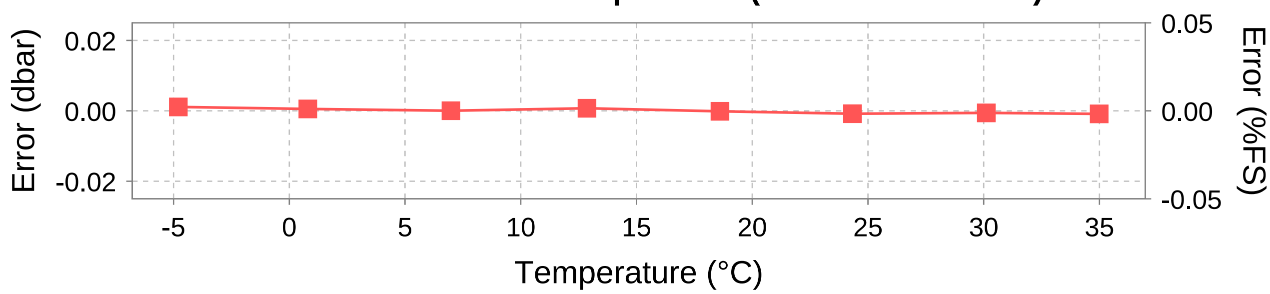
Head (mm) = 456

$$P_m = C_0 + C_1 V + C_2 V^2 + C_3 V^3$$

Calibration error vs. Pressure (Tcal = 22.5°C)



Calibration error vs. Temperature (Patm = 10.04 dbar)



Calibration Date: 2020-06-11
Issue Date: 2020-06-11
File Name: 060550_20200611_1354P.rsk

Operator: takuetteh

Approver: kmalorny

ATTACHMENT 3

Tide Gauge Data Deliverable (delivered electronically)

APPENDIX B

Responses to MEWG Comments

Baffinland

Name: Chantal Vis, Allison Stoddart, Jordan Hoffman

Agency / Organization: Parks Canada Agency

Date of Comment Submission: July 8th, 2021

#	Document Name	Section Reference	Comment	Baffinland Response
1	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	Marine Water Quality Executive Summary and Chapter	The analysis of water quality parameters remains qualitative and descriptive (for example based on descriptive statements “were generally within ranges previously observed, with no exceedances of CCME water quality guidelines”), and would require more robust, statistical analyses to support the conclusion of “no project effects on water quality”, in particular given the lack of baseline data – before project started or changing detection levels for some parameters. Providing figures of concentration through time (and variability among stations) for some key parameters (e.g. iron), as well as a statistical analysis of trends through time would provide evidence to support conclusions. Given that there is data for 8 stations, 6x per year with 6 years of data – quantitative or statistical analyses of trends through time should be possible for either single parameters (like iron), or as a composite (using CCME water quality index). Statistical	In the 2021 MEEMP report, concentration data collected over time for iron and potentially a small number of other key parameters, will be presented in graphical form to improve data interpretation. The water quality program is a compliance monitoring program primarily designed to monitor for potential effects from site discharges to the Milne Inlet Receiving Environment. As such, statistical analysis is not required and screening of data against applicable water quality guidelines is appropriate.

#	Document Name	Section Reference	Comment	Baffinland Response
			analyses are done in support of marine sediment quality (ANOVA) and Benthic infauna (e.g. use indices, BACI , ANOVA), so it is unclear why statistical analyses are not conducted for water quality.	
2	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	Marine Water Quality - Iron Executive Summary and Chapter	With respect to the discussion about iron – the executive summary states “analyses shows that iron concentrations in the 2020 water samples remain well within the 2015-2019 range of detected concentrations”. Where are the “analyses” that support this conclusion? As this is an important parameter in marine ecosystems, as well as a concern raised by Inuit, a statistical analysis to support conclusions of no effects would provide important evidence. Also, providing comparisons from reference sites or prior to start of project would be required to support conclusions, since no baseline data provided and detection levels were very high in 2015 and 2016 (<500ug/L), so cannot be used as baseline or to compare 2017-2020 values.	As is the case in any report, supporting details that would answer this question are found within the main body of the report. The reviewer is directed to Sections 2.3.2 and 2.4 of the report. The analyses in the 2020 MEEMP that supported the conclusion referred to in the Executive Summary include: 1) calculation of descriptive statistics for iron at individual stations for the MP-05 and MP-06 Milne Port Site discharges over five sampling events in 2020; and, 2) calculation of annual descriptive statistics for iron between 2015 and 2020 These summary data were then reviewed and the 2020 iron data discussed within the context of the previous years’ summary data, noting limitations such as historical detection limits and conditions at the time of sampling that may have influenced the iron concentrations measured. A comparison was made between total and dissolved iron concentrations to support an informed discussion of the bioavailability of the iron present. The calculation of summary statistics for compliance monitoring of a discharge is appropriate and no further statistical analysis is warranted.

#	Document Name	Section Reference	Comment	Baffinland Response
3	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	Table 1.1. (p.4)	Why are the impacts/significance of "Discharge of ballast water" different between VECs? In section "Water and Sediment Quality" – no anticipated effects to water and sediment. In "Arctic Char Health" section – slight reductions in nutrient concentrations and short-term localized increases in water temperature. Why would the impacts not be the same for discharge in both sections? Could impacts not be tested/validated with water quality data sets, and physical oceanography data?	The overall impacts are the same for water quality and Arctic char – there was just more detail provided for char regarding the specific effect pathway. In their comment, Parks Canada failed to include all the text associated with Arctic char health, which in full context reads: *Slight reductions in nutrient concentrations and short-term, localized increases water temperature in Milne Inlet <u>are expected to have negligible effects on fish health and condition.</u>*
4	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	Table 1-2	Why is condition 86 – the ballast water discharge impact prediction modelling and validation – "N/A" The condition is that sampling should be done to validate the model – has this condition been met?	Yes. The results of the physical oceanography programs have been used extensively to support the validation of the ballast water discharge modelling (Golder, 2017).
5	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	p.10 Study Area p.13 – Physical oceanography monitoring	A physical oceanographic monitoring was started in 2019 – where are these results analyzed and how do they fit with the water quality effects section, or with the ballast water discharge model validation (see above).	Physical oceanographic monitoring began for the Milne Port site in 2014. Measurements have been collected by Golder from 2017 to 2020 and have included ADCPs, CTD profiles, and the tide gauge monitoring program. These results have been reported in: • Mary River Project 2017 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2018)

#	Document Name	Section Reference	Comment	Baffinland Response
				• Annexe L: Physical Oceanography Report to Mary River Project 2018 Milne Inlet Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2019) • Appendix L: Physical Oceanography Report to Mary River Project 2019 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2020) • Appendix A: Tide Gauge Report to Mary River Project 2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program (Golder, 2021) The results of the physical oceanography programs have been used extensively to support the validation of the ballast water discharge modelling (Golder, 2017).
6	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	p.18 – main conclusions of Marine Water Quality	Lab analyses have not revealed a trend of increased levels of iron in water samples collected between 2014 and 2020 Where are the statistical analyses supporting this conclusion? The 2014 iron data is not in summary table (Appendix E p.556/1517).	The statement has been corrected to read: 'Laboratory analyses have not revealed an observed trend of increased levels of iron in water samples collected between 2017 and 2020.'

#	Document Name	Section Reference	Comment	Baffinland Response
			Iron levels in 2015-2016 cannot be used in comparison – below detection levels, and detection levels higher than values in 2017-2020.	
7	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	p.19 Fishing effort and catch data	The conclusion of no indication of project impacts on fish is based on qualitative and descriptive comparisons (s. 6.2.2.). Given the lack of standardize methodology and sampling locations, may want to reword conclusion to focus on need for standardized methods to enable quantitative/statistical comparisons between years.	The objective of this field component is simply to characterize nearshore fish community structure and habitat use in Milne Port and not to quantify abundance or perform a stock assessment. CPUE, as used for MEEMP reporting purposes, is useful because it gives a snapshot indication of relative abundance and habitat use. Nonetheless, Parks Canada's comment is acknowledged and efforts will be made in summer 2021 to standardize fishing efforts and locations to the extent possible to facilitate interannual comparisons going forward.
8	2020 Marine Environmental Effects Monitoring Program and Aquatic Invasive Species Monitoring Program	p.1426 of pdf	s.8.2.2 – NIS/AIS The report states that a single detection of NIS/AIS will initiate a response protocol. The response protocol (Figure 4) does not discuss any intervention measures or communication protocols. Has a general rapid response plan, or specific response plans to trigger list species been developed? It would be important to coordinate communication and response with others, including communities, QIA, Parks Canada, Transport Canada to ensure effective intervention, reduce risks of further spread, etc.	Figure 8-4 is not a Rapid Response Protocol. It simply illustrates the steps taken to flag potential species/taxa of concern that may be linked to the Project in order to evaluate whether a rapid response plan would be required. Baffinland shares Parks Canada's concerns around early detection of NIS/AIS which is why the plan is to continue taking benthic samples to support AIS surveillance monitoring efforts in summer 2021, where 25 stations will be sampled.

#	Document Name	Section Reference	Comment	Baffinland Response
			How will the recommendation to sample benthics every 3 years rather than annually impact the AIS/NIS program effectiveness? This would slow detection and response.	

Baffinland

Name: Kimberly Howland, Alexandra Sorckoff

Agency / Organization: Fisheries and Oceans Canada

Date of Comment Submission: July 9, 2021

#	Document Name	Section Reference	Comment	Baffinland Response
1	2020 MEEMP and AIS Monitoring Program Report	NIS/AIS 8.1.2 Introduction – Definitions and executive summary P. vii Summary P.viii	DFO disagrees with including the statement in definition of Non-Indigenous species (NIS) that "…they do not hinder or prevent the survival of other organisms". To our knowledge an NIS is any species that exists outside the region where it originated naturally. Aquatic invasive species (AIS) are essentially NIS that become harmful or are known to cause harm elsewhere. All NIS have the potential to become harmful and there is always uncertainty as to whether they may become invasive once introduced to a new environment. DFO suggests this be acknowledged in the definition of NIS. Definitions of No Risk, Low Risk, High Risk – DFO does not necessarily agree with the way these risk categories are defined, particularly the no risk category. We intend to conduct a science peer review of Baffinland's Rapid Response Protocol including these definitions (which form part of the protocol) and provide further opinion on this. The crux of our concerns lies with the notion that just because something has	Baffinland has revised the definition of NIS in the 2020 MEEMP report based on DFO's suggestions. Definitions of no/low/high risk are not meant to characterize an organism's potential to spread and/or ability to harm the receiving environment. Rather, the definitions are specific to BIM operations and attempt to capture risk of introduction associated with shipping operations. For example, if something has been found in the Canadian Arctic before then it is less likely to have been introduced to the area by Baffinland shipping and therefore is considered lower risk from that perspective. For clarity, Figure 8-4 is not a Rapid Response Protocol. It simply illustrates the steps taken to flag potential species/taxa of concern that may be linked to the Project in order to evaluate whether a rapid response plan would be required. This process does take into consideration the concerns outlined by DFO; in fact, Section 8.5.1 acknowledges and discusses the potential for taxonomic errors and uncertainties in the historical record. The MLE test (see Figure 8-4 and associated description) was explicitly

Baffinland

#	Document Name	Section Reference	Comment	Baffinland Response
			previously been found in the Canadian Arctic it has no risk. This does not take into consideration that species introduced elsewhere in the Arctic could also be introduced to a new area of the Arctic through project vessels and could still be high risk to the project area. It also does not consider that there may be taxonomic errors and uncertainty with historical records so there is a need for careful investigation of Arctic occurrence records in the case of species that are not well described to confirm if they have indeed previously been found in the Canadian Arctic. Given these concerns with how BIM is defining species, DFO questions the validity of the statement that "no project related introduction of NIS/AIS have been documented at Milne Port and the requirement for rapid response has not been triggered". We recommend that this statement be revised to reflect the taxonomic uncertainties, need for further examination/validation of existing isolated/limited Canadian Arctic records and the possibility that some new species could be project related.	designed with such concerns in mind and involves careful review of all available evidence. Baffinland requests that DFO elaborate on its statement regarding the possibility that some new species could be project related – could DFO please provide a list of species it believes were introduced via Project vectors and the associated supporting evidence?
2	2020 MEEMP and AIS Monitoring Program Report	NIS/AIS 8.2 Study Design	For i) under dedicated surveys, it should be acknowledged that although surveys started due to concerns over Inuit concerns of ballast discharge in the area, "monitoring is also important in the area because ships anchor and there is therefore a risk of release for biofouling organisms"	The text has been revised to include this acknowledgement.

#	Document Name	Section Reference	Comment	Baffinland Response
3	2020 MEEMP and AIS Monitoring Program Report	8.2.1 Study design - Modifications of program	DFO is pleased to see increased survey effort as well as targeted sampling for preserving samples in ethanol. Given that the target species *M. viridis* was not found in target samples, would Baffinland consider taking additional target samples in future years? DFO also notes that short term preservation in formalin followed by ethanol can allow for good preservation and maintaining genetic integrity of samples for barcoding. This approach could be tested with future samples and may allow for meeting taxonomy and genetic barcoding needs. Publications on these methods are provided at the end of this document.	Additional target sampling is planned for the 2021 field season at nine locations in Milne Inlet. Results will inform whether additional targeted monitoring in future years is warranted. We have reviewed the publications sent by DFO and consulted with the analysts at the Canadian Centre for DNA Barcoding where the samples are sent for analysis and has made the decision to continue with the current preservation methodology (i.e., 90% ethanol) for two main reasons: 1) ability to barcode longer sequences and 2) logistical challenges with shipping samples south from Baffin Island on tight timelines. Separate samples are taken for genetic and taxonomic purposes, which are preserved via different methods (ethanol and formalin, respectively). While it is possible to obtain DNA from formalin-fixed specimens, there is a strong limitation on the length of DNA sequence one can obtain. DNA barcoding at ~600 bp is about the limit of sequence length for which this is reasonable/ feasible. The DNA in formalin-fixed specimens is actually fine – it is just irretrievably trapped in a matrix of denatured (fixed) proteins, so one has to piece fragments of ~100-200 bp together, generally. Since, for the most part, preserving in formalin would preclude obtaining larger sequences that could be necessary for some marine groups (e.g., 18s, which is commonly used), we will continue to preserve specimens in ethanol.

#	Document Name	Section Reference	Comment	Baffinland Response
				It is also worth noting that there are significant logistical constraints with shipping the samples south from Baffin Island within ~7 days of preservation as recommended in this paper.
4	2020 MEEMP and AIS Monitoring Program Report	8.2.2. Study design - Indicators & thresholds Figure 4 Flow chart describing taxa review process for flagging species and low or high risk	As indicated above, we have a number of comments on the flow chart describing AIS/NIS response, but intend to conduct a DFO Science Advisory Secretariat (CSAS) peer review of Baffinland's Rapid Response Protocol (provided as part of phase 2 EA) and associated definitions of risk (high, low, no risk). Trigger list - DFO recommends BIM develop response plans now – these were planned as part of Phase 2 (post project approval), but they are applicable now given shipping is already occurring. DFO understands this commitment was made with Phase 2 in mind, but we recommend Baffinland implement this before Phase 2.	See response to Comment No. 1, which clearly explains this figure is not a rapid response protocol and should not be reviewed as such. Since rapid response plans are species specific, and no species has yet triggered the need for response via the established monitoring programs As the Board's assessment of the Phase 2 Development proposal is in the decision-making process and currently waiting for the Public Hearing proceedings to resume, Baffinland will not be providing a further response to DFOs request at this time.
5	2020 MEEMP and AIS Monitoring Program Report	8.3.1.2 Methods - Zooplankton	Plankton are well known to exhibit high seasonal variability in both abundance and species richness (e.g., McKinstry and Campbell 2018 and references therein). This has been well demonstrated in surveys of other Canadian Arctic ports where variability in density and species richness across months was found to greatly exceed variability among sites at a given port (Dispas 2019). Sampling at regular intervals over a 3 month period versus overs a two week window resulted in a 40% increase in species richness (Dispas 2019). <u>Could BIM please indicate the timing and frequency of plankton collections done in 2020.</u> We	We agree that plankton exhibit high variability and, as outlined in previous responses to DFO, are therefore not considered a reliable indicator with which to evaluate potential Project effects. Accordingly, zooplankton abundance is not discussed within the MEEMP Report; however, species diversity is presented as part of the AIS/NIS component only and presented as supplemental information which helps contextualize data relative to previous sample years. The timing and frequency of plankton collections done in 2020 is outlined in Appendix 8C-1. At Milne Port, vertical tows were conducted on August 6 and horizontal tows on August 7. At

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			reiterate that collection of more frequent plankton samples (at least once/month during open water season when plankton are blooming) is recommended to improve baseline coverage of species that may be present.	Ragged Island, vertical tows were conducted on August 16 and horizontal tows on September 5. The timing of sampling is opportunistic and is fit into the schedule as Program priorities and weather days allow. The recommendation to sample at regular intervals over a 3-month period consistent with Dispas 2019 is not feasible, given the short length of the open water season at Milne Port. We note that the redeployment of settlement baskets in 2021 will capture plankton settling out of the water column and help address some of DFO's concerns.
6	2020 MEEMP and AIS Monitoring Program Report	8.3.2 Methods - Sample collection for genetic analysis	We note samples were preserved in 90% ethanol. For preservation of genetic samples we recommend a minimum of 95% ethanol with an alcohol change at 24 hours to ensure proper preservation for genetic barcoding. With these methods the jar should be no more than 1/3 organic material with the remaining volume ethanol. As requested above, could the number of stations with ethanol preserved samples be increased or could composite samples be made to improve chances of detecting the target organism in 2021?	Baffinland notes DFO's recommendations regarding sample preservation and refers DFO to the response to comment #3 above. Baffinland is planning on collecting composite samples (via 2 Van Veen grabs) for genetic analysis at nine stations where flagged taxa have previously been collected in order to improve our chances of finding them.
7	2020 MEEMP and AIS Monitoring Program Report	8.3.3 Methods - Ship Hull Monitoring	A sample size of 3 vessels used in 2020 is unlikely to be representative for characterizing biofouling of the fleet that call on Milne Port. It is also not clear how the ships were selected for hull monitoring. Recommend that ships are selected based on age of anti-fouling paint/time since last dry-dock aiming to survey ships that have not recently been painted or	Due to the limited time the ROV is available for AIS surveys, selecting ships based on risk factors such as anti-fouling paint is not practicable. Efforts are made to survey as many of the ships as possible while the equipment and operator are on site. It is also noted that the paper referenced by DFO (Sylvester & MacIsaac 2011) describes the use of

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			cleaned. Together with the above factors, greater time spent in previous ports of call, and greater number of regions visited since last cleaning have also been shown to be associated with increased extent of fouling and could be used to select vessels for monitoring (e.g. see Sylvester eta l. 2011). DFO recommends identification of factors influencing biofouling risk of vessels calling on Milne Port through a validated risk assessment, however this would require initial sampling from a subset of vessels to assess of percent cover and physical collection of organisms in a representative, standardized and comprehensive manner (including both hull and niche areas) that will allow for identification of non-native species that may be transported through project shipping (DFO 2020).	an opportunistic sampling method, making efforts where feasible to sample a range of vessels. This method is consistent with the current approach undertaken by Golder.

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8	2020 MEEMP and AIS Monitoring Program Report	8.3.4.1 Methods - Data Analysis - Taxonomic Identification and literature review	As noted for previous reports, there are multiple references that Casas-Monroy et al. (2014) was used as a definitive list of invasive species in Canada (e.g. Executive Summary, AIS Zooplankton section). Please note that the Casas-Monroy list is a subset of Molnar et al. 2008 data, limited to those species listed by Molnar from ecoregions connected to Canada by ship traffic during the period of study, with some species removed when recognized as being native to Canada. This reference is not an exhaustive list of existing or potential species considered invasive to Canada. As the reference is a subset of Molnar et al, it may be best to retain only the references to the Molnar study and remove the citations to Casas-Monroy completely to avoid misunderstanding.	As noted in previous responses, references to Casas-Monroy et al 2014 were intended to be examples, and not exhaustive, to demonstrate that due diligence was being performed in terms of comparing to both global and domestic databases. Collected specimens not listed on Baffinland's existing inventory are evaluated against multiple sources, which are detailed in Section 8.3.4.1. Casas-Monroy and Molnar were both used as starting points, but neither was considered to be a definitive list of invasive species in Canada. The literature review that was performed for each flagged species involved cross-referencing with collection records and regional specimen lists as well as broader taxonomic records, as recommended by DFO. It is acknowledged that the Casas-Monroy list is a subset of Molnar and, moving forward, will retain citations to the Molnar study only.
9	2020 MEEMP and AIS Monitoring Program Report	8.3.4.2 Methods – Data Analysis	Chao 2 - Could more clarification be provided on how this was calculated. When BIM indicates they used all taxonomic designations, does this mean they counted higher taxonomic levels (e.g., genus) in cases where there were specimens that could be identified at a lower level e.g. (to species) within the same genus. If so, this may artificially inflate the values.	Yes, higher taxonomic levels were counted in cases where specimens could be identified at a lower level (e.g., Mya sp. would be treated as separate from Mya truncata). This has been the way Chao has been calculated for the program since its inception and original methods developed by SEM continue to be used for consistency. The opposite way (assuming the same designation) would lead to underestimating the values – either option involves making assumptions. The possibility of this method leading to artificially inflated values has already been noted and acknowledged in the text in Section 8.3.4.2.

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10	2020 MEEMP and AIS Monitoring Program Report	8.4.1.1 Results Taxonomic ID Benthic Infauna	Only 38% of new identifications were to species level – this seems low; what proportion of the remaining 62% were sent for further verification?	Baffinland's standard approach to the identification of specimens is called a "non-aggregate" approach, which means that each individual specimen is assigned only to the classification that its characteristics allow (according to specimen condition, stage of development). In many cases, it may only be possible to identify a mature or subadult specimen to species, but juveniles/damaged individuals of the same species (presumably) to a higher level, e.g. family, order, etc. In some cases, an individual species may be represented by 2 or more ranks in the data, which can inflate the species list with lower-resolution (i.e. higher taxonomic rank than species) names. Baffinland would like to emphasize that the 38% value DFO is referring to relates to new observations in 2020 and that the proportion of species level identifications across the whole program is higher. If you look at the number of specimens, of a total of 17,134 specimens examined (Raw Count of non-incidental organisms), 11992 were identified to species (69.9% by abundance). The remaining ~30% were either immature, damaged, or were not identified further due to lack of resources on the particular group. The breakdown is approximately: 17% damaged/ immature (i.e., did not have characteristics allowing for species identification) and 13% of groups that were poorly described in the literature and our taxonomists were not comfortable identifying to species with available resources. This rate of poorly described taxa is certainly higher in the Arctic than in other regions of the world, but it is well

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				documented in the literature (e.g., Arctic Biodiversity Assessment 2013). Unidentified species are only sent to specialists when there is concern that it may be NIS or AIS (based on the literature review, e.g. where a genus contains a flagged species of concern for the Canadian Arctic). Due to the large number of unidentified taxa (typically due to specimen condition or life stage) it is not practical to send all for verification. Baffinland refers DFO to Appendix 8D, which lists all 21 taxa sent for independent verification between 2018-2020. Reference: Arctic Biodiversity Assessment. 2013 https://www.caff.is/assessment-series/233-arctic-biodiversity-assessment-2013
10	2020 MEEMP and AIS Monitoring Program Report	8.4.1.1 Results Taxonomic ID Benthic Infauna	For the statement "Ranges were were considered to have a high probability of including project area if limited collections on record were georeferenced to Arctic waters or spread across a wide range that could reasonably include Canadian Arctic waters" Earlier in methods it was stated that presence of Canadian Arctic records for a species was a deciding factor on whether natural range was likely to include the project area – please clarify the protocol for decisions on species status. Is it based on previous records in the Arctic more broadly or the Canadian Arctic? First observations of phyla Nematoda and Entoprocta – these are typically common, so it seems odd to only be seeing them for the first time this year – were they just	These are not mutually exclusive statements. If a particular specimen has a Canadian Arctic record, then it is assumed its natural range likely includes the Project area. If, for example, it didn't have a Canadian record but was found in Arctic waters with a broad range extending to the north Atlantic around Greenland, or just found in Greenland with a limited collection record (such as seen in some understudied species), we would potentially make the assumption as well on a case by case basis. Again, decisions are based on multiple lines of evidence, not just ranges on record. Nematoda have for all years been included as incidental organisms. It is our standard practice to exclude these from the main data set given their abundances are not adequately captured with methods

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			ignored/not reported in previous collections? Please clarify. DFO has questions/concerns regarding designation of *Crassicorophium clarencense* as there was only one Arctic specimen from an old museum collection, yet type descriptions and any literature on the species is from the Pacific coast. The one Arctic specimen is located at DFO Institute Maurice Lamontagne museum collection and DFO could arrange could have someone examine it to confirm identity. This species is among a group known to be transported by biofouling of vessels.	used to study macrofauna (for the most part), as evidenced by the patchiness in the reported abundances. In the first year we processed these samples, we were also attempting to be consistent with the previous work, in which nematodes were excluded (although it appears the focus was just on the >1cm organisms that could be detected with the naked eye). As for Entoprocts, in our experience they are not incredibly common, so it wouldn't be surprising, necessarily, that they had not been detected yet in this habitat (soft bottom with some hard substrates). We can assure they would have been reported if observed in previous years. Baffinland's taxonomist (Biologica) is confident in this identification although does concede that the characters in this genus can be subjective. It is possible to send for verification to an amphipod expert, and/or the taxonomist of DFO's choosing. There seems to be some confusion about the suggested range of this species, as Don Cadien has indicated in SCAMIT materials (association of Marine Invertebrate Taxonomists out of California) that its range is Bering Sea/Arctic, but as pointed out by DFO there are actually few records on which this may be based. It is plausible that there may be more records in the gray literature given some of the information that is circulating.

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11	2020 MEEMP and AIS Monitoring Program Report	8.4.1.2 Results – taxonomic ID - macroflora and benthic epifauna	DFO has concerns that most specimens could not be identified to species – could specimens be collected for identification in future? Statements that none were recognized as invasives are also misleading, given most were not identified to a taxonomic level that would allow for this determination. This uncertainty should be conveyed in the text.	For the 2021 field program, the dive team has been instructed to collect opportunistic samples of benthic epifauna and macroflora to aid taxonomic identification efforts. These will either be keyed out on site, sent to appropriate experts for verification, or sent for DNA barcoding analysis. Therefore, it is expected that taxonomic resolution will be vastly improved for 2021.
12	2020 MEEMP and AIS Monitoring Program Report	8.4.1.3 Results – taxonomic ID – Fish and incidentals	The presence of other species in Arctic at higher taxonomic level is not confirmation that something is not an NIS/AIS. Evaluation/designation od status (AIS/NIS native) of specimens and associated text should be changed to reflect this. Again not clear if known Arctic or Canadian Arctic distribution is the deciding factor on whether organisms may be project related introductions of NIS/AIS.	Baffinland acknowledges DFO's comment. The AIS surveillance program is incredibly comprehensive but is obviously limited by the extent to which fauna of Arctic Canadian waters have been characterized by DFO and the broader scientific community. Baffinland directs DFO to the response to comment 10 above regarding the role of range in deciding whether organisms may be introduced via Project vectors and would again emphasize that decisions are based on multiple lines of evidence, not just ranges on record.
13	2020 MEEMP and AIS Monitoring Program Report	8.4.1.4 Results – taxonomic ID – Fish and incidentals	Will unidentified *Liparis* and Bugainvillia be confirmed? Why weren't these identified to species?	*Bougainvillia*: For many hydroids, it is necessary to identify from the medusa stage to be confident of species ID. The polyp stages in some groups are poorly described and/or associated with a particular species. This genus is one of these groups; and the difficulty with identifying to species is further complicated by the often small quantity of specimen that is found in the samples. *Liparis*: This was a very small, damaged specimen. The taxonomist suggested it may be *Liparis tunicatus.* Given the condition and relative immaturity we don't think it

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				would be beneficial to get this specimen verified.
14	2020 MEEMP and AIS Monitoring Program Report	8.4.1.5 Results – Ship hull monitoring	Difficult to evaluate results for this. Could BIM provide a standardized measure of effort – minutes of footage relative to area surveyed. Could they provide a standardized measure of fouling – proportion of area fouled per unit surveyed? Clearly methods are not useful for identifying AIS/NIS, but could give relative measure of fouling for risk assessment if standardized appropriately, but hard to judge with data provided. All they have given is a qualitative description of what they saw ("large patches of…" "larger presence of", "small numbers of…", etc.). DFO recommends reporting of results with standardized, quantitative measures to allow for informed comparison/evaluation.	We will investigate modifications to the program with the MEWG to standardize methodology before the program resumes in future monitoring years.
15	2020 MEEMP and AIS Monitoring Program Report	4.2.1 benthic Infauna Modifications	In 2020 Van Veen Grab samples were subsampled (1/4 of sample retained for identification). Was a rare sort done on the remaining ¾ of sample? If not, we would recommend using a protocol for this on larger organisms that may not be well represented in the subsample. This is a common approach and would be especially important in detecting new or rare taxa that could be important in tracking changes in species presence/absence over time.	A rare sort was not done on the remaining ¾ of the sample, per se. However, macrofauna >1 cm in size (i.e., greater than the mesh size) are hand-picked from the sample and processed separately as a whole sample. Thus, the survey methodology adequately captures larger organisms and enables detection of new or rare taxa not well represented in the subsample.

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16	2020 MEEMP and AIS Monitoring Program Report	5.3.1 Benthic Epifauna methods	DFO has concerns that the new methods using a sample size of 5 quadrats each in the reference and project areas may be insufficient to detect effects given the high spatial variability in benthos. We suggest a power analysis be done using 2020 data to estimate the appropriate sample sizes needed based on levels of observed variability among quadrats.	The intention of this survey has always been to sample more than five quadrats; however, the program is limited by the ability to fabricate steel quadrats. Another 10 quadrats have been fabricated and will be installed in summer 2021, effectively doubling sample size. In 2021 we will conduct a power analysis using data from the 2020 and 2021 surveys to inform how many additional quadrats might need to be added to better detect change going forward and will evaluate the feasibility for implementation in 2022.
17	2020 MEEMP and AIS Monitoring Program Report	5.6 Benthic Epifauna Conclusions	We agree that use of divers would be best for quadrats, but as suggested above, the number of quadrats may need to be increased. As previously suggested, use of a small benthic trawl/sled towed at short distances could also complement these methods and provide better representation of biodiversity. We have concerns regarding statements that fauna are similar at reference and project sites, given the limited sample sizes of quadrats which may limit the power to detect difference. As stated above we recommend a power analysis be completed together with species accumulation curves to assess adequacy of sample design and sample sizes.	See response to Comment No. 16.
18	2020 MEEMP and AIS Monitoring Program Report	P.1068 Section 4.6. Benthic Infauna Conclusions	Shift in sampling frequency to every 2-3 years – DFO has concerns with reduction in benthic sampling effort given that early detection of AIS requires consistent, intense sampling effort. The loss of additional MEEMP monitoring sites in intervening years will significantly reduce sampling effort that previously contributed to early detection of NIS/AIS and make it	It is standard in Project monitoring programs to adjust the frequency of sampling if, after several years of sampling, no change has been detected – which is the case for benthic infauna. Baffinland shares DFO concerns around early detection of NIS/AIS which is why the plan is to continue taking benthic samples to support AIS

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			more difficult to track shifts in species presence/absence/abundance over time.	surveillance monitoring efforts in summer 2021, where 25 stations will be sampled.
19	2020 MEEMP and AIS Monitoring Program Report	Chapter 8.0 Non-Indigenous and Aquatic Invasive Species (NIS/AIS)	DFO is still undertaking a review of the list of newly observed species with internal taxonomic experts, and may have further comments on these species once this review is complete. DFO will provide these comments to the MEWG and Baffinland if and when available, as well as any associated recommendations. To ensure that DFO has sufficient time to undertake an internal review of any new species, DFO recommends and requests that Baffinland supply this list to DFO as soon as possible once it is finalized and prior to the submission of the draft MEEMP report to the MEWG.	Appendix 8A provides a complete species list (2010-2020) for Milne Port and Appendix 8D for a list of taxa sent for independent verification.
20	2020 MEEMP and AIS Monitoring Program Report	Section 5.5 Discussion P. 31 (pdf p. 1145)	Golder indicates that "*Quadrat 9 was dominated by hard substrate (boulder) and supported different ecological communities relative to the soft substrate quadrats*" and recommends that either more quadrats with hard substrate be sampled or that Quadrat 9 be located to an area with soft substrate to be more comparable with other quadrats, otherwise this quadrat be removed from future comparisons. Table 5-5 on p. 14 of Chapter 5 (pdf p. 1128) indicates that the Milne Port Quadrats are comprised of silt/sand substrate. If there are areas with hard substrate in Milne Port, DFO recommends that Golder sample additional quadrats with hard substrate to ensure that the ecological communities supported by hard substrate are adequately monitored for impacts.	Quadrat 9 will be relocated to soft substrate in summer 2021 to be more comparable with other quadrats. Hard substrate areas within Milne Port are associated with habitat offsetting and are adequately monitored according to the comprehensive stipulations laid out in the Fisheries Act Authorization. Methods of monitoring include both SCUBA and ROV surveys, rather than steel quadrats.

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21	2020 MEEMP and AIS Monitoring Program Report Chapter 5.0 Substrate, Macroflora, and Benthic Epifauna	Section 5.4.4 Relative Richness and Diversity P. 29 and 30(pdf p. 1143and 1144)	It is difficult to visually compare data between quadrats for macroflora, sessile epifauna, and motile epifauna in figures 5-16 and 5-17, as the colours are representative of different values for species richness and SDI. It would be easier to compare data between quadrats for macroflora, sessile epifauna, and motile epifauna if each of these categories were represented by specific colours, and then thresholds for species richness and SDI being represented by dashed lines according to the values on the Y-axis.	We note DFO's stated preferences for figure colours and formatting and will endeavour to incorporate them into the 2021 report.

References on Formalin Ethanol preservation:

DNA barcoding of formalin-fixed aquatic oligochaetes for biomonitoring

https://www.wizdom.ai/publication/10.7717/PEERJ.6050/title/simultaneous_preservation_of_the_dna_quality_the_community_composition_and_the_density_of_freshwater_oligochaetes_for_the_development_of_genetically_based_biological_indices

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Name: Bruce Stewart, Jeff Higdon

Agency / Organization: Qikiqtani Inuit Association

Date of Comment Submission: July 8, 2021

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1	Golder (Golder Associates Ltd.) 2021b. Mary River Project, 2020 Marine Environmental Effects Monitoring Program (MEEMP), and Aquatic Invasive Species (AIS) Monitoring Program. Draft report. 23 April 2021. 1517 pp. [1663724-281-R-RevB-34000 2020MEEMP 23APR_21_secured.pdf]	Whole document **NOTE:** the document was variously paginated, so the Word page counter was used to identify which pages are referred to in the 1517-page draft.	Not receiving a copy to review from Golder that allows copying of text for quotations wastes reviewers time! In future the MEEMP text should be available for reviewers to copy for use in these comments, as it is in most other Project documents we receive for review.	Noted.
2	Golder 2021b	Executive Summary, p. 4 See also: s.3.5, p. 601	"Comparison of the percentage of fine sediment over time along the transects did not indicate statistically significant changes in fines content from the previous year (2020 vs. 2019), nor between the six-year period between 2014 and 2020." (p. 4). The same was said of iron sediment concentrations. Were there significant differences in the percentage of fine	The sediment fines content data were analyzed separately for 2019 and 2020, and the combined 2014–2020 dataset, respectively, to assess spatial and temporal gradients (as described in Section 3.3.2.2). The same analysis was repeated for iron content. The results of these analyses are presented in Sections 3.4.5 for fines and 3.4.6 for iron. The results of multiple comparisons of percent fines between years (within distance/transect combinations) are provided in Table 3-5. There

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			sediments and iron sediment concentrations between 2020 and individual earlier years (i.e., 2014, 2015, 2016, 2017, or 2018)?	were no significant differences in the percentage of fine sediments between 2020 and individual years prior to 2019 (i.e., 2014, 2015, 2016, 2017, or 2018). The results of multiple comparisons of normalized iron content between years, within distance/transect combinations (adjusted to mean fines) are provided in Table 3-9. At some distances on the east and west transects, there were some significant differences detected between years, but these were localized. All comparisons to baseline (2014) were not significantly different. There were no significant differences in the iron content between 2020 and individual years prior to 2019 (i.e., 2014, 2015, 2016, 2017, or 2018) along the northern transect. As discussed in the report, substrate composition and metals content were more variable along the coastal transects reflective of naturally occurring background conditions.
3	Golder 2021b	Executive Summary, pp. 4 and 5 See also: s.1.6, pp. 31 and 32 s.3.6, p. 601	Golder has recommended "that monitoring of marine sediment quality within the study area should continue, but is not required annually, commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet" (p. 4). It has also	The radial sediment and benthic sampling program is ongoing and future sampling will be undertaken, as noted in the 2020 MEEMP. With respect to the 2021 MEEMP, sediment and benthic invertebrate data are being collected in 2021 to support other components which have been identified as priorities (e.g., fish health, NIS/AIS). Follow up sediment and benthic sampling is also being undertaken at SW-2.

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			recommended that monitoring of benthic infauna should be continued "…but on a reduced frequency (i.e., every 2-3 years)…" (p. 5) QIA does not agree with this approach. The radial sampling design was only fully sampled for the first time in 2020. This leaves only one year of benchmark for direct comparison with future sampling programs that, if Phase 2 is approved would be impacted by further development, including construction of the proposed Ore Dock 2. This approach will weaken future impact assessment. Annual monitoring should be continued annually until there are at least 3 years of directly comparable data from these programs for comparison with future operations and possible future development.	For future impact assessment, there are three years of co-located sediment and benthic data collected by an integrated sampling program, and another four years of sediment quality data collected along the designated transects radiating from Milne Port. These data are more than adequate for comparison with future operations and possible future development. Our analysis has shown that, to date, the temporal and spatial variability observed in the MEEMP is consistent with our understanding of coastal and offshore natural processes.
5	Golder 2021b	Executive Summary, p. 5	"Invertebrate densities were either higher in 2020, or were not significantly lower relative to 2018 or 2019. Moreover, richness values along all four transects in 2020 were not significantly different from those calculated for 2018." (p. 5)	2020 was the first year that all 15 stations along each of the four transects (East, West, Northwest and Northeast) were sampled. Therefore, stations SE-8 through SE-15, SW-8 through SW-15, NE-8 through NE-15, and NW-8 though NW-15 are new stations that have not been sampled in previous years.

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			How comparable were 2020 data with data from previous years that are not mentioned here? How many years of directly comparable data are available for each sampling site?	Sampling at the stations listed below are directly comparable for the time series indicated: • SE-1 through SE-5: 2018 – 2020 (3 years) • SW-1 through SW-5: 2018 – 2020 (3 years) • NE-1 through NE-5: 2018 – 2020 (3 years) • NW-1 through NW-5: 2018 – 2020 (3 years) • SE-6 through SE-8: 2019 – 2020 (2 years) • SW-6 through SW-8: 2019 – 2020 (2 years) • NE-6 through NE-8: 2019 – 2020 (2 years) • NW-6 through NW-8: 2019 – 2020 (2 years)
6	Golder 2021b	Executive Summary, p. 5; s.1.5.3.1, Table 1-5, p. 27	Golder proposes to replace the use of Fukui traps with hoop nets (p. 7) but “will continue to use these in addition to hoop nets for a minimum of 3 years to facilitate comparison of old and new methods/results (p. 27). Are these sampling methods being run in tandem in 2021?	Yes, both methods will be run in tandem in 2021.
7	Golder 2021b	Executive Summary, p. 5 See also: s.1.6, p. 33 s..6.2.2, p. 1185	“Statistical comparison of CPUE, species composition and relative abundances is not possible under current methodologies due to variations in total efforts and fishing locations. It is recommended that these fishing efforts be	The objective of this field component is to characterize nearshore fish community structure and habitat use in Milne Port and not to quantify abundance or perform a stock assessment. CPUE, as used for MEEMP reporting purposes, is useful because it gives a snapshot indication of relative abundance

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		s. 6.3.1.2, p. 185 to s.6.3.1.7, p. 1192	standardized in the future to facilitate the ability to make comparisons between survey years." (p. 5). Current fish sampling effort remains relatively low for all methods (pp. 1187 to 1192). QIA supports this recommendation provided sampling coverage is suitable for long-term monitoring in the event Phase 2 is approved, and that sampling effort is adequate for detecting Project-related effects at a low risk level.	and habitat use. Nonetheless, QIA's comment is acknowledged and efforts will be made in summer 2021 to standardize fishing efforts and locations to the extent possible to facilitate interannual comparisons going forward.
8	Golder 2021b	Executive Summary, p. 7	"Overall, the similarities observed across sampling years for both species occurrence and relative abundance suggests that construction and operational activities at Milne Port do not appear to have resulted in detectable changes to local fish communities to date." (p. 7) This statement is not supported given that the previous paragraph states "Statistical comparison of CPUE, species composition and relative abundances is not possible under current methodologies…".	The report has been amended to indicate that this statement is based on qualitative, not quantitative, comparison.

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9	Golder 2021b	Executive Summary, p. 8	The assertion that non-indigenous species (NIS) "do not hinder or prevent survival of other organisms within the ecosystem" (p. vii) requires clarification. In particular, that species identified as benign (i.e., NIS) or harmful (i.e., AIS) in one area may be harmful or benign, respectively, in another, hence the need to prevent introductions and to monitor all species that may have been introduced.	The definition of NIS has been updated in the report to clarify that it includes any species that exists outside the region where it originated and that NIS have the potential to become harmful.
10	Golder 2021b	Executive Summary, p. 9 See also: s. 1.6, p. 34 s.8.4.1.5, p. 1449 s. 8.5.2.5, pp. 1462-1463	Regarding hull fouling, "many taxa were not resolved to species level…" (pp. 9 and 34). This is not the full story and should be corrected. The section on hull fouling taxa did not identify any taxa to species. They were identified as "barnacles of indeterminate species", "calcareous tube worms of indeterminate species", "unidentifiable encrusting organisms", and "unidentifiable filamentous algae". (pp. 1462 and 1463)	The report has been updated to clarify that no species level identifications were made.
11	Golder 2021b	Executive Summary, p. 9 s.8.3.4.3, p. 1433	"To date, no Project-related introduction of a NIS/AIS species have been documented at Milne Port and the requirement for a rapid	The standard approach for the identification of specimens is called a "non-aggregate" approach, which means that each individual specimen is assigned only to the

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			response has not been triggered." (p. 9) QIA welcomes the involvement of external taxonomic experts but remains concerned by the inability of some AIS programs to identify taxa to species level. This limits what can be concluded regarding the presence/absence of NIS and AIS. QIA recommends that the Proponent elaborate on the proportion of the taxa collected each year by each monitoring program that were not identifiable to species level, to put the above quoted text in full perspective.	classification that its characteristics allow (according to specimen condition, stage of development). In many cases, it may only be possible to identify a mature or subadult specimen to species, but juveniles/damaged individuals of the same species (presumably) to a higher level, e.g. family, order, etc. In some cases, an individual species may be represented by 2 or more ranks in the data, which can inflate the species list with lower-resolution (i.e. higher taxonomic rank than species) names. Across the whole program, looking at the number of specimens: of a total of 17,134 specimens examined (Raw Count of non-incidental organisms), 11992 were identified to species (69.9% by abundance). The remaining ~30% were either immature, damaged, or were not identified further due to lack of resources on the particular group. The breakdown is approximately: 17% damaged/ immature (i.e., did not have characteristics allowing for species identification) and 13% of groups that were poorly described in the literature and our taxonomists were not comfortable identifying to species with available resources. This rate of poorly described taxa is certainly higher in the Arctic than in other regions of the world, but it is well documented in the

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				literature (e.g., Arctic Biodiversity Assessment 2013). Moving forward, Baffinland will continue working with taxonomists, engaging global experts, and employing technology such as genetic barcoding to resolve species identifications to the extent possible. Reference: Arctic Biodiversity Assessment. 2013 https://www.caff.is/assessment-series/233-arctic-biodiversity-assessment-2013
12	Golder 2021b	s.1.5.3, Table 1-4, p. 24; s.2.2, p. 66; s.2.3.1, p. 69	The marine water quality sampling frequency was variously described as 6 sampling events /year (Table 1-4, p. 24) or 5 separate sampling events (pp. 66 and 69). Which frequency was correct in 2020 and in other years?	This should have stated five sampling events in 2020, which is consistent with previous years. In 2019, we completed six events, but the target was five sampling events per year. Some flexibility was built into the sampling program to facilitate the collection of effluent and receiving water quality samples from the same discharge period. The text in the report has been updated to clarify that five sampling events occurred in 2020.
13	Golder 2021b	s.1.5.3, Table 1-4, p. 24 s.1.6, p. 33 See also: s.5.5, p. 1145 s.7.4.3.1, p. 1282	Only 8 tissue samples are being collected per sex per species for fish tissue chemistry. (p 24). “Statistically significant elevations in tissue concentrations of metals were noted for the clam *H. arctica* and Arctic char in 2020 relative to concentrations in 2018	Tissue chemistry samples selected for analyses were chosen from a range of size classes that represent the range of size classes collected in 2020 of each species. This approach will continue in the future to maintain consistency and comparability over time (to the extent possible), and the method will be noted in subsequent MEEMP annual

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		s.7.7, p. 291	and 2019, however these differences were small and often inconsistent…" (p. 33). Continued monitoring has been recommended to "achieve continuity in established time series (e.g., Arctic char) and to better characterize baseline data (e.g., sculpin and *H. arctica* tissue chemistry)" (pp. 33 and 1291). What measures are being taken to ensure that the small numbers of tissue samples are representative and directly comparable over time? QIA supports continued monitoring; recommends that its concerns related to interannual comparability be addressed in the sampling program design; and notes that the Project has been operating for 6 years so the tissue chemistry data are not "baseline", which implies pre-disturbance, instead they are part of a time series that may provide a "benchmark" for comparison if Phase 2 is approved (same for the quadrat studies, s.5.5, p. 1145) .	reports in the methods section (e.g., Section 7.3.3.3 in the 2020 MEEMP Annual Report). In addition, a power analysis was completed on the tissue chemistry analyses for each species which indicated that adequate statistical power was achieved for the chemicals of potential concern (see Table 7-9 in the 2020 MEEMP Annual Report). Where power was lower (i.e., for aluminum), statistical differences were detected with a sample size of 8 in 2020 relative to previous sampling years, indicating adequate statistical power with a sample size of 8 to detect differences among years.

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14	Golder 2021b	s.1.5.3.1, Table 1-5, p. 28	"…detection of a single Project-related invasive species is the threshold for triggering of adaptive management measures (e.g., species rapid response plans) and/or potential corrective actions (e.g., measures to eradicate the NIS/AIS), if deemed feasible." (p. 28) Who decides whether these measures and/or actions are feasible? What is the fallback if they are not deemed feasible?	In the event a Project-related invasive species is identified, Baffinland would work with DFO and other MEWG members to decide on an appropriate and feasible course of action.
14	Golder 2021b	s.1.5.4, p. 28	"NIS/AIS monitoring is recommended to be conducted annually until results of ballast water sampling are deemed satisfactory to recommend reducing the frequency of monitoring in the receiving environment." (p. 28) QIA supports continuation of the NIS/AIS monitoring and recommends the Proponent clarify how the decision to reduce monitoring frequency would be reached.	A decision to reduce monitoring frequency for ballast water sampling would be made with input from DFO.
16	Golder 2021b	s.1.5.4, p. 29 s.8.4.1.5, p. 1449 and 1450	The three vessels examined for hull fouling in 2020 had extensive biofouling on their hulls, rudders and propellers but the taxa present	As the Board's assessment of the Phase 2 Development proposal is in the decision-making process and currently waiting for the Public Hearing proceedings to

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			could not be identified to species using the ROV video (pp. 29, 1449 and 1450). The amount of hull fouling suggests risk of species introductions is high and lack of species identifications prevents proper assessment of that risk. This is an important gap in impact assessment. QIA welcomes the Proponent's plans to work collaboratively with DFO to improve the methodology of hull fouling surveys (p. 1462) and requests this assessment gap be filled regardless of whether the Phase 2 proposal is accepted.	resume, Baffinland will not be providing a response at this time.
17	Golder 2021b	s.1.6, p. 32, s.5.4.2, table 5-4, p. 1127 s.5.6, p. 1146	Golder has "recommended that divers continue to be used to survey all quadrats to standardize the methodology and improve identification of substrate and taxonomic resolution." (p. 32 and 1145). QIA supports this recommendation but notes that only 2 of 10 macroflora taxa found using a combination of ROV video and divers were identified to species (p. 1127), and recommends further efforts be undertaken to	We agree that macroalgae taxa identification is an important component of the study. Extensive efforts were made to identify macroalgae to species, including: reviewing peer reviewed literature, identifying morphological characteristics under a microscope, and pressing algae for further evaluation. Macroalgae is inherently difficult to identify to species with researchers indicating that current data for the Canadian Arctic should be used with caution because morphological identification approaches limit diversity (i.e., misidentification) (Saunders and McDevit 2013). Researchers are now relying on DNA barcoding to identify cryptic

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			identify taxa in the quadrats to species. Otherwise changes observed may be very difficult to detect and understand over time, defeating the purpose of the monitoring.	algal species and diversity for the northern Baffin Island region (Küpper et al. 2016). For 2021, biologists will collect select algal samples to send for DNA barcoding analysis. Küpper FC et al. 2016. Arctic marine phytobenthos of northern Baffin Island. J Phycol. 2016 Aug;52(4):532-49. Saunders GW & McDevit DC. 2013. DNA barcoding unmasks overlooked diversity improving knowledge on the composition and origins of the Churchill algal flora. BMC Ecol. 13
18	Golder 2021b	s.1.6, p. 34	Inability to identify live species carried to Milne port on fouled hulls (p. 34) severely limits any efforts to assess risk of the introduction of invasive species via hull fouling. QIA recommends the Proponent work with DFO and the MEWG to solve this problem, and consider options for eDNA sampling that might be possible using an ROV. QIA supports Golder's recommendations for the NIS/AIS Program (p. 34). QIA further recommends the Proponent work with DFO on testing for NIS/AIS in the ballast water and on biofouled	As the Board's assessment of the Phase 2 Development proposal is in the decision-making process and currently waiting for the Public Hearing proceedings to resume, Baffinland will not be providing a response at this time.

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			hulls of Project vessels and conduct risk risk-based assessments of Project shipping to inform mitigation, monitoring, and adaptive management.	
19	Golder 2021b	s.2.3, p. 38 See also: s.3.0, p. 52ff	QIA requests Golder clarify how much interannual variation there has been in the relative water level elevation between sampling years, and the value of these relative measurements cf. absolute measurements for assessing sea-level changes related to climate change.	The purpose of the tide gauge monitoring program is to meet Condition No. 001 of Project Certificate No. 005 that states "the Proponent shall use GPS monitoring or a similar means of monitoring at both Steensby Port and Milne Port, with tidal gauges to monitor the relative sea levels and storm surges at these sites". The accuracy of the Milne Port tide gauge instrument is ±0.025 m and the resolution is 0.0005 m. The instrument is suitable for monitoring local water level variations due to tides, storm surge, wave setup, and longer term trends in mean sea level, provided adequate vertical elevation control information for determining relative sea levels. Interannual variation due to relative sea level change depends on global sea level rise, spatial variations in the redistribution of glacial meltwater, vertical land motion, and regional ocean dynamic effects. In northern Baffin Island glacial isostatic adjustment, or postglacial rebound, is a predominant source of vertical land motion and relative sea level change. Although global sea levels are projected to rise by as much as a metre or more over the next

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				century, the rate of glacial isostatic adjustment of northern Baffin Island currently exceeds the global sea level rise rates. Monitoring relative mean sea level changes at Milne Port would also require a geodetically controlled survey of glacial isostatic adjustment rates which are considered beyond the scope of the MEEMP program. Currently the gauge position is surveyed annually with a Real Time Kinematic Global Positioning System (RTK GPS). However, the measurements are not of sufficient duration and quality to resolve variations in crustal uplift.
20	Golder 2021b	s.2.3, p. 39	In 2020, the tide gauge stopped recording 37 days prematurely (*i.e.* stopped September 10, planned removal on October 17) (p. 39). The recorder also stopped recording prematurely in 2019. How does the Proponent plan to avoid future data loss caused by premature stoppages?	A number of steps have been taken to rectify this issue: • The data collection parameters have been modified to extend the duration of battery life and to eliminate any unnecessary processes that require power during the deployment. • A second instrument was purchased and installed to provide redundancy in case of an instrument failure. • Both tide gauges underwent a pre-deployment test to ensure that they had adequate battery life for the planned deployment.
21	Golder 2021b	s.2.4.6, p. 72	RE: water quality measurements for iron concentrations in Milne Inlet: “Differences in the sensitivity of detection limits precludes comparison of the 2020 data to pre-2017 data…” (p. 72).	The hold time for metals analysis of 6 months (28 days for mercury) unfortunately, precludes the archiving of previous years of water samples for metals analysis. Historically elevated detection limits are not unusual for long-term monitoring programs. While,

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			What does this mean for future monitoring? How will future changes in lower detection limits be dealt with to ensure data comparability? Are there archived samples available for re-analysis?	it is true that differences in detection limits can complicate direct comparisons over time, as discussed in the 2020 MEEMP, it can be stated with confidence that no iron concentrations measured since 2017 have exceeded the previous detection limit (500 ug/L), nor did concentrations measured in 2015 and 2016. The maximum total iron concentration in 2020 (53 µg/L) was substantially lower than the highest iron concentration of 286 µg/L measured during a 2017 September storm event when TSS was elevated. As demonstrated in the 2020 MEEMP report Baffinland will continue to review the multiple years of data available and place emphasis on those more recent years that have low and comparable detection limits. This includes data from 2017, 2018, and 2019 to compare to the 2020 data. We will continue to use the improved methods moving forward, allowing us to compare to these previous years.
22	Golder 2021b	s.2.6, p. 77	”With respect to iron, which is of primary concern for the Project, laboratory analyses have not revealed a trend of increased concentrations in water samples collected between 2014 and 2020.” (p. 77) It should be clarified here, as it was earlier in the MEEMP draft (p. 72), that the reason no trend	Please see response to QIA comment #21. In addition, the data collected with the improved detection limits from 2017 to 2020 tell us that there is no evidence of change because waterborne total iron concentrations in 2020 remained within the range measured in previous years. Dissolved iron concentrations were <10 µg/L in each of the samples collected in 2020

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			has been revealed is that "Differences in the sensitivity of detection limits precludes comparison of the 2020 data to pre-2017 data…" (p. 72). What do the 2017 through 2020 data tell us?	indicating that, for most samples, a substantial portion of the reported total concentration was present in particulate form, and therefore likely less bioavailable for uptake by aquatic biota. Environmental conditions in the receiving environment, such as pH, dissolved oxygen concentrations and redox potential, can influence the proportion of biologically available iron that can be released from particulates into surrounding waters. According to Millero (1998) and Lis et al. (2015), in circumneutral pH and well oxygenated environments, similar to those observed in Milne Inlet, iron tends to be poorly soluble. As a result, many open ocean waters and some freshwater systems are characterized by low dissolved iron concentrations (Johnson et al 1997; McKay et al 2004). Johnson KS, Gordon RM, Coale KH. 1997. What controls dissolved iron concentrations in the world ocean? Marine Chemistry, 57: 137–161. McKay RML, Bullerjahn GS, Porta D, Brown ET, Sherrell RM, Smutka TM. 2004. Consideration of the bioavailability of iron in the North American Great Lakes: development of novel approaches toward understanding iron biogeochemistry. Aquatic Ecosystem Health 7: 475–490.

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23	Golder 2021b	App. 2B, pp. 191-544 App. 2C, pp. 545-549 App. 3C, pp. 674 to 970	There were substantial exceedances of sample hold and/or extraction times for numerous water quality and sediment quality analyses. Relative to the recommended holding times, exceedances were much greater for some parameters than for others. What will be done in future to reduce these hold and/or extraction times and make them more consistent? How do these exceedances impact the effectiveness of monitoring and mitigation?	Hold time exceedances occur more frequently when samples are collected from a remote Arctic location and have to be shipped south. This because especially challenging in 2020 due to constraints associated with COVID-19. Some parameters have shorter hold times than others which affects the consistency of exceedance reporting. In planning the sampling program, efforts are made to time the water quality sampling around when there is an active discharge, as well as on a flight day in order to get the samples shipped as quickly as possible. Despite the samples being marked as priority on the charter flights, unforeseen complications can occur. For example, they can get bumped if the plane needs to lose weight based on other items or inclement weather conditions. To facilitate transparent reporting, we note the relevant information in our reporting and document logs. Evaluation of the data in the MEEMP has determined that the water quality monitoring completed to date is effective. Baffinland continues to look for opportunities to further reduce hold time exceedances for water quality samples.
24	Golder 2021b	s.3.2, p. 562	RE: bottom paragraph on p. 562, which describes the Northeast Transect as extending directly off the existing ore dock.	The report has been revised according to the reviewer's suggestion.

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			Suggest editing text from "...the existing ore dock out..." to read "...the existing and proposed ore docks, respectively, out...".	
25	Golder 2021b	s.3.4.2, Fig. 3-3, p. 576 s.3.4.5, Fig. 3-10, p. 586 s.3.5, p. 601 s.4.4.1, Fig. 4-2, p. 1043 s.4.4.3.2.2, p. 1058 s.4.5, p. 1067	A general linear analysis (p. 601) may not be the most appropriate test as the Project effects may be concentrated in particular areas. For example, in Table 3-9, 3 of the 4 highest annual measurements of normalized iron content at 200 m and 500 m along the E and W coastal transects were found in 2020. The fourth was found in 2018. These suggest higher iron inputs to these areas from port operations. In Figure 3-1, the percent fines was particularly low at the stations immediately west of the ore dock (e.g. SW-2) Benthic infaunal species density, richness, diversity, and evenness were lower at SW-2 than elsewhere along the coastal transects. Indeed the total density was so low as to be considered an outlier (p. 1051). QIA requests that the temporal data from this anomalous area be revisited to learn whether changes are occurring at this location;	The general linear analysis employed in the 2020 MEEMP allowed for different effect trends at different transects and years, which is the goal of this analysis. In addition, the results of the analysis are shown together with the collected data, for maximum transparency. Regarding the statement about 3 of the 4 highest annual measurements of normalized iron content at 200 m and 500 m, this statement fails to recognize that table 3-9 does not present measurements, but rather model predictions, and that in this table the 2020 values at the East and West transects at both 200 m and 500 m are not significantly different from the 2014 values in those years. It is correct that, in 2020, percent fines and benthos density were low at station SW-2. This station is considered to be an outlier, rather than reflecting Project-related change, for three main reasons. First, it is not likely that such a substantial reduction would be localized to a 100 m length along a single transect, especially considering that this was not observed in previous years. Second, values of observed

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			that the Proponent increase monitoring efforts in this area, beginning with additional targeted sampling in 2021 (p. 1067), to determine whether Project activities are contributing to these differences; and that the Proponent provide rationale for considering the total density of benthic infauna an outlier rather than a Project effect.	density and richness at adjacent station SW-1 did not indicate any strong reductions in benthos density / richness in close proximity to the dock. Third, sediment with a higher proportion of sand would be expected at this station due to the local coastal topography, which is heavily influenced by the proximity of Phillips Creek. Nonetheless, QIA's request is noted and station SW-2 will undergo target sampling in 2021.
26	Golder 2021b	s.3.4.5.1, Fig. 3-11, p. 588 See also: s.3.4.6.1, Fig. 3-16, p. 596	Differences in trajectory of the 2019 and 2020 W, NE, and NW transects for percent fines (p. 588) and fines adjusted iron (p. 596) may be largely an artefact of not sampling sites farther from the point of origin in 2019.	Agreed. A difference in the spatial extent of sediment sampling along the transects in 2019 and 2020 could have contributed to the observed differences in trajectories between years for the east, north-east, and north-west transects. The west transect is influenced by sediment transport down Philips Creek to Milne Inlet. These differences were, however, not statistically significant, with only a few localized exceptions (as noted in the text): • Percent Fines: one exception (furthest distance sampled in 2019 along the NE Transect). • Iron Content: two exceptions - at a distance of 1,500 along the Northwest Transect and at distance of 500 m along the West Transect.

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27	Golder 2021b	s.3.4.5.2, Fig. 3-12, p. 591 s.3.4.6.2, Fig. 3-17, p. 599	Data trajectories suggest the percent fines has been decreasing at stations located 0 to 500 m west of the ore dock (p. 591), while the mean predicted iron content has been increasing (p. 599).	Figure 3-12 does suggest lower estimated percent fines in 2019 and 2020 at some stations ≤500 west of the ore dock compared to previous years. However, these values are within the range predicted at ~1,500 m from the ore dock in 2014, and so are largely within the range of values predicted along this transect under baseline conditions. This interpretation is supported by the statistical analysis results presented in Table 3-5, where there were no significant differences between years at 200 m, 500 m, and 1,500m from the ore dock. Figure 3-17 does suggest that higher mean predicted iron content values in 2019 and 2020 at stations ≤500 west of the ore dock compared to previous years. However, these values are within the range predicted at 1,500 m from the ore dock in 2014, and so are largely within the range of values predicted along this transect under baseline conditions. This interpretation is supported by the statistical analysis results presented in Table 3-9, where there were no significant differences between years at 200 m, 500 m, and 1,5000 from the ore dock. Baffinland will continue to monitor and assess spatial and temporal changes in sediment quality along the West transect through the MEEMP program.

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28	Golder 2021b	s.3.5, pp. 600 and 601	"When compared to 2014 (pre-Project baseline) the percentage of finer sediments along the Northern Offshore Transects was not significantly different in 2020, indicating the Project has not had an effect on fine sediments distribution in Milne Inlet." (p. 600). Characterizing "not significantly different" as "not had an effect", is potentially misleading. Showing with 95% certainty that an effect has occurred is very different than proving there has been no effect. The probability of error should be reported with statements like these.	The P-value for significant interactions for the analysis used to support this conclusion is provided in the footnotes for Table 3-6 (P<0.05). Baffinland will revise the text to address QIA's comment.
29	Golder 2021b	App. 3C, p. 810ff	Hydrocarbon surrogates spike recovery (dichlorotoluene, 3,4-) in sediment samples was either higher or lower than the data quality objective (p. 810). This suggests there may also be inconsistencies in the detection of hydrocarbons in the natural sediment samples. How will future sampling and analyses be adjusted to improve the consistency and ensure accuracy of these results?	Though samples SE-8, DUP F and SNE-4 had recoveries just outside the data quality objectives, the majority were within the recovery. Petroleum hydrocarbons and PAHs were below the analytical DLs in each of the samples collected during the 2020 MEEMP. This is consistent with previous years where hydrocarbons have been largely below DLs since sampling was initiated in 2015. Given these consistencies across all samples and years we are confident that non-detect results were unaffected.

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30	Golder 2021b	s.4.3.1, p. 1038 s.8.3.1.2, p. 1430	Benthic infauna were preserved in formalin (p. 1038), as were zooplankton (p. 1430). This method of preservation, while useful for microscopic taxonomy, reduces the value of these samples for DNA identification. QIA recommends that alternative approaches be established that could enable both approaches and make better use of the samples (e.g., short-term fixation in formalin followed by transfer to alcohol).	Samples sent for genetic identification were preserved in 90% ethanol, per the recommendation of analysts at the Canadian Centre for DNA barcoding, and as outlined in Section 8.3.2. Samples sent for taxonomic identification were preserved in formalin as outlined in Sections 8.3.1.1 and 8.3.1.2.
31	Golder 2021b	s.4.3.1, p. 1038	Various taxa were eliminated from the benthic infaunal samples as they were not expected to have significant direct exposure to sediments (e.g., Nematoda). Were these taxa identified for NIS/AIS consideration? If not, why not?	Nematoda were not excluded based on a lack of exposure to sediments. Rather, they have for all years been included as incidental organisms. It is our standard practice to exclude these from the main data set given their abundances are not adequately captured with methods used to study macrofauna (for the most part), as evidenced by the patchiness in the reported abundances. In the first year we processed these samples, we were also attempting to be consistent with the previous work, in which nematodes were excluded.
32	Golder 2021b	s.4.4.1, Fig. 4-1, p. 1042; Fig. 4-3, p. 1044; Fig. 4-5, p. 1046; and	Figure 4-1 is unnecessarily difficult to interpret. The y-axes presented are not directly comparable, and	Total density of benthic infauna varied between transects (Figure 4-1) and the scale for each transect was chosen to better display variation within transects.

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		Fig, 4-7, p. 1048 s.4.4.2, Fig. 4-9, p. 1050 s.4.4.3.1.1, Fig. 4-10, p. 1052 s.4.4.3.2.1, Fig. 4-12, p. 1057 s. 4.4.3.3.1, Fig 4-14, p. 1062 s.4.4.3.4.1, Fig. 4-15, p. 1065	the panels are not arranged in a logical order. As noted in past comments these figures would be more useful if they had the same y-axis scale as per Figure 4-3, so they are immediately comparing apples to apples. Arranging them to correspond with the positions of the transects around the origin would facilitate comparisons with the map figure that follows. NW15-1 NE1-15 origin W15-1 E1-15 This arrangement should also be applied to other figures (e.g., 4-3, 4-5, 4-7, 4-9, 4-10, 12, 4-14, 4-15)	In addition, the low total density value of station SW-2 would appear as 0 if the same scale was used on all transects. Nevertheless, the figures in the final report have been revised to address QIA's comments.
33	Golder 2021b	s.4.4.3.1.1, Fig. 4-10, p. 1052 s. 4.4.3.3.1, Fig 4-14, p. 1062 s.4.4.3.4.1, Fig. 4-15, p. 1065	Given the number of outliers removed from analysis (i.e., Fig. 4-10 = 2, Fig. 4-14 = 3, Fig 4-15 = 3), and the fact that each one comprises the data for a particular year at that location, consideration should be given to replicate sampling rather than relying on a single combined sample--i.e., 3 separate samples so there is a better chance of identifying an outlier	The number of outliers is, in fact, not very large – with 60 stations sampled in 2020 and 32 stations sampled in 2019, a removal of 3 outliers in a 2019-2020 analysis is well within reason. The goal of these analyses is to describe overall temporal and spatial trends rather than capture individual values at each sampled station. While the removal of an outlier indeed removes the entire station/year information for that variable, it does not affect the overall trend described by the

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			without losing all samples from a site. Comparing transects with very different lengths should be avoided given the strong influence of points at the extremities of the transects (short or long). These differences between 2019 and 2020 highlight the need for annual sampling of the complete radial monitoring design to establish a better basis for comparison in the event Phase 2 is approved.	model. That is, the removal of three outliers in a 2019-2020 analysis will not affect the trend being modeled. We agree with the reviewer that transect lengths should be kept the same between sampling years. The difference in sampling length between 2019 and 2020 was due to health and safety, as well as logistical issues in 2019. These issues were resolved in 2019, and we expect future sampling to be comparable to the full sampling extent that was performed in 2020.
34	Golder 2021b	s.5.3.1, p. 1117	"In 2020 divers surveyed the quadrats in the reference area, but due to time constraints in the field program, were unable to survey the quadrats in the Project exposure area (these were subsequently completed using ROV-video surveys)." (p. 1117). What impact will this gap in diver surveys have on temporal comparisons going forward, and how will such gaps be prevented in future?	To mitigate the change in methods from diver-based to ROV quadrat surveys, the ROV footage was reviewed and data recorded by the same marine biologist who conducted the dive surveys. In this way, the marine taxa were identified at the same level of classification between survey methods. There is no evident gap for the overall quadrat studies. The results for 2021 will be reviewed in comparison to 2020 and recommendations will be identified should results show statistically significant differences.
35	Golder 2021b	s.8.4.1.2, Tables 8-3 and 8-4, pp. 1439 to 1441	In the AIS/NIS monitoring only 20% (2 of 10; p. 1439 and 1440) of the benthic macroflora and 29% (5 of 17; p. 1441) of the epibenthic fauna in	See response to Comment 11, which provides detailed discussion around species identification rates.

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		s.8.4.1.3, Table 8-5, p. 1444 s. 8.4.1.4, p. 1447 s. 8.4.1.5, p. 1449 s. 8.5.2.5 pp. 1462-1463	the permanent quadrat studies, 62% (26 of 42; p. 1447) of the zooplankton, and 65% (17 of 26; p. 1444) of the incidental macroflora and fauna taxa were identified to species (pg. 1440-1448). Taxonomic resolution limits what can be concluded about the presence or absence of non-indigenous species. QIA recommends the Proponent continue working to improve the taxonomic resolution of its NIA/AIS monitoring programs.	We are continually working to improve taxonomic resolution of our monitoring programs and actively seek out global experts and best available technology (e.g., genetic barcoding) to aid in identification efforts.
36	Golder 2021b	s.5.5, p. 1145	The Proponent is considering whether or not to keep quadrat 9, which is dominated by hard substrate and different from the others. Adding a soft substrate site would increase the sample size and make the reference and exposed sites easier to compare; adding a hard site would expand the range of species and habitats available for comparison. Both approaches have merit. Overall the epibenthic community assemblages and associated indicators appear to be variable, and this variability among sites will make it very difficult to identify	Quadrat 9 will be relocated to soft substrate in summer 2021 to be more comparable with other quadrats. The intention of this survey has always been to sample more than five quadrats; however, the program is limited by the ability to fabricate steel quadrats. Another 10 quadrats have been fabricated and will be installed in summer 2021, essentially doubling the sample size. A power analysis using data from the 2020 and 2021 surveys will be conducted to inform whether additional quadrats may need to be added to better detect change going forward. For the 2021 field program, the dive team has been instructed to collect opportunistic samples of benthic epifauna and macroflora

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			changes. This suggests the need for additional quadrats, there are comparable and representative of the habitat types and depths. Power analysis may be useful for informing sample size requirements, and there is a definite need to improve species identifications.	to aid taxonomic identification efforts. These will either be keyed out on site, sent to appropriate experts for verification, or sent for DNA barcoding analysis.
37	Golder 2021b	s.6.4.1.4, p. 1199 App. 6A-1, pp. 1236 and 1237) s.6.3.1.6, p. 1191 s. 6.3.1.7, p. 1192) s.6.5, p. 1205	Miscellaneous fishing methodology comments: Photos of the beach seine (pp. 1236 and 1237) show it being used without poles at the ends, which causes the ends to pinch and can affect swept area. An alternative approach is to use shorter seines with poles at either end that hold the ends stretched vertically and maintain swept area. Depending upon the substrate the shorter nets can be easier to use. Hoopnets were set to target fish moving in and out of fresh water, and set in deep water with both ends open to permit fish to swim into the trap (p. 1191). Tying the cod ends of two nets together and spreading the wings of both works well for following the direction of fish	Beach seines were fitted with a foot and hand bridal. The operators step into the bridal and hold the bottom of the net to the substrate during seining. Advice regarding deployment of hoopnets will be shared with the field crews. The net chamber openings are not progressively smaller. The use of baited longlines has been added to the 2021 sampling program.

#	Document Name	Section Reference	Comment	Baffinland Response
			movements, and could also be used in deep water to increase catches. It is not clear for the description or photos whether the nets used have multiple chambers, with progressively smaller openings that reduce predation of small fish. If not, these might provide a more accurate record of the catch. The total otter trawl duration was 16 minutes (p. 1192) and impacted non-target species (p. 1205). Golder has recommended considering different methods for assessing large-bodied demersal fishes (p. 1205). Baited longlines set through the sea ice are another technique that could be considered. This gear has been used in the Pond Inlet area to catch Greenland halibut (*Reinhardtius hippoglossoides*) (aka turbot).	
38	Golder 2021b	s.6.4.1.1, Tables 6-7 and 6-8, pp. 1195-1197 s.6.6, p. 1206	Table 6-7 provides a temporal comparison of total catch by species (all sampling methods combined) for each year from 2010 to 2020 (p. 1195). Table 6-8 provides total fish catch records and catch per unit effort (CPUE) by	See response to Comment No. 7.

#	Document Name	Section Reference	Comment	Baffinland Response
			sampling method for 2020 (p. 1197). QIA understands there are limitations to what can be compared using CPUE (p. 1206) but requests that the Proponent provide a temporal comparison of total catch and CPUE by species for each sampling method (i.e., 2010-2020 where possible, and identifying changes in methodology), as this may improve understanding of fish availability in the Milne Port area. CPUE should also describe the gear as that is an important component of the effort. Is it per gillnet, per 100 m of gillnet, per 100 sq m of gillnet, etc? Otherwise the data may not be comparable over time with this or other studies. This applies to all of the gear types.	
39	Golder 2021b	s.6.4.1.5, p. 1200	"…Fourhorn sculpin was also the most abundant species captured..." (p. 1200). As written this suggests sculpin were the most abundant species. That is not necessarily accurate and should be corrected. The fishing gear may have caught more sculpins but not because they were most	The text in the final report has been updated to reflect QIA's comment.

#	Document Name	Section Reference	Comment	Baffinland Response
			abundant but because they were most vulnerable to capture by the fishing gear.	
40	Golder 2021b	s.6.5, p. 1205	Golder has recommended that hoop nets, which had higher catches, replace the Fukui traps (p. 1205), although the modified Fukui traps had the highest diversity of fish species captured. QIA recommends that the 3-year comparison of Fukui trap and hoop net catches be completed before deciding whether to keep one or both fishing methods for monitoring purposes.	See response to Comment No. 6.
41	Golder 2021b	s.7.3.1,p. 1263	*Hiatella arctica* were retained from benthic infaunal grab samples for the fish health and tissue chemistry programs (p.1263). What was the spread of the samples, *i.e.*, were most specimens from close to the dock or further away?	The objectives of the fish health and tissue chemistry programs are to assess established endpoints (i.e., length frequency distributions, length-weight relationships, and visual assessment of internal and external abnormalities) and assess concentrations of contaminants of potential concern (COPCs), respectively. Accordingly, analysing the data to report on spatial distribution has not been prioritized. Generally, as outlined in Section 7.3.1 *H. arctica* specimens were collected opportunistically from benthic infauna samples; hence, they were collected at a range of distances from the ore dock.

#	Document Name	Section Reference	Comment	Baffinland Response
				Retained samples were collected from the northwestern, western, and eastern transects, with the majority of collections occurring from the western and eastern transects (i.e., shallower waters).
42	Golder 2021b	s. 7.3.2, p. 1263	Fourhorn sculpin were held live for some period before processing (p. 1264). What were the holding times? How did they affect assessment of stomach contents?	Generally, Fourhorn Sculpin were held for up to two to three hours, depending on the capture method and number of fish to process. Fish were kept in a holding tub until processing. No food materials were provided nor observed (i.e., regurgitation) in the holding tubs during the holding period. While digestion of any food items present in the stomach will have progressed during this time, this stomach content sample degradation is unavoidable and minimized by processing fish as soon after capture as possible.
43	Golder 2021b	s.7.3.2, Table 7-1, p. 1264	Please provide the reference citation for Brown-Peterson et al. 2011 as it was not in the reference section.	Brown-Peterson, N. J., Wyanski, D. M., Saborido-Rey, F., Macewicz, B. J., & Lowerre-Barbieri, S. K. (2011). A Standardized Terminology for Describing Reproductive Development in Fishes (Vol. 3). This has been added to the reference section of the final report.
44	Golder 2021b	s.7.3.4, p. 1267	Where are the box plots for tissue mercury?	Mercury results are presented in Figure 7C-19 (per the y-axis label), however, the figure title has an error indicating manganese instead of mercury. Mercury results are also presented in the main report as regression plots in

#	Document Name	Section Reference	Comment	Baffinland Response
				Section 7.4.3.1 (Figure 7-7), Section 7.4.3.2 (Figure 7-8).
45	Golder 2021b	s.7.3.5, p. 1269	Tissue "[m]ercury concentrations were compared to Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury guideline of 0.5 mg/kg ww (Health Canada 2015)" QIA recommends tissues be compared to the more precautionary level of 0.2 mg/kg ww to provide a better low risk threshold for response.	The 0.2 mg/kg ww mercury was a subsistence guideline that has since been superceded by the current Health Canada guidelines (i.e., Health Canada 2015). While comparison of fish tissue chemistry mercury concentrations to non-current guidelines is not recommended and is not intended to be undertaken as part of MEEMP reporting, it is noteworthy that based on 2020 results, all but one Arctic Char were reported with mercury concentrations well below the 0.2 mg/kg ww value. One Arctic Char exceeded the value with 0.297 mg/kg ww mercury reported. Reference: HC (Health Canada). 2015. Health Canada's Maximum Levels for Chemical Contaminants in Foods. Available at: https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/maximum-levels-chemical-contaminants-foods.html. Retrieved 20 July 2021.
46	Golder 2021b	s.7.3.6.2.1, p. 1270	"QC standards for chromium, copper, and nickel were outside acceptance criteria due to digestion limitation for Arctic [c]har." (p.1270) Please clarify what the digestion limitation was.	The following clarification was provided by the Bureau Veritas laboratory supervisor responsible for the tissue sample analyses: "For each batch of 20 samples, we digest one internal reference material sample. This reference material sample goes through the same digestion process as all other samples.

#	Document Name	Section Reference	Comment	Baffinland Response
				The listed parameters had biased low recoveries on the reference material sample, due to the digestion limitation of the method (some elements have low percentage recoveries following digestion process). All other batch Quality Controls passed our method requirements. Client samples are not affected by biases in one reference material sample."
47	Golder 2021b	s.7.4.2.1, p. 1282	"No internal parasites were observed during the 2020 fish health assessment." (p. 1277). How thorough was the parasite autopsy?	Parasites are not themselves subject to necropsy, however, they are observed and documented during the fish health assessment. Once each fish has been euthanized, the internal body cavity and external surfaces of the visceral organs undergo a visual examination (e.g., liver, spleen, kidneys, gonads, intestinal tract are examined). The occurrence of macroscopic tapeworms, cysts and other parasites are documented during this internal health assessment.
48	Golder 2021b	s.7.4.3.2, p. 1285 App. 7C, Fig. 7C-1 to 7C-36, pp. 1313 to 1338	Figure 7C-14 (p. 1327) gives the impression there has been a precipitous (nearly 10-fold) decline in Arctic char tissue iron. However, over the period of study, the lower detection limit (LDL) has declined 30-fold, from 15 mg/kg ww (2013, 2015, 2016), to 1 mg/kg ww (2017), to 0.25 mg/kg ww (2018 to 2020) (Baffinland 2021a, pp.	Variable detection limits present a challenge in data visualization due to the potential biases described, particularly when incorporating substituted values. To minimize this issue, only *detected concentrations* above the lower detection limit were included in the figures in Appendix 7C (i.e., values below detection limits were excluded from these plots). Baffinland will include the lower detection limit in future iterations

#	Document Name	Section Reference	Comment	Baffinland Response
			119-121 of 339). These changes can badly bias temporal comparisons of the result because metal concentrations below the LDL were often estimated at half the LDL. Without this information Figure 7C-14 is comparing apples to oranges and is misleading. Other figures in Appendix 7C may also give the false impression that tissue metals have declined since baseline (e.g., Al, Cd, Cr, Co, Cu). The effects of changing technology also argue for the need to archive samples wherever possible so they can be revisited when the need arises. QIA requests that Baffinland show all lower detection limits on figures comparing tissue metals, and recommends that it review this and previous annual monitoring reports for other temporal comparisons that may be misleading without clear depiction of when important changes in methodology have occurred. QIA requests clarification as to why there is no fish tissue mercury Figure in Appendix 7C of the MEEMP draft, when	of these figures, when values are observed below detection limits, to avoid potential confusion. Mercury results are presented in Figure 7C-19 (per the y-axis label), however, the figure title has an error indicating manganese instead of mercury. Mercury results are also presented in the main report as regression plots in Section 7.4.3.1 (Figure 7-7), Section 7.4.3.2 (Figure 7-8). We will archive any additional samples collected during future monitoring based on the maximum recommended hold times from the analytical laboratory.

#	Document Name	Section Reference	Comment	Baffinland Response
			there was one in Golder (2021; Fig. 4-5, p. 15 of 30). QIA further recommends that Baffinland archive samples in the future so they can be revisited when the need arises. <u>References</u>: Baffinland (Baffinland Iron Mines Corp.) 2021a. Post-hearing question responses Phase 2 proposal-- Mary River Project. 339 pp. [NIRB Public Registry File: 210322-08MN053-BIM Responses to Questions-IA2E.pdf] Golder (Golder Associates Ltd). 2021. Nunavut Impact Review Board recommendation #2: population and health status of fish and marine mammals. Technical Memorandum Reference No. 1663724-255-TM-Rev0-38000. 30 pp.	
49	Golder 2021b	s.7.5, p. 1290	"Sampling for *H. arctica* may not be optimal for assessing reproductive endpoints, as gonads could not be readily extracted from collected samples." (p. 1290). How does the Proponent plan to address this monitoring gap?	Based on the biology and timing of sampling of *Hiatella arctica,* this species may not be optimal for assessing reproductive endpoints; however, reproductive endpoints are assessed using the other sentinel species, Fourhorn Sculpin. Sample timing appeared to be appropriate for future assessments of reproductive endpoints for Fourhorn Sculpin with all individuals assessed

#	Document Name	Section Reference	Comment	Baffinland Response
				observed to be in the late stages of gonadal recrudescence. Therefore, the absence of appropriately timed reproductive endpoints from *H. arctica* is considered acceptable for the monitoring program.
50	Golder 2021b	s.8.2.1, p. 1426 d.8.3.2, p. 1431	QIA welcomes the collection of benthic samples for DNA analysis in 2020, and recommends the collection and analysis of further samples for species identification.	Baffinland is planning to collect further samples for DNA barcoding in 2021 at a total of 9 locations around Milne Port.
51	Golder 2021b	s.8.4.4.2, p. 1453 s.8.5.3, p. 1462 s.8.6, p. 1474	"For samples collected in 2020, the Chao 2 calculation provided an estimate of 61.3 taxa observed, which exceeded the actual observed number of taxa (41) by 50% (Table 8-10)." (p. 1453, 1462, 1474) This suggests the 2020 sampling did not reflect the species diversity as well as previous sampling. What was different? QIA recommends that zooplankton sampling be augmented or adjusted to adequately characterize the zooplankton community structure.	Sampling in 2020 followed the same methodology and level of effort used in previous years dating back to 2017. Zooplankton populations are characterized by extremely high variability in both abundance and community structure and interannual variability is expected. The Chao 2 calculation is performed in order to contextualize a given year's sampling relative to previous years. While sampling in 2020 was not able to fully characterize community structure, the same level of effort has been able to in previous years. In light of the high natural variability, we do not plan to augment methods based on one year of data; however, if this trend is noted multiple years in a row, adjusting the methods or sampling effort would be explored.

#	Document Name	Section Reference	Comment	Baffinland Response
52	Golder 2021b	s.8.4.3, p. 1454	The status *of Pseudofabricia aberrans*, is under review (p. 1454). Has the identity of the specimen(s) been confirmed using DNA barcoding? If so, what is its status?	DNA barcoding results for the *Pseudofabricia* specimens remain pending.
53	Golder 2021b	s.8.4.4.1, p. 1455	What is the current identification status of *Monocorophium viridis* which was later revised by independent experts to *Crassicorophium bonelli*?	Currently, the identification stands as *C. bonelli* but but both genii are flagged for future monitoring due to morphological similarities and known invasive species within the *Monocorophium* genus. It is one of the target specimens for DNA barcoding to resolve the identification.
54	Golder 2021b	s.8.5.2.3, p. 1460	For fish specimens that could not be resolved to species, review efforts focused on confirming that the higher-level classification (e.g., Genus), had at least one species with a distribution that included Arctic waters (p. 1460). This approach is not definitive so special care should be taken to identify future taxa from these higher classifications to species.	See response to Comment No.11.
55	Golder 2021b	s.8.5.2.4, p. 1461	Stewart and MacDonald (1981) collected *Cyclops scutifer* from lakes on northern Baffin Island. Reference: Stewart, D.B., and MacDonald, G. 1981. An aquatic resource survey	Noted.

#	Document Name	Section Reference	Comment	Baffinland Response
			of Devon, Cornwallis, Somerset and northern Baffin islands, District of Franklin, Northwest Territories. Department of Indian and Northern Affairs, Environmental Study 20: v + 84 p. ______________ *Limnocalanus macrurus* is also present as a marine glacial relict in numerous coastal lakes in Arctic Canada. *Liparis fabricii, L. gibbus, and L. tunicatus* have all been reported from northern Baffin Island.	

#	Document Name	Section Reference	Comment	Baffinland Response
56	Golder 2021b	s.8.5.4, p. 1463	What evidence is there that the range of *Pseudofabricia sp. nr aberrans* includes Arctic waters?	The species range for *P. aberrans* has currently only been defined in the Mediterranean Sea and, therefore, has been assumed to be endemic to that region (Giangrande and Cantone 1990, WoRMS 2021). However, specimens of *P. aberrans*, as well as unidentified specimens from the *Pseudofabricia* genus, have been identified in waters around the United Kingdom and the Black Sea indicating the range may extend further, or the genus is present outside of the Mediterranean Sea (OBIS 2021). OBIS Canada. 2011. FRB Eastern Arctic Investigations: The Calanus Series. OBIS Canada Digital Collections. OBIS Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada, Version 2. [Accessed February 2021]. http://ipt.obis.org/nonode/resource?r=frb_calanusseries

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Chapter 2.0 Marine Water Quality

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

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1663724-281a-R-Rev1-34000

18 August 2021

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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
ALS	ALS Canada Ltd.
BC	British Columbia
BC MOE	BC Ministry of Environment and Climate Change Strategy
CCME	Canadian Council of Ministers of the Environment
CFU	Colony Forming Unit
Cr(VI)	Hexavalent Chromium
DL	Detection limit
DQOs	Data Quality Objectives
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
L	Litre
m	meter
µm	micrometre
µg/L	microgram per litre
MEEMP	Marine Environmental Effects Monitoring Program
MDL	Method Detection Limit
Min	Minimum
Max	Maximum
N	Nitrogen
No.	Number
NR	Not Recorded
PAHs	Polycyclic aromatic hydrocarbons
PC	Project Certificate
ppt	Part per Thousands
PSU	Practical Salinity Unit
QA/QC	Quality Assurance / Quality Control
QC	Quality Control
RPD	Relative Percent Difference
TSS	Total Suspended Solids
UTM	Universal Transverse Mercator
WQGs	Water Quality Guidelines

2.0 WATER QUALITY

2.1 Introduction

This chapter presents the results of the marine water quality monitoring program, a component of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted at Milne Port and in Milne Inlet during the 2020 open-water season. This component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the Project Certificate (PC) Conditions described in Chapter 1.0, Table 1-2. PC Conditions related to the monitoring of marine water quality include PC Conditions No. 89 and 99 (a).

2.1.1 Objectives

The MEEMP objectives are outlined in Section 1.3 for the overall program. The objective specific to the marine water quality component is:

- Assess potential changes in marine water quality parameters related to site drainage and treated effluent discharges (i.e., compliance monitoring).

2.2 Study Design

The marine water quality study is designed to monitor potential changes in receiving environment water quality associated with site drainage and treated effluent from two discharge points (MP-05 and MP-06), including iron ore stockpile run-off. The MP-05 discharge is permitted from the Milne Port Ore Stockpile Sedimentation Pond (East) and the MP-06 discharge is permitted from the Milne Port Ore Stockpile Sedimentation Pond (West). Effluent quality from both treated effluent discharges is monitored monthly during the discharge period by the Mine as per the requirements of the Type "A", Water Licence No. 2AM-MRY1325, and reported elsewhere. The marine receiving environment for the MP-05 primary discharge has been monitored annually since 2015, with monitoring for a second discharge point at MP-06 added in 2020.

Water quality samples were collected at four sampling stations previously monitored annually from 2015 to 2019[1] near the primary site discharge (MP-05). One station was situated downstream from the marine discharge point for treated effluent and collected site drainage (i.e., Source-1), while the remaining three stations were located approximately 250 m offshore from the outfall location to the northwest (WNE-1), north (North-1), and northeast (ENE-1), respectively (Figure 2-1, Table 2-1). The same sampling plan was applied to MP-06 and four additional water quality stations were monitored in 2020 downstream from the discharge (Source-2) and 250 m offshore in different directions (WNE-2, North-2, ENE-2) (Figure 2-1, Table 2-1). Water samples were collected at each of the eight stations during five separate sampling events that coincided with effluent discharge over an approximate 30-day period.

This design is used to identify adverse (negative) effects on marine water quality in Milne Port from the two treated discharges to inform the need for further mitigation and/or alterations to Project activities.

[1] SEM 2016; SEM 2017; Golder 2018, Golder 2019, Golder 2020

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LEGEND

DISCRETE WATER QUALITY SAMPLES

- MP-05
- MP-06
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500

METRES

1:10,000

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
WATER QUALITY SAMPLING STATIONS FOR THE MP-05 AND MP-06 MILNE PORT SITE DISCHARGES, MEEMP 2020

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	GZ
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm
0

Table 2-1: 2020 Marine Water Quality Sampling Locations at MP-05 and MP-06

Site Discharge Location	Station Name	UTM Zone	Easting (m)	Northing (m)
MP-05 (Milne Port Ore Stockpile Sedimentation Pond [East])	ENE-1	17W	503874	7976517
	North-1	17W	503725	7976612
	WNW-1	17W	503540	7976599
	Source-1[2]	17W	503662	7976403
MP-06 (Milne Port Ore Stockpile Sedimentation Pond [West])	ENE-2[2]	17W	503114	7976665
	North-2	17W	502943	7976619
	WNW-2	17W	502828	7976474
	Source-2[1]	17W	503038	7976416

Notes: UTM = Universal Transverse Mercator; m = meter.

[1] Proposed GPS coordinates of 17W 503038 7976416, placed the sampling location on shore, sample location was therefore moved from the proposed coordinates to the coordinates listed in the table above..

[2] Source-1 sample location was moved to 17W 503604 7976425 during the 2nd sampling event on 1 August 2020 due to the fuel lines of the tanker *Sarah Desgagnes* impeding the sample location. Additionally, water samples collected at ENE-2 were collected 30 m off the port stern of *Rio Tamara* during active de-ballasting.

2.2.1 Modifications to the Program (2020)

In 2020, Baffinland requested that a second effluent discharge monitoring location known as MP-06 be included in the sampling program. Consistent with the study design used to monitor receiving environment water quality downstream of the primary site discharge (MP-05), four additional water quality stations downstream from MP-06 were monitored in 2020 (Source-2, WNE-2, North-2 and ENE-2). Similar to previous years, effort was made to collect water quality samples during active effluent discharge periods, given that the site effluent discharges were intermittent in the 2020 open-water season.

2.2.2 Indicators & Thresholds

Indicators and thresholds for the entire MEEMP program are described in Section 1.2.2. For marine water quality, a number of parameters are measured including physical parameters, nutrients, bacteria, metals, and hydrocarbons. A sub-set of these parameters (i.e., metals, total suspended solids [TSS], nutrients, and hydrocarbons) were identified as water quality indicators to assess the potential for environmental effects from the effluent discharge on the receiving environment. To provide early warning of environmental effects from the Project, applicable water quality guidelines are used as a threshold, where they exist (i.e., Canadian Council of Ministers of the Environment [CCME] water quality guidelines for the protection of aquatic life in marine environments [CCME 2014]). For indicators with no associated water quality guideline, such as iron, concentrations are compared to the data range from previous years (2015-2019). If either of these thresholds are exceeded, then the treated effluent data from the discharge were reviewed to determine if the observed increase in this parameter in the marine environment is related to the Port's effluent discharge.

2.3 Materials and Methods

2.3.1 Field Methodology

Water quality samples were collected during five sampling events scheduled between 26 July and 16 August 2020, to monitor for potential changes in water quality associated with site drainage and treated effluent discharges to the marine environment (including iron ore stockpile run-off). Samples were typically collected weekly over this period; however, the second and third sampling events were conducted 3 days apart to align with the confirmed active site discharge at MP-05. Some flexibility was built into the sampling program to facilitate the collection of effluent and receiving water quality samples from the same discharge period.

Water samples were collected from approximately 0.5 to 1 m below the surface at each water quality sampling station from a zodiac boat using a 5.0 L Niskin sampling bottle. The sampler was washed with laboratory-grade detergent and then rinsed with site-water prior to sample collection at each station. Samples were preserved in the field according to laboratory instructions and kept refrigerated until they were shipped (within 48 h of sample collection) on ice in coolers to ALS Canada Ltd. (ALS), a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited analytical laboratory. Dissolved metal samples were not preserved or filtered in the field and were instead filtered by the analytical laboratory upon sample receipt. Samples were analyzed for routine parameters, total suspended solids, nutrients, major ions, total and dissolved metals (including mercury), radium-226, coliforms, benzene, toluene, ethylbenzene, xylenes, hydrocarbons, and polycyclic aromatic hydrocarbons[2]. A full list of field water quality parameters is provided in Appendix 2A in the field data sheets, while a full chemistry parameter list is provided in Appendix 2B.

A field duplicate quality control (QC) sample was collected during each sampling event (5 duplicates in total), and two field blanks were collected for Quality Assurance / Quality Control (QA/QC) purposes as discussed in Section 2.3.3.

2.3.2 Data Analysis

Descriptive summary statistics (i.e., mean, minimum, maximum) were calculated for each sampling station over the five sampling events. For statistical calculations, the value of the reported detection limit (DL)[3] was conservatively used for measurements reported to be below the DL. The 2020 summary statistics were screened against the CCME water quality guidelines for the protection of aquatic life in marine environments (CCME 2014). For parameters without an applicable CCME water quality guideline (e.g., iron), concentrations were qualitatively compared to the range of water concentrations reported in previous years (i.e., annually from 2015 to 2019). Baffinland was responsible for summarizing the 2020 effluent data from MP-05 and MP-06 as per their Type A Water Licence requirements and, consequently, the effluent data are not reported here as part of the MEEMP.

The application of CCME water quality guidelines to total concentrations measured in the environment can be conservative, especially when those metals are part of the mineral matrix that makes up the particle. This is because total metal concentrations reflect both the proportion of metals associated with particles and that are

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[2] Radium-226 and benzene, toluene, ethylbenzene, xylenes were added to the 2020 water quality program to provide background information but were not intended to be monitored on an annual basis as part of the MEEMP because these parameters are not required to be monitored in the MP-5 and MP-6 site effluents by the Water License.

[3] The lowest concentration at which individual measurement results for a specific analyte are statistically different from a blank (that may be zero) with a specified confidence level for a given method and representative matrix.

dissolved in the water column. Dissolved concentrations tend to provide a more realistic indication of the bioavailable concentration for direct uptake from the water, particularly in turbid receiving environments (Chapman and Wang 2000). However, the measure of "dissolved" metals is an operational definition based on whether the metal passes through a small (0.45 micrometre [µm]) filter (BC MWLAP 2003). Water quality guidelines for the protection of aquatic life are generally applied to total concentrations but are derived from laboratory-based toxicity tests. In these tests, exposure concentrations are based on metals in solution from metal salts and the laboratory test water has a low level of suspended matter (typically clear water). Typically, these tests, while reporting total metal concentrations, are based on dissolved metals, (and thus more bioavailable metals) than those reported as total concentrations.

2.3.3 Quality Management

The overall goal of the water quality sampling program was to collect quality data, which was achieved through the consistent application of QA/QC measures. These quality management procedures were applied to the field collection, data analysis, and reporting tasks for the water quality program to verify that the data presented were valid and of acceptable quality to address MEEMP objectives.

2.3.3.1 Field QA/QC

Field staff were trained to be proficient in standardized sampling procedures, data recording using standard forms, and equipment operations applicable to the monitoring program. Field work was completed according to specified instructions and established technical procedures for standard sample collection, preservation, handling, storage, and shipping procedures.

General QA/QC tasks applicable to the water quality program included, but were not limited to, the following:

- Preparing geo-referenced field maps for use during the surveys to accurately document sampling locations and project-specific data collection forms to standardize the field data collection process.
- Regular communications between the Project Manager and field staff.
- Collection of Quality Control samples in the field (i.e., field duplicates and blanks).
- Accredited laboratories were selected for sample analysis. Performance quality of selected laboratories were verified through Golder's internal vendor approval and assessment procedures.
- Field data sheets were reviewed by the field supervisor at the end of each day for completeness and accuracy.
- Chain-of-custody documentation were used to track sample shipments to the individual subcontractor laboratories.
- Samples were packaged and shipped to the laboratory in accordance with required holding times and storage conditions.

Field blanks were collected to identify potential sources of contamination during field sampling. Field blank sample containers were filled with de-ionized water in the laboratory and then processed in the field in the same manner as water samples from each station (i.e., uncapped, treated with preservative, re-capped). Five (5) field duplicates were collected during each sampling event to represent at least 10% of the total number of collected samples.

2.3.3.2 Laboratory and Data Analysis QA/QC

Laboratory QA/QC reports were reviewed upon receipt to confirm adherence to sample hold times and laboratory data quality objectives (DQOs), and that the appropriate QA/QC information had been reported. Laboratory QA/QC included verification of recommended sample holding times and the analysis of laboratory control samples, laboratory duplicates, and spiked samples to assess precision and accuracy of analytical methods.

The analysis of field QC samples involved a review of field blank results. Notable results were defined as those greater than five times the respective DL detected in the field blanks, in accordance with the BC Field Sampling Manual (BC MOE 2013) and CCME (2014). To assess variability between field duplicates, the Relative Percent Difference (RPD) was calculated as follows:

$$RPD = \left(\frac{sample - duplicate}{(sample + duplicate)/2}\right) \times 100$$

In accordance with the BC Field Sampling Manual (BC MOE 2013) and CCME (2014), an RPD value of >20% was used to identify differences between original and duplicate samples. Values less than five times the Method Detection Limit (MDL) were not included in the RPD calculations because analytical variability near the MDL is higher and does not provide a good measure of variability associated with the collection of field samples.

2.4 Results

2.4.1 QA/QC Results

The 2020 marine water quality data were considered valid based on the results of the QA/QC assessment provided in Appendix 2D for the following reasons:

- most chemical analyses on surface water samples were completed within the sample hold time requirements. Although exceedances of sample hold time requirements have been documented, the hold times for the parameters in question are relatively short. Given the remote location of the site, such exceedances were unavoidable. The data should still be comparable to previous yearly measurements as similar issues with hold time exceedances have been encountered.
- data reported by the laboratory were considered reliable according to the accredited laboratory QA/QC assessment.
- there was a low frequency and magnitude of notable detected concentrations in blanks and low variability and high precision between duplicates.

Overall, the QA/QC results indicate that the water chemistry data collected during the 2020 MEEMP are of acceptable quality to address the objectives stated in Section 2.1.

2.4.2 Marine Water Quality Results

Field water quality measurements are documented in Appendix 2A and water quality laboratory reports are provided in Appendix 2B. The field measurements and laboratory raw data for each station sampled in 2020 are summarized in Appendix 2D. Summary statistics (mean, maximum, and minimum) for the 2020 water quality program calculated from these data are presented in Table 2-2. Summary statistics for the five monitoring years between 2015 and 2020 are provided in Appendix 2E, with annual summaries for parameters analyzed in the 2020 program presented in Table 2-3.

2.4.3 Conventional Parameters

The pH in water samples collected in 2020 downstream of both discharges ranged from 7.9 to 8.1 (Table 2-2), within the CCME water quality guidelines (WQG) range for marine waters (7.0 to 8.7) and were within ranges reported in previous years (7.0 to 8.1) (Table 2-3; Appendix 2E). Both TSS and turbidity levels downstream of both discharges in 2020 were low and below CCME WQGs (Table 2-2). Salinity ranged from 4100 mg/L to 29,400 mg/L in 2020, reflective of an estuarine environment (i.e., one that fluctuates between brackish and fully saline) and dissolved oxygen levels at all stations were indicative of well-oxygenated conditions (Table 2-2).

2.4.4 Nutrients

Nitrate concentrations downstream of both discharges in 2020 were below CCME guidelines and were mostly below detection (<0.01 mg-N/L) (Table 2-2), consistent with those reported between 2017 and 2019 for the MP-05 discharge. No CCME marine water quality guidelines are available for ammonia and nitrite; therefore, 2020 concentrations are compared to what has been documented in previous years. Ammonia concentrations were also mostly below detection in 2020 (<0.005 mg-N/L) and, where detected, were within the concentration range measured between 2015 and 2019 (Table 2-2). Nitrite concentrations measured in 2020 were also below detection (<0.01 mg-N/L) except for the sample collected from station WNW-2 on the Northwest Transect that measured just slightly above the detection limit at 0.014 mg-N/L (Appendix 2C).

2.4.5 Bacteria

Fecal coliform bacteria were not detected in the 2020 samples collected downstream of both discharges and, therefore, met the maximum allowable concentration recommended by the Health Canada drinking water quality guideline of non-detectable/100 mL (Health Canada 2020) (Table 2-2). Bacteria were also not detected in 2018 downstream of the MP-05 discharge (Golder 2019), and were low in 2017 and 2019, ranging from between 1 and 2 colony forming units (CFU)/100 mL (Table 2-3; Golder 2018; 2020).

2.4.6 Metals

Measured concentrations downstream of both discharges were less than applicable CCME WQGs over the five 2020 sampling events (Table 2-2). A number of total metals were measured below DLs[4] in each of the 2020 samples (Appendix 2C). Several total concentrations of metals were detected, and of those, some were mostly present in particulate form because dissolved concentrations were below detection (i.e., aluminum, chromium, iron, nickel, tellurium, and zinc).

Iron is the metal of primary concern for the MEEMP, flagged by local Inuit due to the potential for increased deposition in the form of ore dust or in runoff from storage stockpiles. A CCME marine WQG for iron is not available and, as such, the 2020 iron data were compared to the detected concentration range measured between 2015 and 2019 downstream from the MP-05 discharge. Note that analytical improvements in the ability to detect iron were made in 2017, reducing the detection limit to <10 µg/L from the 500 µg/L used in the 2015 and 2016 monitoring programs. Differences in the sensitivity of detection limits precludes comparison of the 2020 data to pre-2017 data. Since 2017, iron has been detected up to a maximum concentration of 286 µg/L (in 2017).

[4] Total antimony, beryllium, bismuth, cesium, gallium, lead, mercury, selenium, silicon, silver, thallium, thorium-232, tin, titanium, zirconium, tungsten, rhenium, and yttrium.

Total iron concentrations downstream of MP-05 and MP-06 in 2020 were less than the reported DL of 500 µg/L in the 2015 and 2016 monitoring programs. Concentrations detected downstream of both discharges in 2020 were within detected concentrations measured from 2017 to 2019, which ranged from <10 to 286 mg/L. The maximum total iron concentration in 2020 (53 µg/L) was substantially lower than the highest iron concentration of 286 µg/L measured during a 2017 September storm event when TSS was elevated. Dissolved iron concentrations were <10 µg/L in each of the samples collected in 2020 indicating that, for most samples, a substantial portion of the reported total concentration was present in particulate form, and therefore likely less bioavailable for uptake by aquatic biota.

In addition to iron, several other metals do not have CCME marine water quality guidelines. In these cases, comparisons of 2020 concentrations were made to the 2015 to 2019 MEEMP water quality dataset. Data show that all measurements downstream from the primary site discharge (MP-05) were within the detected concentration range from previous years. Similarly, data show that most 2020 measurements downstream from MP-06 were within the 2015 and 2019 concentration range, with few exceptions. The exceptions are listed below and it should be noted that maximum concentrations of these metals were infrequently outside previous concentration ranges (one in five MP-06 samples for each metal). Based on the rationale below, the reported concentrations 250 m downstream from MP-6 were not expected to adversely affect marine water quality or aquatic life:

- Maximum concentration of 33.6 µg/L total manganese at Source-2 (the station closest to MP-06), which was an order of magnitude higher than the four other samples taken 250 m downstream of MP-06 that day (maximum = 1.09 µg/L), substantially higher than the station mean concentration (7.5 µg/L), and comparable to the effluent concentration of 48 µg/L at the approximate time of sampling.
- Maximum concentration of total barium at ENE-2 (250 m from MP-06) which was within two times the station mean concentration. Barium is not required to be measured in the MP-6 effluent and there are no marine water quality guidelines due to a lack of toxicity data. In a recent review of barium toxicity data for marine organisms, Verbruggen et al. (2020) only identified one reliable marine study by Spangenberg and Cherr (1996). The authors reported a “no observed” effect concentration of 100 µg/L dissolved barium for embryonic development of Californian mussels, which means there was no effect on this toxicity endpoint at 100 µg/L in seawater. The maximum barium concentrations of 10 µg/L total barium and 9 µg/L dissolved barium were ten times lower than this toxicity benchmark and would not pose a risk to aquatic life based on the available information.
- Maximum concentration of total nickel at North-2 (250 m from MP-06), though this concentration was low and close to the detection limit. The other measurements of total nickel and all dissolved nickel samples from North-2 were below the detection limit.

2.4.7 Hydrocarbons

Hydrocarbons and polycyclic aromatic hydrocarbons (PAHs) were below the analytical DLs in each of the samples collected during the 2020 MEEMP. Hydrocarbons have consistently been less than DLs since sampling was initiated in 2015 (SEM 2016; SEM 2017; Golder 2018, Golder 2019).

Table 2-2: Marine Water Quality - Summary Statistics for the MP-05 and MP-06 Milne Port Site Discharges over Five Sampling Events in the MEEMP 2020

Parameter	CCME Marine WQG for Protection of Aquatic Life[(a)]		MP-05			MP-06			MP-05			MP-06			MP-05			MP-06			MP-05			MP-06		
			Source 1			Source 2			WNW 1			WNW 2			North 1			North 2			ENE 1			ENE 2		
	Short Term	Long Term	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Physical																										
pH	—	7.0-8.7	6.4	7.95	8.11	6.4	7.88	8.01	6.4	7.98	8.1	6.4	7.9	8.04	6.4	7.89	8.1	6.4	7.99	8.01	6.4	7.91	8.1	6.4	7.9	8.05
Salinity (mg/L)	—	—	5680	4100	11100	6080	5100	9900	5740	4400	10800	5300	4600	9200	5980	4200	11000	9980	5000	28400	5740	4100	11400	10620	5000	29400
TSS (mg/L)	<25 mg/L above background	<5 mg/L above background	2.0	< 2.0	2	2.1	< 2.0	2.6	2.0	< 2.0	< 2.0	2.1	< 2.0	2.3	2.0	< 2.0	< 2.0	2.0	< 2.0	< 2.0	2.1	< 2.0	2.6	3.1	< 2.0	7.5
Turbidity (NTU)	<8 NTU above background	<2 NTU above background	0.6	0.13	1.8	0.7	0.29	2.4	0.8	0.44	2.1	0.3	0.2	0.7	0.7	0.43	1.5	0.3	0.3	0.7	0.7	0.4	1.6	0.3	0.26	0.7
Nutrients (µg/L)																										
Nitrate (as N)	339,000	45,000	35	< 10	134	64	< 10	280	17	< 10	35	< 10	< 10	< 10	10	< 10	10	< 10	< 10	< 10	11	< 10	13	< 10	< 10	< 10
Bacteria (CFU/100 mL)																										
Fecal Coliform	Nondetectable/100 mL[(b)]	Nondetectable/100 mL[(b)]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Metals (µg/L)																										
Aluminum	—	—	14.7	8	26.5	14.7	10.6	24.2	14.0	6.5	23.8	11.0	6.0	15.2	13.9	9.9	23.6	9.3	5.4	10.8	13.0	7.2	19.9	9.2	6.4	10.8
Arsenic	—	12.5	0.48	< 0.40	0.7	0.51	< 0.40	0.8	0.49	< 0.40	0.7	0.51	< 0.40	0.83	0.50	< 0.40	0.72	0.66	< 0.40	1.4	0.48	< 0.40	0.66	0.70	< 0.40	1.4
Cadmium	—	0.12	0.011	< 0.010	0.015	0.010	< 0.010	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.012	< 0.010	0.018	< 0.010	< 0.010	< 0.010	0.011	< 0.010	0.017
Chromium	—	1.5 (Cr(VI))	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.9	< 0.50	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	—	—	< 0.50	< 0.50	< 0.50	0.53	< 0.50	0.65	< 0.50	< 0.50	< 0.50	0.51	< 0.50	0.57	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Iron	—	—	17.4	< 10	33	13.6	11	18	17.8	< 10	29	13.2	< 10	20	15.8	< 10	28	20.0	< 10	53	16.4	< 10	26	10.2	< 10	11
Mercury	—	0.016	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Silver	7.5	—	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
PAHs (µg/L)																										
Naphthalene	—	1.4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

Notes: (a) = Guidelines taken from CMME Marine WQG for the protection of Aquatic Life (http://ceqg-rcqe.ccme.ca/download/en/221); (b) Guidelines taken from Heath Canada 2020 (https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/summary-table-EN-2020-02-11.pdf); **Bold Font = max exceeding a short term guideline or mean exceeding a long term guideline**; CCME = Canadian council of ministers of the environment; WQG = water quality guidelines; Min = minimum; Max = maximum; — = no guideline available; NR = not recorded; PSU = practical salinity unit; TSS = Total suspended solid; mg/L = milligrams per liter; < = less than; N = Nitrogen; CFU = colony forming unit; Cr(VI) = hexavalent chromium; PAH = polycyclic aromatic hydrocarbon; µg/L = micrograms per liter; mL = milliliter.

Table 2-3: Marine Water Quality - Summary Statistics for 2015, 2016, 2017, 2018, 2019 and 2020 at all Sampling Locations

Parameter	CCME Marine WQG for Protection of Aquatic Life[a]		2015 (MP-05) n = 12			2016 (MP-05) n = 20			2017 (MP-05) n = 20			2018 (MP-05) n = 20			2019 (MP-05) n = 20			2020 (MP-05 and MP-06) n = 40		
	Short Term	Long Term	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Physical																				
Salinity (ppt)	—	Within 10% of background ppt	NR	NR	NR	NR	NR	NR	13.9	4.1	24.4	8.8	5.4	19.3	20.7	6.4	31.5	8.6	4.1	29.4
pH	—	7.0–8.7	7.8	7.5	7.9	7.8	7.7	7.9	7.8	7.0	8.0	8.0	7.9	8.1	8.0	7.9	8.2	8.0	7.9	8.1
TSS (mg/L)	**<25 mg/L above background**	**<5 mg/L above background**	1.2	0.5	2.2	1.6	1.0	3.0	4.2	<2.0	**25.5**	1.4	1.0	4.3	1.3	<2.0	2.9	3.4	<2.0	7.5
Turbidity (NTU)	**<8 NTU above background**	**<2 NTU above background**	0.2	0.1	0.9	0.4	0.1	1.0	1.1	0.3	**9.6**	0.7	0.2	2.5	0.3	<0.1	0.7	0.3	<0.1	0.7
Nutrients (mg/L)																				
Nitrate (as N)	339	45	0.04	0.03	0.2	0.16	0.05	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.02	<0.01	0.3
Bacteria (CFU/100 mL)																				
Fecal Coliform	Nondetectable/100 mL[b]	Nondetectable/100 mL[b]	NR	NR	NR	NR	NR	NR	1.2	1.0	2.0	<1.0	<1.0	<1.0	1.5	<10	<10	<1.0	<1.0	< 1.0
Total Metals (µg/L)																				
Aluminum	—	—	NR	<50	50	16	9	25	25	8	142	18	8	48	25	<5	334	12.5	5.4	26.5
Arsenic	—	12.5	<10	<10	<10	<10	<10	<10	<2	<2	<2	<2	<2	<2	1	<0.4	1.6	0.54	<0.4	1.4
Cadmium	—	0.12	<0.01	<0.01	<0.01	0.02	0.01	0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.03	<0.01	0.05	0.01	<0.01	0.02
Chromium	—	1.5 (Cr[VI])	<10	<10	<10	<10	<10	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.3	<0.5	0.5	0.55	< 0.5	2.4
Copper	—	—	<20	<20	<20	<20	<20	<20	0.61	<0.5	1.0	0.6	<0.5	0.9	1.7	<0.5	11	0.51	< 0.5	0.6
Iron	—	—	<500	<500	<500	<500	<500	<500	40	<10	286	25.3	<10	93	14	<10	20	15.6	<10	53
Mercury	—	**0.016**	0.01	0.01	**0.03**	<0.013	<0.013	<0.013	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.003	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	7.5	—	<1	<1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAHs (µg/L)																				
Naphthalene	—	**1.4**	NR	NR	NR	NR	NR	NR	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes: (a) = Guidelines taken from CMME Marine WQG for the protection of Aquatic Life (http://ceqg-rcqe.ccme.ca/download/en/221); (b) Guidelines taken from Heath Canada 2020 (https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/summary-table-EN-2020-02-11.pdf); **Bold Font = max exceeding a short term guideline or mean exceeding a long term guideline**; CCME = Canadian council of ministers of the environment; WQG = water quality guidelines; Min = minimum; Max = maximum; ppt = parts per trillion; % = percentage; — = no guideline available; NR = not recorded; NTU = nephelometric turbidity unit; TSS = Total suspended solid; mg/L = milligrams per liter; < = less than; N = Nitrogen; CFU = colony forming unit; Cr(VI) = hexavalent chromium; PAH = polycyclic aromatic hydrocarbon; µg/L = micrograms per liter; mL = milliliter; n = number of samples.

2.5 Discussion

The collection of water samples was added to the MEEMP in 2015 to monitor for potential effects on water quality associated with site drainage and treated effluent discharges to the marine environment. Since 2015, samples have been collected close to the primary site discharge (MP-05) location and at three downstream locations 250 m offshore from MP-05. Sampling has typically involved five separate sampling events at each of the four stations between August and October. In 2020, a second discharge location (MP-06) was added and water quality was monitored under a similar design as that for MP-05.

For both discharges, hydrocarbons and PAHs were not detected in downstream water samples, consistent with results from previous sampling years. Fecal coliform bacteria were not detected in water samples collected downstream of both discharges, suggesting that the treated effluent discharge collection system is effective at limiting ingress to the marine environment.

Concentrations of conventional water quality parameters, major ions, nutrients, metals, hydrocarbons, and PAHs did not exceed applicable CCME water quality guidelines downstream from either discharge. Where guidelines were not available, maximum concentrations downstream of both discharges were within detected concentration ranges measured from the 2015 to 2019 MEEMP water quality dataset. The exceptions were maximum concentration of three metals (barium, manganese, and nickel) downstream from MP-06 that were outside the detected concentration range from previous years. However, for each metal, only one out of 20 samples taken downstream from MP-06 was outside the range; 30-day mean values for barium, manganese, and nickel were within the range of mean values from 2015 to 2019 (Appendix 2E); and maximum concentrations 250 m downstream from MP-6 were not expected to adversely affect aquatic life.

Monitoring results remain within original FEIS predictions (see Table 1-1), which forecasted no significant residual effects on water quality but indicated the potential for minor localized increases in TSS, nutrient, metal, and hydrocarbon concentrations. Increased iron deposition in the marine environment as a result of the Project is also an issue of concern for local Inuit. Water quality monitoring in 2020 shows that iron concentrations in water samples collected in 2020 remained within the range measured in previous years. These results show no evidence of compromised water quality as a result of iron ore deposition. Further, it should be noted that for iron to be biologically-available to phytoplankton and other marine biota, it generally needs to be in a dissolved form so that it can effectively cross biological membranes. Because iron ore particulates stored at the Site are in mineral form, they would be expected to predominantly settle in marine sediments and to be fairly inert biologically. Environmental conditions in the receiving environment, such as pH, dissolved oxygen concentrations and redox potential, can influence the proportion of biologically available iron that can be released from particulates into surrounding waters. According to Millero (1998) and Lis et al. (2015), in circumneutral pH and well oxygenated environments, similar to those observed in Milne Inlet, iron tends to be poorly soluble. As a result, many open ocean waters and some freshwater systems are characterized by low dissolved iron concentrations (Johnson et al 1997; McKay et al 2004).

2.6 Conclusions and Recommendations

Site drainage and treated effluent discharge to the marine environment does not appear to have negatively affected water quality, as measured concentrations in downstream waters were low, below applicable guidelines, and generally consistent with previous years' measurements. With respect to iron, which is of primary concern for the Project, a trend of increased levels of iron in water samples collected between 2017 and 2020 has not been observed from the laboratory analysis. For water quality in general, monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on water quality but indicated the potential for minor localized increases in TSS, nutrient, metal, and hydrocarbon concentrations.

These results confirm that mitigation measures are functioning as intended and that these Project activities are being managed in a way that has not adversely affected marine water quality. Moving forward, marine water quality monitoring is recommended to continue to enable evaluation of potential changes in downstream water chemistry from Site operations and to provide continuity in the established time series for the MEEMP.

2.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

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APPENDIX 2A

Water Field Data Sheets

data entered
TC (8/3/20)

Water Quality Field Log | **Project #**: 1663724-34000 | **Project title: Baffinlands MEEMP**

Date: Aug 1, 2020 Sampled By: TC, TT, CB

Weather: light winds, clear skies Wind Spd/Dir: 8 knots Tide: ______

Station	Sample Name	Depth	# of Jars	Time	pH	DO (mg/L)	Cond. spc cond. (µS/cm)	Temp	Turb ntu	Comments
Dup-A	Source-1	~~3m~~ 2m		1246	7.95	10.7	40073	11.1	1.8	WP 182 (101% DO)
~~1330~~ 1300	North-1	2m		1318	8.1	10.8	7513	11.1	1.5	(103%)
	ENE-1	1m		1342	8.0	10.8	7542	11.4	1.6	(102%)
	WNW-1	1m		1517	8.1	10.9	7380	11.7	2.1	(104%)
	ENE-2	10 ~~30m~~		1541	7.9	13.3	25491	1.9	0.3	10 m (YSI) (118%)
	WNW-2	~~9~~ 10m		1557	7.9	13.2	25401	1.7	0.2	(117%)
	North-2	10m		1625	8.0	13.7	25332	1.6	0.3	(119%)
	Source-2	3m		1641	8.0	10.9	7235	11.7	2.4	(104%)
	Site-1			1725						Equip. blank

Date: ______ Sampled By: ______

Weather: ______ Wind Spd/Dir: ______ Tide: ______

Station	Sample Name	Depth	# of Jars	Time	pH	DO	Cond.	Temp	Turb	Comments

data entry by TC 06-aug-20

Water Quality Field Log | **Project #**: 1663724-34000 | **Project title: Baffinlands MEEMP**

Date: 4/Aug/20 Sampled By: TC, CB, NOB

Weather: overcast, winds Wind Spd/Dir: Tide: low

Station	Sample Name	Depth	# of Jars	Time (~~10-21~~ TC)	pH	DO	Cond. (μS/cm)	Temp	Turb (ntu)	Comments
	ENE-1	1m	10:21	~~10:00~~	7.91	11.15	12558	8.6	0.63	(102.6%)
	North-1	1m		1038	7.89	10.99	12226	8.8	0.41	(101%)
	source-1	1m		1054	7.97	11.08	12375	8.7	0.55	(102.2)
	WNW-1	1m		1107	7.96	11.14	11915	8.6	0.90	~~102~~ 101.9
	ENE-2	1m		1141	8.03	11.15	12806	9.1	0.26	101.6
	North-2	1m		1150	7.99	11.04	~~117~~	9.0	0.31	101.4 / 9455 (cond)
	Dup-B	1m		1158	~~8.03~~	~~11.06~~	~~10540~~	~~9.1~~	~~0.31~~	~~101.4~~
	WNW-2	1m		1208	8.03	11.06	10540	9.1	0.31	101.4
	source-2	1m		1217	8.00	11.11	11989	8.3	0.29	102.4

Date: Sampled By:

Weather: Wind Spd/Dir: Tide:

Station	Sample Name	Depth	# of Jars	Time	pH	DO	Cond.	Temp	Turb	Comments

Data entered into computer by TC (16-aug-20)

Header ID #

Data proofed by

Page ___ of ___

WATER QUALITY AND ENVIRONMENT FORM

PROJECT AND SITE DATA

Project Number: 1663724 - 34000	**Project Title:** Baffinland MEEMP	**Personnel:** DV, JR, CB, T	
Date (d/m/y) 15 Aug 2020	**Time (military)**	**(circle)** WC WB	**Site:** Milne Port
Description of Location and Comments Discharges @ MP05 + MP06			
Winkler: 1=	**2=**	**3=**	**Avg=** mg/L **pH Testr=**

ENVIRONMENTAL DATA

Air Temp °C 7	Cloud Cover % 50	Wind Dir/Rate NE - Mild	Precip Y or N

WATER QUALITY DATA

Station	Frozen to Bottom? Y/N	Trap here? (write detail)	Profile or Point	Time ~~UTM NAD/ Zone~~	SAMPLE ~~Easting~~	Northing	NTU ~~Secchi Depth (m)~~	Effective Water Depth (m)	Sample Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	pH	Spec. Cond. (µS/cm)	~~Ice Thickness (m)~~	~~Snow Depth (m)~~	Lab Sample Taken? Y/N
[illegible]				1331	SOURCE-2		0.33	1	1	7.9	1129	104	7.88	22890			
~~WNW-1~~				1342	NORTH-2		-0.43		1.5	7.4	11.25	102.3	8.00	22461			
~~SOURCE-1~~				1350	WNW-2		-0.42		1.5	7.5	11.19	101.8	8.01	22467			
~~NORTH-1~~				1403	DUPE	(At WNW2)	-0.40		1.5	7.6	11.25	102.7	8.04	22180			
~~DUPD~~				~~1414~~	~~ENE-2~~		~~-0.40~~		~~1.5~~	~~7.7~~	~~11.19~~	~~102.6~~	~~8.03~~	~~22495~~			
~~ENE-2~~				1423	ENE-2		-0.42		1.5	7.7	11.23	102.9	8.05	22671			
~~WNW-2~~				1446	SOURCE-1		-0.15	1	1	7.8	11.48	103.2	8.11	18091			
~~SOURCE-2~~				1455	WNW-1		-0.44	2	1.5	7.6	11.32	101.6	8.08	19127			
~~NORTH-2~~				1507	NORTH-1		-0.40	2	1.5	7.6	11.29	101.9	8.09	18330			
~~DUPE~~				1513	DUPD		-0.43	2	1.5	7.6	11.31	101.9	8.10	19122			
				1523	ENE-1		-0.40	2	1.5	7.9	11.26	102.3	8.10	19412			

*Effective Water Depth = depth of water below bottom of ice

17/07/2018

data entered
TC (8/3/20)

Water Quality Field Log **Project #:** 1663724-34000 **Project title: Baffinlands MEEMP**

Date: 27 July 2020 Sampled By: TT NOB

Weather: Overcast light showers Wind Spd/Dir: light NE Tide: Rising

Station	Sample Name	Depth	# of Jars	Time	pH	DO	Cond.	Temp	Turb	Comments
SOURCE-1	Same name			17:40						Current too Strong to use weighted line to measure depth.
WNW-1				17:48						
ENE-1				18:02						
NORTH-1				17:55						all samples taken @ near surface. (approx 2 m/1.5m)
SOURCE-2				17:20						
WNW-2				15:53						- YSI not available
ENE-2				17:09						
NORTH-2				17:00						

Date: Sampled By:

Weather: Wind Spd/Dir: Tide:

Station	Sample Name	Depth	# of Jars	Time	pH	DO	Cond.	Temp	Turb	Comments

APPENDIX 2B

Water Quality Analysis Data

GOLDER ASSOCIATES LTD.
ATTN: Brett Lucas
200-2920 Virtual Way
Vancouver BC V5M 0C4

Date Received: 12-AUG-20
Report Date: 08-SEP-20 11:31 (MT)
Version: FINAL

Client Phone: 604-298-6623

Certificate of Analysis

Lab Work Order #: L2487406

Project P.O. #: NOT SUBMITTED
Job Reference: 1663724/34000/03
C of C Numbers: 17-766318
Legal Site Desc:

Amber Springer

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-1	L2487406-2	L2487406-3	L2487406-4	L2487406-5
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:30	11:10	11:15	11:30	10:45
	Client ID	SOURCE-1	WNW-1	NORTH-1	ENE-1	SOURCE-2
Grouping	**Analyte**					
SEAWATER						
Physical Tests	Conductivity (uS/cm)	11100	11800	12600	11200	14400
	Hardness (as CaCO3) (mg/L)	1240	1350	1480	1320	1680
	pH (pH)	7.97	7.96	7.98	7.98	7.95
	Salinity (psu)	7.0	7.5	8.0	7.0	9.3
	Total Suspended Solids (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Turbidity (NTU)	0.64	0.46	0.48	0.36	0.28
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	78.6	77.5	78.1	78.4	74.9
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	12.8	15.7	16.9	14.7	19.3
	Chloride (Cl) (mg/L)	3520	3810	4090	3630	4820
	Fluoride (F) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Nitrate (as N) (mg/L)	0.012	<0.010	<0.010	<0.010	<0.010
	Nitrite (as N) (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Total Kjeldahl Nitrogen (mg/L)	0.149	0.117	0.118	0.119	0.090
	Orthophosphate-Dissolved (as P) (mg/L)	0.0067	0.0063	0.0043	0.0053	0.0038
	Sulfate (SO4) (mg/L)	465	508	563	505	673
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.78	0.82	0.90	0.81	0.74
Total Metals	Aluminum (Al)-Total (mg/L)	0.0130	0.0137	0.0118	0.0093	0.0106
	Antimony (Sb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Arsenic (As)-Total (mg/L)	<0.00040	0.00044	0.00044	0.00040	0.00048
	Barium (Ba)-Total (mg/L)	0.0052	0.0055	0.0056	0.0054	0.0058
	Beryllium (Be)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	0.89	0.91	1.01	0.88	1.15
	Cadmium (Cd)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Calcium (Ca)-Total (mg/L)	96.9	103	110	99.4	124
	Cesium (Cs)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chromium (Cr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Cobalt (Co)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Gallium (Ga)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.015	0.023	0.016	0.013	0.011
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.035	0.036	0.040	0.034	0.045
	Magnesium (Mg)-Total (mg/L)	246	260	283	254	332
	Manganese (Mn)-Total (mg/L)	0.00125	0.00131	0.00124	0.00115	0.00101

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-6	L2487406-7	L2487406-8	L2487406-9	L2487406-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:10	09:50	10:20	10:35	17:20
	Client ID	WNW-2	NORTH-2	ENE-2	DUPC	SITE-2
Grouping	**Analyte**					
SEAWATER						
Physical Tests	Conductivity (uS/cm)	12300	12500	16100	14800	3.2 RRV
	Hardness (as CaCO3) (mg/L)	1410	1400	1860	1680	<4.8
	pH (pH)	7.96	7.97	7.93	7.96	5.51
	Salinity (psu)	7.8	7.9	10.5	9.6	<1.0
	Total Suspended Solids (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Turbidity (NTU)	0.29	0.33	0.24	0.32	<0.10
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	76.4	76.8	73.8	73.9	<1.0
	Ammonia, Total (as N) (mg/L)	0.0193 HTP	<0.0050	<0.0050	<0.0050	<0.0050
	Bromide (Br) (mg/L)	15.8	15.8	21.6	19.3	<5.0
	Chloride (Cl) (mg/L)	4000	4060	5470	4940	<50
	Fluoride (F) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Nitrate (as N) (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Nitrite (as N) (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Total Kjeldahl Nitrogen (mg/L)	0.108	0.094	0.082	0.103	0.064
	Orthophosphate-Dissolved (as P) (mg/L)	0.0047	0.0043	0.0043	0.0039	<0.0010
	Sulfate (SO4) (mg/L)	554	549	756	657	<30
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.91 HTP	0.83	0.73	0.70	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0098	0.0092	0.0102	0.0110	<0.0050
	Antimony (Sb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Arsenic (As)-Total (mg/L)	0.00042	0.00043	0.00052	0.00048	<0.00040
	Barium (Ba)-Total (mg/L)	0.0055	0.0054	0.0061	0.0059	<0.0010
	Beryllium (Be)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	0.95	0.99	1.29	1.19	<0.30
	Cadmium (Cd)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000011	<0.000010
	Calcium (Ca)-Total (mg/L)	107	108	141	131	<1.0
	Cesium (Cs)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chromium (Cr)-Total (mg/L)	<0.00050	0.00240	<0.00050	<0.00050	<0.00050
	Cobalt (Co)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Gallium (Ga)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.010	0.053	0.011	0.015	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.037	0.038	0.053	0.048	<0.020
	Magnesium (Mg)-Total (mg/L)	273	289	379	344	<1.0
	Manganese (Mn)-Total (mg/L)	0.00094	0.00130	0.00106	0.00109	<0.00020

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-1	L2487406-2	L2487406-3	L2487406-4	L2487406-5
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:30	11:10	11:15	11:30	10:45
	Client ID	SOURCE-1	WNW-1	NORTH-1	ENE-1	SOURCE-2
Grouping	**Analyte**					
SEAWATER						
Total Metals	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.00229	0.00235	0.00266	0.00234	0.00294
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	80.3	86.6	93.5	80.8	111
	Rhenium (Re)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Rubidium (Rb)-Total (mg/L)	0.0230	0.0247	0.0263	0.0233	0.0301
	Selenium (Se)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Silicon (Si)-Total (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Sodium (Na)-Total (mg/L)	2120	2280	2540	2160	2780
	Strontium (Sr)-Total (mg/L)	1.44	1.52	1.61	1.51	1.86
	Sulfur (S)-Total (mg/L)	189	191	219	185	249
	Tellurium (Te)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Thallium (Tl)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Thorium (Th)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Tin (Sn)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Titanium (Ti)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Tungsten (W)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Uranium (U)-Total (mg/L)	0.00146	0.00131	0.00180	0.00137	0.00125
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Yttrium (Y)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Arsenic (As)-Dissolved (mg/L)	<0.00040	<0.00040	0.00043	<0.00040	0.00048
	Barium (Ba)-Dissolved (mg/L)	0.0050	0.0051	0.0057	0.0052	0.0056
	Beryllium (Be)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.83	0.89	1.03	0.89	1.12
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	92.7	100	112	102	127
	Cesium (Cs)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chromium (Cr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-6	L2487406-7	L2487406-8	L2487406-9	L2487406-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:10	09:50	10:20	10:35	17:20
	Client ID	WNW-2	NORTH-2	ENE-2	DUPC	SITE-2
Grouping	**Analyte**					
SEAWATER						
Total Metals	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.00264	0.00251	0.00322	0.00304	<0.00010
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00113	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	90.5	95.5	125	115	<1.0
	Rhenium (Re)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Rubidium (Rb)-Total (mg/L)	0.0255	0.0269	0.0348	0.0314	<0.0050
	Selenium (Se)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Silicon (Si)-Total (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Sodium (Na)-Total (mg/L)	2430	2410	3110	2880	<2.5
	Strontium (Sr)-Total (mg/L)	1.67	1.59	2.14	1.94	<0.010
	Sulfur (S)-Total (mg/L)	206	213	286	253	<5.0
	Tellurium (Te)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Thallium (Tl)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Thorium (Th)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Tin (Sn)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Titanium (Ti)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Tungsten (W)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Uranium (U)-Total (mg/L)	0.00125	0.00126	0.00133	0.00130	<0.000050
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Yttrium (Y)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Antimony (Sb)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Arsenic (As)-Dissolved (mg/L)	0.00042	<0.00040	0.00048	0.00052	<0.00040
	Barium (Ba)-Dissolved (mg/L)	0.0055	0.0055	0.0059	0.0057	<0.0010
	Beryllium (Be)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.96	0.94	1.27	1.18	<0.30
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000011	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	110	106	136	128	<1.0
	Cesium (Cs)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chromium (Cr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-1	L2487406-2	L2487406-3	L2487406-4	L2487406-5
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:30	11:10	11:15	11:30	10:45
	Client ID	SOURCE-1	WNW-1	NORTH-1	ENE-1	SOURCE-2
Grouping	**Analyte**					
SEAWATER						
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Copper (Cu)-Dissolved (mg/L)	0.00038	0.00027	0.00030	0.00028	0.00028
	Gallium (Ga)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.034	0.034	0.041	0.035	0.047
	Magnesium (Mg)-Dissolved (mg/L)	246	267	291	258	332
	Manganese (Mn)-Dissolved (mg/L)	0.00059	0.00043	0.00064	0.00060	0.00067
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00213	0.00254	0.00257	0.00242	0.00297
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	77.4	86.9	91.4	81.0	108
	Rhenium (Re)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Rubidium (Rb)-Dissolved (mg/L)	0.0215	0.0250	0.0269	0.0234	0.0307
	Selenium (Se)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Silicon (Si)-Dissolved (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Sodium (Na)-Dissolved (mg/L)	1960	2230	2400	2120	2810
	Strontium (Sr)-Dissolved (mg/L)	1.40	1.57	1.66	1.51	1.96
	Sulfur (S)-Dissolved (mg/L)	184	198	219	185	247
	Tellurium (Te)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Thallium (Tl)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Thorium (Th)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Tin (Sn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Titanium (Ti)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Tungsten (W)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Uranium (U)-Dissolved (mg/L)	0.00147	0.00142	0.00188	0.00148	0.00139
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Yttrium (Y)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-6	L2487406-7	L2487406-8	L2487406-9	L2487406-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:10	09:50	10:20	10:35	17:20
	Client ID	WNW-2	NORTH-2	ENE-2	DUPC	SITE-2
Grouping	**Analyte**					
SEAWATER						
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Copper (Cu)-Dissolved (mg/L)	0.00089	0.00026	0.00030	0.00027	<0.00020
	Gallium (Ga)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.038	0.038	0.052	0.047	<0.020
	Magnesium (Mg)-Dissolved (mg/L)	276	275	369	330	<1.0
	Manganese (Mn)-Dissolved (mg/L)	0.00022	0.00020	0.00073	0.00062	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00253	0.00266	0.00355	0.00306	<0.00010
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	89.1	91.0	122	109	<1.0
	Rhenium (Re)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Rubidium (Rb)-Dissolved (mg/L)	0.0256	0.0264	0.0343	0.0317	<0.0050
	Selenium (Se)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Silicon (Si)-Dissolved (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Sodium (Na)-Dissolved (mg/L)	2390	2420	3150	2900	<2.5
	Strontium (Sr)-Dissolved (mg/L)	1.66	1.74	2.29	2.01	<0.010
	Sulfur (S)-Dissolved (mg/L)	207	209	291	261	<5.0
	Tellurium (Te)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Thallium (Tl)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Thorium (Th)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Tin (Sn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Titanium (Ti)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Tungsten (W)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Uranium (U)-Dissolved (mg/L)	0.00131	0.00130	0.00135	0.00135	<0.000050
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Yttrium (Y)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2487406-1 WATER 10-AUG-20 10:30 SOURCE-1	L2487406-2 WATER 10-AUG-20 11:10 WNW-1	L2487406-3 WATER 10-AUG-20 11:15 NORTH-1	L2487406-4 WATER 10-AUG-20 11:30 ENE-1	L2487406-5 WATER 10-AUG-20 10:45 SOURCE-2
Grouping	**Analyte**					
WATER						
Bacteriological Tests	Fecal Coliforms (CFU/100mL)	<1	<1	<1	<1	<1
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
	ortho-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	meta- & para-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
	F1 (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	84.8	89.1	87.1	87.5	89.9
	Surrogate: 1,4-Difluorobenzene (SS) (%)	101.7	103.3	100.5	101.7	104.6
Hydrocarbons	F1-BTEX (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	F2 (C10-C16) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	F3 (C16-C34) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	F4 (C34-C50) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	98.1	97.3	93.1	100.9	93.8
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	94.9	95.1	93.3	96.2	95.9
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Acenaphthylene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Acridine (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Anthracene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benz(a)anthracene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(a)pyrene (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Benzo(b&j)fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(b+j+k)fluoranthene (mg/L)	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
	Benzo(g,h,i)perylene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(k)fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chrysene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Dibenz(a,h)anthracene (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Fluorene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	1-Methylnaphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	2-Methylnaphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-6	L2487406-7	L2487406-8	L2487406-9	L2487406-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:10	09:50	10:20	10:35	17:20
	Client ID	WNW-2	NORTH-2	ENE-2	DUPC	SITE-2
Grouping	**Analyte**					
WATER						
Bacteriological Tests	Fecal Coliforms (CFU/100mL)	<1	<1	<1	<1	<1
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
	ortho-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	meta- & para-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
	F1 (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	93.3	92.9	91.3	90.3	91.1
	Surrogate: 1,4-Difluorobenzene (SS) (%)	107.5	112.2	111.3	109.3	108.7
Hydrocarbons	F1-BTEX (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	F2 (C10-C16) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	F3 (C16-C34) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	F4 (C34-C50) (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	99.9	96.7	96.2	99.0	98.4
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	102.8	100.8	89.8	99.9	102.1
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Acenaphthylene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Acridine (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Anthracene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benz(a)anthracene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(a)pyrene (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Benzo(b&j)fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(b+j+k)fluoranthene (mg/L)	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
	Benzo(g,h,i)perylene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(k)fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Chrysene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Dibenz(a,h)anthracene (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Fluoranthene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Fluorene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	1-Methylnaphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	2-Methylnaphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-1	L2487406-2	L2487406-3	L2487406-4	L2487406-5
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:30	11:10	11:15	11:30	10:45
	Client ID	SOURCE-1	WNW-1	NORTH-1	ENE-1	SOURCE-2
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Naphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Phenanthrene (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Quinoline (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Surrogate: Acridine d9 (%)	97.6	98.4	105.1	107.2	94.7
	Surrogate: Chrysene d12 (%)	117.3	119.0	106.6	123.7	112.3
	Surrogate: Naphthalene d8 (%)	113.7	114.8	106.4	122.2	106.8
	Surrogate: Phenanthrene d10 (%)	107.1	107.4	100.2	112.9	102.1
Radiological Parameters	Ra-226 (Bq/L)	<0.0058	<0.0058	0.0068	<0.0069	<0.0083

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487406-6	L2487406-7	L2487406-8	L2487406-9	L2487406-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20	10-AUG-20
	Sampled Time	10:10	09:50	10:20	10:35	17:20
	Client ID	WNW-2	NORTH-2	ENE-2	DUPC	SITE-2
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Naphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Phenanthrene (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Quinoline (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Surrogate: Acridine d9 (%)	104.6	96.9	96.4	102.3	93.1
	Surrogate: Chrysene d12 (%)	125.7	115.1	114.4	125.8	116.0
	Surrogate: Naphthalene d8 (%)	120.2	112.6	109.8	122.2	110.6
	Surrogate: Phenanthrene d10 (%)	112.8	107.9	104.9	115.2	103.2
Radiological Parameters	Ra-226 (Bq/L)	<0.0078	0.0060	<0.0045	<0.0063	<0.0083

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Boron (B)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2487406-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTP	Sample preparation or preservation hold time was exceeded.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Seawater	Alkalinity Spec by Titration (Seawater)	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-C-BR-IC-VA	Seawater	Bromide by IC (seawater)	EPA 300.1 (mod)

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-C-CL-IC-VA	Seawater	Chloride by IC (seawater)	EPA 300.1 (mod)

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-C-F-IC-VA	Seawater	Fluoride by IC (seawater)	EPA 300.1 (mod)

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-C-SO4-IC-VA	Seawater	Sulfate by IC (seawater)	EPA 300.1 (mod)

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-C-TOC-VA	Seawater	TOC by combustion (seawater)	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

EC-C-PCT-VA	Seawater	Conductivity (Automated) (seawater)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F1-BTX-CALC-VA	Water	F1-Total BTX	CCME CWS PHC TIER 1 (2001)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a purge and trap extraction prior to analysis by GC/FID. The F1-BTEX result is calculated as follows:

F1-BTEX: F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

F1-HSFID-VA	Water	CCME F1 By Headspace with GCFID	EPA 5021A/CCME CWS PHC (Pub# 1310)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a headspace purge prior to analysis by GC/FID.

F1 (C6-C10): Sum of all hydrocarbons that elute between nC6 and nC10.

		CCME F2-F4 Hydrocarbons in Water	CCME CWS-PHC, Pub #1310, Dec 2001

Reference Information

F2-F4-ME-FID-VA Water

F2-F4 is extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, Dec 2001.

FC-MF-TG Water Fecal Coliforms by MF SM9222D

HARDNESS-CALC-VA Seawater Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-C-CVAFS-VA Seawater Diss. Mercury in Seawater by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified seawater sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-C-CVAFS-VA Seawater Total Mercury in Seawater by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. The procedure involves a cold-oxidation of the acidified seawater sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-D-F-HMI-CCMS-VA Seawater Diss. Metals in Seawater by CRC ICPMS APHA 3030B/EPA 6020B (mod)

Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS (HMI Mode).

MET-T-HB-F-HMI-MS-VA Seawater Tot Metals in Seawater by CRC ICPMS (BC) EPA 200.2/6020B (mod)

Seawater samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS (HMI Mode). This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.

NA-D-CCMS-VA Seawater Diss. Sodium in Seawater by CRC ICPMS APHA 3030B/EPA 6020B (mod)

Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

NA-T-CCMS-VA Seawater Total Sodium in Seawater by CRC ICPMS EPA 200.2/6020B (mod)

Seawater samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

NH3-F-VA Seawater Ammonia in Seawater by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Seawater Nitrite in Seawater by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-U-IC-N-VA Seawater Nitrate in Seawater by IC (Ultra Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PAH-ME-MS-VA Water PAHs in Water EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-C-PCT-VA Seawater pH by Meter (Automated) (seawater) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Seawater D-Orthophosphate in Seawater by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

RA226-MMER-FC Water Ra226 by Alpha Scint, MDC=0.01 Bq/L EPA 903.1

SALINITY-CALC-VA Seawater Salinity by conductivity meter APHA 2520B

Salinity is determined by the APHA 2520B Electrical Conductivity Method. Salinity is a unitless parameter that is roughly equivalent to grams per Litre. ALS applies the unit of psu (practical salinity unit) to indicate that salinity values are derived from the Practical Salinity Scale.

SI-D-CCMS-VA Seawater Diss. Silicon in Seawater by CRC ICPMS APHA 3030B/EPA 6020B (mod)

Reference Information

Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

SI-T-CCMS-VA	Seawater	Total Silicon in Seawater by CRC ICPMS	EPA 200.2/6020B (mod)

Seawater samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

TKN-C-F-VA	Seawater	TKN in Seawater by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-C-VA	Seawater	Total Suspended Solids by Gravimetric	APHA 2540 D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) is determined by filtering a sample through a glass fibre filter. TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-C-VA	Seawater	Turbidity by Meter in Seawater	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

VH-SURR-FID-VA	Water	VH Surrogates for Waters	BC Env. Lab Manual (VH in Solids)
VOC7-HSMS-VA	Water	BTEX/MTBE/Styrene by Headspace GCMS	EPA 5021A/8260C

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

VOC7/VOC-SURR-MS-VA	Water	VOC7 and/or VOC Surrogates for Waters	EPA 5035A/5021A/8260C
XYLENES-CALC-VA	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TG	TAIGA ENVIRONMENTAL LABORATORY (INAC)
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-766318

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: GOLDER ASSOCIATES LTD.
200-2920 Virtual Way
Vancouver BC V5M 0C4
Contact: Brett Lucas

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HSFID-VA	**Water**							
Batch R5149663								
WG3384850-2 LCS								
F1 (C6-C10)			97.4		%		70-130	18-AUG-20
WG3384850-1 MB								
F1 (C6-C10)			<0.10		mg/L		0.1	18-AUG-20
Batch R5184840								
WG3387860-3 LCS								
F1 (C6-C10)			80.4		%		70-130	20-AUG-20
WG3387860-2 MB								
F1 (C6-C10)			<0.10		mg/L		0.1	20-AUG-20
F2-F4-ME-FID-VA	**Water**							
Batch R5200147								
WG3388891-2 LCS								
F2 (C10-C16)			121.3		%		70-130	25-AUG-20
F3 (C16-C34)			114.3		%		70-130	25-AUG-20
F4 (C34-C50)			118.0		%		70-130	25-AUG-20
WG3388891-1 MB								
F2 (C10-C16)			<0.30		mg/L		0.3	25-AUG-20
F3 (C16-C34)			<0.30		mg/L		0.3	25-AUG-20
F4 (C34-C50)			<0.30		mg/L		0.3	25-AUG-20
Surrogate: 2-Bromobenzotrifluoride, F2-F4			90.5		%		60-140	25-AUG-20
PAH-ME-MS-VA	**Water**							
Batch R5192563								
WG3388891-2 LCS								
Acenaphthene			108.5		%		60-130	23-AUG-20
Acenaphthylene			107.6		%		60-130	23-AUG-20
Acridine			75.3		%		60-130	23-AUG-20
Anthracene			95.3		%		60-130	23-AUG-20
Benz(a)anthracene			107.2		%		60-130	23-AUG-20
Benzo(a)pyrene			113.9		%		60-130	23-AUG-20
Benzo(b&j)fluoranthene			110.7		%		60-130	23-AUG-20
Benzo(g,h,i)perylene			108.5		%		60-130	23-AUG-20
Benzo(k)fluoranthene			124.9		%		60-130	23-AUG-20
Chrysene			109.8		%		60-130	23-AUG-20
Dibenz(a,h)anthracene			109.4		%		60-130	23-AUG-20
Fluoranthene			102.1		%		60-130	23-AUG-20
Fluorene			97.7		%		60-130	23-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-ME-MS-VA	**Water**							
Batch R5192563								
WG3388891-2 LCS								
Indeno(1,2,3-c,d)pyrene			107.3		%		60-130	23-AUG-20
1-Methylnaphthalene			104.3		%		60-130	23-AUG-20
2-Methylnaphthalene			102.1		%		60-130	23-AUG-20
Naphthalene			109.6		%		50-130	23-AUG-20
Phenanthrene			96.0		%		60-130	23-AUG-20
Pyrene			107.5		%		60-130	23-AUG-20
Quinoline			103.0		%		60-130	23-AUG-20
WG3388891-1 MB								
Acenaphthene			<0.000010		mg/L		0.00001	23-AUG-20
Acenaphthylene			<0.000010		mg/L		0.00001	23-AUG-20
Acridine			<0.000010		mg/L		0.00001	23-AUG-20
Anthracene			<0.000010		mg/L		0.00001	23-AUG-20
Benz(a)anthracene			<0.000010		mg/L		0.00001	23-AUG-20
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	23-AUG-20
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	23-AUG-20
Benzo(g,h,i)perylene			<0.000010		mg/L		0.00001	23-AUG-20
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	23-AUG-20
Chrysene			<0.000010		mg/L		0.00001	23-AUG-20
Dibenz(a,h)anthracene			<0.0000050		mg/L		0.000005	23-AUG-20
Fluoranthene			<0.000010		mg/L		0.00001	23-AUG-20
Fluorene			<0.000010		mg/L		0.00001	23-AUG-20
Indeno(1,2,3-c,d)pyrene			<0.000010		mg/L		0.00001	23-AUG-20
1-Methylnaphthalene			<0.000050		mg/L		0.00005	23-AUG-20
2-Methylnaphthalene			<0.000050		mg/L		0.00005	23-AUG-20
Naphthalene			<0.000050		mg/L		0.00005	23-AUG-20
Phenanthrene			<0.000020		mg/L		0.00002	23-AUG-20
Pyrene			<0.000010		mg/L		0.00001	23-AUG-20
Quinoline			<0.000050		mg/L		0.00005	23-AUG-20
Surrogate: Acridine d9			102.2		%		60-130	23-AUG-20
Surrogate: Chrysene d12			120.2		%		60-130	23-AUG-20
Surrogate: Naphthalene d8			114.4		%		50-130	23-AUG-20
Surrogate: Phenanthrene d10			112.1		%		60-130	23-AUG-20
VOC7-HSMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC7-HSMS-VA	**Water**							
Batch R5149613								
WG3384850-2 LCS								
Benzene			91.5		%		70-130	18-AUG-20
Ethylbenzene			86.5		%		70-130	18-AUG-20
Methyl t-butyl ether (MTBE)			95.5		%		70-130	18-AUG-20
Styrene			89.2		%		70-130	18-AUG-20
Toluene			90.4		%		70-130	18-AUG-20
meta- & para-Xylene			96.4		%		70-130	18-AUG-20
ortho-Xylene			87.5		%		70-130	18-AUG-20
WG3384850-1 MB								
Benzene			<0.00050		mg/L		0.0005	18-AUG-20
Ethylbenzene			<0.00050		mg/L		0.0005	18-AUG-20
Methyl t-butyl ether (MTBE)			<0.00050		mg/L		0.0005	18-AUG-20
Styrene			<0.00050		mg/L		0.0005	18-AUG-20
Toluene			<0.00045		mg/L		0.00045	18-AUG-20
meta- & para-Xylene			<0.00050		mg/L		0.0005	18-AUG-20
ortho-Xylene			<0.00050		mg/L		0.0005	18-AUG-20
Batch R5184599								
WG3387860-3 LCS								
Benzene			101.9		%		70-130	20-AUG-20
Ethylbenzene			97.3		%		70-130	20-AUG-20
Methyl t-butyl ether (MTBE)			120.0		%		70-130	20-AUG-20
Styrene			97.0		%		70-130	20-AUG-20
Toluene			91.8		%		70-130	20-AUG-20
meta- & para-Xylene			107.9		%		70-130	20-AUG-20
ortho-Xylene			99.7		%		70-130	20-AUG-20
WG3387860-2 MB								
Benzene			<0.00050		mg/L		0.0005	20-AUG-20
Ethylbenzene			<0.00050		mg/L		0.0005	20-AUG-20
Methyl t-butyl ether (MTBE)			<0.00050		mg/L		0.0005	20-AUG-20
Styrene			<0.00050		mg/L		0.0005	20-AUG-20
Toluene			<0.00045		mg/L		0.00045	20-AUG-20
meta- & para-Xylene			<0.00050		mg/L		0.0005	20-AUG-20
ortho-Xylene			<0.00050		mg/L		0.0005	20-AUG-20
ALK-TITR-VA	**Seawater**							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Seawater**							
Batch R5191101								
WG3385408-4 DUP		**L2487406-1**						
Alkalinity, Total (as CaCO3)		78.6	79.0		mg/L	0.5	20	18-AUG-20
WG3385408-3 LCS								
Alkalinity, Total (as CaCO3)			97.5		%		70-130	18-AUG-20
WG3385408-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	18-AUG-20
ANIONS-C-BR-IC-VA	**Seawater**							
Batch R5191770								
WG3385406-3 DUP		**L2487406-1**						
Bromide (Br)		12.8	13.5		mg/L	6.0	20	18-AUG-20
WG3385406-2 LCS								
Bromide (Br)			107.1		%		85-115	18-AUG-20
WG3385406-1 MB								
Bromide (Br)			<5.0		mg/L		5	18-AUG-20
ANIONS-C-CL-IC-VA	**Seawater**							
Batch R5191770								
WG3385406-3 DUP		**L2487406-1**						
Chloride (Cl)		3520	3610		mg/L	2.6	20	18-AUG-20
WG3385406-2 LCS								
Chloride (Cl)			102.9		%		90-110	18-AUG-20
WG3385406-1 MB								
Chloride (Cl)			<50		mg/L		50	18-AUG-20
ANIONS-C-F-IC-VA	**Seawater**							
Batch R5191770								
WG3385406-3 DUP		**L2487406-1**						
Fluoride (F)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	18-AUG-20
WG3385406-2 LCS								
Fluoride (F)			105.0		%		90-110	18-AUG-20
WG3385406-1 MB								
Fluoride (F)			<1.0		mg/L		1	18-AUG-20
ANIONS-C-SO4-IC-VA	**Seawater**							
Batch R5191770								
WG3385406-3 DUP		**L2487406-1**						
Sulfate (SO4)		465	482		mg/L	3.6	20	18-AUG-20
WG3385406-2 LCS								
Sulfate (SO4)			104.5		%		90-110	18-AUG-20
WG3385406-1 MB								

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-C-SO4-IC-VA	**Seawater**							
Batch R5191770								
WG3385406-1 MB								
Sulfate (SO4)			<30		mg/L		30	18-AUG-20
CARBONS-C-TOC-VA	**Seawater**							
Batch R5191245								
WG3385927-3 DUP		**L2487406-3**						
Total Organic Carbon		0.90	0.64	J	mg/L	0.27	1	17-AUG-20
WG3385927-2 LCS								
Total Organic Carbon			89.0		%		80-120	17-AUG-20
WG3385927-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	17-AUG-20
WG3385927-4 MS		**L2487406-4**						
Total Organic Carbon			100.6		%		70-130	17-AUG-20
EC-C-PCT-VA	**Seawater**							
Batch R5191101								
WG3385408-4 DUP		**L2487406-1**						
Conductivity		11100	11000		uS/cm	0.4	10	18-AUG-20
WG3385408-1 MB								
Conductivity			<2.0		uS/cm		2	18-AUG-20
HG-DIS-C-CVAFS-VA	**Seawater**							
Batch R5187338								
WG3383861-2 LCS								
Mercury (Hg)-Dissolved			98.0		%		80-120	14-AUG-20
WG3383861-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	14-AUG-20
WG3383861-4 MS		**L2487406-7**						
Mercury (Hg)-Dissolved			90.1		%		70-130	14-AUG-20
HG-TOT-C-CVAFS-VA	**Seawater**							
Batch R5189770								
WG3384406-7 DUP		**L2487406-5**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	15-AUG-20
WG3384406-2 LCS								
Mercury (Hg)-Total			100.8		%		80-120	15-AUG-20
WG3384406-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	15-AUG-20
MET-D-F-HMI-CCMS-VA	**Seawater**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5191960								
WG3385786-3 DUP		**L2487406-1**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-AUG-20
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Arsenic (As)-Dissolved		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	19-AUG-20
Barium (Ba)-Dissolved		0.0050	0.0052		mg/L	3.8	20	19-AUG-20
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Boron (B)-Dissolved		0.83	0.88		mg/L	6.3	20	19-AUG-20
Cadmium (Cd)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-AUG-20
Calcium (Ca)-Dissolved		92.7	102		mg/L	9.9	20	19-AUG-20
Cesium (Cs)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Cobalt (Co)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Copper (Cu)-Dissolved		0.00038	0.00037		mg/L	2.3	20	19-AUG-20
Gallium (Ga)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Iron (Fe)-Dissolved		<0.010	0.016	RPD-NA	mg/L	N/A	20	19-AUG-20
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Lithium (Li)-Dissolved		0.034	0.037		mg/L	8.0	20	19-AUG-20
Magnesium (Mg)-Dissolved		246	244		mg/L	0.8	20	19-AUG-20
Manganese (Mn)-Dissolved		0.00059	0.00063		mg/L	5.7	20	19-AUG-20
Molybdenum (Mo)-Dissolved		0.00213	0.00223		mg/L	4.3	20	19-AUG-20
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	19-AUG-20
Potassium (K)-Dissolved		77.4	77.8		mg/L	0.6	20	19-AUG-20
Rhenium (Re)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Rubidium (Rb)-Dissolved		0.0215	0.0224		mg/L	4.2	20	19-AUG-20
Selenium (Se)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-AUG-20
Strontium (Sr)-Dissolved		1.40	1.43		mg/L	2.4	20	19-AUG-20
Sulfur (S)-Dissolved		184	179		mg/L	2.6	20	19-AUG-20
Tellurium (Te)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Thorium (Th)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Titanium (Ti)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-AUG-20

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5191960								
WG3385786-3 DUP		**L2487406-1**						
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Uranium (U)-Dissolved		0.00147	0.00151		mg/L	3.1	20	19-AUG-20
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Yttrium (Y)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Zirconium (Zr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
WG3385786-2 LCS								
Aluminum (Al)-Dissolved			103.9		%		80-120	19-AUG-20
Antimony (Sb)-Dissolved			96.9		%		80-120	19-AUG-20
Arsenic (As)-Dissolved			103.0		%		80-120	19-AUG-20
Barium (Ba)-Dissolved			100.5		%		80-120	19-AUG-20
Beryllium (Be)-Dissolved			100.4		%		80-120	19-AUG-20
Bismuth (Bi)-Dissolved			105.5		%		80-120	19-AUG-20
Boron (B)-Dissolved			100.0		%		80-120	19-AUG-20
Cadmium (Cd)-Dissolved			106.2		%		80-120	19-AUG-20
Calcium (Ca)-Dissolved			99.0		%		80-120	19-AUG-20
Cesium (Cs)-Dissolved			106.8		%		80-120	19-AUG-20
Chromium (Cr)-Dissolved			106.9		%		80-120	19-AUG-20
Cobalt (Co)-Dissolved			106.0		%		80-120	19-AUG-20
Copper (Cu)-Dissolved			108.9		%		80-120	19-AUG-20
Gallium (Ga)-Dissolved			116.8		%		80-120	19-AUG-20
Iron (Fe)-Dissolved			98.6		%		80-120	19-AUG-20
Lead (Pb)-Dissolved			106.4		%		80-120	19-AUG-20
Lithium (Li)-Dissolved			98.7		%		80-120	19-AUG-20
Magnesium (Mg)-Dissolved			103.5		%		80-120	19-AUG-20
Manganese (Mn)-Dissolved			105.2		%		80-120	19-AUG-20
Molybdenum (Mo)-Dissolved			104.6		%		80-120	19-AUG-20
Nickel (Ni)-Dissolved			108.7		%		80-120	19-AUG-20
Phosphorus (P)-Dissolved			106.3		%		80-120	19-AUG-20
Potassium (K)-Dissolved			99.8		%		80-120	19-AUG-20
Rhenium (Re)-Dissolved			101.6		%		80-120	19-AUG-20
Rubidium (Rb)-Dissolved			103.2		%		80-120	19-AUG-20
Selenium (Se)-Dissolved			105.4		%		80-120	19-AUG-20
Silver (Ag)-Dissolved			109.1		%		80-120	19-AUG-20
Strontium (Sr)-Dissolved			105.2		%		80-120	19-AUG-20

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5191960								
WG3385786-2 LCS								
Sulfur (S)-Dissolved			100.1		%		80-120	19-AUG-20
Tellurium (Te)-Dissolved			114.0		%		80-120	19-AUG-20
Thallium (Tl)-Dissolved			104.1		%		80-120	19-AUG-20
Thorium (Th)-Dissolved			89.8		%		80-120	19-AUG-20
Tin (Sn)-Dissolved			102.2		%		80-120	19-AUG-20
Titanium (Ti)-Dissolved			99.4		%		80-120	19-AUG-20
Tungsten (W)-Dissolved			99.3		%		80-120	19-AUG-20
Uranium (U)-Dissolved			101.2		%		80-120	19-AUG-20
Vanadium (V)-Dissolved			99.7		%		80-120	19-AUG-20
Yttrium (Y)-Dissolved			102.2		%		80-120	19-AUG-20
Zinc (Zn)-Dissolved			108.3		%		80-120	19-AUG-20
Zirconium (Zr)-Dissolved			97.0		%		80-120	19-AUG-20
WG3385786-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	19-AUG-20
Antimony (Sb)-Dissolved			<0.0010		mg/L		0.001	19-AUG-20
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	19-AUG-20
Barium (Ba)-Dissolved			<0.0010		mg/L		0.001	19-AUG-20
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Boron (B)-Dissolved			<0.30		mg/L		0.3	19-AUG-20
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	19-AUG-20
Calcium (Ca)-Dissolved			<1.0		mg/L		1	19-AUG-20
Cesium (Cs)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Cobalt (Co)-Dissolved			<0.000050		mg/L		0.00005	19-AUG-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-AUG-20
Gallium (Ga)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-AUG-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-AUG-20
Lithium (Li)-Dissolved			<0.020		mg/L		0.02	19-AUG-20
Magnesium (Mg)-Dissolved			<1.0		mg/L		1	19-AUG-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-AUG-20
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	19-AUG-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5191960								
WG3385786-1 MB		**LF**						
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	19-AUG-20
Potassium (K)-Dissolved			<1.0		mg/L		1	19-AUG-20
Rhenium (Re)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Rubidium (Rb)-Dissolved			<0.0050		mg/L		0.005	19-AUG-20
Selenium (Se)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	19-AUG-20
Strontium (Sr)-Dissolved			<0.010		mg/L		0.01	19-AUG-20
Sulfur (S)-Dissolved			<5.0		mg/L		5	19-AUG-20
Tellurium (Te)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	19-AUG-20
Thorium (Th)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Tin (Sn)-Dissolved			<0.0010		mg/L		0.001	19-AUG-20
Titanium (Ti)-Dissolved			<0.0050		mg/L		0.005	19-AUG-20
Tungsten (W)-Dissolved			<0.0010		mg/L		0.001	19-AUG-20
Uranium (U)-Dissolved			<0.000050		mg/L		0.00005	19-AUG-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Yttrium (Y)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-AUG-20
Zirconium (Zr)-Dissolved			<0.00050		mg/L		0.0005	19-AUG-20
WG3385786-4 MS		**L2487406-2**						
Aluminum (Al)-Dissolved			103.1		%		70-130	19-AUG-20
Antimony (Sb)-Dissolved			93.0		%		70-130	19-AUG-20
Arsenic (As)-Dissolved			97.5		%		70-130	19-AUG-20
Barium (Ba)-Dissolved			97.3		%		70-130	19-AUG-20
Beryllium (Be)-Dissolved			101.0		%		70-130	19-AUG-20
Bismuth (Bi)-Dissolved			88.0		%		70-130	19-AUG-20
Boron (B)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Cadmium (Cd)-Dissolved			93.5		%		70-130	19-AUG-20
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Cesium (Cs)-Dissolved			103.1		%		70-130	19-AUG-20
Chromium (Cr)-Dissolved			103.5		%		70-130	19-AUG-20
Cobalt (Co)-Dissolved			98.3		%		70-130	19-AUG-20
Copper (Cu)-Dissolved			93.2		%		70-130	19-AUG-20
Gallium (Ga)-Dissolved			118.2		%		70-130	19-AUG-20

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5191960								
WG3385786-4 MS		**L2487406-2**						
Iron (Fe)-Dissolved			102.7		%		70-130	19-AUG-20
Lead (Pb)-Dissolved			90.0		%		70-130	19-AUG-20
Lithium (Li)-Dissolved			97.5		%		70-130	19-AUG-20
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Manganese (Mn)-Dissolved			102.2		%		70-130	19-AUG-20
Molybdenum (Mo)-Dissolved			106.7		%		70-130	19-AUG-20
Nickel (Ni)-Dissolved			95.2		%		70-130	19-AUG-20
Phosphorus (P)-Dissolved			110.4		%		70-130	19-AUG-20
Potassium (K)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Rhenium (Re)-Dissolved			106.0		%		70-130	19-AUG-20
Rubidium (Rb)-Dissolved			95.5		%		70-130	19-AUG-20
Selenium (Se)-Dissolved			98.0		%		70-130	19-AUG-20
Silver (Ag)-Dissolved			97.6		%		70-130	19-AUG-20
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Sulfur (S)-Dissolved			N/A	MS-B	%		-	19-AUG-20
Tellurium (Te)-Dissolved			92.9		%		70-130	19-AUG-20
Thallium (Tl)-Dissolved			91.8		%		70-130	19-AUG-20
Thorium (Th)-Dissolved			99.4		%		70-130	19-AUG-20
Tin (Sn)-Dissolved			98.2		%		70-130	19-AUG-20
Titanium (Ti)-Dissolved			105.3		%		70-130	19-AUG-20
Tungsten (W)-Dissolved			94.4		%		70-130	19-AUG-20
Uranium (U)-Dissolved			90.7		%		70-130	19-AUG-20
Vanadium (V)-Dissolved			103.1		%		70-130	19-AUG-20
Yttrium (Y)-Dissolved			119.2		%		70-130	19-AUG-20
Zinc (Zn)-Dissolved			91.3		%		70-130	19-AUG-20
Zirconium (Zr)-Dissolved			114.3		%		70-130	19-AUG-20
Batch R5199248								
WG3387247-3 DUP		**L2487406-1**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	24-AUG-20
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-AUG-20
Arsenic (As)-Dissolved		<0.00040	0.00042		mg/L	3.0	20	24-AUG-20
Barium (Ba)-Dissolved		0.0050	0.0053		mg/L	3.6	20	24-AUG-20
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5199248								
WG3387247-3 DUP		**L2487406-1**						
Boron (B)-Dissolved		0.83	0.91		mg/L	0.2	20	24-AUG-20
Cadmium (Cd)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	24-AUG-20
Calcium (Ca)-Dissolved		92.7	96.2		mg/L	1.6	20	24-AUG-20
Cesium (Cs)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Cobalt (Co)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-AUG-20
Copper (Cu)-Dissolved		0.00038	0.00035		mg/L	5.8	20	24-AUG-20
Gallium (Ga)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	24-AUG-20
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-AUG-20
Lithium (Li)-Dissolved		0.034	0.035		mg/L	3.7	20	24-AUG-20
Magnesium (Mg)-Dissolved		246	236		mg/L	1.1	20	24-AUG-20
Manganese (Mn)-Dissolved		0.00059	0.00048		mg/L	4.6	20	24-AUG-20
Molybdenum (Mo)-Dissolved		0.00213	0.00202		mg/L	0.4	20	24-AUG-20
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	24-AUG-20
Potassium (K)-Dissolved		77.4	80.4		mg/L	6.4	20	24-AUG-20
Rhenium (Re)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Rubidium (Rb)-Dissolved		0.0215	0.0221		mg/L	0.9	20	24-AUG-20
Selenium (Se)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Silver (Ag)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	24-AUG-20
Strontium (Sr)-Dissolved		1.40	1.40		mg/L	3.3	20	24-AUG-20
Sulfur (S)-Dissolved		184	188		mg/L	1.7	20	24-AUG-20
Tellurium (Te)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Thallium (Tl)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	24-AUG-20
Thorium (Th)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-AUG-20
Titanium (Ti)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	24-AUG-20
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-AUG-20
Uranium (U)-Dissolved		0.00147	0.00151		mg/L	0.8	20	24-AUG-20
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Yttrium (Y)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-AUG-20
Zirconium (Zr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	24-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5199248								
WG3387247-2 LCS								
Aluminum (Al)-Dissolved			103.8		%		80-120	24-AUG-20
Antimony (Sb)-Dissolved			94.8		%		80-120	24-AUG-20
Arsenic (As)-Dissolved			102.8		%		80-120	24-AUG-20
Barium (Ba)-Dissolved			106.1		%		80-120	24-AUG-20
Beryllium (Be)-Dissolved			104.8		%		80-120	24-AUG-20
Bismuth (Bi)-Dissolved			116.3		%		80-120	24-AUG-20
Boron (B)-Dissolved			106.1		%		80-120	24-AUG-20
Cadmium (Cd)-Dissolved			97.3		%		80-120	24-AUG-20
Calcium (Ca)-Dissolved			102.9		%		80-120	24-AUG-20
Cesium (Cs)-Dissolved			95.3		%		80-120	24-AUG-20
Chromium (Cr)-Dissolved			106.5		%		80-120	24-AUG-20
Cobalt (Co)-Dissolved			101.6		%		80-120	24-AUG-20
Copper (Cu)-Dissolved			105.1		%		80-120	24-AUG-20
Gallium (Ga)-Dissolved			114.5		%		80-120	24-AUG-20
Iron (Fe)-Dissolved			101.1		%		80-120	24-AUG-20
Lead (Pb)-Dissolved			110.0		%		80-120	24-AUG-20
Lithium (Li)-Dissolved			107.0		%		80-120	24-AUG-20
Magnesium (Mg)-Dissolved			103.8		%		80-120	24-AUG-20
Manganese (Mn)-Dissolved			106.7		%		80-120	24-AUG-20
Molybdenum (Mo)-Dissolved			96.3		%		80-120	24-AUG-20
Nickel (Ni)-Dissolved			106.0		%		80-120	24-AUG-20
Phosphorus (P)-Dissolved			101.9		%		80-120	24-AUG-20
Potassium (K)-Dissolved			104.6		%		80-120	24-AUG-20
Rhenium (Re)-Dissolved			101.9		%		80-120	24-AUG-20
Rubidium (Rb)-Dissolved			108.1		%		80-120	24-AUG-20
Selenium (Se)-Dissolved			106.8		%		80-120	24-AUG-20
Silver (Ag)-Dissolved			98.8		%		80-120	24-AUG-20
Strontium (Sr)-Dissolved			102.9		%		80-120	24-AUG-20
Sulfur (S)-Dissolved			116.9		%		80-120	24-AUG-20
Tellurium (Te)-Dissolved			103.3		%		80-120	24-AUG-20
Thallium (Tl)-Dissolved			111.8		%		80-120	24-AUG-20
Thorium (Th)-Dissolved			96.9		%		80-120	24-AUG-20
Tin (Sn)-Dissolved			95.8		%		80-120	24-AUG-20
Titanium (Ti)-Dissolved			100.9		%		80-120	24-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5199248								
WG3387247-2 LCS								
Tungsten (W)-Dissolved			108.1		%		80-120	24-AUG-20
Uranium (U)-Dissolved			99.0		%		80-120	24-AUG-20
Vanadium (V)-Dissolved			101.4		%		80-120	24-AUG-20
Yttrium (Y)-Dissolved			97.4		%		80-120	24-AUG-20
Zinc (Zn)-Dissolved			104.6		%		80-120	24-AUG-20
Zirconium (Zr)-Dissolved			96.9		%		80-120	24-AUG-20
WG3387247-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	24-AUG-20
Antimony (Sb)-Dissolved			<0.0010		mg/L		0.001	24-AUG-20
Arsenic (As)-Dissolved			<0.00040		mg/L		0.0004	24-AUG-20
Barium (Ba)-Dissolved			<0.0010		mg/L		0.001	24-AUG-20
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Boron (B)-Dissolved			<0.30		mg/L		0.3	24-AUG-20
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	24-AUG-20
Calcium (Ca)-Dissolved			<1.0		mg/L		1	24-AUG-20
Cesium (Cs)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Cobalt (Co)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	24-AUG-20
Gallium (Ga)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	24-AUG-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-20
Lithium (Li)-Dissolved			<0.020		mg/L		0.02	24-AUG-20
Magnesium (Mg)-Dissolved			<1.0		mg/L		1	24-AUG-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-20
Molybdenum (Mo)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	24-AUG-20
Potassium (K)-Dissolved			<1.0		mg/L		1	24-AUG-20
Rhenium (Re)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Rubidium (Rb)-Dissolved			<0.0050		mg/L		0.005	24-AUG-20
Selenium (Se)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Silver (Ag)-Dissolved			<0.00010		mg/L		0.0001	24-AUG-20

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Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-F-HMI-CCMS-VA	**Seawater**							
Batch R5199248								
WG3387247-1 MB		**LF**						
Strontium (Sr)-Dissolved			<0.010		mg/L		0.01	24-AUG-20
Sulfur (S)-Dissolved			<5.0		mg/L		5	24-AUG-20
Tellurium (Te)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Thallium (Tl)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-20
Thorium (Th)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Tin (Sn)-Dissolved			<0.0010		mg/L		0.001	24-AUG-20
Titanium (Ti)-Dissolved			<0.0050		mg/L		0.005	24-AUG-20
Tungsten (W)-Dissolved			<0.0010		mg/L		0.001	24-AUG-20
Uranium (U)-Dissolved			<0.000050		mg/L		0.00005	24-AUG-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Yttrium (Y)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	24-AUG-20
Zirconium (Zr)-Dissolved			<0.00050		mg/L		0.0005	24-AUG-20
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-3 DUP		**L2487406-1**						
Aluminum (Al)-Total		0.0130	0.0130		mg/L	0.0	20	19-AUG-20
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Arsenic (As)-Total		<0.00040	<0.00040	RPD-NA	mg/L	N/A	20	19-AUG-20
Barium (Ba)-Total		0.0052	0.0049		mg/L	5.0	20	19-AUG-20
Beryllium (Be)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Boron (B)-Total		0.89	0.91		mg/L	1.2	20	19-AUG-20
Cadmium (Cd)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-AUG-20
Calcium (Ca)-Total		96.9	95.4		mg/L	1.5	20	19-AUG-20
Cesium (Cs)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Cobalt (Co)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Gallium (Ga)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Iron (Fe)-Total		0.015	0.016		mg/L	10	20	19-AUG-20
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Lithium (Li)-Total		0.035	0.037		mg/L	5.4	20	19-AUG-20
Magnesium (Mg)-Total		246	248		mg/L	0.9	20	19-AUG-20

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Quality Control Report

Workorder: L2487406 Report Date: 08-SEP-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-3 DUP		**L2487406-1**						
Manganese (Mn)-Total		0.00125	0.00125		mg/L	0.2	20	19-AUG-20
Molybdenum (Mo)-Total		0.00229	0.00208		mg/L	9.6	20	19-AUG-20
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	19-AUG-20
Potassium (K)-Total		80.3	78.9		mg/L	1.8	20	19-AUG-20
Rhenium (Re)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Rubidium (Rb)-Total		0.0230	0.0220		mg/L	4.7	20	19-AUG-20
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Silver (Ag)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-AUG-20
Strontium (Sr)-Total		1.44	1.37		mg/L	4.9	20	19-AUG-20
Sulfur (S)-Total		189	190		mg/L	0.2	20	19-AUG-20
Tellurium (Te)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Thallium (Tl)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-AUG-20
Thorium (Th)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Titanium (Ti)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-AUG-20
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-AUG-20
Uranium (U)-Total		0.00146	0.00139		mg/L	4.6	20	19-AUG-20
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Yttrium (Y)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	19-AUG-20
Zirconium (Zr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-AUG-20
WG3385784-2 LCS								
Aluminum (Al)-Total			108.5		%		80-120	19-AUG-20
Antimony (Sb)-Total			98.5		%		80-120	19-AUG-20
Arsenic (As)-Total			106.5		%		80-120	19-AUG-20
Barium (Ba)-Total			106.2		%		80-120	19-AUG-20
Beryllium (Be)-Total			103.3		%		80-120	19-AUG-20
Bismuth (Bi)-Total			108.6		%		80-120	19-AUG-20
Boron (B)-Total			110.4		%		80-120	19-AUG-20
Cadmium (Cd)-Total			109.9		%		80-120	19-AUG-20
Calcium (Ca)-Total			104.1		%		80-120	19-AUG-20
Cesium (Cs)-Total			102.7		%		80-120	19-AUG-20
Chromium (Cr)-Total			107.7		%		80-120	19-AUG-20

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Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-2 LCS								
Cobalt (Co)-Total			111.1		%		80-120	19-AUG-20
Copper (Cu)-Total			112.0		%		80-120	19-AUG-20
Gallium (Ga)-Total			116.7		%		80-120	19-AUG-20
Iron (Fe)-Total			100.6		%		80-120	19-AUG-20
Lead (Pb)-Total			106.8		%		80-120	19-AUG-20
Lithium (Li)-Total			101.8		%		80-120	19-AUG-20
Magnesium (Mg)-Total			110.7		%		80-120	19-AUG-20
Manganese (Mn)-Total			109.5		%		80-120	19-AUG-20
Molybdenum (Mo)-Total			100.3		%		80-120	19-AUG-20
Nickel (Ni)-Total			111.7		%		80-120	19-AUG-20
Phosphorus (P)-Total			110.0		%		80-120	19-AUG-20
Potassium (K)-Total			103.3		%		80-120	19-AUG-20
Rhenium (Re)-Total			103.9		%		80-120	19-AUG-20
Rubidium (Rb)-Total			109.3		%		80-120	19-AUG-20
Selenium (Se)-Total			109.4		%		80-120	19-AUG-20
Silver (Ag)-Total			106.5		%		80-120	19-AUG-20
Strontium (Sr)-Total			104.3		%		80-120	19-AUG-20
Sulfur (S)-Total			98.2		%		80-120	19-AUG-20
Tellurium (Te)-Total			112.9		%		80-120	19-AUG-20
Thallium (Tl)-Total			103.7		%		80-120	19-AUG-20
Thorium (Th)-Total			85.8		%		80-120	19-AUG-20
Tin (Sn)-Total			106.3		%		80-120	19-AUG-20
Titanium (Ti)-Total			101.7		%		80-120	19-AUG-20
Tungsten (W)-Total			98.3		%		80-120	19-AUG-20
Uranium (U)-Total			97.4		%		80-120	19-AUG-20
Vanadium (V)-Total			103.7		%		80-120	19-AUG-20
Yttrium (Y)-Total			105.3		%		80-120	19-AUG-20
Zinc (Zn)-Total			113.8		%		80-120	19-AUG-20
Zirconium (Zr)-Total			93.8		%		80-120	19-AUG-20
WG3385784-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	19-AUG-20
Antimony (Sb)-Total			<0.0010		mg/L		0.001	19-AUG-20
Arsenic (As)-Total			<0.00040		mg/L		0.0004	19-AUG-20
Barium (Ba)-Total			<0.0010		mg/L		0.001	19-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-1 MB								
Beryllium (Be)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Bismuth (Bi)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Boron (B)-Total			<0.30		mg/L		0.3	19-AUG-20
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	19-AUG-20
Calcium (Ca)-Total			<1.0		mg/L		1	19-AUG-20
Cesium (Cs)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Cobalt (Co)-Total			<0.000050		mg/L		0.00005	19-AUG-20
Copper (Cu)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Gallium (Ga)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Iron (Fe)-Total			<0.010		mg/L		0.01	19-AUG-20
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-AUG-20
Lithium (Li)-Total			<0.020		mg/L		0.02	19-AUG-20
Magnesium (Mg)-Total			<1.0		mg/L		1	19-AUG-20
Manganese (Mn)-Total			<0.00020		mg/L		0.0002	19-AUG-20
Molybdenum (Mo)-Total			<0.00010		mg/L		0.0001	19-AUG-20
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Phosphorus (P)-Total			<0.050		mg/L		0.05	19-AUG-20
Potassium (K)-Total			<1.0		mg/L		1	19-AUG-20
Rhenium (Re)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Rubidium (Rb)-Total			<0.0050		mg/L		0.005	19-AUG-20
Selenium (Se)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Silver (Ag)-Total			<0.00010		mg/L		0.0001	19-AUG-20
Strontium (Sr)-Total			<0.010		mg/L		0.01	19-AUG-20
Sulfur (S)-Total			<5.0		mg/L		5	19-AUG-20
Tellurium (Te)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Thallium (Tl)-Total			<0.000050		mg/L		0.00005	19-AUG-20
Thorium (Th)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Tin (Sn)-Total			<0.0010		mg/L		0.001	19-AUG-20
Titanium (Ti)-Total			<0.0050		mg/L		0.005	19-AUG-20
Tungsten (W)-Total			<0.0010		mg/L		0.001	19-AUG-20
Uranium (U)-Total			<0.000050		mg/L		0.00005	19-AUG-20
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-AUG-20
Yttrium (Y)-Total			<0.00050		mg/L		0.0005	19-AUG-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-AUG-20
Zirconium (Zr)-Total			<0.00050		mg/L		0.0005	19-AUG-20
WG3385784-4 MS		**L2487406-2**						
Aluminum (Al)-Total			107.3		%		70-130	19-AUG-20
Antimony (Sb)-Total			89.1		%		70-130	19-AUG-20
Arsenic (As)-Total			97.6		%		70-130	19-AUG-20
Barium (Ba)-Total			94.3		%		70-130	19-AUG-20
Beryllium (Be)-Total			99.7		%		70-130	19-AUG-20
Bismuth (Bi)-Total			87.5		%		70-130	19-AUG-20
Boron (B)-Total			N/A	MS-B	%		-	19-AUG-20
Cadmium (Cd)-Total			92.9		%		70-130	19-AUG-20
Calcium (Ca)-Total			N/A	MS-B	%		-	19-AUG-20
Cesium (Cs)-Total			95.0		%		70-130	19-AUG-20
Chromium (Cr)-Total			104.5		%		70-130	19-AUG-20
Cobalt (Co)-Total			101.2		%		70-130	19-AUG-20
Copper (Cu)-Total			95.3		%		70-130	19-AUG-20
Gallium (Ga)-Total			123.7		%		70-130	19-AUG-20
Iron (Fe)-Total			102.7		%		70-130	19-AUG-20
Lead (Pb)-Total			87.2		%		70-130	19-AUG-20
Lithium (Li)-Total			99.9		%		70-130	19-AUG-20
Magnesium (Mg)-Total			N/A	MS-B	%		-	19-AUG-20
Manganese (Mn)-Total			103.6		%		70-130	19-AUG-20
Molybdenum (Mo)-Total			99.3		%		70-130	19-AUG-20
Nickel (Ni)-Total			97.7		%		70-130	19-AUG-20
Phosphorus (P)-Total			112.4		%		70-130	19-AUG-20
Potassium (K)-Total			N/A	MS-B	%		-	19-AUG-20
Rhenium (Re)-Total			104.4		%		70-130	19-AUG-20
Rubidium (Rb)-Total			102.0		%		70-130	19-AUG-20
Selenium (Se)-Total			101.8		%		70-130	19-AUG-20
Silver (Ag)-Total			90.6		%		70-130	19-AUG-20
Strontium (Sr)-Total			N/A	MS-B	%		-	19-AUG-20
Sulfur (S)-Total			N/A	MS-B	%		-	19-AUG-20
Tellurium (Te)-Total			85.8		%		70-130	19-AUG-20
Thallium (Tl)-Total			87.1		%		70-130	19-AUG-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-HB-F-HMI-MS-VA	**Seawater**							
Batch R5191960								
WG3385784-4 MS		**L2487406-2**						
Thorium (Th)-Total			94.4		%		70-130	19-AUG-20
Tin (Sn)-Total			98.6		%		70-130	19-AUG-20
Titanium (Ti)-Total			107.3		%		70-130	19-AUG-20
Tungsten (W)-Total			91.9		%		70-130	19-AUG-20
Uranium (U)-Total			91.4		%		70-130	19-AUG-20
Vanadium (V)-Total			104.9		%		70-130	19-AUG-20
Yttrium (Y)-Total			117.9		%		70-130	19-AUG-20
Zinc (Zn)-Total			95.1		%		70-130	19-AUG-20
Zirconium (Zr)-Total			99.0		%		70-130	19-AUG-20
NA-D-CCMS-VA	**Seawater**							
Batch R5196716								
WG3385786-3 DUP		**L2487406-1**						
Sodium (Na)-Dissolved		1960	2050		mg/L	4.3	20	22-AUG-20
WG3385786-2 LCS								
Sodium (Na)-Dissolved			103.1		%		80-120	22-AUG-20
WG3385786-1 MB		**LF**						
Sodium (Na)-Dissolved			<2.5		mg/L		2.5	22-AUG-20
WG3385786-4 MS		**L2487406-2**						
Sodium (Na)-Dissolved			N/A	MS-B	%		-	22-AUG-20
NA-T-CCMS-VA	**Seawater**							
Batch R5196716								
WG3385784-3 DUP		**L2487406-1**						
Sodium (Na)-Total		2120	2080		mg/L	1.5	20	22-AUG-20
WG3385784-2 LCS								
Sodium (Na)-Total			107.5		%		80-120	22-AUG-20
WG3385784-1 MB								
Sodium (Na)-Total			<2.5		mg/L		2.5	22-AUG-20
WG3385784-4 MS		**L2487406-2**						
Sodium (Na)-Total			N/A	MS-B	%		-	22-AUG-20
NH3-F-VA	**Seawater**							
Batch R5194337								
WG3386071-3 DUP		**L2487406-5**						
Ammonia, Total (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	20-AUG-20
WG3386071-2 LCS								
Ammonia, Total (as N)			102.8		%		85-115	20-AUG-20
WG3386071-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Seawater**							
Batch R5194337								
WG3386071-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	20-AUG-20
WG3386071-4 MS		**L2487406-6**						
Ammonia, Total (as N)			101.7		%		75-125	20-AUG-20
NO2-L-IC-N-VA	**Seawater**							
Batch R5192158								
WG3385406-3 DUP		**L2487406-1**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-AUG-20
WG3385406-2 LCS								
Nitrite (as N)			105.0		%		90-110	18-AUG-20
WG3385406-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	18-AUG-20
NO3-U-IC-N-VA	**Seawater**							
Batch R5192158								
WG3385406-3 DUP		**L2487406-1**						
Nitrate (as N)		0.012	0.016	J	mg/L	0.004	0.02	18-AUG-20
WG3385406-2 LCS								
Nitrate (as N)			102.1		%		90-110	18-AUG-20
WG3385406-1 MB								
Nitrate (as N)			<0.010		mg/L		0.01	18-AUG-20
PH-C-PCT-VA	**Seawater**							
Batch R5191101								
WG3385408-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	18-AUG-20
WG3385408-4 DUP		**L2487406-1**						
pH		7.97	7.99	J	pH	0.02	0.3	18-AUG-20
PO4-DO-COL-VA	**Seawater**							
Batch R5190585								
WG3385413-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			97.1		%		80-120	18-AUG-20
WG3385413-3 DUP		**L2487406-1**						
Orthophosphate-Dissolved (as P)		0.0067	0.0061		mg/L	9.0	20	18-AUG-20
WG3385413-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	18-AUG-20
WG3385413-4 MS		**L2487406-2**						
Orthophosphate-Dissolved (as P)			111.0		%		70-130	18-AUG-20
SI-D-CCMS-VA	**Seawater**							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SI-D-CCMS-VA	**Seawater**							
Batch R5196716								
WG3385786-3 DUP		**L2487406-1**						
Silicon (Si)-Dissolved		<1.0	<1.0	RPD-NA	mg/L	N/A	20	22-AUG-20
WG3385786-2 LCS								
Silicon (Si)-Dissolved			101.1		%		80-120	22-AUG-20
WG3385786-1 MB		**LF**						
Silicon (Si)-Dissolved			<1.0		mg/L		1	22-AUG-20
WG3385786-4 MS		**L2487406-2**						
Silicon (Si)-Dissolved			95.4		%		70-130	22-AUG-20
SI-T-CCMS-VA	**Seawater**							
Batch R5196716								
WG3385784-3 DUP		**L2487406-1**						
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	22-AUG-20
WG3385784-2 LCS								
Silicon (Si)-Total			104.1		%		80-120	22-AUG-20
WG3385784-1 MB								
Silicon (Si)-Total			<1.0		mg/L		1	22-AUG-20
WG3385784-4 MS		**L2487406-2**						
Silicon (Si)-Total			96.7		%		70-130	22-AUG-20
TKN-C-F-VA	**Seawater**							
Batch R5193542								
WG3386060-3 DUP		**L2487406-1**						
Total Kjeldahl Nitrogen		0.149	0.127		mg/L	16	20	20-AUG-20
WG3386060-2 LCS								
Total Kjeldahl Nitrogen			114.8		%		75-125	20-AUG-20
WG3386060-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-AUG-20
WG3386060-4 MS		**L2487406-2**						
Total Kjeldahl Nitrogen			113.2		%		70-130	20-AUG-20
TSS-C-VA	**Seawater**							
Batch R5190447								
WG3384242-2 LCS								
Total Suspended Solids			97.8		%		85-115	15-AUG-20
WG3384242-4 LCS								
Total Suspended Solids			99.8		%		85-115	15-AUG-20
WG3384242-1 MB								
Total Suspended Solids			<2.0		mg/L		2	15-AUG-20
WG3384242-3 MB								
Total Suspended Solids			<2.0		mg/L		2	15-AUG-20

Quality Control Report

Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-C-VA		**Seawater**							
Batch	**R5189722**								
WG3384328-2	**CRM**		**VA-FORM-40**						
Turbidity				100.5		%		85-115	15-AUG-20
WG3384328-3	**DUP**		**L2487406-1**						
Turbidity			0.64	0.63		NTU	1.1	15	15-AUG-20
WG3384328-1	**MB**								
Turbidity				<0.10		NTU		0.1	15-AUG-20

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity by Meter in Seawater							
	1	10-AUG-20 10:30	15-AUG-20 12:39	3	5	days	EHT
	2	10-AUG-20 11:10	15-AUG-20 12:39	3	5	days	EHT
	3	10-AUG-20 11:15	15-AUG-20 12:39	3	5	days	EHT
	4	10-AUG-20 11:30	15-AUG-20 12:39	3	5	days	EHT
	5	10-AUG-20 10:45	15-AUG-20 12:39	3	5	days	EHT
	6	10-AUG-20 10:10	15-AUG-20 12:39	3	5	days	EHT
	7	10-AUG-20 09:50	15-AUG-20 12:39	3	5	days	EHT
	8	10-AUG-20 10:20	15-AUG-20 12:39	3	5	days	EHT
	9	10-AUG-20 10:35	15-AUG-20 12:39	3	5	days	EHT
	10	10-AUG-20 17:20	15-AUG-20 12:39	3	5	days	EHT
pH by Meter (Automated) (seawater)							
	1	10-AUG-20 10:30	18-AUG-20 14:06	0.25	196	hours	EHTR-FM
	2	10-AUG-20 11:10	18-AUG-20 14:06	0.25	195	hours	EHTR-FM
	3	10-AUG-20 11:15	18-AUG-20 14:06	0.25	195	hours	EHTR-FM
	4	10-AUG-20 11:30	18-AUG-20 14:06	0.25	195	hours	EHTR-FM
	5	10-AUG-20 10:45	18-AUG-20 14:06	0.25	195	hours	EHTR-FM
	6	10-AUG-20 10:10	18-AUG-20 14:06	0.25	196	hours	EHTR-FM
	7	10-AUG-20 09:50	18-AUG-20 14:06	0.25	196	hours	EHTR-FM
	8	10-AUG-20 10:20	18-AUG-20 14:06	0.25	196	hours	EHTR-FM
	9	10-AUG-20 10:35	18-AUG-20 14:06	0.25	196	hours	EHTR-FM
	10	10-AUG-20 17:20	18-AUG-20 14:06	0.25	189	hours	EHTR-FM
Anions and Nutrients							
D-Orthophosphate in Seawater by Colour							
	1	10-AUG-20 10:30	18-AUG-20 04:30	3	8	days	EHT
	2	10-AUG-20 11:10	18-AUG-20 04:30	3	8	days	EHT
	3	10-AUG-20 11:15	18-AUG-20 04:30	3	8	days	EHT
	4	10-AUG-20 11:30	18-AUG-20 04:30	3	8	days	EHT
	5	10-AUG-20 10:45	18-AUG-20 04:30	3	8	days	EHT
	6	10-AUG-20 10:10	18-AUG-20 04:30	3	8	days	EHT
	7	10-AUG-20 09:50	18-AUG-20 04:30	3	8	days	EHT
	8	10-AUG-20 10:20	18-AUG-20 04:30	3	8	days	EHT
	9	10-AUG-20 10:35	18-AUG-20 04:30	3	8	days	EHT
	10	10-AUG-20 17:20	18-AUG-20 04:30	3	7	days	EHT
Nitrate in Seawater by IC (Ultra Level)							
	1	10-AUG-20 10:30	18-AUG-20 06:19	3	8	days	EHT
	2	10-AUG-20 11:10	18-AUG-20 06:19	3	8	days	EHT
	3	10-AUG-20 11:15	18-AUG-20 06:19	3	8	days	EHT
	4	10-AUG-20 11:30	18-AUG-20 06:19	3	8	days	EHT
	5	10-AUG-20 10:45	18-AUG-20 06:19	3	8	days	EHT
	6	10-AUG-20 10:10	18-AUG-20 06:19	3	8	days	EHT
	7	10-AUG-20 09:50	18-AUG-20 06:19	3	8	days	EHT
	8	10-AUG-20 10:20	18-AUG-20 06:19	3	8	days	EHT
	9	10-AUG-20 10:35	18-AUG-20 06:19	3	8	days	EHT
	10	10-AUG-20 17:20	18-AUG-20 06:19	3	8	days	EHT
Nitrite in Seawater by IC (Low Level)							
	1	10-AUG-20 10:30	18-AUG-20 06:19	3	8	days	EHT
	2	10-AUG-20 11:10	18-AUG-20 06:19	3	8	days	EHT
	3	10-AUG-20 11:15	18-AUG-20 06:19	3	8	days	EHT
	4	10-AUG-20 11:30	18-AUG-20 06:19	3	8	days	EHT
	5	10-AUG-20 10:45	18-AUG-20 06:19	3	8	days	EHT
	6	10-AUG-20 10:10	18-AUG-20 06:19	3	8	days	EHT
	7	10-AUG-20 09:50	18-AUG-20 06:19	3	8	days	EHT
	8	10-AUG-20 10:20	18-AUG-20 06:19	3	8	days	EHT
	9	10-AUG-20 10:35	18-AUG-20 06:19	3	8	days	EHT
	10	10-AUG-20 17:20	18-AUG-20 06:19	3	8	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2487406 were received on 12-AUG-20 09:50.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Thursday, September 03, 2020

Amber Springer
ALS Environmental
8081 Lougheed Hwy, Suite 100
Burnaby, BC V5A 1W9

Re: ALS Workorder: 2008406
Project Name:
Project Number: L2487406

Dear Ms. Springer:

Ten water samples were received from ALS Environmental, on 8/18/2020. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

2008406

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008406
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2487406
Client PO Number: L2487406

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2487406-1	2008406-1		WATER	10-Aug-20	
L2487406-2	2008406-2		WATER	10-Aug-20	
L2487406-3	2008406-3		WATER	10-Aug-20	
L2487406-4	2008406-4		WATER	10-Aug-20	
L2487406-5	2008406-5		WATER	10-Aug-20	
L2487406-6	2008406-6		WATER	10-Aug-20	
L2487406-7	2008406-7		WATER	10-Aug-20	
L2487406-8	2008406-8		WATER	10-Aug-20	
L2487406-9	2008406-9		WATER	10-Aug-20	
L2487406-10	2008406-10		WATER	10-Aug-20	

ALS Environmental

2008406

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2487406*
ALS requires QC data to be provided with your final results.

Please see enclosed 10 **sample(s) in** 10 **Container(s)**

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2487406-1 SOURCE-1**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
2	**L2487406-2 WNW-1**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
3	**L2487406-3 NORTH-1**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
4	**L2487406-4 ENE-1**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
5	**L2487406-5 SOURCE-2**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
6	**L2487406-6 WNW-2**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
7	**L2487406-7 NORTH-2**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
8	**L2487406-8 ENE-2**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
9	**L2487406-9 DUPC**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	
10	**L2487406-10 SITE-2**		**8/10/2020**	
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/24/2020	

ALS Environmental

L2487406

VANCOUVER

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

Subcontract Info Contact: Brittany Puckey (604) 253-4188

Analysis and reporting info contact: Amber Springer, B.Sc
8081 LOUGHEED HWY
SUITE 100
BURNABY,BC V5A 1W9

Phone: (604) 253-4188 Email: amber.springer@alsglobal.com

Please email confirmation of receipt to: **amber.springer@alsglobal.com**

Shipped By: ______ Date Shipped: ______

Received By: [signature] Date Received: 8/18/20 1320

Verified By: ______ Date Verified: ______

Temperature: ______

Sample Integrity Issues: ______

Amber Springer

NEW Reporting Contacts:
1.Account Manager Listed Below
2.ALSEVDataSublet@ALSGlobal.com (PDF / EXCEL)
3.ALSE.CASDG@ALSGlobal.com (EDD/Database Formats)

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:	ALS Canada	Workorder No:	2008406
Project Manager:	KMO	Initials: KMO	Date: 8/18/20

Question			
1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO
2. Are custody seals on **shipping** containers intact?	☑ NONE	☐ YES	☐ NO*
3. Are custody seals on **sample** containers intact?	☑ NONE	☐ YES	☐ NO*
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*
6. Are short-hold samples present?		☐ YES	☑ NO
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☑ YES	☐ NO*
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO
14. Were the samples shipped on ice?		☐ YES	☑ NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used+: ☐ #3 ☐ #5	☑ Rad Only	☐ YES	☑ NO

Cooler #:	1	2	3
Temperature (°C):	Amb	Amb	Amb
# of custody seals on cooler:	0	0	0
External mR/hr reading:	11	11	11
Background mR/hr reading:	12		

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☐ N/A ☑ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: KMO

If applicable, was the client contacted? ☐ YES ☐ N/A Contact Name Date:

Project Manager Signature / Date: [signature] 8/19/20

Form 201r30.xls
(06/04/2020)

+IR Gun #3, VWR SN 170647571
+IR Gun #5, VWR SN 192272629

EXPRESS WORLDWIDE WPX DHL

2020-08-17 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight Piece
44.0/86.0 lbs 1 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 41 3287 9704

(2L)US80524+48000001

(J) JD01 4600 0080 4479 4721

EXPRESS WORLDWIDE WPX DHL

2020-08-17 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 37.0/86.0 lbs

Piece 2 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 41 3287 9704

(2L)US80524+48000001

(J) JD01 4600 0080 4479 4722

EXPRESS WORLDWIDE WPX DHL

2020-08-17 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight: 5.0/86.0 lbs

Piece: 3 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 41 3287 9704

(2L)US80524+48000001

(J) JD01 4600 0080 4479 4723

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-1	**Lab ID:**	2008406-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0031 (+/- 0.0037)	U	0.0058	BQ/l	NA	9/2/2020 11:47
Carr: BARIUM	*96*		*40-110*	*%REC*	DL = NA	9/2/2020 11:47

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-2	**Lab ID:**	2008406-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0053 (+/- 0.0043)	U	0.0058	BQ/l	NA	9/2/2020 11:47
Carr: BARIUM	*96.9*		*40-110*	*%REC*	DL = NA	9/2/2020 11:47

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-3	**Lab ID:**	2008406-3
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	**0.0068 (+/- 0.0047)**		**0.0052**	**BQ/l**	NA	9/2/2020 11:47
Carr: BARIUM	*96.9*		*40-110*	*%REC*	DL = NA	9/2/2020 11:47

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-4	**Lab ID:**	2008406-4
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0049 (+/- 0.0048)	U	0.0069	BQ/l	NA	9/2/2020 11:47
Carr: BARIUM	*95.5*		*40-110*	*%REC*	DL = NA	9/2/2020 11:47

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-5	**Lab ID:**	2008406-5
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0032 (+/- 0.0050)	U	0.0083	BQ/l	NA	9/2/2020 12:17
Carr: BARIUM	*95.8*		*40-110*	*%REC*	DL = NA	9/2/2020 12:17

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-6	**Lab ID:**	2008406-6
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0035 (+/- 0.0048)	U	0.0078	BQ/l	NA	9/2/2020 12:17
Carr: BARIUM	*94.6*		*40-110*	*%REC*	DL = NA	9/2/2020 12:17

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-7	**Lab ID:**	2008406-7
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	**0.0060 (+/- 0.0044)**		**0.0056**	**BQ/l**	NA	9/2/2020 12:17
Carr: BARIUM	*96.6*		*40-110*	*%REC*	DL = NA	9/2/2020 12:17

SAMPLE SUMMARY REPORT

Client:	ALS Environmental		**Date:**	*03-Sep-20*
Project:	L2487406		**Work Order:**	2008406
Sample ID:	L2487406-8		**Lab ID:**	2008406-8
Legal Location:			**Matrix:**	WATER
Collection Date:	8/10/2020		**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0042 (+/- 0.0035)	U	0.0045	BQ/l	NA	9/2/2020 12:17
Carr: BARIUM	*92.7*		*40-110*	*%REC*	DL = NA	9/2/2020 12:17

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-9	**Lab ID:**	2008406-9
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	0.0013 (+/- 0.0035)	U	0.0063	BQ/l	NA	9/2/2020 12:17
Carr: BARIUM	*97.2*		*40-110*	*%REC*	DL = NA	9/2/2020 12:17

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-10	**Lab ID:**	2008406-10
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/20/2020**		PrepBy: **TRW**
Ra-226	-0.00047 (+/- 0.0041)	Y1,U	0.0083	BQ/l	NA	9/2/2020 12:17
Carr: BARIUM	*101*	Y1	*40-110*	*%REC*	DL = NA	9/2/2020 12:17

Client:	ALS Environmental	**Date:**	*03-Sep-20*
Project:	L2487406	**Work Order:**	2008406
Sample ID:	L2487406-10	**Lab ID:**	2008406-10
Legal Location:		**Matrix:**	WATER
Collection Date:	8/10/2020	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
U or ND - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
U or ND - Indicates that the compound was analyzed for but not detected.
E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
M - Duplicate injection precision was not met.
N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
* - Duplicate analysis (relative percent difference) not within control limits.
S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
E - Analyte concentration exceeds the upper level of the calibration range.
J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
A - A tentatively identified compound is a suspected aldol-condensation product.
X - The analyte was diluted below an accurate quantitation level.
* - The spike recovery is equal to or outside the control criteria used.
+ - The relative percent difference (RPD) equals or exceeds the control criteria.
G - A pattern resembling gasoline was detected in this sample.
D - A pattern resembling diesel was detected in this sample.
M - A pattern resembling motor oil was detected in this sample.
C - A pattern resembling crude oil was detected in this sample.
4 - A pattern resembling JP-4 was detected in this sample.
5 - A pattern resembling JP-5 was detected in this sample.
H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

ALS -- Fort Collins

Date: *9/3/2020 3:25:0*

Client: ALS Environmental
Work Order: 2008406
Project: L2487406

QC BATCH REPORT

Batch ID: **RE200820-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE200820-2** Units: **BQ/l** Analysis Date: **9/2/2020 12:37**
Client ID: Run ID: **RE200820-2A** Prep Date: **8/20/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.45 (+/- 0.361)	0.0108	1.719		84.1	67-120					P,Y1,M3
Carr: BARIUM	16200		15960		101	40-110					Y1

LCSD Sample ID: **RE200820-2** Units: **BQ/l** Analysis Date: **9/2/2020 12:37**
Client ID: Run ID: **RE200820-2A** Prep Date: **8/20/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.60 (+/- 0.399)	0.0083	1.719		93.2	67-120		1.45	0.3	2.1	P,Y1
Carr: BARIUM	16000		15970		100	40-110		16200			Y1

MB Sample ID: **RE200820-2** Units: **BQ/l** Analysis Date: **9/2/2020 12:37**
Client ID: Run ID: **RE200820-2A** Prep Date: **8/20/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0 (+/- 0.0035)	0.0067									U
Carr: BARIUM	15600		15960		97.5	40-110					

The following samples were analyzed in this batch:

2008406-1	2008406-2	2008406-3
2008406-4	2008406-5	2008406-6
2008406-7	2008406-8	2008406-9
2008406-10		

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- FINAL REPORT -

Prepared For: ALS Environmental

Address: 314 Old Airport Road
Unit 116
Yellowknife,NT
X1A 2R1

Attn: **Oliver Gregg** **Facsimile:**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-1 SOURCE-1 **Taiga Sample ID:** 001

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-2 WNW-1 **Taiga Sample ID:** 002

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-3 NORTH-1 **Taiga Sample ID:** 003

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-4 ENE-1 **Taiga Sample ID:** 004

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

Taiga Environmental Laboratory
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-5 SOURCE-2 **Taiga Sample ID:** 005

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-6 WNW-2 **Taiga Sample ID:** 006

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-7 NORTH-2 **Taiga Sample ID:** 007

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-8 ENE-2 **Taiga Sample ID:** 008

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-9 DUPC **Taiga Sample ID:** 009

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-10 SITE-2 **Taiga Sample ID:** 010

Client Project:
Sample Type: Water
Received Date: 12-Aug-20
Sampling Date: 10-Aug-20
Sampling Time:

Location:

Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Fecal	< 1	1	CFU/100mL	12-Aug-20	SM9222:D	

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200563

- CERTIFICATE OF ANALYSIS -

Client Sample ID: L2487406-10 SITE-2 **Taiga Sample ID:** 010

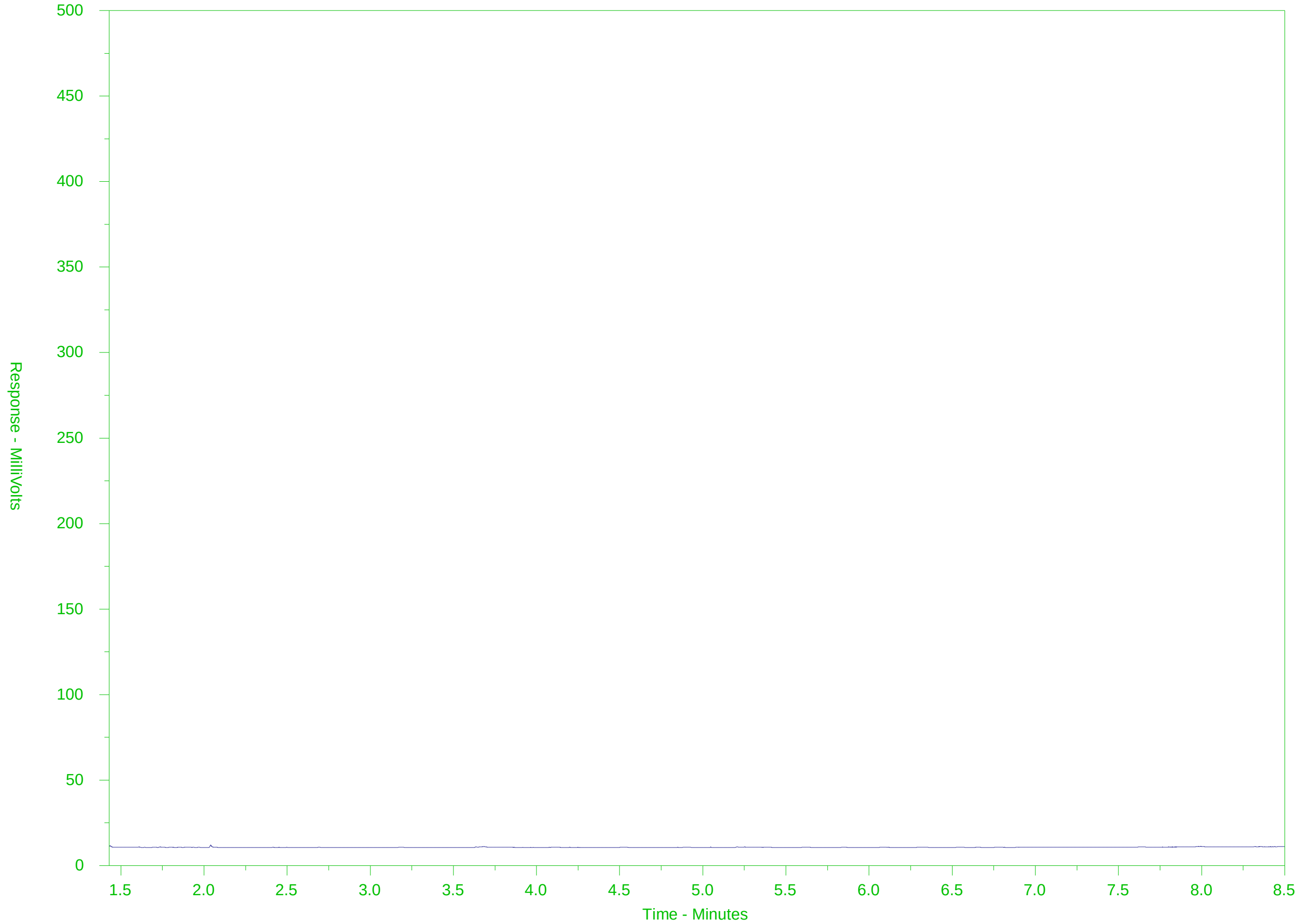
*** Taiga analytical methods are based on the following standard analytical methods**
SM - Standard Methods for the Examination of Water and Wastewater
EPA - United States Environmental Protection Agency

Comments *L2487406*

ReportDate: Monday, August 17, 2020
Print Date: *Monday, August 17, 2020*

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-1
Client Sample ID: SOURCE-1



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

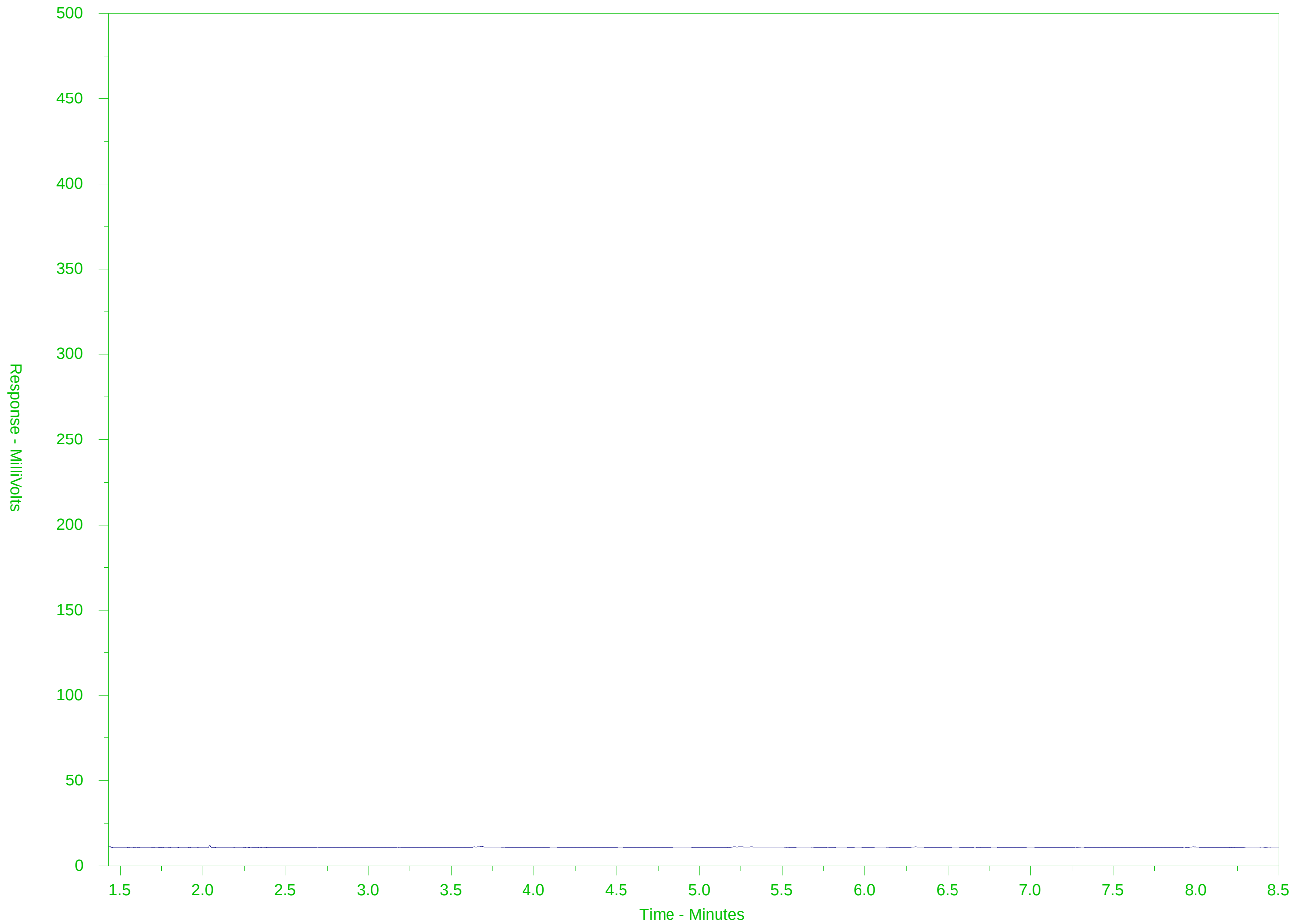
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-2
Client Sample ID: WNW-1



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

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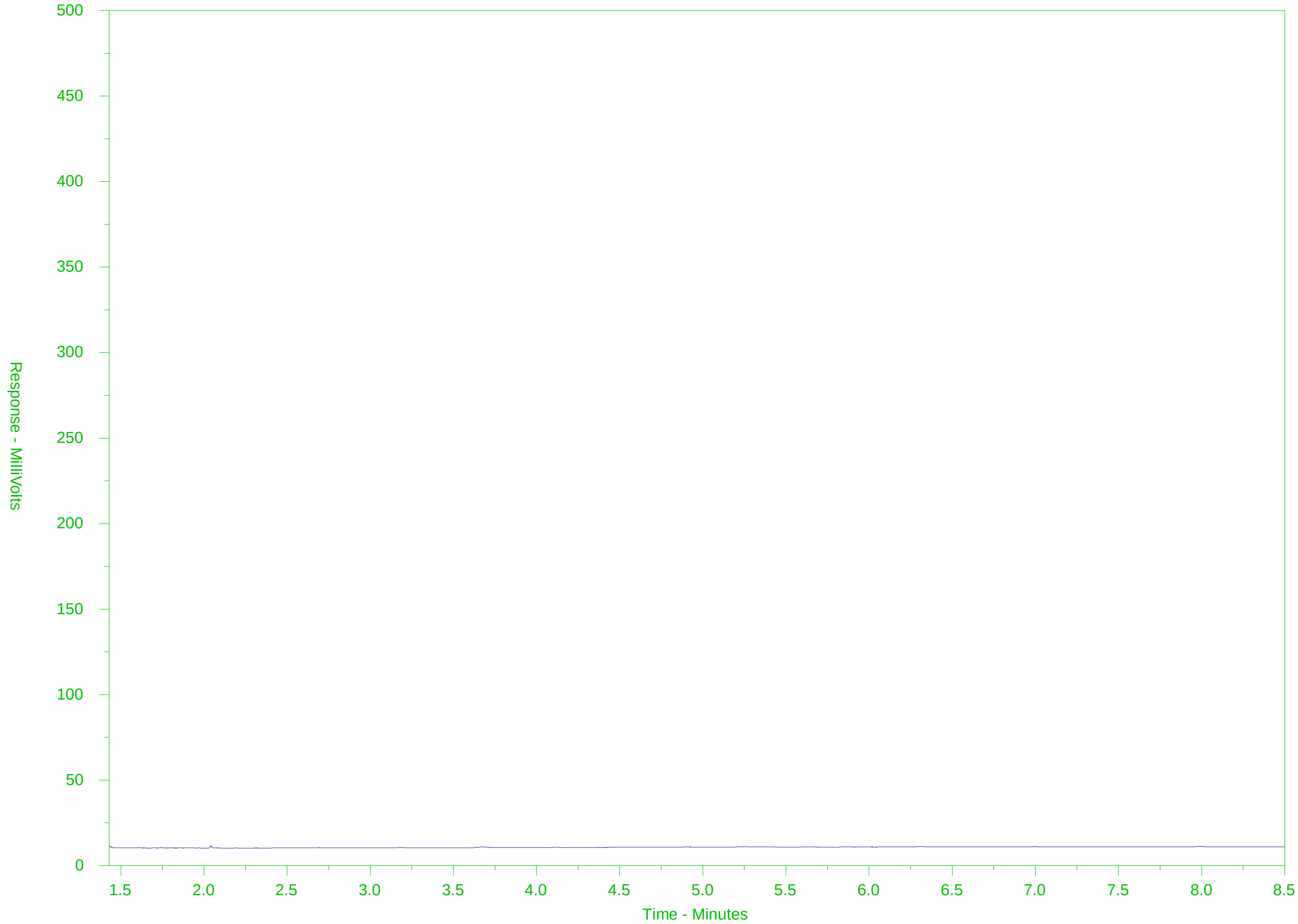
CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-3
Client Sample ID: NORTH-1



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

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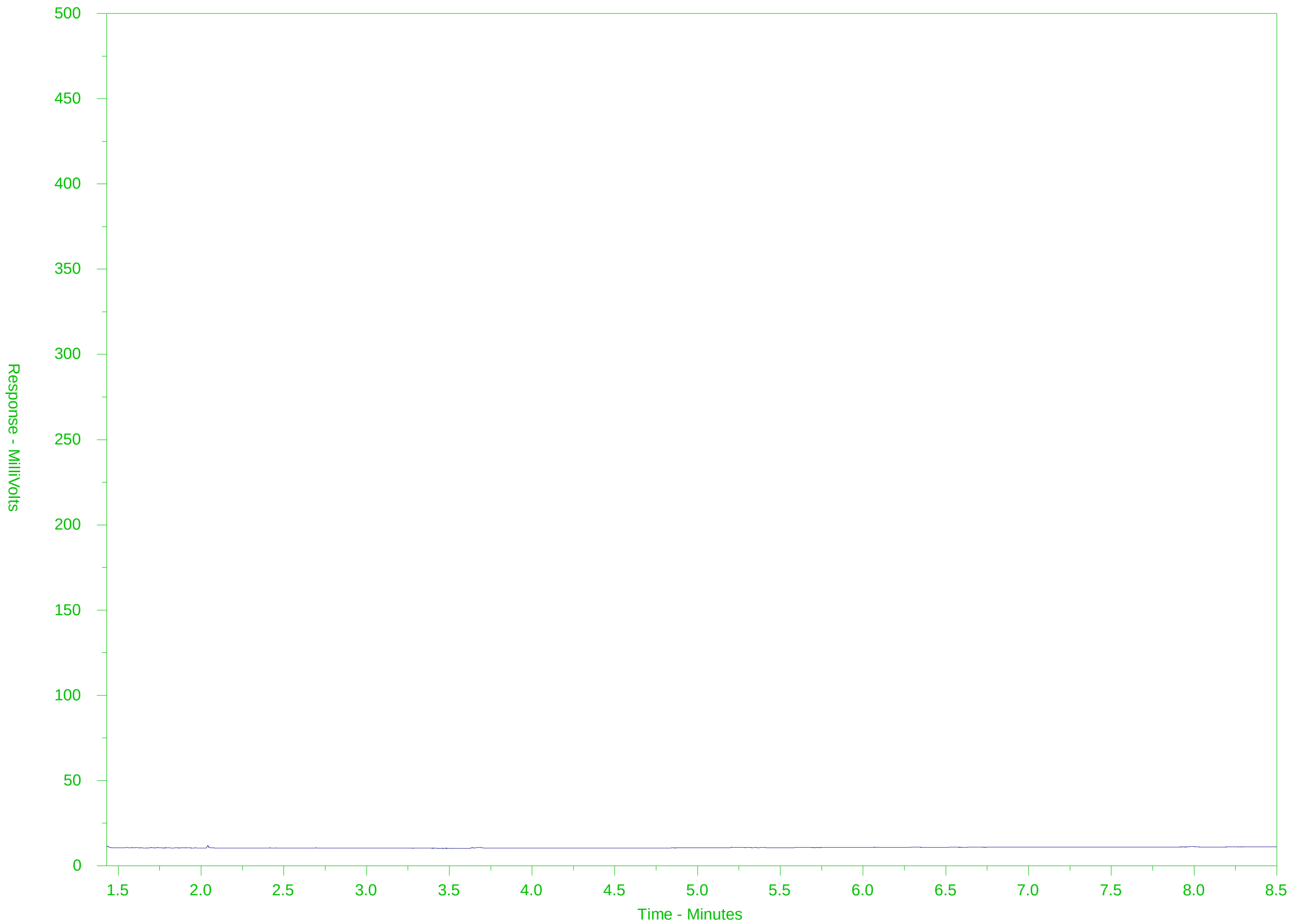
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-4
Client Sample ID: ENE-1



← F2 →← F3 →← F4 →			
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→ ← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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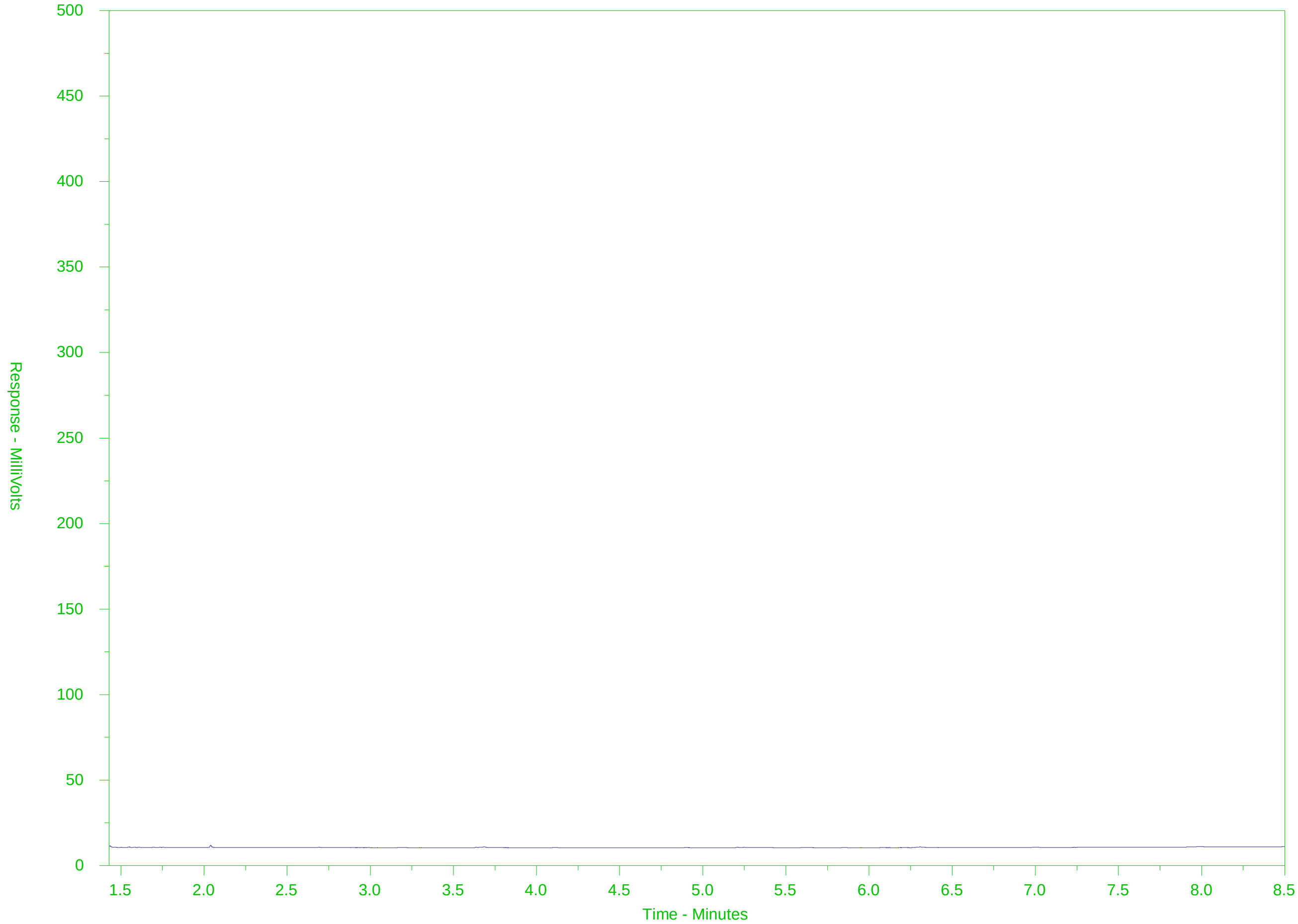
CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-5
Client Sample ID: SOURCE-2



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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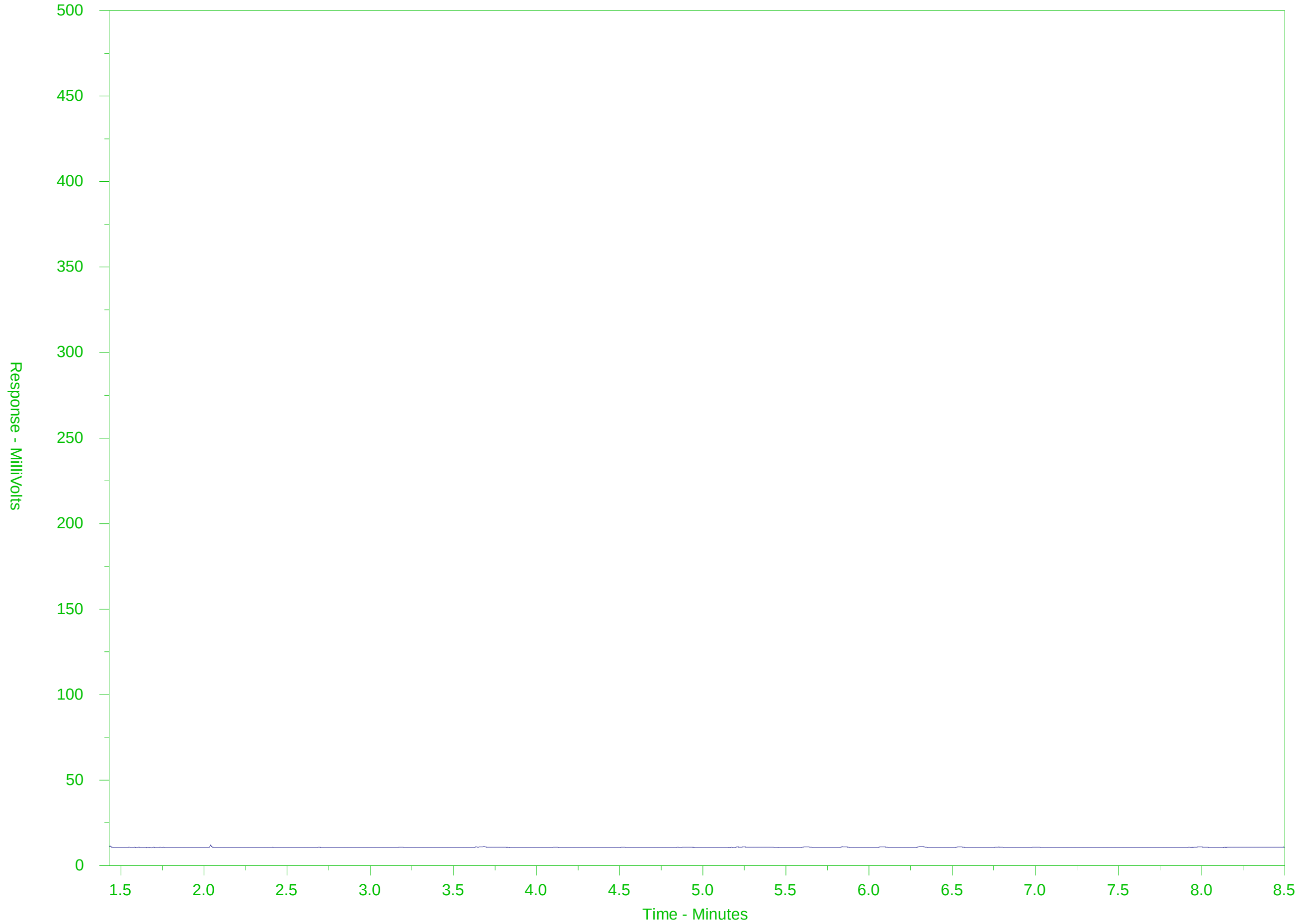
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-6
Client Sample ID: WNW-2



← F2 →←	F3	→← F4 →	
nC10	nC16	nC34	nC50
174'C 346'F	287'C 549'F	481'C 898'F	575'C 1067'F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

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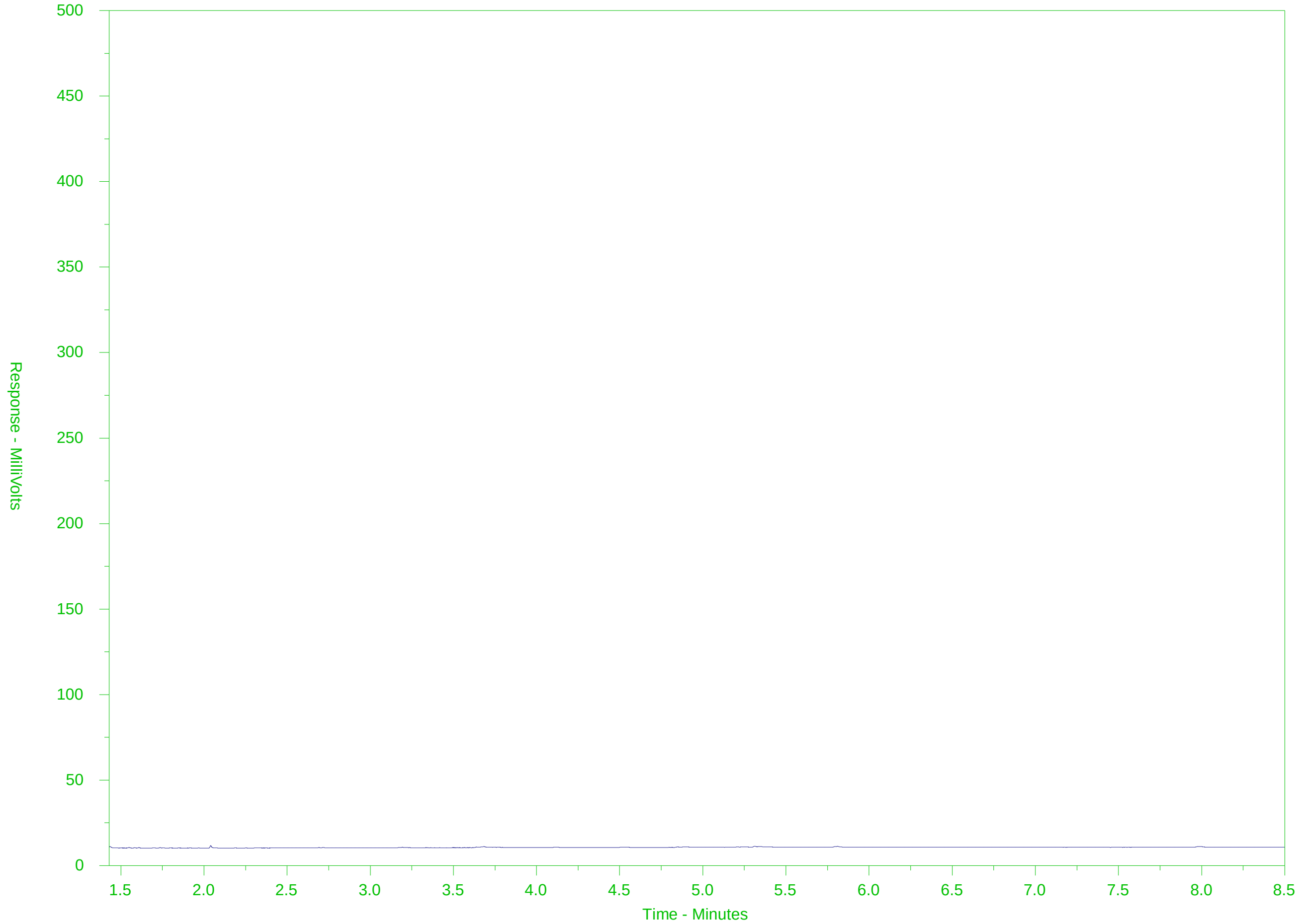
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-7
Client Sample ID: NORTH-2



← F2 →←	F3	→← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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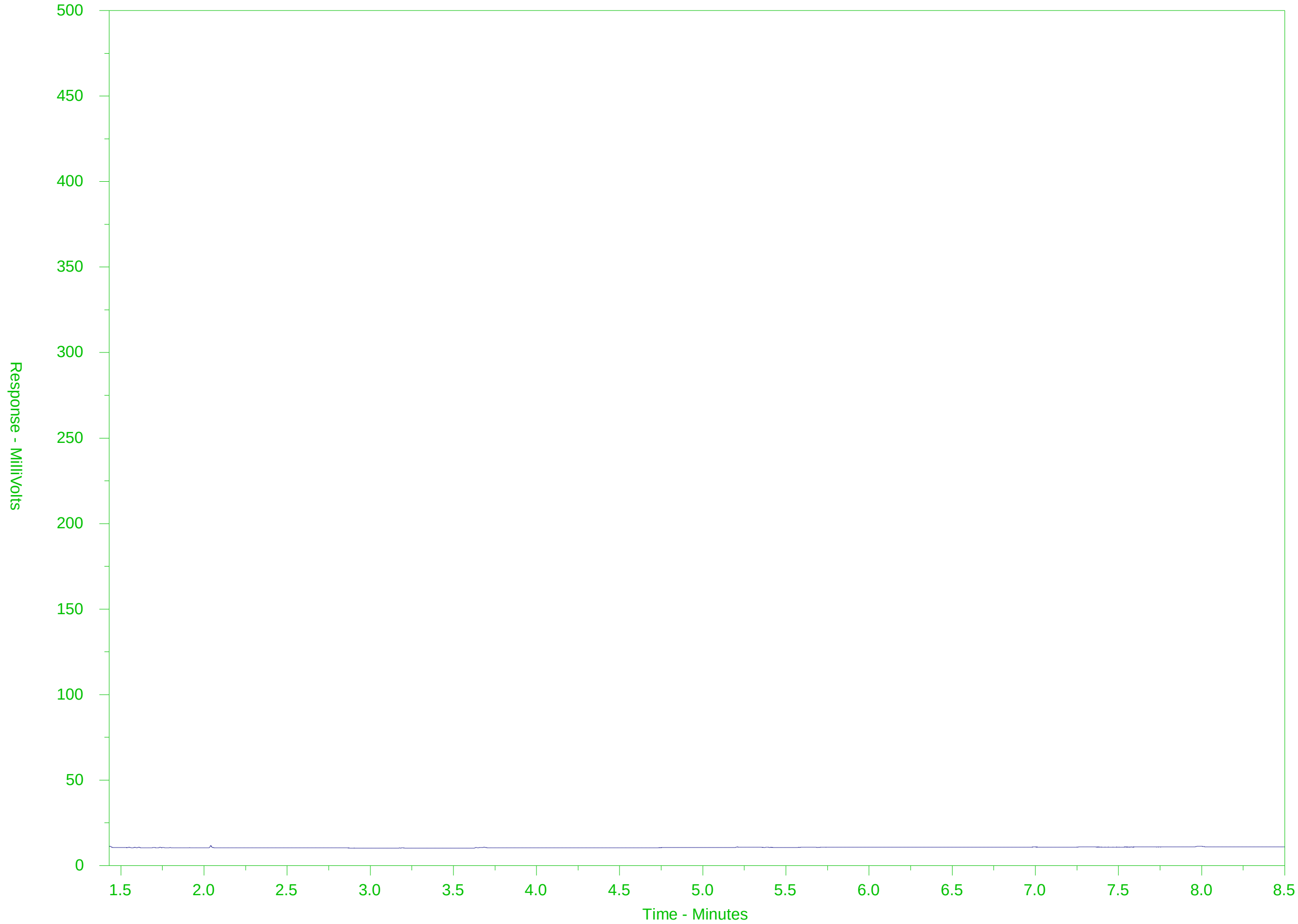
Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-8
Client Sample ID: ENE-2



← F2 →←	F3	→← F4 →	
nC10	nC16	nC34	nC50
174'C 346'F	287'C 549'F	481'C 898'F	575'C 1067'F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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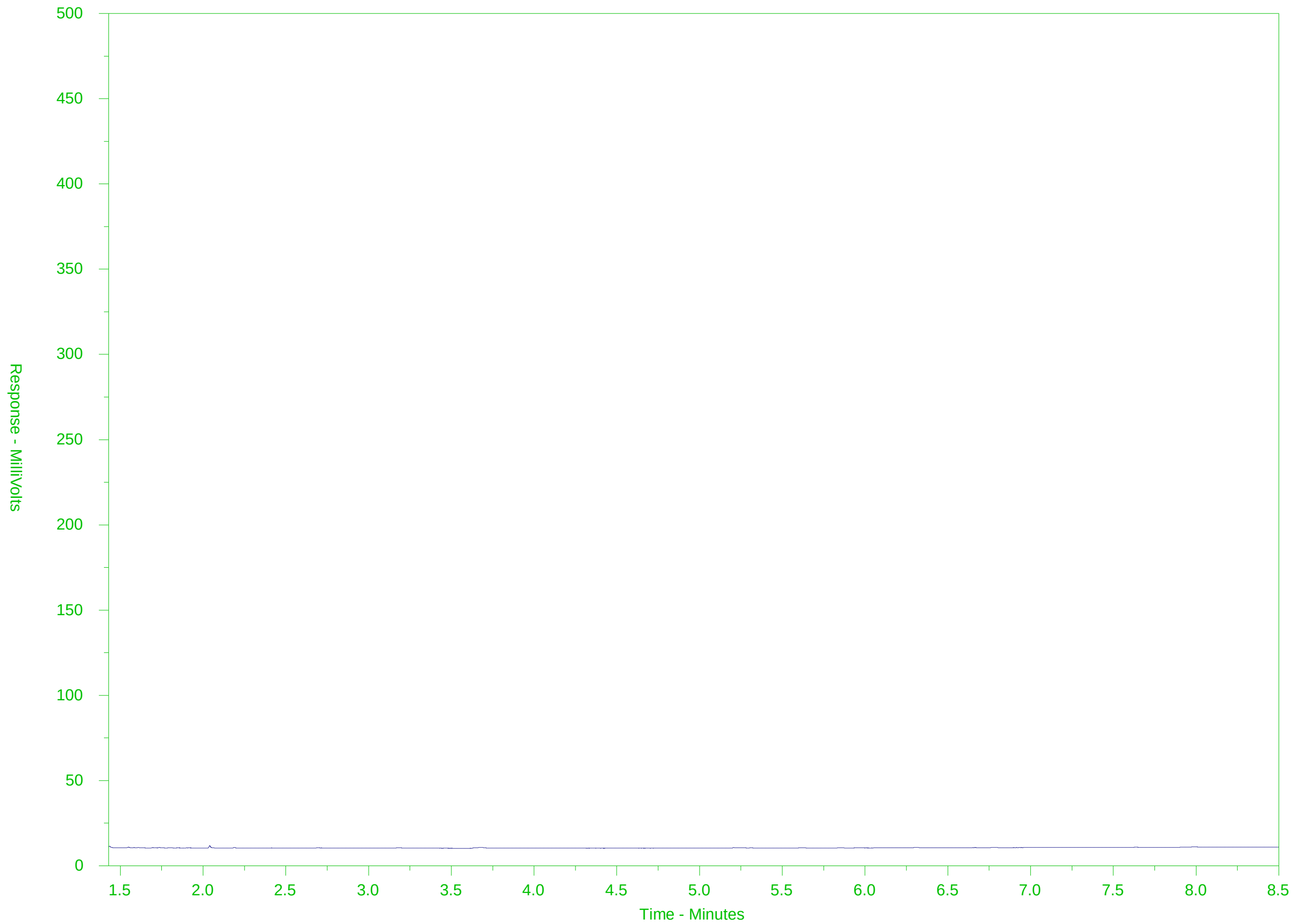
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-9
Client Sample ID: DUPC



← F2 →←	F3	→← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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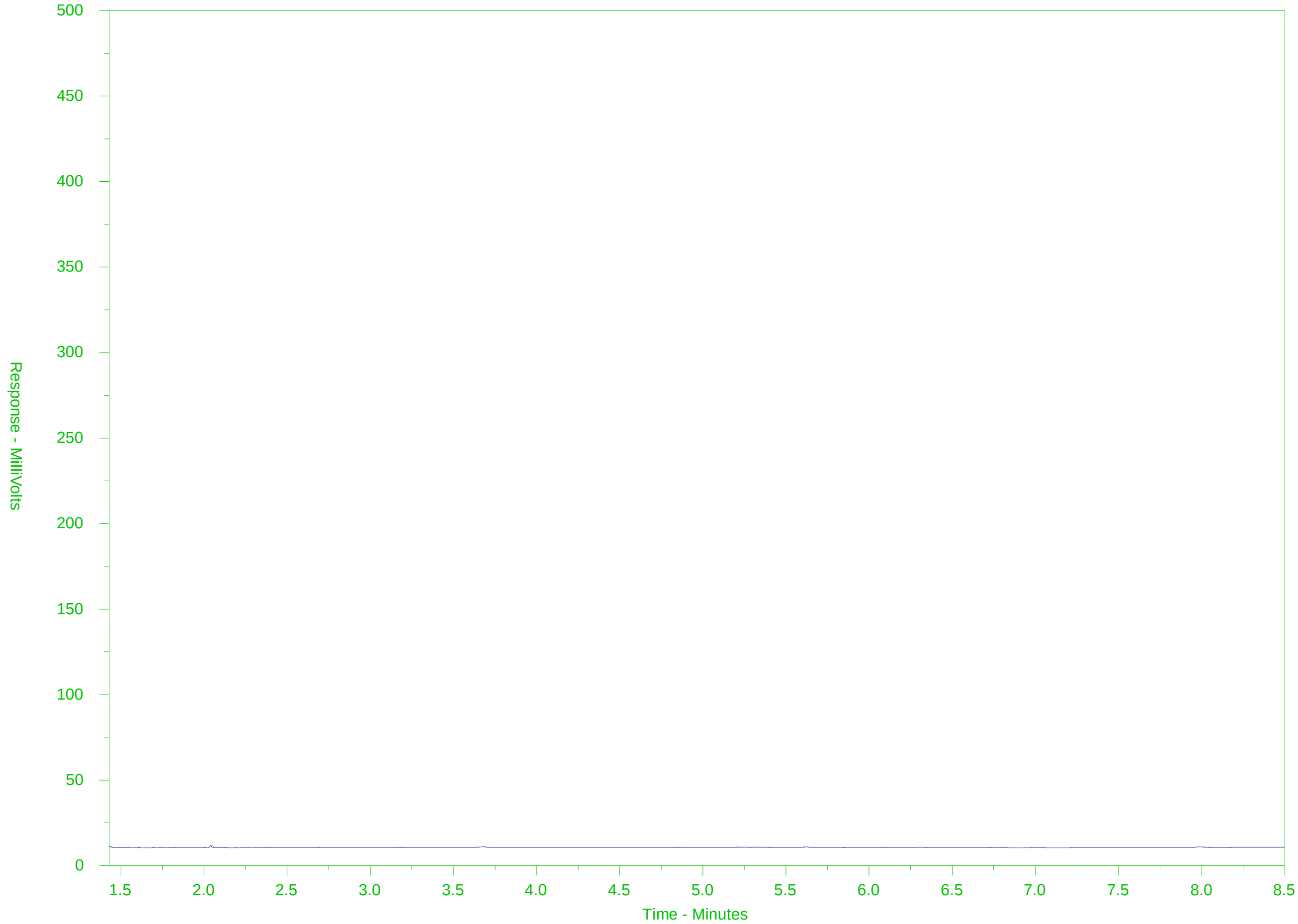
Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487406-C-10
Client Sample ID: SITE-2



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

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ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2487406-COFC

COC Number: 17 - 766318

Page 1 of

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates
Contact:	Christine Bylenga / Brett Lucas
Phone:	1604 296 4200
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver BC
Postal Code:	V5M 0C4

Report Format / Distribution

Select Report Format: [x] PDF [x] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report [x] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [x] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: Cbylenga@golder.com
Email 2: blucas@golder.com
Email 3:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [x] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ] 3 day [P3-25%] [ ] 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	
Same as Report To	[x] YES [ ] NO
Copy of Invoice with Report	[ ] YES [x] NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: [x] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax:
Email 2:

Project Information

ALS Account # / Quote #: Q79542
Job #: 1663724/34000/03
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2487406

ALS Contact: | Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	General (pH, alkalinity, TSS, Turbidity, conductivity, anions)	TOC, Ammonia, TKN (P)	Dissolved Metals	Total metals (P)	Dissolved Mercury	Total Mercury (P)	Hydrocarbons (LEPH/HEPH) F2-F4 (P)	Fecal Coliforms (P)	Radium-226 (P)	BTEX/F1 (P)	Total Nutrients (P)				SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	SOURCE-1	10-Aug-20	10:30	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	WNW-1	10-Aug-20	11:10	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	NORTH-1	10-Aug-20	11:15	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	ENE-1	10-Aug-20	11:30	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	SOURCE-2	10-Aug-20	10:45	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	WNW-2	10-Aug-20	10:10	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	NORTH-2	10-Aug-20	9:50	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	ENE-2	10-Aug-20	10:20	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	DUPC	10-Aug-20	10:35	WATER	12	X	X	X	X	X	X	X	X	X	X	X					
	SITE-2	10-Aug-20	17:20	WATER	12	X	X	X	X	X	X	X	X	X	X	X					

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [x] NO
Are samples for human consumption/ use? [ ] YES [x] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Note: dissolved metals and mercury are unpreserved and unfiltered

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] | SIF Observations Yes [ ] No [ ]
Ice Packs [x] Ice Cubes [x] | Custody seal intact Yes [ ] No [ ]
Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C: 6.1
FINAL COOLER TEMPERATURES °C: 7 (avg) (2)

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by: [illegible]	Date: 12 Aug 20	Time: 9:50	Received by: JL	Date: AUG 13 2020	Time: 1:35p

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION | WHITE - LABORATORY COPY | YELLOW - CLIENT COPY | JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B2114**	Page	: 1 of 15
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 15-560022	Issue Date	: 01-Sep-2020 11:51
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Internal Subcontracting, Fort Collins, Colorado
Ken Chan	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
Bq/L	Becquerels per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL
NTU	nephelometric turbidity units
pH units	pH units
psu	practical salinity units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Sample Comments

Sample	Client Id	*Comment*
VA20B2114-004	ENE - 1	ENE-1: Water sample for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
VA20B2114-004	ENE - 1	ENE-1: Water sample for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

Qualifier	*Description*
DLA	*Detection Limit adjusted for required dilution.*

Analytical Results

Sub-Matrix: **Seawater**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
					VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	72.0	72.9	72.4	72.6	72.6
conductivity	----	E100S	2.0	µS/cm	17200	16800	17000	17600	15500
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	2130	2020	2040	2080	1820
pH	----	E108	0.10	pH units	7.96	7.98	7.96	7.97	7.95
salinity	----	EC100S	1.0	psu	11.1	10.8	11.0	11.4	9.9
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
turbidity	----	E121	0.10	NTU	0.31	0.40	0.29	0.37	0.34
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	2000	2020	2100	2200	1830
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	20.5	19.8	20.4	20.8	18.2
chloride	16887-00-6	E235S.Cl	50	mg/L	5410	5170	5440	5470	4820
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.32	0.32	0.31	0.32	0.30
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.072	0.094	0.084	0.107	0.084
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	0.035	<0.010	0.013	<0.010
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0045	0.0068	0.0040	0.0048	0.0037
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	796	789	794	818	721
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.26	1.32	1.11	1.12	1.14
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	<10 DLA	<10 DLA
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0138	0.0139	0.0115	0.0163	0.0121
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00052	0.00050	0.00055	0.00056	0.00047
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0057	0.0056	0.0059	0.0061	0.0056
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	1.46	1.46	1.47	1.53	1.29

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
Analyte	CAS Number	Method	LOR	Unit	VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Total Metals									
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
calcium, total	7440-70-2	E468S	1.0	mg/L	146	151	150	157	135
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	0.016	0.015	0.012	0.018	0.013
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.056	0.056	0.056	0.057	0.050
magnesium, total	7439-95-4	E468S	1.0	mg/L	397	400	419	439	362
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00121	0.00160	0.00101	0.00187	0.00102
mercury, total	7439-97-6	E508S	0.00500	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00343	0.00329	0.00335	0.00341	0.00300
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	125	127	130	136	114
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0344	0.0332	0.0352	0.0369	0.0310
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	2980	2970	3010	3180	2690
strontium, total	7440-24-6	E468S	0.010	mg/L	2.35	2.36	2.46	2.42	2.16
sulfur, total	7704-34-9	E468S	5.0	mg/L	318	307	324	326	286
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
					VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Total Metals									
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00148	0.00150	0.00132	0.00165	0.00131
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00051	<0.00050
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0043
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00057	0.00047	0.00052	0.00053	0.00044
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0059	0.0058	0.0056	0.0059	0.0056
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.43	1.40	1.50	1.46	1.27
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	0.000012	<0.000010
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	146	146	148	148	130
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00022	0.00025	0.00023	0.00024	0.00023
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.058	0.054	0.057	0.057	0.050
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	429	401	405	415	364
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00071	0.00074	0.00058	0.00080	0.00053
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00337	0.00355	0.00336	0.00348	0.00316
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	128	124	126	128	113
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
Client sampling date / time					04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
					VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Dissolved Metals									
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0352	0.0334	0.0342	0.0341	0.0296
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.43	2.57	2.44	2.49	2.21
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	334	325	334	347	294
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00149	0.00150	0.00130	0.00166	0.00124
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3070	3000	3010	3130	2720
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0.80	0.65	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0.62	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	1.4	<1.2	<1.2
Volatile Organic Compounds Surrogates									

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
					VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	90.6	91.3	92.6	92.7	92.6
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	99.3	100	101	99.1	98.9
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	99.7	90.9	94.6	84.4	89.6
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	93.8	90.6	91.6	85.9	84.8
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	77.3	106	93.8	95.8	102
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	0.018	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	04-Aug-2020 10:54	04-Aug-2020 11:07	04-Aug-2020 10:38	04-Aug-2020 10:21	04-Aug-2020 12:17
Analyte	CAS Number	Method	LOR	Unit	VA20B2114-001	VA20B2114-002	VA20B2114-003	VA20B2114-004	VA20B2114-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	87.7	83.0	83.5	83.8	81.6
chrysene-d12	1719-03-5	E641A	0.010	%	97.3	87.7	91.5	89.0	87.6
naphthalene-d8	1146-65-2	E641A	0.010	%	110	99.4	104	97.6	97.6
phenanthrene-d10	1517-22-2	E641A	0.010	%	115	104	109	106	104
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0064	Bq/L	<0.0064	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0068	Bq/L	----	----	<0.0068	<0.0068	----
radium-226	13982-63-3	RA226-MMER	0.008	Bq/L	----	----	----	----	<0.008
radium-226	13982-63-3	RA226-MMER	0.0086	Bq/L	----	<0.0086	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
					VA20B2114-006	VA20B2114-007	VA20B2114-008	VA20B2114-009	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	73.8	74.4	75.4	73.0	----
conductivity	----	E100S	2.0	µS/cm	14400	13600	13000	15700	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	1690	1560	1500	1880	----
pH	----	E108	0.10	pH units	7.97	7.98	7.98	7.96	----
salinity	----	EC100S	1.0	psu	9.2	8.6	8.2	10.1	----
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	----
turbidity	----	E121	0.10	NTU	0.31	0.28	0.27	0.29	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	1660	1570	1480	1800	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0408	<0.0050	<0.0050	<0.0050	----
bromide	24959-67-9	E235S.Br	5.0	mg/L	17.8	17.0	15.5	19.4	----
chloride	16887-00-6	E235S.Cl	50	mg/L	4680	4480	4040	5170	----
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.27	0.26	0.25	0.28	----
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.081	0.091	0.094	0.088	----
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0035	0.0032	0.0031	0.0041	----
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	663	617	592	732	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.09	1.29	1.08	1.14	----
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	<10 DLA	----
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0106	0.0104	0.0092	0.0113	----
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00052	0.00041	<0.00040	0.00050	----
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0054	0.0054	0.0049	0.0053	----
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
boron, total	7440-42-8	E468S	0.30	mg/L	1.23	1.06	1.05	1.22	----
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
Analyte	CAS Number	Method	LOR	Unit	VA20B2114-006	VA20B2114-007	VA20B2114-008	VA20B2114-009	--------
					Result	Result	Result	Result	----
Total Metals									
calcium, total	7440-70-2	E468S	1.0	mg/L	126	114	113	131	----
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
iron, total	7439-89-6	E468S	0.010	mg/L	0.014	0.014	0.010	0.011	----
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
lithium, total	7439-93-2	E468S	0.020	mg/L	0.050	0.042	0.042	0.049	----
magnesium, total	7439-95-4	E468S	1.0	mg/L	326	312	290	358	----
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00101	0.00092	0.00090	0.00095	----
mercury, total	7439-97-6	E508S	0.00500	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00298	0.00261	0.00234	0.00301	----
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E468S	1.0	mg/L	108	96.5	89.7	111	----
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0302	0.0268	0.0243	0.0300	----
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	2450	2280	2260	2680	----
strontium, total	7440-24-6	E468S	0.010	mg/L	1.87	1.82	1.63	2.17	----
sulfur, total	7704-34-9	E468S	5.0	mg/L	252	228	227	273	----
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00131	0.00131	0.00123	0.00132	----

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
					VA20B2114-006	VA20B2114-007	VA20B2114-008	VA20B2114-009	--------
					Result	Result	Result	Result	----
Total Metals									
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	0.0037	----
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00047	0.00043	<0.00040	0.00048	----
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0054	0.0052	0.0050	0.0057	----
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.19	1.12	1.05	1.30	----
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	124	113	112	133	----
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00036	<0.00020	0.00027	0.00024	----
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.047	0.042	0.040	0.049	----
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	335	310	296	375	----
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00042	0.00033	0.00038	0.00031	----
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00279	0.00257	0.00257	0.00302	----
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	102	93.4	90.7	110	----
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0278	0.0252	0.0249	0.0300	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
Analyte	CAS Number	Method	LOR	Unit	VA20B2114-006	VA20B2114-007	VA20B2114-008	VA20B2114-009	--------
					Result	Result	Result	Result	----
Dissolved Metals									
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	1.99	1.79	1.83	2.19	----
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	263	253	237	294	----
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00122	0.00122	0.00120	0.00125	----
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	----
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	----
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	2490	2290	2270	2780	----
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	<1.2	<1.2	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	92.4	92.5	91.3	90.4	----

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
					VA20B2114-006	VA20B2114-007	VA20B2114-008	VA20B2114-009	--------
					Result	Result	Result	Result	----
Volatile Organic Compounds Surrogates									
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	116	107	98.8	114	----
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	----
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	90.1	93.9	84.6	90.3	----
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	90.4	87.3	85.1	86.0	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	101	111	93.8	97.2	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW - 2	North - 2	ENE - 2	DUP - B	----
				Client sampling date / time	04-Aug-2020 12:08	04-Aug-2020 11:50	04-Aug-2020 11:41	04-Aug-2020 11:58	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B2114-006**	**VA20B2114-007**	**VA20B2114-008**	**VA20B2114-009**	--------
					Result	Result	Result	Result	----
Polycyclic Aromatic Hydrocarbons									
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	89.8	83.9	88.0	84.0	----
chrysene-d12	1719-03-5	E641A	0.010	%	92.3	90.3	92.4	88.4	----
naphthalene-d8	1146-65-2	E641A	0.010	%	104	100	103	99.2	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	110	107	110	106	----
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0039	Bq/L	----	----	----	<0.0039	----
radium-226	13982-63-3	RA226-MMER	0.007	Bq/L	<0.007	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0073	Bq/L	----	<0.0073	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0083	Bq/L	----	----	<0.0083	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B2114**	Page	: 1 of 37
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Issue Date	: 01-Sep-2020 11:51
C-O-C number	: 15-560022		
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP - B	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 1	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 2	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 1	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 2	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 1	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 2	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E298	04-Aug-2020	----	----	----		13-Aug-2020	28 days	9 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE DUP - B	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 1	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 2	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 1	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 2	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 1	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 2	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 1	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 2	E235S.Br	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE DUP - B	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 1	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 2	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 1	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 2	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 1	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 2	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 1	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 2	E235S.Cl	04-Aug-2020	----	----	----		07-Aug-2020	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP - B	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 1	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 2	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 1	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 2	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 1	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 2	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 1	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 2	E378-U	04-Aug-2020	----	----	----		14-Aug-2020	3 days	9 days	× EHTL
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE DUP - B	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 1	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 2	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.F-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE DUP - B	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 2	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 1	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 2	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 1	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 2	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 1	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 2	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 1	E235S.NO3-T	04-Aug-2020	----	----	----		16-Aug-2020	3 days	12 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE DUP - B	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 1	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 2	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	11 days	× EHTL
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.NO2-L	04-Aug-2020	----	----	----		16-Aug-2020	3 days	12 days	× EHTL
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE DUP - B	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 1	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 2	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.SO4-L	04-Aug-2020	----	----	----		16-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) DUP - B	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE - 1	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE - 2	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) North - 1	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) North - 2	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) Source - 1	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) Source - 2	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E318S	04-Aug-2020	11-Aug-2020	28 days	7 days	✓	13-Aug-2020	20 days	1 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) DUP - B	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	75 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 2	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	75 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 2	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	75 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 2	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	75 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 2	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	75 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 1	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	76 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 1	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	76 hrs	× EHTR

Matrix: **Water**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 1	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	76 hrs	✘ EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 1	E010.FC	04-Aug-2020	----	----	----		07-Aug-2020	30 hrs	77 hrs	✘ EHTR
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) DUP - B	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 1	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 2	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 1	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 2	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 1	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 2	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 1	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 2	E509S	04-Aug-2020	12-Aug-2020	28 days	8 days	✓	12-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) DUP - B	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 1	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 2	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 1	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 2	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 1	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 2	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 1	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 2	E469S	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	17-Aug-2020	170 days	3 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) DUP - B	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 1	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 2	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 1	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 2	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 1	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 2	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 1	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 2	E469S.NaSi	04-Aug-2020	13-Aug-2020	180 days	9 days	✓	18-Aug-2020	170 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP - B	E601	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E601	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E601	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E601	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E601	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 1	E601	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E601	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E601	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E601	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP - B	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 1	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 2	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 1	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 2	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 1	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 2	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 1	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 2	E581.VH+F1	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP - B	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 1	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 2	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 1	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 2	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 1	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 2	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 1	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 2	E355-L	04-Aug-2020	----	----	----		11-Aug-2020	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP - B	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 1	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 2	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 1	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 2	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source - 1	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source - 2	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE WNW - 1	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WNW - 2	E290	04-Aug-2020	----	----	----		10-Aug-2020	14 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE DUP - B	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE - 1	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE - 2	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North - 1	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North - 2	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source - 1	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source - 2	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : Conductivity in Seawater										
HDPE WNW - 1	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE WNW - 2	E100S	04-Aug-2020	----	----	----		10-Aug-2020	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE Source - 2	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW - 2	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP - B	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE - 2	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North - 2	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW - 1	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE - 1	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	147 hrs	× EHTR-FM

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter										
HDPE North - 1	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	147 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source - 1	E108	04-Aug-2020	----	----	----		10-Aug-2020	0.25 hrs	147 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 2	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE DUP - B	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 1	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 2	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 1	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 2	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 1	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 1	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 2	E160S	04-Aug-2020	----	----	----		11-Aug-2020	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Source - 2	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE DUP - B	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE ENE - 1	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE ENE - 2	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE North - 1	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE North - 2	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE Source - 1	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE WNW - 1	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Physical Tests : Turbidity by Nephelometry										
HDPE WNW - 2	E121	04-Aug-2020	----	----	----		08-Aug-2020	3 days	4 days	× EHTL
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) DUP - B	E641A	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E641A	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E641A	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E641A	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E641A	04-Aug-2020	11-Aug-2020	14 days	6 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 1	E641A	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E641A	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E641A	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E641A	04-Aug-2020	11-Aug-2020	14 days	7 days	✓	12-Aug-2020	40 days	0 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) DUP - B	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	23 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 2	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	23 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 2	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	23 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 2	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	23 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 2	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	23 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 1	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	24 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 1	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	24 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 1	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	24 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 1	RA226-MMER	04-Aug-2020	----	----	----		28-Aug-2020	180 days	24 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) DUP - B	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 2	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 1	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 2	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 1	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 2	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 1	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 2	E508S	04-Aug-2020	----	----	----		11-Aug-2020	28 days	6 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 1	E508S	04-Aug-2020	----	----	----		14-Aug-2020	28 days	9 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) DUP - B	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 1	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 2	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 1	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 2	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 1	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 2	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 1	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 2	E468S	04-Aug-2020	----	----	----		17-Aug-2020	180 days	13 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) DUP - B	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 1	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 2	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 1	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 2	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 1	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 2	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 1	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 2	E468S.NaSi	04-Aug-2020	----	----	----		18-Aug-2020	180 days	14 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP - B	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 1	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 2	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 1	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 2	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 1	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 2	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 1	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	12-Aug-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 2	E611A	04-Aug-2020	12-Aug-2020	14 days	8 days	✓	13-Aug-2020	5 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	70114	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69433	1	9	11.1	5.0	✓
BTEX by Headspace GC-MS	E611A	71014	2	37	5.4	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69434	1	9	11.1	5.0	✓
Conductivity in Seawater	E100S	70112	1	9	11.1	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
pH by Meter	E108	70113	1	11	9.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69409	2	20	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	2	22	9.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
Turbidity by Nephelometry	E121	69713	2	35	5.7	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71013	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	70114	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	70463	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69433	1	9	11.1	5.0	✓
BTEX by Headspace GC-MS	E611A	71014	2	37	5.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	70465	1	16	6.2	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69434	1	9	11.1	5.0	✓
Conductivity in Seawater	E100S	70112	1	9	11.1	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Control Samples (LCS) - Continued							
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
PAHs by LVI GC-MS	E641A	70464	1	18	5.5	5.0	✓
pH by Meter	E108	70113	1	11	9.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	2	22	9.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
TSS by Gravimetry (Seawater)	E160S	70496	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	69713	2	35	5.7	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71013	2	40	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	70114	1	11	9.0	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	70463	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69433	1	9	11.1	5.0	✓
BTEX by Headspace GC-MS	E611A	71014	2	37	5.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	70465	1	16	6.2	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69434	1	9	11.1	5.0	✓
Conductivity in Seawater	E100S	70112	1	9	11.1	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
PAHs by LVI GC-MS	E641A	70464	1	18	5.5	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69409	2	20	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	2	22	9.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
TSS by Gravimetry (Seawater)	E160S	70496	1	9	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Turbidity by Nephelometry	E121	69713	2	35	5.7	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71013	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69433	1	9	11.1	5.0	✓
BTEX by Headspace GC-MS	E611A	71014	2	37	5.4	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69434	1	9	11.1	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	×
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	2	22	9.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71013	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC Vancouver - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test detects Thermotolerant Coliforms in a 100 mL sample after an 18 hour incubation at 44.5 ±0.2°C.
Conductivity in Seawater	E100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry (Seawater)	E160S Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Seawater by IC	E235S.Br Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Seawater by IC	E235S.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Seawater by IC (Low Level)	E235S.F-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence	E318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Seawater by CRC ICPMS (HMI)	E468S Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode). This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode).
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Seawater by CVAAS	E508S Vancouver - Environmental	Water	EPA 1631E (mod)	Seawater samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Mercury in Seawater by CVAAS	E509S Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Seawater samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fractions 2-4 (F2-F4) are analyzed by GC-FID.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Salinity in Seawater (calculation)	EC100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
Radium-226 by Radon Emanation	RA226-MMER	Water	EPA 903.1	Radium-226 in sample was analyzed according to the current revision of SOP 783.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Fort Collins - Environmental - 225 Commerce Drive Fort Collins Colorado United States 80524			

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in Seawater	EP318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent and H_2SO_4.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO_3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA20B2114**		Page	: 1 of 22
Client	: Golder Associates Ltd.		Laboratory	: Vancouver - Environmental
Contact	: C Bylenga		Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4		Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----		Telephone	: +1 604 253 4188
Project	: 1663724/34000/03		Date Samples Received	: 07-Aug-2020 09:05
PO	: ----		Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 15-560022		Issue Date	: 01-Sep-2020 11:51
Sampler	: ----			
Site	: ----			
Quote number	: Payment Terms for Finance			
No. of samples received	: 9			
No. of samples analysed	: 9			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
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Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
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Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
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Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 69713)											
KS2001291-003	Anonymous	turbidity	----	E121	0.10	NTU	0.24	0.25	0.007	Diff <2x LOR	----
Physical Tests (QC Lot: 69714)											
VA20B2114-005	Source - 2	turbidity	----	E121	0.10	NTU	0.34	0.36	0.02	Diff <2x LOR	----
Physical Tests (QC Lot: 70112)											
VA20B2114-001	Source - 1	conductivity	----	E100S	2.0	µS/cm	17200	17100	0.526%	20%	----
Physical Tests (QC Lot: 70113)											
VA20B2114-001	Source - 1	pH	----	E108	0.10	pH units	7.96	7.97	0.126%	4%	----
Physical Tests (QC Lot: 70114)											
VA20B2114-001	Source - 1	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	72.0	72.2	0.277%	20%	----
Anions and Nutrients (QC Lot: 69433)											
VA20B2114-001	Source - 1	bromide	24959-67-9	E235S.Br	5.0	mg/L	20.5	17.9	2.6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 69434)											
VA20B2114-001	Source - 1	chloride	16887-00-6	E235S.Cl	50	mg/L	5410	4680	14.6%	20%	----
Anions and Nutrients (QC Lot: 70515)											
VA20B2114-001	Source - 1	Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.072	0.076	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70517)											
VA20B2114-001	Source - 1	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71859)											
VA20B2114-001	Source - 1	fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.32	0.32	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71860)											
VA20B2114-001	Source - 1	nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71861)											
VA20B2114-001	Source - 1	nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71862)											
VA20B2114-001	Source - 1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	796	799	0.284%	20%	----
Anions and Nutrients (QC Lot: 71867)											
VA20B2114-001	Source - 1	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0045	0.0044	0.00004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 70516)											
VA20B2114-001	Source - 1	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.26	1.22	0.04	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 69409)											
VA20B2123-006	Anonymous	coliforms, thermotolerant [fecal]	----	E010.FC	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Bacteriological Tests (QC Lot: 69410)											
VA20B2114-008	ENE - 2	coliforms, thermotolerant [fecal]	----	E010.FC	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
Total Metals (QC Lot: 70375)											
VA20B2114-001	Source - 1	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 71895)											
VA20B2114-004	ENE - 1	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 72036)											
VA20B2114-001	Source - 1	silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	2980	3020	1.22%	20%	----
Total Metals (QC Lot: 72037)											
VA20B2114-001	Source - 1	aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0138	0.0139	0.00006	Diff <2x LOR	----
		antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00052	0.00051	0.00001	Diff <2x LOR	----
		barium, total	7440-39-3	E468S	0.0010	mg/L	0.0057	0.0060	0.0002	Diff <2x LOR	----
		beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E468S	0.30	mg/L	1.46	1.48	0.02	Diff <2x LOR	----
		cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E468S	1.0	mg/L	146	146	0.396%	20%	----
		cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E468S	0.010	mg/L	0.016	0.016	0.00004	Diff <2x LOR	----
		lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E468S	0.020	mg/L	0.056	0.056	0.0001	Diff <2x LOR	----
		magnesium, total	7439-95-4	E468S	1.0	mg/L	397	440	10.3%	20%	----
		manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00121	0.00130	0.00009	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00343	0.00343	0.0941%	20%	----
		nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E468S	1.0	mg/L	125	131	4.85%	20%	----
		rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0344	0.0356	0.0012	Diff <2x LOR	----
		selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 72037) - continued											
VA20B2114-001	Source - 1	silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E468S	0.010	mg/L	2.35	2.47	5.10%	20%	----
		sulfur, total	7704-34-9	E468S	5.0	mg/L	318	321	0.886%	20%	----
		tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00148	0.00144	2.36%	20%	----
		vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	0.00052	0.00002	Diff <2x LOR	----
		yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71067)											
VA20B2114-001	Source - 1	mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71857)											
VA20B2114-001	Source - 1	silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3070	3060	0.390%	20%	----
Dissolved Metals (QC Lot: 71858)											
VA20B2114-001	Source - 1	aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00057	0.00051	0.00006	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0059	0.0057	0.0002	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.43	1.41	0.02	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E469S	1.0	mg/L	146	145	1.08%	20%	----
		cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00022	0.00022	0.000003	Diff <2x LOR	----
		gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Dissolved Metals (QC Lot: 71858) - continued											
VA20B2114-001	Source - 1	lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.058	0.057	0.0009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	429	410	4.56%	20%	----
		manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00071	0.00069	0.00002	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00337	0.00333	1.36%	20%	----
		nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E469S	1.0	mg/L	128	125	2.38%	20%	----
		rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0352	0.0339	0.0013	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.43	2.47	1.68%	20%	----
		sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	334	327	2.07%	20%	----
		tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00149	0.00146	1.86%	20%	----
		vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 71014)											
VA20B2114-001	Source - 1	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 71091)											
VA20B2114-005	Source - 2	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 71091) - continued											
VA20B2114-005	Source - 2	methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 71013)											
VA20B2114-001	Source - 1	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----
Hydrocarbons (QC Lot: 71092)											
VA20B2114-005	Source - 2	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 69713)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 69714)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 70112)						
conductivity	----	E100S	2	µS/cm	<2.0	----
Physical Tests (QCLot: 70114)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 70496)						
solids, total suspended [TSS]	----	E160S	2	mg/L	<2.0	----
Anions and Nutrients (QCLot: 69433)						
bromide	24959-67-9	E235S.Br	5	mg/L	<5.0	----
Anions and Nutrients (QCLot: 69434)						
chloride	16887-00-6	E235S.Cl	50	mg/L	<50	----
Anions and Nutrients (QCLot: 70515)						
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 70517)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 71859)						
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	<0.20	----
Anions and Nutrients (QCLot: 71860)						
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71861)						
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71862)						
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 71867)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 70516)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Bacteriological Tests (QCLot: 69409)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----
Bacteriological Tests (QCLot: 69410)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 70375)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 71895)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 72036)						
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	<1.0	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	<2.5	----
Total Metals (QCLot: 72037)						
aluminum, total	7429-90-5	E468S	0.005	mg/L	<0.0050	----
antimony, total	7440-36-0	E468S	0.001	mg/L	<0.0010	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	<0.00040	----
barium, total	7440-39-3	E468S	0.001	mg/L	<0.0010	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	<0.00050	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	<0.00050	----
boron, total	7440-42-8	E468S	0.3	mg/L	<0.30	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	<0.000010	----
calcium, total	7440-70-2	E468S	1	mg/L	<1.0	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	<0.00050	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	<0.000050	----
copper, total	7440-50-8	E468S	0.0005	mg/L	<0.00050	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E468S	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E468S	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E468S	0.02	mg/L	<0.020	----
magnesium, total	7439-95-4	E468S	1	mg/L	<1.0	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	<0.00020	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	<0.00010	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E468S	1	mg/L	<1.0	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	<0.00050	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	<0.0050	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	<0.00050	----
silver, total	7440-22-4	E468S	0.0001	mg/L	<0.00010	----
strontium, total	7440-24-6	E468S	0.01	mg/L	<0.010	----
sulfur, total	7704-34-9	E468S	5	mg/L	<5.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 72037) - continued						
tellurium, total	13494-80-9	E468S	0.0005	mg/L	<0.00050	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	<0.000050	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	<0.00050	----
tin, total	7440-31-5	E468S	0.001	mg/L	<0.0010	----
titanium, total	7440-32-6	E468S	0.005	mg/L	<0.0050	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	<0.000050	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	<0.00050	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E468S	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 71067)						
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 71857)						
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 71858)						
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	<0.00040	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	<0.0010	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	<0.30	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	<1.0	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	<0.00020	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	<0.020	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	<1.0	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 71858) - continued						
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	<0.00010	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	<1.0	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	<0.0050	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	<0.00050	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	<0.010	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	<5.0	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	<0.000050	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	<0.00050	----
Volatile Organic Compounds (QCLot: 71014)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Volatile Organic Compounds (QCLot: 71091)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 71091) - continued						
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Hydrocarbons (QCLot: 70465)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 71013)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 71092)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70464)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 69713)									
turbidity	----	E121	0.1	NTU	200 NTU	102	85.0	115	----
Physical Tests (QCLot: 69714)									
turbidity	----	E121	0.1	NTU	200 NTU	104	85.0	115	----
Physical Tests (QCLot: 70112)									
conductivity	----	E100S	2	µS/cm	146.9 µS/cm	102	80.0	120	----
Physical Tests (QCLot: 70113)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 70114)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	99.3	85.0	115	----
Physical Tests (QCLot: 70496)									
solids, total suspended [TSS]	----	E160S	2	mg/L	150 mg/L	85.2	85.0	115	----
Anions and Nutrients (QCLot: 69433)									
bromide	24959-67-9	E235S.Br	5	mg/L	0.5 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 69434)									
chloride	16887-00-6	E235S.Cl	50	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 70515)									
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	4 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 70517)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 71859)									
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71860)									
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71861)									
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 71862)									
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71867)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 70516)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 70375)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----
Total Metals (QCLot: 71895)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	98.3	80.0	120	----
Total Metals (QCLot: 72036)									
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	10 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	50 mg/L	98.0	80.0	120	----
Total Metals (QCLot: 72037)									
aluminum, total	7429-90-5	E468S	0.005	mg/L	2 mg/L	98.3	80.0	120	----
antimony, total	7440-36-0	E468S	0.001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	1 mg/L	95.8	80.0	120	----
barium, total	7440-39-3	E468S	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	1 mg/L	104	80.0	120	----
boron, total	7440-42-8	E468S	0.3	mg/L	10 mg/L	97.0	80.0	120	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
calcium, total	7440-70-2	E468S	1	mg/L	50 mg/L	102	80.0	120	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	0.05 mg/L	99.2	80.0	120	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	0.25 mg/L	98.4	80.0	120	----
copper, total	7440-50-8	E468S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E468S	0.01	mg/L	1 mg/L	92.2	80.0	120	----
lead, total	7439-92-1	E468S	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, total	7439-93-2	E468S	0.02	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, total	7439-95-4	E468S	1	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	10 mg/L	112	80.0	120	----
potassium, total	7440-09-7	E468S	1	mg/L	50 mg/L	97.7	80.0	120	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	0.1 mg/L	97.7	80.0	120	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	0.1 mg/L	100	80.0	120	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	1 mg/L	105	80.0	120	----
silver, total	7440-22-4	E468S	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
strontium, total	7440-24-6	E468S	0.01	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, total	7704-34-9	E468S	5	mg/L	50 mg/L	91.6	80.0	120	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	0.1 mg/L	111	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72037) - continued									
thallium, total	7440-28-0	E468S	0.00005	mg/L	1 mg/L	109	80.0	120	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	0.1 mg/L	89.6	80.0	120	----
tin, total	7440-31-5	E468S	0.001	mg/L	0.5 mg/L	96.9	80.0	120	----
titanium, total	7440-32-6	E468S	0.005	mg/L	0.25 mg/L	93.0	80.0	120	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	0.1 mg/L	99.8	80.0	120	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	0.1 mg/L	95.7	80.0	120	----
zinc, total	7440-66-6	E468S	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	0.1 mg/L	90.5	80.0	120	----
Dissolved Metals (QCLot: 71067)									
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	0.0001 mg/L	89.8	80.0	120	----
Dissolved Metals (QCLot: 71616)									
Dissolved Metals (QCLot: 71857)									
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	10 mg/L	99.3	80.0	120	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	50 mg/L	92.8	80.0	120	----
Dissolved Metals (QCLot: 71858)									
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	2 mg/L	96.2	80.0	120	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	1 mg/L	97.1	80.0	120	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	1 mg/L	95.2	80.0	120	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	1 mg/L	103	80.0	120	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	10 mg/L	109	80.0	120	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	50 mg/L	102	80.0	120	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	0.05 mg/L	92.6	80.0	120	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	1 mg/L	96.8	80.0	120	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	0.25 mg/L	103	80.0	120	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	50 mg/L	104	80.0	120	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	0.25 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 71858) - continued									
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	50 mg/L	102	80.0	120	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	0.1 mg/L	98.1	80.0	120	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	0.1 mg/L	98.2	80.0	120	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	1 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	50 mg/L	99.0	80.0	120	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	0.1 mg/L	111	80.0	120	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	1 mg/L	103	80.0	120	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	0.1 mg/L	88.8	80.0	120	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	0.5 mg/L	97.3	80.0	120	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	0.25 mg/L	94.3	80.0	120	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	0.1 mg/L	96.5	80.0	120	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	0.005 mg/L	94.7	80.0	120	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	0.1 mg/L	93.9	80.0	120	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	0.5 mg/L	99.9	80.0	120	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	0.1 mg/L	88.7	80.0	120	----
Volatile Organic Compounds (QCLot: 71014)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	99.9	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	117	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	98.1	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	107	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	104	70.0	130	----
Volatile Organic Compounds (QCLot: 71091)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.0	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	114	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	100	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Volatile Organic Compounds (QCLot: 71091) - continued									
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	90.7	70.0	130	----
Hydrocarbons (QCLot: 70465)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	110	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	107	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	92.5	70.0	130	----
Hydrocarbons (QCLot: 71013)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	100	70.0	130	----
Hydrocarbons (QCLot: 71092)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	95.1	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70464)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	92.6	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	97.7	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	87.9	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	110	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	113	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.28328 µg/L	79.8	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	88.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	86.1	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	95.7	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	111	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	122	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 69433)										
VA20B2114-002	WNW - 1	bromide	24959-67-9	E235S.Br	51.0 mg/L	50 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 69434)										
VA20B2114-002	WNW - 1	chloride	16887-00-6	E235S.Cl	10300 mg/L	10000 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 70515)										
VA20B2114-002	WNW - 1	Kjeldahl nitrogen, total [TKN]	----	E318S	2.74 mg/L	2.5 mg/L	110	70.0	130	----
Anions and Nutrients (QCLot: 70517)										
VA20B2114-002	WNW - 1	ammonia, total (as N)	7664-41-7	E298	0.198 mg/L	0.2 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 71859)										
VA20B2114-002	WNW - 1	fluoride	16984-48-8	E235S.F-L	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 71860)										
VA20B2114-002	WNW - 1	nitrite (as N)	14797-65-0	E235S.NO2-L	4.92 mg/L	5 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 71861)										
VA20B2114-002	WNW - 1	nitrate (as N)	14797-55-8	E235S.NO3-T	7.23 mg/L	7.5 mg/L	96.4	75.0	125	----
Anions and Nutrients (QCLot: 71862)										
VA20B2114-002	WNW - 1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	933 mg/L	1000 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 71867)										
VA20B2114-002	WNW - 1	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0360 mg/L	0.03 mg/L	120	70.0	130	----
Organic / Inorganic Carbon (QCLot: 70516)										
VA20B2114-002	WNW - 1	carbon, total organic [TOC]	----	E355-L	5.11 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 70375)										
VA20B2114-002	WNW - 1	mercury, total	7439-97-6	E508S	0.0000976 mg/L	0.0001 mg/L	97.6	70.0	130	----
Total Metals (QCLot: 71895)										
VA20B2125-003	Anonymous	mercury, total	7439-97-6	E508S	0.0000964 mg/L	0.0001 mg/L	96.4	70.0	130	----
Total Metals (QCLot: 72036)										
VA20B2114-002	WNW - 1	silicon, total	7440-21-3	E468S.NaSi	464 mg/L	500 mg/L	92.8	70.0	130	----
		sodium, total	7440-23-5	E468S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Total Metals (QCLot: 72037)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 72037) - continued										
VA20B2114-002	WNW - 1	aluminum, total	7429-90-5	E468S	0.415 mg/L	0.4 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E468S	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		arsenic, total	7440-38-2	E468S	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		barium, total	7440-39-3	E468S	0.0351 mg/L	0.04 mg/L	87.8	70.0	130	----
		beryllium, total	7440-41-7	E468S	0.0773 mg/L	0.08 mg/L	96.6	70.0	130	----
		bismuth, total	7440-69-9	E468S	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		boron, total	7440-42-8	E468S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E468S	0.00708 mg/L	0.008 mg/L	88.6	70.0	130	----
		calcium, total	7440-70-2	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E468S	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		chromium, total	7440-47-3	E468S	0.0808 mg/L	0.08 mg/L	101	70.0	130	----
		cobalt, total	7440-48-4	E468S	0.0375 mg/L	0.04 mg/L	93.7	70.0	130	----
		copper, total	7440-50-8	E468S	0.0358 mg/L	0.04 mg/L	89.6	70.0	130	----
		gallium, total	7440-55-3	E468S	0.00555 mg/L	0.005 mg/L	111	70.0	130	----
		iron, total	7439-89-6	E468S	3.79 mg/L	4 mg/L	94.8	70.0	130	----
		lead, total	7439-92-1	E468S	0.0366 mg/L	0.04 mg/L	91.4	70.0	130	----
		lithium, total	7439-93-2	E468S	0.198 mg/L	0.2 mg/L	98.9	70.0	130	----
		magnesium, total	7439-95-4	E468S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E468S	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		molybdenum, total	7439-98-7	E468S	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		nickel, total	7440-02-0	E468S	0.0735 mg/L	0.08 mg/L	91.9	70.0	130	----
		phosphorus, total	7723-14-0	E468S	22.6 mg/L	20 mg/L	113	70.0	130	----
		potassium, total	7440-09-7	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, total	7440-15-5	E468S	0.00482 mg/L	0.005 mg/L	96.4	70.0	130	----
		rubidium, total	7440-17-7	E468S	0.0410 mg/L	0.04 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E468S	0.0782 mg/L	0.08 mg/L	97.8	70.0	130	----
		silver, total	7440-22-4	E468S	0.00736 mg/L	0.008 mg/L	92.0	70.0	130	----
		strontium, total	7440-24-6	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E468S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E468S	0.0758 mg/L	0.08 mg/L	94.8	70.0	130	----
		thallium, total	7440-28-0	E468S	0.00734 mg/L	0.008 mg/L	91.7	70.0	130	----
		thorium, total	7440-29-1	E468S	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		tin, total	7440-31-5	E468S	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		titanium, total	7440-32-6	E468S	0.0805 mg/L	0.08 mg/L	100	70.0	130	----
		tungsten, total	7440-33-7	E468S	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
		uranium, total	7440-61-1	E468S	0.00735 mg/L	0.008 mg/L	91.9	70.0	130	----
		vanadium, total	7440-62-2	E468S	0.202 mg/L	0.2 mg/L	101	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72037) - continued										
VA20B2114-002	WNW - 1	yttrium, total	7440-65-5	E468S	0.00527 mg/L	0.005 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E468S	0.706 mg/L	0.8 mg/L	88.2	70.0	130	----
		zirconium, total	7440-67-7	E468S	0.0818 mg/L	0.08 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 71067)										
VA20B2114-002	WNW - 1	mercury, dissolved	7439-97-6	E509S	0.0000897 mg/L	0.0001 mg/L	89.7	70.0	130	----
Dissolved Metals (QCLot: 71857)										
VA20B2114-002	WNW - 1	silicon, dissolved	7440-21-3	E469S.NaSi	462 mg/L	500 mg/L	92.3	70.0	130	----
		sodium, dissolved	7440-23-5	E469S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 71858)										
VA20B2114-002	WNW - 1	aluminum, dissolved	7429-90-5	E469S	0.384 mg/L	0.4 mg/L	96.1	70.0	130	----
		antimony, dissolved	7440-36-0	E469S	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E469S	0.0362 mg/L	0.04 mg/L	90.4	70.0	130	----
		barium, dissolved	7440-39-3	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		beryllium, dissolved	7440-41-7	E469S	0.0776 mg/L	0.08 mg/L	97.0	70.0	130	----
		bismuth, dissolved	7440-69-9	E469S	0.0171 mg/L	0.02 mg/L	85.7	70.0	130	----
		boron, dissolved	7440-42-8	E469S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E469S	0.00698 mg/L	0.008 mg/L	87.3	70.0	130	----
		calcium, dissolved	7440-70-2	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E469S	0.0189 mg/L	0.02 mg/L	94.3	70.0	130	----
		chromium, dissolved	7440-47-3	E469S	0.0751 mg/L	0.08 mg/L	93.9	70.0	130	----
		cobalt, dissolved	7440-48-4	E469S	0.0353 mg/L	0.04 mg/L	88.3	70.0	130	----
		copper, dissolved	7440-50-8	E469S	0.0344 mg/L	0.04 mg/L	86.1	70.0	130	----
		gallium, dissolved	7440-55-3	E469S	0.00526 mg/L	0.005 mg/L	105	70.0	130	----
		iron, dissolved	7439-89-6	E469S	3.78 mg/L	4 mg/L	94.5	70.0	130	----
		lead, dissolved	7439-92-1	E469S	0.0354 mg/L	0.04 mg/L	88.4	70.0	130	----
		lithium, dissolved	7439-93-2	E469S	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		magnesium, dissolved	7439-95-4	E469S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E469S	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		molybdenum, dissolved	7439-98-7	E469S	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		nickel, dissolved	7440-02-0	E469S	0.0701 mg/L	0.08 mg/L	87.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E469S	20.8 mg/L	20 mg/L	104	70.0	130	----
		potassium, dissolved	7440-09-7	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, dissolved	7440-15-5	E469S	0.00458 mg/L	0.005 mg/L	91.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		selenium, dissolved	7782-49-2	E469S	0.0758 mg/L	0.08 mg/L	94.7	70.0	130	----
		silver, dissolved	7440-22-4	E469S	0.00741 mg/L	0.008 mg/L	92.6	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 71858) - continued										
VA20B2114-002	WNW - 1	strontium, dissolved	7440-24-6	E469S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E469S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E469S	0.0752 mg/L	0.08 mg/L	94.0	70.0	130	----
		thallium, dissolved	7440-28-0	E469S	0.00712 mg/L	0.008 mg/L	89.0	70.0	130	----
		thorium, dissolved	7440-29-1	E469S	0.0359 mg/L	0.04 mg/L	89.6	70.0	130	----
		tin, dissolved	7440-31-5	E469S	0.0367 mg/L	0.04 mg/L	91.8	70.0	130	----
		titanium, dissolved	7440-32-6	E469S	0.0764 mg/L	0.08 mg/L	95.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E469S	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		uranium, dissolved	7440-61-1	E469S	0.00701 mg/L	0.008 mg/L	87.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E469S	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		yttrium, dissolved	7440-65-5	E469S	0.00505 mg/L	0.005 mg/L	101	70.0	130	----
		zinc, dissolved	7440-66-6	E469S	0.669 mg/L	0.8 mg/L	83.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E469S	0.0834 mg/L	0.08 mg/L	104	70.0	130	----
Volatile Organic Compounds (QCLot: 71014)										
VA20B2114-003	North - 1	benzene	71-43-2	E611A	91.0 µg/L	100 µg/L	91.0	60.0	140	----
		ethylbenzene	100-41-4	E611A	84.6 µg/L	100 µg/L	84.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		styrene	100-42-5	E611A	106 µg/L	100 µg/L	106	60.0	140	----
		toluene	108-88-3	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	192 µg/L	200 µg/L	95.8	60.0	140	----
		xylene, o-	95-47-6	E611A	117 µg/L	100 µg/L	117	60.0	140	----
Volatile Organic Compounds (QCLot: 71091)										
VA20B2114-006	WNW - 2	benzene	71-43-2	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.6 µg/L	100 µg/L	87.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	95.9 µg/L	100 µg/L	95.9	60.0	140	----
		styrene	100-42-5	E611A	111 µg/L	100 µg/L	111	60.0	140	----
		toluene	108-88-3	E611A	93.7 µg/L	100 µg/L	93.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	196 µg/L	200 µg/L	98.0	60.0	140	----
		xylene, o-	95-47-6	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
Hydrocarbons (QCLot: 71013)										
VA20B2114-002	WNW - 1	F1 (C6-C10)	----	E581.VH+F1	5980 µg/L	6310 µg/L	94.8	60.0	140	----
Hydrocarbons (QCLot: 71092)										
VA20B2114-007	North - 2	F1 (C6-C10)	----	E581.VH+F1	6460 µg/L	6310 µg/L	102	60.0	140	----

Saturday, August 29, 2020

Amber Springer
ALS Environmental
8081 Lougheed Hwy, Suite 100
Burnaby, BC V5A 1W9

Re: ALS Workorder: 2008282
Project Name:
Project Number: VA20B2114

Dear Ms. Springer:

Nine water samples were received from ALS Environmental, on 8/12/2020. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

2008282

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008282
Client Name: ALS Environmental
Client Project Name:
Client Project Number: VA20B2114
Client PO Number: VA20B2114

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
VA20B2114-001	2008282-1		WATER	04-Aug-20	11:54
VA20B2114-002	2008282-2		WATER	04-Aug-20	12:07
VA20B2114-003	2008282-3		WATER	04-Aug-20	11:38
VA20B2114-004	2008282-4		WATER	04-Aug-20	11:21
VA20B2114-005	2008282-5		WATER	04-Aug-20	13:17
VA20B2114-006	2008282-6		WATER	04-Aug-20	13:09
VA20B2114-007	2008282-7		WATER	04-Aug-20	12:50
VA20B2114-008	2008282-8		WATER	04-Aug-20	12:41
VA20B2114-009	2008282-9		WATER	04-Aug-20	12:58

Chain of Custody

Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

3748

Destination Lab:	**USA - Fort Collins**
Address:	225 Commerce Drive Fort Collins CO United States 80524
Client:	Golder Associates Ltd.
Work Order Number:	**VA20B2114**
Original Receipt Date/Time	Instructions Received
07/08/2020 10:05	

#2008282 #

Relinquished By

Date/Time

Received By EMILY LYONS el

Date/Time AUG 12 2020

Receipt Temp 1450

Return as Indicated: Results: Invoice: Electronic Data:

Attention: Amber Springer

	ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
1	VA20B2114-001	Source - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 11:54	
2	VA20B2114-002	WNW - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 12:07	
3	VA20B2114-003	North - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 11:38	
4	VA20B2114-004	ENE - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 11:21	
5	VA20B2114-005	Source - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 13:17	
6	VA20B2114-006	WNW - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 13:09	
7	VA20B2114-007	North - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 12:50	
8	VA20B2114-008	ENE - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 12:41	
9	VA20B2114-009	DUP - B	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	04/08/2020 12:58	

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:	ALS Canada_Burnaby	Workorder No:	2008282
Project Manager:	KMO	Initials: ERL	Date: 08.13.20

Question		YES	NO
1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO
2. Are custody seals on **shipping** containers intact?	☑ NONE	☐ YES	☐ NO*
3. Are custody seals on **sample** containers intact?	☑ NONE	☐ YES	☐ NO*
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*
6. Are short-hold samples present?		☐ YES	☑ NO
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☑ YES	☐ NO*
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO
14. Were the samples shipped on ice?		☐ YES	☑ NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used⁺: ☐ #3 ☐ #5	☑ Rad Only	☐ YES	☐ NO

Cooler #:	1	2
Temperature (°C):	Amb	Amb
# of custody seals on cooler:	0	0
External mR/hr reading:	11	11
Background mR/hr reading:	11	

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☑ N/A ☐ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: ERL

If applicable, was the client contacted? ☐ YES ☐ NA Contact Name: Date:

Project Manager Signature / Date: [signature] 8/13/20

Form 201r30.xls
(06/04/2020)

+IR Gun #3, VWR SN 170647571
+IR Gun #5, VWR SN 192272629

EXPRESS WORLDWIDE WPX DHL

2020-08-10 MYDHL+ 1.0 / "30-0821"

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

11-ø

Origin:
YVR

To: ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Amb

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight Piece
32.0/96.0 lbs 3 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 95 2605 4145

(2L)US80524+48000001

(J) JD01 4600 0080 3226 0229

EXPRESS WORLDWIDE WPX DHL

2020-08-10 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

11-Ø

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

Amb

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 32.0/96.0 lbs

Piece 1 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 95 2605 4145

(2L)US80524+48000001

(J) JD01 4600 0080 3226 0227

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-001	**Lab ID:**	2008282-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 11:54	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0039 (+/- 0.0043)	U	0.0064	BQ/l	NA	8/28/2020 14:00
Carr: BARIUM	*91.1*		*40-110*	*%REC*	DL = NA	8/28/2020 14:00

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-002	**Lab ID:**	2008282-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 12:07	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0029 (+/- 0.0051)	U	0.0086	BQ/l	NA	8/28/2020 14:00
Carr: BARIUM	*97.4*		*40-110*	*%REC*	DL = NA	8/28/2020 14:00

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-003	**Lab ID:**	2008282-3
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 11:38	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0041 (+/- 0.0045)	U	0.0068	BQ/l	NA	8/28/2020 14:00
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	8/28/2020 14:00

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-004	**Lab ID:**	2008282-4
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 11:21	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0026 (+/- 0.0041)	Y1,U	0.0068	BQ/l	NA	8/28/2020 14:00
Carr: BARIUM	*101*	Y1	*40-110*	*%REC*	DL = NA	8/28/2020 14:00

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-005	**Lab ID:**	2008282-5
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 13:17	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0048 (+/- 0.0053)	U	0.008	BQ/l	NA	8/28/2020 14:00
Carr: BARIUM	*95.9*		*40-110*	*%REC*	DL = NA	8/28/2020 14:00

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-006	**Lab ID:**	2008282-6
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 13:09	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0026 (+/- 0.0042)	U	0.007	BQ/l	NA	8/28/2020 14:31
Carr: BARIUM	*95.4*		*40-110*	*%REC*	DL = NA	8/28/2020 14:31

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-007	**Lab ID:**	2008282-7
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 12:50	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0029 (+/- 0.0044)	U	0.0073	BQ/l	NA	8/28/2020 14:31
Carr: BARIUM	*92.6*		*40-110*	*%REC*	DL = NA	8/28/2020 14:31

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-008	**Lab ID:**	2008282-8
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 12:41	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0029 (+/- 0.0049)	U	0.0083	BQ/l	NA	8/28/2020 14:31
Carr: BARIUM	*93.3*		*40-110*	*%REC*	DL = NA	8/28/2020 14:31

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-009	**Lab ID:**	2008282-9
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 12:58	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/18/2020**		PrepBy: **MIG**
Ra-226	0.0038 (+/- 0.0032)	U	0.0039	BQ/l	NA	8/28/2020 14:31
Carr: BARIUM	*98.7*		*40-110*	*%REC*	DL = NA	8/28/2020 14:31

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2114	**Work Order:**	2008282
Sample ID:	VA20B2114-009	**Lab ID:**	2008282-9
Legal Location:		**Matrix:**	WATER
Collection Date:	8/4/2020 12:58	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Client: ALS Environmental

Work Order: 2008282

Project: VA20B2114

QC BATCH REPORT

Batch ID: **RE200818-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE200818-1** Units: **BQ/l** Analysis Date: **8/28/2020 15:10**

Client ID: Run ID: **RE200818-1A** Prep Date: **8/18/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.76 (+/- 0.438)	0.00943	1.719		102	67-120					P
Carr: BARIUM	15600		16070		96.8	40-110					

LCSD Sample ID: **RE200818-1** Units: **BQ/l** Analysis Date: **8/28/2020 15:10**

Client ID: Run ID: **RE200818-1A** Prep Date: **8/18/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.62 (+/- 0.405)	0.0117	1.719		94.1	67-120		1.76	0.2	2.1	P,M3
Carr: BARIUM	15400		16070		96	40-110		15600			

MB Sample ID: **RE200818-1** Units: **BQ/l** Analysis Date: **8/28/2020 15:10**

Client ID: Run ID: **RE200818-1A** Prep Date: **8/18/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	-0.00042 (+/- 0.0028)	0.006									Y1,U
Carr: BARIUM	16200		16070		101	40-110					Y1

The following samples were analyzed in this batch:

2008282-1	2008282-2	2008282-3
2008282-4	2008282-5	2008282-6
2008282-7	2008282-8	2008282-9

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 560022

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd.
Contact:	Christine Bylenga / Brett Lucas
Phone:	1 (250) 881 - 7372
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4

Invoice To	
Same as Report To	☑ YES ☐ NO
Copy of Invoice with Report	☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax CBYLENGA@GOLDER.COM

Email 2 BLUCAS@GOLDER.COM

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/03

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only) 2114

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Contact: Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	General (pH, alkalinity, TSS, turbidity, conductivity, anions)	TOC, Ammonia, TKN (P)	Dissolved metals	Total metals (P)	Dissolved mercury	Total mercury (P)	Hydrocarbons (LEPH/HEPH) F2-F4 (P)	Fecal coliforms (P)	Radium-226 (P)	BTEX/F1 (P)	Total nutrients (P)			Number of Containers
1	Source-1	04-Aug-20	1054	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
2	WNW-1	04-Aug-20	1107	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
3	North-1	04-Aug-20	1038	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
4	ENE-1	04-Aug-20	1021	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
5	Source-2	04-Aug-20	1217	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
6	WNW-2	04-Aug-20	1208	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
7	North-2	04-Aug-20	1150	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
8	ENE-2	04-Aug-20	1141	Seawater	X	X	X	X	X	X	X	X	X	X	X			12
9	DUP-B	04-Aug-20	1158	Seawater	X	X	X	X	X	X	X	X	X	X	X			12

Environmental Division
Vancouver
Work Order Reference
VA20B2114
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Note: dissolved metals and mercury are unpreserved and unfiltered

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 11

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: JL	Date: Aug 7, 2020	Time: 9:05a

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

~~A0~~ A2

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B2123**	Page	: 1 of 15
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 17-766323	Issue Date	: 01-Sep-2020 11:50
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Erick Magalhaes	Analyst	Microbiology, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Internal Subcontracting, Fort Collins, Colorado
Ken Chan	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Muneeb Alam	Analyst	Metals, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
Bq/L	Becquerels per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL
NTU	nephelometric turbidity units
pH units	pH units
psu	practical salinity units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Workorder Comments

Sample no.8 (ENE 2) One BTEX vial received broken in Transit.

Qualifiers

Qualifier	*Description*
DLA	*Detection Limit adjusted for required dilution.*

Analytical Results

Sub-Matrix: **Seawater**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
					VA20B2123-001	VA20B2123-002	VA20B2123-003	VA20B2123-004	VA20B2123-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.2	70.9	71.6	71.4	67.6
conductivity	----	E100S	2.0	µS/cm	6700	7200	6770	6680	8240
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	732	787	751	736	934
pH	----	E108	0.10	pH units	8.02	8.02	8.03	8.05	8.00
salinity	----	EC100S	1.0	psu	4.1	4.4	4.2	4.1	5.1
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
turbidity	----	E121	0.10	NTU	0.24	0.22	0.33	0.25	0.17
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	743	804	764	742	922
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	8.2	8.0	7.7	7.8	9.7
chloride	16887-00-6	E235S.Cl	50	mg/L	2020	2200	2050	1980	2550
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.112	0.098	0.091	0.098	0.078
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0025	0.0018	0.0014	0.0023	0.0014
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	286	308	289	283	360
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.10	0.97	1.09	0.90	1.10
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	<10 DLA	<10 DLA
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0124	0.0121	0.0128	0.0122	0.0124
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0041	0.0040	0.0040	0.0040	0.0044
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	0.52	0.57	0.49	0.51	0.63
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B2123-001**	**VA20B2123-002**	**VA20B2123-003**	**VA20B2123-004**	**VA20B2123-005**
					Result	Result	Result	Result	Result
Total Metals									
calcium, total	7440-70-2	E468S	1.0	mg/L	62.3	70.1	63.5	64.4	75.8
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	0.013	0.012	0.013	0.015	0.012
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.020	0.022	<0.020	<0.020	0.026
magnesium, total	7439-95-4	E468S	1.0	mg/L	143	153	147	141	178
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00101	0.00105	0.00118	0.00118	0.00088
mercury, total	7439-97-6	E508S	0.00500	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00125	0.00141	0.00128	0.00130	0.00156
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	43.9	48.1	44.3	43.3	54.0
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0120	0.0134	0.0126	0.0125	0.0160
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	1100	1190	1090	1050	1320
strontium, total	7440-24-6	E468S	0.010	mg/L	0.832	0.910	0.869	0.832	1.05
sulfur, total	7704-34-9	E468S	5.0	mg/L	99.9	110	103	99.1	128
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00116	0.00113	0.00122	0.00119	0.00109
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
Client sampling date / time					27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
					VA20B2123-001	VA20B2123-002	VA20B2123-003	VA20B2123-004	VA20B2123-005
					Result	Result	Result	Result	Result
Total Metals									
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	0.0056	<0.0030
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0038	0.0040	0.0041	0.0039	0.0044
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	0.54	0.57	0.54	0.52	0.65
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	62.2	67.6	62.5	62.0	74.0
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00024	0.00035	0.00026	0.00025	0.00025
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.020	0.022	0.020	<0.020	0.025
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	140	150	144	141	182
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	<0.00010	0.00027	0.00036	0.00025	0.00040
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00120	0.00138	0.00134	0.00125	0.00161
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	39.5	43.8	40.2	40.2	53.2
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0120	0.0132	0.0124	0.0121	0.0158
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
Analyte	CAS Number	Method	LOR	Unit	VA20B2123-001	VA20B2123-002	VA20B2123-003	VA20B2123-004	VA20B2123-005
					Result	Result	Result	Result	Result
Dissolved Metals									
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	0.836	0.926	0.885	0.839	1.10
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	103	112	109	101	134
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00124	0.00122	0.00135	0.00124	0.00111
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	1130	1210	1060	1060	1360
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	<1.2	<1.2	<1.2
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.9	94.1	100	99.8	94.6
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	98.4	95.0	93.9	94.0	85.0
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
					VA20B2123-001	VA20B2123-002	VA20B2123-003	VA20B2123-004	VA20B2123-005
					Result	Result	Result	Result	Result
Hydrocarbons									
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	84.9	92.8	84.9	91.5	87.8
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	81.3	86.0	82.3	86.4	84.3
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	101	106	112	124	111
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	81.1	80.9	80.0	79.3	75.8
chrysene-d12	1719-03-5	E641A	0.010	%	92.6	88.5	90.8	93.4	86.7

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

					Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
					Client sampling date / time	27-Jul-2020 17:40	27-Jul-2020 17:48	27-Jul-2020 17:55	27-Jul-2020 18:02	27-Jul-2020 17:20
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA20B2123-001**	**VA20B2123-002**	**VA20B2123-003**	**VA20B2123-004**	**VA20B2123-005**
						Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates										
naphthalene-d8	1146-65-2	E641A	0.010	%		96.0	96.8	95.7	97.2	89.6
phenanthrene-d10	1517-22-2	E641A	0.010	%		103	102	102	103	95.9
Radiological Parameters										
radium-226	13982-63-3	RA226-MMER	0.0069	Bq/L		<0.0069	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0074	Bq/L		----	----	----	----	<0.0074
radium-226	13982-63-3	RA226-MMER	0.0083	Bq/L		----	----	<0.0083	----	----
radium-226	13982-63-3	RA226-MMER	0.0084	Bq/L		----	----	----	<0.0084	----
radium-226	13982-63-3	RA226-MMER	0.0085	Bq/L		----	<0.0085	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
					VA20B2123-006	VA20B2123-007	VA20B2123-008	--------	--------
					Result	Result	Result	----	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	68.1	67.7	67.6	----	----
conductivity	----	E100S	2.0	µS/cm	7920	8070	8090	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	919	885	918	----	----
pH	----	E108	0.10	pH units	8.00	7.99	8.00	----	----
salinity	----	EC100S	1.0	psu	4.9	5.0	5.0	----	----
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	----	----
turbidity	----	E121	0.10	NTU	0.20	0.18	0.18	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	945	898	899	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
bromide	24959-67-9	E235S.Br	5.0	mg/L	8.8	10.0	8.5	----	----
chloride	16887-00-6	E235S.Cl	50	mg/L	2410	2730	2420	----	----
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	<0.20	<0.20	<0.20	----	----
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.085	0.084	0.082	----	----
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	<0.010	----	----
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0018	0.0020	0.0016	----	----
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	347	353	355	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.96	0.98	1.08	----	----
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	----	----
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0132	0.0108	0.0108	----	----
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
arsenic, total	7440-38-2	E468S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	----	----
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0044	0.0043	0.0042	----	----
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
boron, total	7440-42-8	E468S	0.30	mg/L	0.66	0.58	0.59	----	----
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
calcium, total	7440-70-2	E468S	1.0	mg/L	76.4	69.2	69.8	----	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
					VA20B2123-006	VA20B2123-007	VA20B2123-008	--------	--------
					Result	Result	Result	----	----
Total Metals									
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
copper, total	7440-50-8	E468S	0.00050	mg/L	0.00057	<0.00050	<0.00050	----	----
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
iron, total	7439-89-6	E468S	0.010	mg/L	0.012	0.011	0.010	----	----
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
lithium, total	7439-93-2	E468S	0.020	mg/L	0.026	0.023	0.023	----	----
magnesium, total	7439-95-4	E468S	1.0	mg/L	183	176	176	----	----
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00088	0.00079	0.00082	----	----
mercury, total	7439-97-6	E508S	0.00500	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00155	0.00152	0.00155	----	----
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	----	----
potassium, total	7440-09-7	E468S	1.0	mg/L	56.3	53.0	53.4	----	----
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0164	0.0150	0.0158	----	----
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	----	----
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	1310	1320	1310	----	----
strontium, total	7440-24-6	E468S	0.010	mg/L	1.00	1.07	1.03	----	----
sulfur, total	7704-34-9	E468S	5.0	mg/L	124	126	123	----	----
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00108	0.00104	0.000991	----	----
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----

Analytical Results

Sub-Matrix: Seawater
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
					VA20B2123-006	VA20B2123-007	VA20B2123-008	--------	--------
					Result	Result	Result	----	----
Total Metals									
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	----	----
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	----	----
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0043	0.0043	0.0044	----	----
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
boron, dissolved	7440-42-8	E469S	0.30	mg/L	0.64	0.67	0.68	----	----
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	71.9	73.0	75.2	----	----
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00050	0.00023	0.00032	----	----
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	----	----
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.026	0.024	0.024	----	----
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	180	171	177	----	----
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00028	0.00023	0.00042	----	----
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00153	0.00159	0.00161	----	----
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	----	----
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	53.9	51.0	53.1	----	----
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0160	0.0151	0.0154	----	----
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	1.00	1.03	1.06	----	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
					VA20B2123-006	VA20B2123-007	VA20B2123-008	--------	--------
					Result	Result	Result	----	----
Dissolved Metals									
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	126	130	129	----	----
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00110	0.00107	0.00108	----	----
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	----	----
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	----	----
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	----	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	1340	1330	1320	----	----
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	<1.2	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	94.8	93.7	95.0	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	94.5	100	102	----	----
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	----	----
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	----	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B2123-006	VA20B2123-007	VA20B2123-008	--------	--------
					Result	Result	Result	----	----
Hydrocarbons									
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	----	----
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	89.3	89.6	109	----	----
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	84.6	87.1	103	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	108	90.9	112	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	80.2	79.8	98.3	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	93.7	93.8	126	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	95.0	94.5	115	----	----

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	----	----
				Client sampling date / time	27-Jul-2020 15:53	27-Jul-2020 17:00	27-Jul-2020 17:09	----	----
					VA20B2123-006	**VA20B2123-007**	**VA20B2123-008**	--------	--------
					Result	Result	Result	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
phenanthrene-d10	1517-22-2	E641A	0.010	%	102	100	127	----	----
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0071	Bq/L	----	<0.0071	<0.0071	----	----
radium-226	13982-63-3	RA226-MMER	0.0087	Bq/L	<0.0087	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B2123**	Page	: 1 of 35
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Issue Date	: 01-Sep-2020 11:50
C-O-C number	: 17-766323		
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Hydrocarbons	QC-MRG2-69855002	----	F2 (C10-C16)	----	E601	133 % LCS-ND	70.0-130%	Recovery greater than upper control limit
Hydrocarbons	QC-MRG2-69855002	----	F3 (C16-C34)	----	E601	132 % LCS-ND	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
Container / Client Sample ID(s)			*Preparation Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*	*Analysis Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 1	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 2	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 1	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 2	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 1	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 2	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E298	27-Jul-2020	----	----	----		13-Aug-2020	28 days	16 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 1	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 2	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 1	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 2	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 1	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 2	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 1	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 2	E235S.Br	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 1	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 2	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 1	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 2	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 1	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 2	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 1	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 2	E235S.Cl	27-Jul-2020	----	----	----		08-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 1	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 2	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 1	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 2	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 1	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 2	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 1	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 2	E378-U	27-Jul-2020	----	----	----		14-Aug-2020	3 days	17 days	× EHTR
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 1	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 2	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.F-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 1	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 2	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 1	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 2	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 1	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 2	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 1	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 2	E235S.NO3-T	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 1	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 2	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.NO2-L	27-Jul-2020	----	----	----		16-Aug-2020	3 days	19 days	× EHTR
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 1	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 2	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.SO4-L	27-Jul-2020	----	----	----		16-Aug-2020	28 days	19 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE - 1	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE - 2	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) North - 1	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) North - 2	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) Source - 1	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) Source - 2	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E318S	27-Jul-2020	11-Aug-2020	28 days	14 days	✓	13-Aug-2020	13 days	1 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 1	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	259 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 1	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	259 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 1	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	259 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 1	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	259 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 2	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	260 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 2	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	260 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 2	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	260 hrs	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 2	E010.FC	27-Jul-2020	----	----	----		07-Aug-2020	30 hrs	261 hrs	× EHTR
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 1	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 2	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 1	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 2	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 1	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 2	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 1	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 2	E509S	27-Jul-2020	13-Aug-2020	28 days	16 days	✓	13-Aug-2020	11 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 1	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 2	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 1	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 2	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 1	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 2	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 1	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 2	E469S	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	17-Aug-2020	162 days	3 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 1	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 2	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 1	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 2	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 1	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 2	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 1	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 2	E469S.NaSi	27-Jul-2020	13-Aug-2020	180 days	17 days	✓	18-Aug-2020	162 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 1	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E601	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	11-Aug-2020	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 1	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 2	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 1	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 2	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 1	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 2	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 1	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 2	E581.VH+F1	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 1	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 2	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 1	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 2	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 1	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 2	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 1	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 2	E355-L	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 1	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 2	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 1	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 2	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source - 1	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
Source - 2	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
WNW - 1	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
WNW - 2	E290	27-Jul-2020	----	----	----		11-Aug-2020	14 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
ENE - 1	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
ENE - 2	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
North - 1	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
North - 2	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
Source - 1	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE										
Source - 2	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Conductivity in Seawater										
HDPE WNW - 1	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : Conductivity in Seawater										
HDPE WNW - 2	E100S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Physical Tests : pH by Meter										
HDPE ENE - 1	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	355 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North - 1	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	355 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source - 1	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	355 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW - 1	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	355 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE - 2	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	356 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North - 2	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	356 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source - 2	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	356 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE WNW - 2	E108	27-Jul-2020	----	----	----		11-Aug-2020	0.25 hrs	357 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 1	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 2	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 1	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 2	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 1	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 2	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 1	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 2	E160S	27-Jul-2020	----	----	----		08-Aug-2020	7 days	11 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE										
ENE - 1	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
ENE - 2	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
North - 1	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
North - 2	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
Source - 1	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
Source - 2	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
WNW - 1	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE										
WNW - 2	E121	27-Jul-2020	----	----	----		07-Aug-2020	3 days	11 days	× EHTR
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
ENE - 1	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E641A	27-Jul-2020	10-Aug-2020	14 days	13 days	✓	10-Aug-2020	40 days	0 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 1	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 2	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 1	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 2	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 1	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 2	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 1	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 2	RA226-MMER	27-Jul-2020	----	----	----		25-Aug-2020	180 days	28 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 1	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 2	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 1	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 2	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 1	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 2	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 1	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 2	E508S	27-Jul-2020	----	----	----		11-Aug-2020	28 days	14 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 1	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 2	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 1	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 2	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 1	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 2	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 1	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 2	E468S	27-Jul-2020	----	----	----		17-Aug-2020	180 days	21 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 1	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	21 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 1	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	21 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 1	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	21 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 1	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	21 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 2	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	22 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 2	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	22 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 2	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	22 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 2	E468S.NaSi	27-Jul-2020	----	----	----		18-Aug-2020	180 days	22 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 1	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 2	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 1	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 2	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 1	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 2	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 1	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 2	E611A	27-Jul-2020	09-Aug-2020	14 days	12 days	✓	10-Aug-2020	1 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	69792	2	13	15.3	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71424	1	8	12.5	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71619	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
pH by Meter	E108	70166	1	18	5.5	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69405	2	20	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	1	20	5.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
Turbidity by Nephelometry	E121	69354	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	69790	2	16	12.5	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	69855	1	9	11.1	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	69792	2	13	15.3	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	69857	1	8	12.5	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71424	1	8	12.5	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71619	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
PAHs by LVI GC-MS	E641A	69856	1	9	11.1	5.0	✓
pH by Meter	E108	70166	1	18	5.5	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	1	20	5.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
TSS by Gravimetry (Seawater)	E160S	69662	1	8	12.5	5.0	✓
Turbidity by Nephelometry	E121	69354	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	69790	2	16	12.5	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	69855	1	9	11.1	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	69792	2	13	15.3	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	69857	1	8	12.5	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71424	1	8	12.5	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71619	0	0	0.0	4.7	×
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
PAHs by LVI GC-MS	E641A	69856	1	9	11.1	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69405	2	20	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	1	20	5.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
TSS by Gravimetry (Seawater)	E160S	69662	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Turbidity by Nephelometry	E121	69354	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	69790	2	16	12.5	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	70517	1	20	5.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	69792	2	13	15.3	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71424	1	8	12.5	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71619	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	71867	1	17	5.8	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	1	20	5.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71859	1	17	5.8	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71861	1	17	5.8	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71860	1	17	5.8	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71862	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	1	20	5.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	1	20	5.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72037	1	17	5.8	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	1	20	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72036	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	69790	2	16	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC Vancouver - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test detects Thermotolerant Coliforms in a 100 mL sample after an 18 hour incubation at 44.5 ±0.2°C.
Conductivity in Seawater	E100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry (Seawater)	E160S Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Seawater by IC	E235S.Br Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Seawater by IC	E235S.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Seawater by IC (Low Level)	E235S.F-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence	E318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Seawater by CRC ICPMS (HMI)	E468S Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode). This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode).
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Seawater by CVAAS	E508S Vancouver - Environmental	Water	EPA 1631E (mod)	Seawater samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Mercury in Seawater by CVAAS	E509S Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Seawater samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fractions 2-4 (F2-F4) are analyzed by GC-FID.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Salinity in Seawater (calculation)	EC100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
Radium-226 by Radon Emanation	RA226-MMER	Water	EPA 903.1	Radium-226 in sample was analyzed according to the current revision of SOP 783.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Fort Collins - Environmental - 225 Commerce Drive Fort Collins Colorado United States 80524			

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in Seawater	EP318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent and H2SO4.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA20B2123**	Page	: 1 of 22
Client	: Golder Associates Ltd.	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 17-766323	Issue Date	: 01-Sep-2020 11:50
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
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Ken Chan	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
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Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Muneeb Alam	Analyst	Metals, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia

Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 69354)											
VA20B2000-002	Anonymous	turbidity	----	E121	0.10	NTU	1.19	1.20	0.01	Diff <2x LOR	----
Physical Tests (QC Lot: 70165)											
VA20B2123-001	Source - 1	conductivity	----	E100S	2.0	µS/cm	6700	6690	0.149%	20%	----
Physical Tests (QC Lot: 70166)											
VA20B2123-001	Source - 1	pH	----	E108	0.10	pH units	8.02	8.03	0.125%	4%	----
Physical Tests (QC Lot: 70167)											
VA20B2123-003	North - 1	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.6	71.9	0.418%	20%	----
Anions and Nutrients (QC Lot: 69527)											
VA20B2123-001	Source - 1	chloride	16887-00-6	E235S.Cl	50	mg/L	2020	2010	0.339%	20%	----
Anions and Nutrients (QC Lot: 69528)											
VA20B2123-001	Source - 1	bromide	24959-67-9	E235S.Br	5.0	mg/L	8.2	7.8	0.4	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70515)											
VA20B2114-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.072	0.076	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70517)											
VA20B2114-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71859)											
VA20B2114-001	Anonymous	fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.32	0.32	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71860)											
VA20B2114-001	Anonymous	nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71861)											
VA20B2114-001	Anonymous	nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71862)											
VA20B2114-001	Anonymous	sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	796	799	0.284%	20%	----
Anions and Nutrients (QC Lot: 71867)											
VA20B2114-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0045	0.0044	0.00004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 70516)											
VA20B2114-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.26	1.22	0.04	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 69405)											
VA20B2126-001	Anonymous	coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	41	24	50.7%	65%	----
Bacteriological Tests (QC Lot: 69409)											
VA20B2123-006	WNW - 2	coliforms, thermotolerant [fecal]	----	E010.FC	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 70375)											
VA20B2114-001	Anonymous	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 72036)											
VA20B2114-001	Anonymous	silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	2980	3020	1.22%	20%	----
Total Metals (QC Lot: 72037)											
VA20B2114-001	Anonymous	aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0138	0.0139	0.00006	Diff <2x LOR	----
		antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00052	0.00051	0.00001	Diff <2x LOR	----
		barium, total	7440-39-3	E468S	0.0010	mg/L	0.0057	0.0060	0.0002	Diff <2x LOR	----
		beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E468S	0.30	mg/L	1.46	1.48	0.02	Diff <2x LOR	----
		cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E468S	1.0	mg/L	146	146	0.396%	20%	----
		cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E468S	0.010	mg/L	0.016	0.016	0.00004	Diff <2x LOR	----
		lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E468S	0.020	mg/L	0.056	0.056	0.0001	Diff <2x LOR	----
		magnesium, total	7439-95-4	E468S	1.0	mg/L	397	440	10.3%	20%	----
		manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00121	0.00130	0.00009	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00343	0.00343	0.0941%	20%	----
		nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E468S	1.0	mg/L	125	131	4.85%	20%	----
		rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0344	0.0356	0.0012	Diff <2x LOR	----
		selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E468S	0.010	mg/L	2.35	2.47	5.10%	20%	----
		sulfur, total	7704-34-9	E468S	5.0	mg/L	318	321	0.886%	20%	----
		tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 72037) - continued											
VA20B2114-001	Anonymous	thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00148	0.00144	2.36%	20%	----
		vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	0.00052	0.00002	Diff <2x LOR	----
		yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71424)											
VA20B2123-001	Source - 1	mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71857)											
VA20B2114-001	Anonymous	silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3070	3060	0.390%	20%	----
Dissolved Metals (QC Lot: 71858)											
VA20B2114-001	Anonymous	aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00057	0.00051	0.00006	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0059	0.0057	0.0002	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.43	1.41	0.02	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E469S	1.0	mg/L	146	145	1.08%	20%	----
		cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00022	0.00022	0.000003	Diff <2x LOR	----
		gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.058	0.057	0.0009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	429	410	4.56%	20%	----
		manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00071	0.00069	0.00002	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00337	0.00333	1.36%	20%	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Dissolved Metals (QC Lot: 71858) - continued											
VA20B2114-001	Anonymous	nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E469S	1.0	mg/L	128	125	2.38%	20%	----
		rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0352	0.0339	0.0013	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.43	2.47	1.68%	20%	----
		sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	334	327	2.07%	20%	----
		tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00149	0.00146	1.86%	20%	----
		vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 69792)											
VA20B1810-018	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	0.55	0.57	0.02	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	1.79	1.79	0.001	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	2.07	2.12	0.04	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	3.76	3.89	3.17%	30%	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	6.79	7.11	4.58%	30%	----
Volatile Organic Compounds (QC Lot: 69813)											
VA20B2123-003	North - 1	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Hydrocarbons (QC Lot: 69790)											
KS2001291-001	Anonymous	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----
Hydrocarbons (QC Lot: 69814)											
VA20B2123-003	North - 1	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 69354)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 69662)						
solids, total suspended [TSS]	----	E160S	2	mg/L	<2.0	----
Physical Tests (QCLot: 70165)						
conductivity	----	E100S	2	µS/cm	<2.0	----
Physical Tests (QCLot: 70167)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.1	----
Anions and Nutrients (QCLot: 69527)						
chloride	16887-00-6	E235S.Cl	50	mg/L	<50	----
Anions and Nutrients (QCLot: 69528)						
bromide	24959-67-9	E235S.Br	5	mg/L	<5.0	----
Anions and Nutrients (QCLot: 70515)						
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 70517)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 71859)						
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	<0.20	----
Anions and Nutrients (QCLot: 71860)						
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71861)						
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71862)						
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 71867)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 70516)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Bacteriological Tests (QCLot: 69405)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----
Bacteriological Tests (QCLot: 69409)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----
Total Metals (QCLot: 70375)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 72036)						
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	<1.0	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	<2.5	----
Total Metals (QCLot: 72037)						
aluminum, total	7429-90-5	E468S	0.005	mg/L	<0.0050	----
antimony, total	7440-36-0	E468S	0.001	mg/L	<0.0010	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	<0.00040	----
barium, total	7440-39-3	E468S	0.001	mg/L	<0.0010	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	<0.00050	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	<0.00050	----
boron, total	7440-42-8	E468S	0.3	mg/L	<0.30	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	<0.000010	----
calcium, total	7440-70-2	E468S	1	mg/L	<1.0	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	<0.00050	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	<0.000050	----
copper, total	7440-50-8	E468S	0.0005	mg/L	<0.00050	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E468S	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E468S	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E468S	0.02	mg/L	<0.020	----
magnesium, total	7439-95-4	E468S	1	mg/L	<1.0	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	<0.00020	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	<0.00010	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E468S	1	mg/L	<1.0	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	<0.00050	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	<0.0050	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	<0.00050	----
silver, total	7440-22-4	E468S	0.0001	mg/L	<0.00010	----
strontium, total	7440-24-6	E468S	0.01	mg/L	<0.010	----
sulfur, total	7704-34-9	E468S	5	mg/L	<5.0	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	<0.00050	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	<0.000050	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	<0.00050	----
tin, total	7440-31-5	E468S	0.001	mg/L	<0.0010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 72037) - continued						
titanium, total	7440-32-6	E468S	0.005	mg/L	<0.0050	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	<0.000050	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	<0.00050	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E468S	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 71424)						
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 71857)						
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 71858)						
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	<0.00040	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	<0.0010	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	<0.30	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	<1.0	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	<0.00020	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	<0.020	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	<1.0	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	<0.00010	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	<1.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 71858) - continued						
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	<0.0050	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	<0.00050	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	<0.010	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	<5.0	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	<0.000050	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	<0.00050	----
Volatile Organic Compounds (QCLot: 69792)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Volatile Organic Compounds (QCLot: 69813)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Hydrocarbons (QCLot: 69790)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 69814)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 69814) - continued						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 69857)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Polycyclic Aromatic Hydrocarbons (QCLot: 69856)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Physical Tests (QCLot: 69354)									
turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
Physical Tests (QCLot: 69662)									
solids, total suspended [TSS]	----	E160S	2	mg/L	150 mg/L	104	85.0	115	----
Physical Tests (QCLot: 70165)									
conductivity	----	E100S	2	µS/cm	146.9 µS/cm	101	80.0	120	----
Physical Tests (QCLot: 70166)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 70167)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	97.5	85.0	115	----
Anions and Nutrients (QCLot: 69527)									
chloride	16887-00-6	E235S.Cl	50	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 69528)									
bromide	24959-67-9	E235S.Br	5	mg/L	0.5 mg/L	94.8	85.0	115	----
Anions and Nutrients (QCLot: 70515)									
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	4 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 70517)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 71859)									
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71860)									
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71861)									
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 71862)									
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 71867)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 70516)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
Total Metals (QCLot: 70375)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72036)									
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	10 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	50 mg/L	98.0	80.0	120	----
Total Metals (QCLot: 72037)									
aluminum, total	7429-90-5	E468S	0.005	mg/L	2 mg/L	98.3	80.0	120	----
antimony, total	7440-36-0	E468S	0.001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	1 mg/L	95.8	80.0	120	----
barium, total	7440-39-3	E468S	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	1 mg/L	104	80.0	120	----
boron, total	7440-42-8	E468S	0.3	mg/L	10 mg/L	97.0	80.0	120	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
calcium, total	7440-70-2	E468S	1	mg/L	50 mg/L	102	80.0	120	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	0.05 mg/L	99.2	80.0	120	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	0.25 mg/L	98.4	80.0	120	----
copper, total	7440-50-8	E468S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E468S	0.01	mg/L	1 mg/L	92.2	80.0	120	----
lead, total	7439-92-1	E468S	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, total	7439-93-2	E468S	0.02	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, total	7439-95-4	E468S	1	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	10 mg/L	112	80.0	120	----
potassium, total	7440-09-7	E468S	1	mg/L	50 mg/L	97.7	80.0	120	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	0.1 mg/L	97.7	80.0	120	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	0.1 mg/L	100	80.0	120	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	1 mg/L	105	80.0	120	----
silver, total	7440-22-4	E468S	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
strontium, total	7440-24-6	E468S	0.01	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, total	7704-34-9	E468S	5	mg/L	50 mg/L	91.6	80.0	120	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	0.1 mg/L	111	80.0	120	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	1 mg/L	109	80.0	120	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	0.1 mg/L	89.6	80.0	120	----
tin, total	7440-31-5	E468S	0.001	mg/L	0.5 mg/L	96.9	80.0	120	----
titanium, total	7440-32-6	E468S	0.005	mg/L	0.25 mg/L	93.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72037) - continued									
tungsten, total	7440-33-7	E468S	0.001	mg/L	0.1 mg/L	99.8	80.0	120	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	0.1 mg/L	95.7	80.0	120	----
zinc, total	7440-66-6	E468S	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	0.1 mg/L	90.5	80.0	120	----
Dissolved Metals (QCLot: 71424)									
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
Dissolved Metals (QCLot: 71619)									
Dissolved Metals (QCLot: 71857)									
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	10 mg/L	99.3	80.0	120	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	50 mg/L	92.8	80.0	120	----
Dissolved Metals (QCLot: 71858)									
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	2 mg/L	96.2	80.0	120	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	1 mg/L	97.1	80.0	120	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	1 mg/L	95.2	80.0	120	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	1 mg/L	103	80.0	120	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	10 mg/L	109	80.0	120	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	50 mg/L	102	80.0	120	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	0.05 mg/L	92.6	80.0	120	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	1 mg/L	96.8	80.0	120	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	0.25 mg/L	103	80.0	120	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	50 mg/L	104	80.0	120	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	50 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 71858) - continued									
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	0.1 mg/L	98.1	80.0	120	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	0.1 mg/L	98.2	80.0	120	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	1 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	50 mg/L	99.0	80.0	120	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	0.1 mg/L	111	80.0	120	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	1 mg/L	103	80.0	120	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	0.1 mg/L	88.8	80.0	120	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	0.5 mg/L	97.3	80.0	120	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	0.25 mg/L	94.3	80.0	120	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	0.1 mg/L	96.5	80.0	120	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	0.005 mg/L	94.7	80.0	120	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	0.1 mg/L	93.9	80.0	120	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	0.5 mg/L	99.9	80.0	120	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	0.1 mg/L	88.7	80.0	120	----
Volatile Organic Compounds (QCLot: 69792)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	114	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	107	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
Volatile Organic Compounds (QCLot: 69813)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	87.4	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	97.4	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	90.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	98.1	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	95.6	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	92.2	70.0	130	----
Hydrocarbons (QCLot: 69790)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	108	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Hydrocarbons (QCLot: 69814)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	103	70.0	130	----
Hydrocarbons (QCLot: 69857)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	# 133	70.0	130	LCS-ND
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	# 132	70.0	130	LCS-ND
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	112	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 69856)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	97.6	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	112	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	116	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	110	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	112	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	125	60.0	130	----

Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 69527)										
VA20B2123-002	WNW - 1	chloride	16887-00-6	E235S.Cl	9370 mg/L	10000 mg/L	93.7	75.0	125	----
Anions and Nutrients (QCLot: 69528)										
VA20B2123-002	WNW - 1	bromide	24959-67-9	E235S.Br	41.8 mg/L	50 mg/L	83.7	75.0	125	----
Anions and Nutrients (QCLot: 70515)										
VA20B2114-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318S	2.74 mg/L	2.5 mg/L	110	70.0	130	----
Anions and Nutrients (QCLot: 70517)										
VA20B2114-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.198 mg/L	0.2 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 71859)										
VA20B2114-002	Anonymous	fluoride	16984-48-8	E235S.F-L	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 71860)										
VA20B2114-002	Anonymous	nitrite (as N)	14797-65-0	E235S.NO2-L	4.92 mg/L	5 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 71861)										
VA20B2114-002	Anonymous	nitrate (as N)	14797-55-8	E235S.NO3-T	7.23 mg/L	7.5 mg/L	96.4	75.0	125	----
Anions and Nutrients (QCLot: 71862)										
VA20B2114-002	Anonymous	sulfate (as SO4)	14808-79-8	E235S.SO4-L	933 mg/L	1000 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 71867)										
VA20B2114-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0360 mg/L	0.03 mg/L	120	70.0	130	----
Organic / Inorganic Carbon (QCLot: 70516)										
VA20B2114-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.11 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 70375)										
VA20B2114-002	Anonymous	mercury, total	7439-97-6	E508S	0.0000976 mg/L	0.0001 mg/L	97.6	70.0	130	----
Total Metals (QCLot: 72036)										
VA20B2114-002	Anonymous	silicon, total	7440-21-3	E468S.NaSi	464 mg/L	500 mg/L	92.8	70.0	130	----
		sodium, total	7440-23-5	E468S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Total Metals (QCLot: 72037)										
VA20B2114-002	Anonymous	aluminum, total	7429-90-5	E468S	0.415 mg/L	0.4 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E468S	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		arsenic, total	7440-38-2	E468S	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 72037) - continued										
VA20B2114-002	Anonymous	barium, total	7440-39-3	E468S	0.0351 mg/L	0.04 mg/L	87.8	70.0	130	----
		beryllium, total	7440-41-7	E468S	0.0773 mg/L	0.08 mg/L	96.6	70.0	130	----
		bismuth, total	7440-69-9	E468S	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		boron, total	7440-42-8	E468S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E468S	0.00708 mg/L	0.008 mg/L	88.6	70.0	130	----
		calcium, total	7440-70-2	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E468S	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		chromium, total	7440-47-3	E468S	0.0808 mg/L	0.08 mg/L	101	70.0	130	----
		cobalt, total	7440-48-4	E468S	0.0375 mg/L	0.04 mg/L	93.7	70.0	130	----
		copper, total	7440-50-8	E468S	0.0358 mg/L	0.04 mg/L	89.6	70.0	130	----
		gallium, total	7440-55-3	E468S	0.00555 mg/L	0.005 mg/L	111	70.0	130	----
		iron, total	7439-89-6	E468S	3.79 mg/L	4 mg/L	94.8	70.0	130	----
		lead, total	7439-92-1	E468S	0.0366 mg/L	0.04 mg/L	91.4	70.0	130	----
		lithium, total	7439-93-2	E468S	0.198 mg/L	0.2 mg/L	98.9	70.0	130	----
		magnesium, total	7439-95-4	E468S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E468S	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		molybdenum, total	7439-98-7	E468S	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		nickel, total	7440-02-0	E468S	0.0735 mg/L	0.08 mg/L	91.9	70.0	130	----
		phosphorus, total	7723-14-0	E468S	22.6 mg/L	20 mg/L	113	70.0	130	----
		potassium, total	7440-09-7	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, total	7440-15-5	E468S	0.00482 mg/L	0.005 mg/L	96.4	70.0	130	----
		rubidium, total	7440-17-7	E468S	0.0410 mg/L	0.04 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E468S	0.0782 mg/L	0.08 mg/L	97.8	70.0	130	----
		silver, total	7440-22-4	E468S	0.00736 mg/L	0.008 mg/L	92.0	70.0	130	----
		strontium, total	7440-24-6	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E468S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E468S	0.0758 mg/L	0.08 mg/L	94.8	70.0	130	----
		thallium, total	7440-28-0	E468S	0.00734 mg/L	0.008 mg/L	91.7	70.0	130	----
		thorium, total	7440-29-1	E468S	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		tin, total	7440-31-5	E468S	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		titanium, total	7440-32-6	E468S	0.0805 mg/L	0.08 mg/L	100	70.0	130	----
		tungsten, total	7440-33-7	E468S	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
		uranium, total	7440-61-1	E468S	0.00735 mg/L	0.008 mg/L	91.9	70.0	130	----
		vanadium, total	7440-62-2	E468S	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		yttrium, total	7440-65-5	E468S	0.00527 mg/L	0.005 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E468S	0.706 mg/L	0.8 mg/L	88.2	70.0	130	----
		zirconium, total	7440-67-7	E468S	0.0818 mg/L	0.08 mg/L	102	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 71424)										
VA20B2123-002	WNW - 1	mercury, dissolved	7439-97-6	E509S	0.0000938 mg/L	0.0001 mg/L	93.8	70.0	130	----
Dissolved Metals (QCLot: 71857)										
VA20B2114-002	Anonymous	silicon, dissolved	7440-21-3	E469S.NaSi	462 mg/L	500 mg/L	92.3	70.0	130	----
		sodium, dissolved	7440-23-5	E469S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 71858)										
VA20B2114-002	Anonymous	aluminum, dissolved	7429-90-5	E469S	0.384 mg/L	0.4 mg/L	96.1	70.0	130	----
		antimony, dissolved	7440-36-0	E469S	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E469S	0.0362 mg/L	0.04 mg/L	90.4	70.0	130	----
		barium, dissolved	7440-39-3	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		beryllium, dissolved	7440-41-7	E469S	0.0776 mg/L	0.08 mg/L	97.0	70.0	130	----
		bismuth, dissolved	7440-69-9	E469S	0.0171 mg/L	0.02 mg/L	85.7	70.0	130	----
		boron, dissolved	7440-42-8	E469S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E469S	0.00698 mg/L	0.008 mg/L	87.3	70.0	130	----
		calcium, dissolved	7440-70-2	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E469S	0.0189 mg/L	0.02 mg/L	94.3	70.0	130	----
		chromium, dissolved	7440-47-3	E469S	0.0751 mg/L	0.08 mg/L	93.9	70.0	130	----
		cobalt, dissolved	7440-48-4	E469S	0.0353 mg/L	0.04 mg/L	88.3	70.0	130	----
		copper, dissolved	7440-50-8	E469S	0.0344 mg/L	0.04 mg/L	86.1	70.0	130	----
		gallium, dissolved	7440-55-3	E469S	0.00526 mg/L	0.005 mg/L	105	70.0	130	----
		iron, dissolved	7439-89-6	E469S	3.78 mg/L	4 mg/L	94.5	70.0	130	----
		lead, dissolved	7439-92-1	E469S	0.0354 mg/L	0.04 mg/L	88.4	70.0	130	----
		lithium, dissolved	7439-93-2	E469S	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		magnesium, dissolved	7439-95-4	E469S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E469S	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		molybdenum, dissolved	7439-98-7	E469S	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		nickel, dissolved	7440-02-0	E469S	0.0701 mg/L	0.08 mg/L	87.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E469S	20.8 mg/L	20 mg/L	104	70.0	130	----
		potassium, dissolved	7440-09-7	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, dissolved	7440-15-5	E469S	0.00458 mg/L	0.005 mg/L	91.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		selenium, dissolved	7782-49-2	E469S	0.0758 mg/L	0.08 mg/L	94.7	70.0	130	----
		silver, dissolved	7440-22-4	E469S	0.00741 mg/L	0.008 mg/L	92.6	70.0	130	----
		strontium, dissolved	7440-24-6	E469S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E469S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E469S	0.0752 mg/L	0.08 mg/L	94.0	70.0	130	----
		thallium, dissolved	7440-28-0	E469S	0.00712 mg/L	0.008 mg/L	89.0	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
Dissolved Metals (QCLot: 71858) - continued										
VA20B2114-002	Anonymous	thorium, dissolved	7440-29-1	E469S	0.0359 mg/L	0.04 mg/L	89.6	70.0	130	----
		tin, dissolved	7440-31-5	E469S	0.0367 mg/L	0.04 mg/L	91.8	70.0	130	----
		titanium, dissolved	7440-32-6	E469S	0.0764 mg/L	0.08 mg/L	95.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E469S	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		uranium, dissolved	7440-61-1	E469S	0.00701 mg/L	0.008 mg/L	87.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E469S	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		yttrium, dissolved	7440-65-5	E469S	0.00505 mg/L	0.005 mg/L	101	70.0	130	----
		zinc, dissolved	7440-66-6	E469S	0.669 mg/L	0.8 mg/L	83.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E469S	0.0834 mg/L	0.08 mg/L	104	70.0	130	----
Volatile Organic Compounds (QCLot: 69792)										
VA20B1820-001	Anonymous	benzene	71-43-2	E611A	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	96.6 µg/L	100 µg/L	96.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		styrene	100-42-5	E611A	107 µg/L	100 µg/L	107	60.0	140	----
		toluene	108-88-3	E611A	97.2 µg/L	100 µg/L	97.2	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	225 µg/L	200 µg/L	112	60.0	140	----
		xylene, o-	95-47-6	E611A	99.5 µg/L	100 µg/L	99.5	60.0	140	----
Volatile Organic Compounds (QCLot: 69813)										
VA20B2123-003	North - 1	benzene	71-43-2	E611A	94.7 µg/L	100 µg/L	94.7	60.0	140	----
		ethylbenzene	100-41-4	E611A	91.8 µg/L	100 µg/L	91.8	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		styrene	100-42-5	E611A	86.6 µg/L	100 µg/L	86.6	60.0	140	----
		toluene	108-88-3	E611A	93.9 µg/L	100 µg/L	93.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	182 µg/L	200 µg/L	91.2	60.0	140	----
		xylene, o-	95-47-6	E611A	88.4 µg/L	100 µg/L	88.4	60.0	140	----
Hydrocarbons (QCLot: 69790)										
KS2001291-002	Anonymous	F1 (C6-C10)	----	E581.VH+F1	6430 µg/L	6310 µg/L	102	60.0	140	----
Hydrocarbons (QCLot: 69814)										
VA20B2123-004	ENE - 1	F1 (C6-C10)	----	E581.VH+F1	6220 µg/L	6310 µg/L	98.7	60.0	140	----

Wednesday, August 26, 2020

Amber Springer
ALS Environmental
8081 Lougheed Hwy, Suite 100
Burnaby, BC V5A 1W9

Re: ALS Workorder: 2008198
Project Name:
Project Number: VA20B2123

Dear Ms. Springer:

Eight water samples were received from ALS Environmental, on 8/10/2020. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

2008198

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008198
Client Name: ALS Environmental
Client Project Name:
Client Project Number: VA20B2123
Client PO Number: VA20B2123

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
VA20B2123-001	2008198-1		WATER	27-Jul-20	18:40
VA20B2123-002	2008198-2		WATER	27-Jul-20	18:48
VA20B2123-003	2008198-3		WATER	27-Jul-20	18:55
VA20B2123-004	2008198-4		WATER	27-Jul-20	19:02
VA20B2123-005	2008198-5		WATER	27-Jul-20	18:20
VA20B2123-006	2008198-6		WATER	27-Jul-20	16:53
VA20B2123-007	2008198-7		WATER	27-Jul-20	18:00
VA20B2123-008	2008198-8		WATER	27-Jul-20	18:09

Chain of Custody

Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

3750

2008198

Destination Lab:	**USA - Fort Collins**
Address:	225 Commerce Drive Fort Collins CO United States 80524
Client:	Golder Associates Ltd.
Work Order Number:	**VA20B2123**
Original Receipt Date/Time	Instructions Received
07/08/2020 10:05	

Relinquished By	
Date/Time	
Received By	[signature]
Date/Time	8/10/20 1245
Receipt Temp	amb

Return as Indicated: Results: Invoice: Electronic Data:

Attention: Amber Springer

	ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
1	VA20B2123-001	Source - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:40	
2	VA20B2123-002	WNW - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:48	
3	VA20B2123-003	North - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:55	
4	VA20B2123-004	ENE - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 19:02	
5	VA20B2123-005	Source - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:20	
6	VA20B2123-006	WNW - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 16:53	
7	VA20B2123-007	North - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:00	
8	VA20B2123-008	ENE - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	27/07/2020 18:09	

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:	ALS Burnaby		Workorder No:	2008198	
Project Manager:	KMO	Initials:	TM	Date:	8/10/20

1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO
2. Are custody seals on **shipping** containers intact?	☑ NONE	☐ YES	☐ NO*
3. Are custody seals on **sample** containers intact?	☑ NONE	☐ YES	☐ NO*
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*
6. Are short-hold samples present?		☐ YES	☑ NO
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☑ YES	☐ NO*
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO
14. Were the samples shipped on ice?		☐ YES	☑ NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used+: ☐ #3 ☐ #5	☑ Rad Only	☐ YES	☑ NO

Cooler #:	1	2	3	4	5
Temperature (°C):	amb	amb	amb	amb	amb
# of custody seals on cooler:	0	0	0	0	0
External mR/hr reading:	8	8	8	7	10
Background mR/hr reading:	13				

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☐ N/A ☑ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: TM

If applicable, was the client contacted? ☐ YES ☐ N/A Contact Name Date:

Project Manager Signature / Date: [signature] 8/11/20

Form 201r30.xls
(06/04/2020)

+IR Gun #3, VWR SN 170647571
+IR Gun #5, VWR SN 192272629

EXPRESS WORLDWIDE WPX DHL

2020-08-07 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

8-0
amb

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight Piece
28.0/67.0 lbs 1 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 50 2467 8772

(2L)US80524+48000001

(J) JD01 4600 0080 2871 7322

EXPRESS WORLDWIDE WPX DHL

2020-08-07 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

80524 FORT COLLINS Colorado
United States of America

Contact:
Sample Receiving

8.0
amb

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 30.0/67.0 lbs

Piece 2 / 3

Contents:
Environmental W ater Samples for Research

WAYBILL 50 2467 8772

(2L)US80524+48000001

(J) JD01 4600 0080 2871 7323

EXPRESS WORLDWIDE WPX DHL

2020-08-07 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

8-0

80524 FORT COLLINS Colorado
United States of America

amb

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 9.0/67.0 lbs

Piece 3 / 3

Contents:
Environmental W ater Samples for Research

WAYBILL 50 2467 8772

(2L)US80524+48000001

(J) JD01 4600 0080 2871 7324

EXPRESS WORLDWIDE WPX DHL

2020-08-06 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway ,

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

80524 FORT COLLINS Colorado
United States of America

Contact:
Sample Receiving

7-0
amb

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight: 34.0/42.0 lbs

Piece: 1 / 2

Contents:
Environmental Water
Samples for Research

WAYBILL 70 3431 5105

(2L)US80524+48000001

(J) JD01 4600 0080 2668 8303

EXPRESS WORLDWIDE WPX DHL

2020-08-06 MYDHL+ 1.0 / *30-0821*

Origin:
YVR

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Contact:
Sample Receiving

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

80524 FORT COLLINS Colorado
United States of America

10-D
Rub

US-DEN-DEN

Day Time

C

Ref: Sublets

Pce/Shpt Weight
8.0/42.0 lbs

Piece
2 / 2

Contents:
Environmental W ater
Samples for Research

WAYBILL 70 3431 5105

(2L)US80524+48000001

(J) JD01 4600 0080 2668 8304

Client:	ALS Environmental		**Date:**	*26-Aug-20*
Project:	VA20B2123		**Work Order:**	2008198
Sample ID:	VA20B2123-001		**Lab ID:**	2008198-1
Legal Location:			**Matrix:**	WATER
Collection Date:	7/27/2020 18:40		**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.00058 (+/- 0.0035)	U	0.0069	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*94.4*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-002	**Lab ID:**	2008198-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 18:48	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.0020 (+/- 0.0048)	U	0.0085	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*97*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

SAMPLE SUMMARY REPORT

Client: ALS Environmental
Project: VA20B2123
Sample ID: VA20B2123-003
Legal Location:
Collection Date: 7/27/2020 18:55

Date: *26-Aug-20*
Work Order: 2008198
Lab ID: 2008198-3
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	-0.00053 (+/- 0.0041)	U	0.0083	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*93.2*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-004	**Lab ID:**	2008198-4
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 19:02	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.0055 (+/- 0.0056)	U	0.0084	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*92.1*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

SAMPLE SUMMARY REPORT

Client:	ALS Environmental		**Date:**	*26-Aug-20*
Project:	VA20B2123		**Work Order:**	2008198
Sample ID:	VA20B2123-005		**Lab ID:**	2008198-5
Legal Location:			**Matrix:**	WATER
Collection Date:	7/27/2020 18:20		**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.0037 (+/- 0.0047)	U	0.0074	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*89.2*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-006	**Lab ID:**	2008198-6
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 16:53	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.0027 (+/- 0.0051)	U	0.0087	BQ/l	NA	8/25/2020 13:12
Carr: BARIUM	*99.3*		*40-110*	*%REC*	DL = NA	8/25/2020 13:12

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-007	**Lab ID:**	2008198-7
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 18:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **8/14/2020**	PrepBy: **TRW**
Ra-226	0.0029 (+/- 0.0043)	U	0.0071	BQ/l	NA	8/25/2020 13:47
Carr: BARIUM	*93.7*		*40-110*	*%REC*	DL = NA	8/25/2020 13:47

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-008	**Lab ID:**	2008198-8
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 18:09	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/14/2020**		PrepBy: **TRW**
Ra-226	0.0050 (+/- 0.0049)	U	0.0071	BQ/l	NA	8/25/2020 13:47
Carr: BARIUM	*94.5*		*40-110*	*%REC*	DL = NA	8/25/2020 13:47

Client:	ALS Environmental	**Date:**	*26-Aug-20*
Project:	VA20B2123	**Work Order:**	2008198
Sample ID:	VA20B2123-008	**Lab ID:**	2008198-8
Legal Location:		**Matrix:**	WATER
Collection Date:	7/27/2020 18:09	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
U or ND - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
U or ND - Indicates that the compound was analyzed for but not detected.
E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
M - Duplicate injection precision was not met.
N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
* - Duplicate analysis (relative percent difference) not within control limits.
S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
E - Analyte concentration exceeds the upper level of the calibration range.
J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
A - A tentatively identified compound is a suspected aldol-condensation product.
X - The analyte was diluted below an accurate quantitation level.
* - The spike recovery is equal to or outside the control criteria used.
+ - The relative percent difference (RPD) equals or exceeds the control criteria.
G - A pattern resembling gasoline was detected in this sample.
D - A pattern resembling diesel was detected in this sample.
M - A pattern resembling motor oil was detected in this sample.
C - A pattern resembling crude oil was detected in this sample.
4 - A pattern resembling JP-4 was detected in this sample.
5 - A pattern resembling JP-5 was detected in this sample.
H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Client: ALS Environmental
Work Order: 2008198
Project: VA20B2123

QC BATCH REPORT

Batch ID: **RE200814-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE200814-1** Units: **BQ/l** Analysis Date: **8/25/2020 14:25**
Client ID: Run ID: **RE200814-1A** Prep Date: **8/14/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.51 (+/- 0.378)	0.0142	1.719		87.9	67-120					P,Y1,M3
Carr: BARIUM	17300		17080		101	40-110					Y1

LCSD Sample ID: **RE200814-1** Units: **BQ/l** Analysis Date: **8/25/2020 14:25**
Client ID: Run ID: **RE200814-1A** Prep Date: **8/14/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.62 (+/- 0.405)	0.0118	1.719		94.4	67-120		1.51	0.2	2.1	P,M3
Carr: BARIUM	17000		17090		99.6	40-110		17300			

MB Sample ID: **RE200814-1** Units: **BQ/l** Analysis Date: **8/25/2020 14:25**
Client ID: Run ID: **RE200814-1A** Prep Date: **8/14/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0017 (+/- 0.0038)	0.0067									Y1,U
Carr: BARIUM	17500		17090		103	40-110					Y1

The following samples were analyzed in this batch:

2008198-1	2008198-2	2008198-3
2008198-4	2008198-5	2008198-6
2008198-7	2008198-8	

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 - 766323

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd.
Contact:	Christine Bylenga / Brett Lucas
Phone:	1 (250) 881 - 7372
	Company address below will appear on the final report
Street:	200 - 2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: cbylenga@golder.com
Email 2: blucas@golder.com
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ 3 day [P3-25%] ☐ 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	Q79542
Job #:	1663724/34000/03
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only):	2123

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	General (pH, alkalinity, TSS, turbidity, conductivity, anions)	TOC, Ammonia, TKN (P)	Dissolved metals	Total metals (P)	Dissolved mercury	Total mercury (P)	Hydrocarbons (LEPH/HEPH) F2-F4 (P)	Fecal Coliforms (P)	Radium-226 (P)	BTEX/F1 (P)	Total nutrients (P)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	Source-1	27-JUL-20	17:40	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
2	WNW-1	27-JUL-20	17:48	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
3	North-1	27-JUL-20	17:55	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
4	ENE-1	27-JUL-20	18:02	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
5	Source-2	27-JUL-20	17:20	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
6	WNW-2	27-JUL-20	15:53	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
7	North-2	27-JUL-20	17:00	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
8	ENE-2	27-JUL-20	1709	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		

Environmental Division
Vancouver
Work Order Reference
VA20B2123
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Note: dissolved metals and mercury are unpreserved and unfiltered

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C:
FINAL COOLER TEMPERATURES °C: 10

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: JL	Date: Aug 7, 2020	Time: 09:05a

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

A1

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B2125**	Page	: 1 of 15
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 17-766326	Issue Date	: 01-Sep-2020 11:50
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Internal Subcontracting, Fort Collins, Colorado
Ken Chan	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Microbiology, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
Bq/L	Becquerels per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL
NTU	nephelometric turbidity units
pH units	pH units
psu	practical salinity units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Sample Comments

Sample	Client Id	*Comment*
VA20B2125-003	North - 1	North - 1: Water sample for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

Qualifier	*Description*
DLA	*Detection Limit adjusted for required dilution.*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
					VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	70.8	71.0	70.4	70.1	70.5
conductivity	----	E100S	2.0	µS/cm	9800	9590	10500	9840	9710
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	1130	1080	1240	1080	1070
pH	----	E108	0.10	pH units	8.00	7.99	8.00	8.01	8.01
salinity	----	EC100S	1.0	psu	6.2	6.0	6.7	6.2	6.1
solids, total suspended [TSS]	----	E160S	2.0	mg/L	2.0	<2.0	<2.0	2.6	2.6
turbidity	----	E121	0.10	NTU	0.66	0.64	0.45	0.42	0.44
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	1080	1140	1210	1160	1050
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	11.0	10.5	12.2	11.1	11.5
chloride	16887-00-6	E235S.Cl	50	mg/L	3040	3000	3260	3150	3050
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.24	0.23	0.25	0.23	0.23
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.099	0.121	0.086	0.099	0.075
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	0.022	<0.010	<0.010	<0.010
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0042	0.0080	0.0033	0.0037	0.0027
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	453	441	493	459	448
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.10	1.11	1.09	1.08	0.97
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	<10 DLA	<10 DLA
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0265	0.0238	0.0236	0.0199	0.0143
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0045	0.0050	0.0047	0.0047	0.0048
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	0.74	0.78	0.86	0.78	0.69

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
Analyte	CAS Number	Method	LOR	Unit	VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Total Metals									
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
calcium, total	7440-70-2	E468S	1.0	mg/L	82.0	87.5	91.9	88.7	80.2
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	0.033	0.029	0.028	0.026	0.018
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.029	0.029	0.032	0.030	0.027
magnesium, total	7439-95-4	E468S	1.0	mg/L	214	223	237	229	206
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00177	0.00192	0.00130	0.00147	0.00109
mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00179	0.00188	0.00212	0.00192	0.00177
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	63.9	68.1	71.2	72.4	63.0
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0182	0.0195	0.0204	0.0201	0.0182
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	1840	1860	1930	1820	1690
strontium, total	7440-24-6	E468S	0.010	mg/L	1.21	1.33	1.40	1.29	1.24
sulfur, total	7704-34-9	E468S	5.0	mg/L	155	158	170	166	146
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Analytical Results

Sub-Matrix: Seawater (Matrix: Water)				Client sample ID	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
Analyte	CAS Number	Method	LOR	Unit	VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Total Metals									
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00137	0.00140	0.00138	0.00128	0.00113
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0047	0.0046	0.0048	0.0043	0.0048
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	0.79	0.78	0.86	0.78	0.69
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	85.9	84.1	95.1	84.7	82.0
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00025	0.00031	0.00030	0.00026	0.00024
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.029	0.028	0.032	0.031	0.026
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	222	212	243	212	210
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00020	<0.00010	0.00026	0.00013	0.00010
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00191	0.00195	0.00216	0.00186	0.00188
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	65.1	62.5	72.1	63.8	63.9
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
					VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Dissolved Metals									
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0186	0.0186	0.0207	0.0186	0.0180
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	1.29	1.29	1.47	1.23	1.19
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	164	158	178	162	154
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00149	0.00153	0.00147	0.00133	0.00116
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	1620	1660	1720	1830	1650
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	0.63	<0.50	0.74	0.82	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0.51	0.56	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	1.2	1.4	<1.2
Volatile Organic Compounds Surrogates									

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
					VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	91.4	92.1	91.5	88.0	91.8
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	102	99.9	99.7	102	98.0
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	85.0	94.5	86.6	95.2	86.9
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	85.8	89.4	88.9	90.2	89.0
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	108	97.4	106	99.2	105
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	0.025	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	0.049	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source - 1	WNW - 1	North - 1	ENE - 1	Source - 2
				Client sampling date / time	01-Aug-2020 12:46	01-Aug-2020 15:17	01-Aug-2020 13:18	01-Aug-2020 13:42	01-Aug-2020 16:41
					VA20B2125-001	VA20B2125-002	VA20B2125-003	VA20B2125-004	VA20B2125-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	0.019	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	81.9	97.5	94.2	90.5	89.2
chrysene-d12	1719-03-5	E641A	0.010	%	85.5	89.0	96.2	92.2	90.5
naphthalene-d8	1146-65-2	E641A	0.010	%	94.6	98.4	107	106	102
phenanthrene-d10	1517-22-2	E641A	0.010	%	102	108	114	111	108
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0078	Bq/L	<0.0078	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0079	Bq/L	----	----	----	----	<0.0079
radium-226	13982-63-3	RA226-MMER	0.0085	Bq/L	----	----	----	<0.0085	----
radium-226	13982-63-3	RA226-MMER	0.0087	Bq/L	----	<0.0087	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0094	Bq/L	----	----	<0.0094	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
Client sampling date / time					01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
					VA20B2125-006	VA20B2125-007	VA20B2125-008	VA20B2125-009	VA20B2125-010
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	73.6	105	107	71.0	1.7
conductivity	----	E100S	2.0	µS/cm	7520	39500	40800	9920	98.6
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	832	6050	6310	1100	8.59
pH	----	E108	0.10	pH units	8.02	7.99	8.00	8.00	6.24
salinity	----	EC100S	1.0	psu	4.6	28.4	29.4	6.3	<1.0
solids, total suspended [TSS]	----	E160S	2.0	mg/L	2.3	<2.0	7.5	<2.0	<2.0
turbidity	----	E121	0.10	NTU	0.39	0.18	<0.10	0.54	<0.10
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	846	6160	6260	1160	8.52
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0.0087	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	8.3	51.3	52.3	10.6	<5.0
chloride	16887-00-6	E235S.Cl	50	mg/L	2330	15300	15600	2900	<50
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	<0.20	0.90	0.91	0.24	<0.20
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.075	0.106	0.087	0.091	<0.050
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	0.014	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0038	0.0191	0.0196	0.0043	<0.0010
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	338	2260	2320	456	3.5
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.92	1.17	1.14	1.08	<0.50
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<10 DLA	<10 DLA	<10 DLA	<10 DLA	<10 DLA
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0152	0.0105	0.0092	0.0300	<0.0050
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	<0.00040	0.00140	0.00140	<0.00040	<0.00040
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0043	0.0092	0.0100	0.0053	<0.0010
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	0.56	4.05	4.08	0.74	<0.30
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	0.000018	0.000017	<0.000010	<0.000010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
				Client sampling date / time	01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
					VA20B2125-006	VA20B2125-007	VA20B2125-008	VA20B2125-009	VA20B2125-010
					Result	Result	Result	Result	Result
Total Metals									
calcium, total	7440-70-2	E468S	1.0	mg/L	69.6	417	421	86.0	<1.0
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	0.020	0.012	<0.010	0.033	<0.010
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.022	0.159	0.164	0.029	<0.020
magnesium, total	7439-95-4	E468S	1.0	mg/L	163	1240	1260	228	1.7 RRV
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00104	0.00123	0.00112	0.00176	<0.00020
mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00153	0.0100	0.00994	0.00194	<0.00010
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	0.057	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	50.0	410	419	70.3	<1.0
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0144	0.103	0.106	0.0201	<0.0050
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	1380	9480	9670	1840	15.1
strontium, total	7440-24-6	E468S	0.010	mg/L	0.948	7.02	7.46	1.32	<0.010
sulfur, total	7704-34-9	E468S	5.0	mg/L	117	1040	1180	162	<5.0
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0.00051	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00115	0.00232	0.00228	0.00141	<0.000050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
				Client sampling date / time	01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
Analyte	CAS Number	Method	LOR	Unit	VA20B2125-006	VA20B2125-007	VA20B2125-008	VA20B2125-009	VA20B2125-010
					Result	Result	Result	Result	Result
Total Metals									
vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	0.00141	0.00138	<0.00050	<0.00050
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	<0.00040	0.00129	0.00142	<0.00040	<0.00040
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0044	0.0090	0.0090	0.0047	<0.0010
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	0.55	4.03	4.23	0.75	<0.30
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	0.000020	0.000022	<0.000010	<0.000010
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	67.9	411	447	82.1	<1.0
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00045	<0.00020	0.00020	0.00024	<0.00020
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.021	0.164	0.172	0.028	<0.020
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	161	1220	1260	217	1.7 RRV
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	<0.00010	0.00065	0.00063	0.00010	<0.00010
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00143	0.00989	0.00987	0.00189	<0.00010
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	47.0	403	416	65.4	<1.0
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0137	0.100	0.105	0.0186	<0.0050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
				Client sampling date / time	01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
					VA20B2125-006	VA20B2125-007	VA20B2125-008	VA20B2125-009	VA20B2125-010
					Result	Result	Result	Result	Result
Dissolved Metals									
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	0.927	7.16	7.07	1.25	<0.010
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	116	1130	1220	159	<5.0
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00114	0.00242	0.00248	0.00138	<0.000050
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	0.00128	0.00132	<0.00050	<0.00050
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	1350	9230	9620	1790	16.0
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	0.61	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	<1.2	<1.2	<1.2
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.7	90.2	92.1	91.2	91.9

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
				Client sampling date / time	01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
					VA20B2125-006	VA20B2125-007	VA20B2125-008	VA20B2125-009	VA20B2125-010
					Result	Result	Result	Result	Result
Volatile Organic Compounds Surrogates									
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	98.7	98.2	96.2	97.5	97.4
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	91.7	82.5	69.7	71.3	68.2
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	87.0	81.4	68.8	71.5	68.6
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	101	97.7	104	92.6	96.9
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water)**

Analyte	CAS Number	Method	LOR	Unit	WNW - 2	North - 2	ENE - 2	DUP - A	Site - 1
				Client sampling date / time	01-Aug-2020 15:57	01-Aug-2020 16:25	01-Aug-2020 15:41	01-Aug-2020 13:00	01-Aug-2020 17:25
					VA20B2125-006	**VA20B2125-007**	**VA20B2125-008**	**VA20B2125-009**	**VA20B2125-010**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	87.3	91.1	83.5	91.4	80.2
chrysene-d12	1719-03-5	E641A	0.010	%	87.1	90.8	78.1	83.0	74.0
naphthalene-d8	1146-65-2	E641A	0.010	%	98.3	98.2	76.4	89.8	76.9
phenanthrene-d10	1517-22-2	E641A	0.010	%	104	106	91.8	101	90.2
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0048	Bq/L	----	----	----	----	<0.0048
radium-226	13982-63-3	RA226-MMER	0.0058	Bq/L	<0.0058	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0073	Bq/L	----	<0.0073	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0077	Bq/L	----	----	0.0077	----	----
radium-226	13982-63-3	RA226-MMER	0.0082	Bq/L	----	----	----	<0.0082	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

ALS Environmental

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B2125**	Page	: 1 of 40
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Issue Date	: 01-Sep-2020 11:50
C-O-C number	: 17-766326		
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 1	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 2	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP - A	E298	01-Aug-2020	----	----	----		14-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE - 2	E298	01-Aug-2020	----	----	----		14-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 1	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	12 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North - 2	E298	01-Aug-2020	----	----	----		14-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Site - 1	E298	01-Aug-2020	----	----	----		14-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source - 1	E298	01-Aug-2020	----	----	----		13-Aug-2020	28 days	12 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE DUP - A	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 1	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE - 2	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 1	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North - 2	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Site - 1	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 1	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source - 2	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 1	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW - 2	E235S.Br	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE DUP - A	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 1	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE - 2	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 1	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North - 2	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Site - 1	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 1	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source - 2	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 1	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW - 2	E235S.Cl	01-Aug-2020	----	----	----		08-Aug-2020	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 2	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 2	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Site - 1	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 2	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 1	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW - 2	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP - A	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE - 1	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North - 1	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source - 1	E378-U	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 2	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Site - 1	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE DUP - A	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North - 1	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.F-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 2	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 2	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Site - 1	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 2	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 1	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW - 2	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE DUP - A	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE - 1	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North - 1	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source - 1	E235S.NO3-T	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation* Preparation Date	Holding Times Rec	Holding Times Actual	Eval	*Analysis* Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 2	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Site - 1	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	14 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE DUP - A	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North - 1	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source - 1	E235S.NO2-L	01-Aug-2020	----	----	----		16-Aug-2020	3 days	15 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 2	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 2	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Site - 1	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source - 2	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 1	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW - 2	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	14 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE DUP - A	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE - 1	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North - 1	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE										
Source - 1	E235S.SO4-L	01-Aug-2020	----	----	----		16-Aug-2020	28 days	15 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
DUP - A	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
ENE - 1	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
ENE - 2	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
North - 1	E318S	01-Aug-2020	11-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
North - 2	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
Site - 1	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
Source - 1	E318S	01-Aug-2020	11-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid)										
Source - 2	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 2	E318S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	13-Aug-2020	17 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW - 1	E318S	01-Aug-2020	11-Aug-2020	28 days	9 days	✓	13-Aug-2020	18 days	1 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Site - 1	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	142 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 2	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	142 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 2	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	143 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 2	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	143 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 2	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	143 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) WNW - 1	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	144 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) ENE - 1	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	145 hrs	× EHTR

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) DUP - A	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	146 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) North - 1	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	146 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) Source - 1	E010.FC	01-Aug-2020	----	----	----		07-Aug-2020	30 hrs	146 hrs	× EHTR
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 1	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE - 2	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 1	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) North - 2	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Site - 1	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 2	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 1	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) WNW - 2	E509S	01-Aug-2020	12-Aug-2020	28 days	10 days	✓	12-Aug-2020	17 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) DUP - A	E509S	01-Aug-2020	12-Aug-2020	28 days	11 days	✓	12-Aug-2020	16 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) Source - 1	E509S	01-Aug-2020	12-Aug-2020	28 days	11 days	✓	12-Aug-2020	16 days	0 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) DUP - A	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 1	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) ENE - 2	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 1	E469S	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) North - 2	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Site - 1	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 1	E469S	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) Source - 2	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 1	E469S	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW - 2	E469S	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	17-Aug-2020	167 days	3 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) DUP - A	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 1	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE - 2	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 1	E469S.NaSi	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) North - 2	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Site - 1	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 1	E469S.NaSi	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) Source - 2	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 1	E469S.NaSi	01-Aug-2020	13-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW - 2	E469S.NaSi	01-Aug-2020	14-Aug-2020	180 days	12 days	✓	18-Aug-2020	167 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP - A	E601	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E601	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Site - 1	E601	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	40 days	1 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 1	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E601	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 2	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 2	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Site - 1	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 2	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 1	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW - 2	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP - A	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE - 1	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) North - 1	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Source - 1	E581.VH+F1	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 2	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 1	E355-L	01-Aug-2020	----	----	----		11-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North - 2	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Site - 1	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 1	E355-L	01-Aug-2020	----	----	----		11-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source - 2	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 2	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP - A	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	11 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE - 1	E355-L	01-Aug-2020	----	----	----		12-Aug-2020	28 days	11 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) WNW - 1	E355-L	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Alkalinity Species by Titration										
HDPE DUP - A	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 1	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source - 1	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 1	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE - 2	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North - 2	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Site - 1	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source - 2	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WNW - 1	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Alkalinity Species by Titration										
HDPE WNW - 2	E290	01-Aug-2020	----	----	----		11-Aug-2020	14 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE DUP - A	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	10 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North - 1	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	10 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source - 1	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	10 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE - 1	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE - 2	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North - 2	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Site - 1	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source - 2	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation* Preparation Date	Holding Times Rec	Holding Times Actual	Eval	*Analysis* Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Seawater										
HDPE WNW - 1	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : Conductivity in Seawater										
HDPE WNW - 2	E100S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Physical Tests : pH by Meter										
HDPE Site - 1	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	236 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source - 2	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	236 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE - 2	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	237 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North - 2	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	237 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW - 2	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	237 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW - 1	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	238 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE - 1	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	239 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter										
HDPE DUP - A	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	240 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North - 1	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	240 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source - 1	E108	01-Aug-2020	----	----	----		11-Aug-2020	0.25 hrs	240 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 2	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	8 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 2	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	8 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Site - 1	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	8 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 2	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	8 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 2	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	8 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE DUP - A	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	9 days	× EHT

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE - 1	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	9 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North - 1	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	9 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source - 1	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	9 days	× EHT
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW - 1	E160S	01-Aug-2020	----	----	----		10-Aug-2020	7 days	9 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE DUP - A	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE ENE - 1	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE ENE - 2	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE North - 1	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE North - 2	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR

Matrix: **Water**

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Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE Site - 1	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Source - 1	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Source - 2	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE WNW - 1	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE WNW - 2	E121	01-Aug-2020	----	----	----		08-Aug-2020	3 days	6 days	× EHTR
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) DUP - A	E641A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 2	E641A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Site - 1	E641A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE - 1	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓

Matrix: **Water**

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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 1	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North - 2	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 1	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source - 2	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 1	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW - 2	E641A	01-Aug-2020	11-Aug-2020	14 days	9 days	✓	12-Aug-2020	40 days	0 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 2	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 2	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Site - 1	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 2	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 1	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW - 2	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) DUP - A	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	26 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE - 1	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	26 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North - 1	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	26 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source - 1	RA226-MMER	01-Aug-2020	----	----	----		27-Aug-2020	180 days	26 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 1	E508S	01-Aug-2020	----	----	----		14-Aug-2020	28 days	12 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) DUP - A	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 1	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE - 2	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North - 2	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Site - 1	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 1	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source - 2	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 1	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW - 2	E508S	01-Aug-2020	----	----	----		11-Aug-2020	28 days	9 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) DUP - A	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 1	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE - 2	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 1	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North - 2	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Site - 1	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 1	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source - 2	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 1	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW - 2	E468S	01-Aug-2020	----	----	----		17-Aug-2020	180 days	16 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) DUP - A	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 1	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE - 2	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 1	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North - 2	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Site - 1	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 1	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source - 2	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 1	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW - 2	E468S.NaSi	01-Aug-2020	----	----	----		18-Aug-2020	180 days	17 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 2	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 2	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Site - 1	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 2	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 1	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW - 2	E611A	01-Aug-2020	12-Aug-2020	14 days	10 days	✓	13-Aug-2020	3 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP - A	E611A	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE - 1	E611A	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North - 1	E611A	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source - 1	E611A	01-Aug-2020	12-Aug-2020	14 days	11 days	✓	13-Aug-2020	2 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	3	45	6.6	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	71091	1	17	5.8	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	2	27	7.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	72767	1	12	8.3	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	2	27	7.4	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71863	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71865	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71864	1	10	10.0	5.0	✓
pH by Meter	E108	70166	1	18	5.5	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71866	1	10	10.0	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69410	2	12	16.6	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	2	27	7.4	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	3	27	11.1	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72039	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	2	40	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72038	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	69714	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71092	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	3	45	6.6	5.0	✓
BC PHC - EPH by GC-FID	E601A	70463	2	33	6.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	71091	1	17	5.8	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	70465	2	19	10.5	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	2	27	7.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	72767	1	12	8.3	5.0	✓

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Control Samples (LCS) - Continued							
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	2	27	7.4	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71863	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71865	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71864	1	10	10.0	5.0	✓
PAHs by LVI GC-MS	E641A	70464	2	31	6.4	5.0	✓
pH by Meter	E108	70166	1	18	5.5	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71866	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	2	27	7.4	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	3	27	11.1	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72039	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	2	40	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72038	1	10	10.0	5.0	✓
TSS by Gravimetry (Seawater)	E160S	70147	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	69714	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71092	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	70167	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	70517	3	45	6.6	5.0	✓
BC PHC - EPH by GC-FID	E601A	70463	2	33	6.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	71091	1	17	5.8	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	70465	2	19	10.5	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Conductivity in Seawater	E100S	70165	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	✗
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	2	27	7.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	72767	1	12	8.3	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	2	27	7.4	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71863	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71865	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71864	1	10	10.0	5.0	✓
PAHs by LVI GC-MS	E641A	70464	2	31	6.4	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71866	1	10	10.0	5.0	✓
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	69410	2	12	16.6	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	2	27	7.4	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	3	27	11.1	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72039	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	2	40	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72038	1	10	10.0	5.0	✓
TSS by Gravimetry (Seawater)	E160S	70147	1	10	10.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Turbidity by Nephelometry	E121	69714	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71092	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	70517	3	45	6.6	5.0	✓
Bromide in Seawater by IC	E235S.Br	69528	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	71091	1	17	5.8	5.0	✓
Chloride in Seawater by IC	E235S.Cl	69527	1	18	5.5	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	71067	1	19	5.2	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS	E421S	71616	0	0	0.0	4.7	×
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	71858	2	27	7.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	72767	1	12	8.3	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	71857	2	27	7.4	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	71863	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	71865	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	71864	1	10	10.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	71866	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	70515	2	27	7.4	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	70375	3	27	11.1	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	72039	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	70516	2	40	5.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	72038	1	10	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	71092	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC Vancouver - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test detects Thermotolerant Coliforms in a 100 mL sample after an 18 hour incubation at 44.5 ±0.2°C.
Conductivity in Seawater	E100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry (Seawater)	E160S Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Seawater by IC	E235S.Br Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Seawater by IC	E235S.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Seawater by IC (Low Level)	E235S.F-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence	E318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Seawater by CRC ICPMS (HMI)	E468S Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode). This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode).
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Seawater by CVAAS	E508S Vancouver - Environmental	Water	EPA 1631E (mod)	Seawater samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Mercury in Seawater by CVAAS	E509S Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Seawater samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fractions 2-4 (F2-F4) are analyzed by GC-FID.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Salinity in Seawater (calculation)	EC100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
Radium-226 by Radon Emanation	RA226-MMER	Water	EPA 903.1	Radium-226 in sample was analyzed according to the current revision of SOP 783.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Fort Collins - Environmental - 225 Commerce Drive Fort Collins Colorado United States 80524			

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in Seawater	EP318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent and H2SO4.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA20B2125**	Page	: 1 of 29
Client	: Golder Associates Ltd.	Laboratory	: Vancouver - Environmental
Contact	: C Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 07-Aug-2020 09:05
PO	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: 17-766326	Issue Date	: 01-Sep-2020 11:50
Sampler	: ----		
Site	: ----		
Quote number	: Payment Terms for Finance		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

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Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 69714)											
VA20B2114-005	Anonymous	turbidity	----	E121	0.10	NTU	0.34	0.36	0.02	Diff <2x LOR	----
Physical Tests (QC Lot: 70165)											
VA20B2123-001	Anonymous	conductivity	----	E100S	2.0	µS/cm	6700	6690	0.149%	20%	----
Physical Tests (QC Lot: 70166)											
VA20B2123-001	Anonymous	pH	----	E108	0.10	pH units	8.02	8.03	0.125%	4%	----
Physical Tests (QC Lot: 70167)											
VA20B2123-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.6	71.9	0.418%	20%	----
Anions and Nutrients (QC Lot: 69527)											
VA20B2123-001	Anonymous	chloride	16887-00-6	E235S.Cl	50	mg/L	2020	2010	0.339%	20%	----
Anions and Nutrients (QC Lot: 69528)											
VA20B2123-001	Anonymous	bromide	24959-67-9	E235S.Br	5.0	mg/L	8.2	7.8	0.4	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70515)											
VA20B2114-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.072	0.076	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70517)											
VA20B2114-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70976)											
VA20B2096-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70977)											
VA20B2125-007	North - 2	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 70979)											
VA20B2125-004	ENE - 1	Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.099	0.106	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71863)											
VA20B2125-001	Source - 1	fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.24	0.24	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71864)											
VA20B2125-001	Source - 1	nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71865)											
VA20B2125-001	Source - 1	nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 71866)											
VA20B2125-001	Source - 1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	453	453	0.0713%	20%	----
Anions and Nutrients (QC Lot: 72767)											
VA20B2125-001	Source - 1	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0042	0.0040	0.0001	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Organic / Inorganic Carbon (QC Lot: 70516)											
VA20B2114-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.26	1.22	0.04	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 70981)											
VA20B2095-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.23	2.16	0.07	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 69410)											
VA20B2114-008	Anonymous	coliforms, thermotolerant [fecal]	----	E010.FC	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 69411)											
VA20B2125-009	DUP - A	coliforms, thermotolerant [fecal]	----	E010.FC	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
Total Metals (QC Lot: 70375)											
VA20B2114-001	Anonymous	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 70376)											
VA20B2125-006	WNW - 2	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 71895)											
VA20B2114-004	Anonymous	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 72038)											
VA20B2125-001	Source - 1	silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	1840	1850	0.749%	20%	----
Total Metals (QC Lot: 72039)											
VA20B2125-001	Source - 1	aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0265	0.0269	0.0003	Diff <2x LOR	----
		antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E468S	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		barium, total	7440-39-3	E468S	0.0010	mg/L	0.0045	0.0046	0.0001	Diff <2x LOR	----
		beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E468S	0.30	mg/L	0.74	0.71	0.03	Diff <2x LOR	----
		cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E468S	1.0	mg/L	82.0	84.1	2.61%	20%	----
		cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E468S	0.010	mg/L	0.033	0.034	0.0009	Diff <2x LOR	----
		lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E468S	0.020	mg/L	0.029	0.029	0.0005	Diff <2x LOR	----
		magnesium, total	7439-95-4	E468S	1.0	mg/L	214	215	0.543%	20%	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 72039) - continued											
VA20B2125-001	Source - 1	manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00177	0.00175	0.00002	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00179	0.00183	2.06%	20%	----
		nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E468S	1.0	mg/L	63.9	65.5	2.57%	20%	----
		rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0182	0.0185	0.0003	Diff <2x LOR	----
		selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E468S	0.010	mg/L	1.21	1.26	3.57%	20%	----
		sulfur, total	7704-34-9	E468S	5.0	mg/L	155	156	0.625%	20%	----
		tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00137	0.00152	10.2%	20%	----
		vanadium, total	7440-62-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71067)											
VA20B2114-001	Anonymous	mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 71857)											
VA20B2114-001	Anonymous	silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3070	3060	0.390%	20%	----
Dissolved Metals (QC Lot: 71858)											
VA20B2114-001	Anonymous	aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00057	0.00051	0.00006	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0059	0.0057	0.0002	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.43	1.41	0.02	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 71858) - continued											
VA20B2114-001	Anonymous	cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E469S	1.0	mg/L	146	145	1.08%	20%	----
		cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00022	0.00022	0.000003	Diff <2x LOR	----
		gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.058	0.057	0.0009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	429	410	4.56%	20%	----
		manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00071	0.00069	0.00002	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00337	0.00333	1.36%	20%	----
		nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E469S	1.0	mg/L	128	125	2.38%	20%	----
		rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0352	0.0339	0.0013	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.43	2.47	1.68%	20%	----
		sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	334	327	2.07%	20%	----
		tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00149	0.00146	1.86%	20%	----
		vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 72011)											
VA20B2125-004	ENE - 1	silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	1830	1870	1.98%	20%	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 72012)											
VA20B2125-004	ENE - 1	aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0043	0.0044	0.00008	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E469S	0.30	mg/L	0.78	0.77	0.01	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E469S	1.0	mg/L	84.7	85.4	0.859%	20%	----
		cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00026	0.00025	0.00001	Diff <2x LOR	----
		gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.031	0.030	0.0009	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	212	214	0.622%	20%	----
		manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00013	0.00013	0.000002	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00186	0.00195	5.05%	20%	----
		nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E469S	1.0	mg/L	63.8	62.6	1.86%	20%	----
		rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0186	0.0183	0.0003	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E469S	0.010	mg/L	1.23	1.29	4.20%	20%	----
		sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	162	163	0.500%	20%	----
		tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00133	0.00134	0.830%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 72012) - continued											
VA20B2125-004	ENE - 1	vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 71091)											
VA20B2114-005	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 71092)											
VA20B2114-005	Anonymous	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 69714)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 70147)						
solids, total suspended [TSS]	----	E160S	2	mg/L	<2.0	----
Physical Tests (QCLot: 70165)						
conductivity	----	E100S	2	µS/cm	<2.0	----
Physical Tests (QCLot: 70167)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.1	----
Anions and Nutrients (QCLot: 69527)						
chloride	16887-00-6	E235S.Cl	50	mg/L	<50	----
Anions and Nutrients (QCLot: 69528)						
bromide	24959-67-9	E235S.Br	5	mg/L	<5.0	----
Anions and Nutrients (QCLot: 70515)						
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 70517)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 70976)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 70977)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 70979)						
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 71863)						
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	<0.20	----
Anions and Nutrients (QCLot: 71864)						
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71865)						
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 71866)						
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 72767)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 70516)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 70981)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Bacteriological Tests (QCLot: 69410)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----
Bacteriological Tests (QCLot: 69411)						
coliforms, thermotolerant [fecal]	----	E010.FC	1	MPN/100mL	<1	----
Total Metals (QCLot: 70375)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 70376)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 71895)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 72038)						
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	<1.0	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	<2.5	----
Total Metals (QCLot: 72039)						
aluminum, total	7429-90-5	E468S	0.005	mg/L	<0.0050	----
antimony, total	7440-36-0	E468S	0.001	mg/L	<0.0010	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	<0.00040	----
barium, total	7440-39-3	E468S	0.001	mg/L	<0.0010	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	<0.00050	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	<0.00050	----
boron, total	7440-42-8	E468S	0.3	mg/L	<0.30	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	<0.000010	----
calcium, total	7440-70-2	E468S	1	mg/L	<1.0	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	<0.00050	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	<0.000050	----
copper, total	7440-50-8	E468S	0.0005	mg/L	<0.00050	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E468S	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E468S	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E468S	0.02	mg/L	<0.020	----
magnesium, total	7439-95-4	E468S	1	mg/L	<1.0	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	<0.00020	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	<0.00010	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 72039) - continued						
phosphorus, total	7723-14-0	E468S	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E468S	1	mg/L	<1.0	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	<0.00050	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	<0.0050	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	<0.00050	----
silver, total	7440-22-4	E468S	0.0001	mg/L	<0.00010	----
strontium, total	7440-24-6	E468S	0.01	mg/L	<0.010	----
sulfur, total	7704-34-9	E468S	5	mg/L	<5.0	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	<0.00050	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	<0.000050	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	<0.00050	----
tin, total	7440-31-5	E468S	0.001	mg/L	<0.0010	----
titanium, total	7440-32-6	E468S	0.005	mg/L	<0.0050	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	<0.000050	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	<0.00050	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E468S	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 71067)						
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 71857)						
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 71858)						
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	<0.00040	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	<0.0010	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	<0.30	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	<1.0	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 71858) - continued						
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	<0.00020	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	<0.020	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	<1.0	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	<0.00010	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	<1.0	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	<0.0050	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	<0.00050	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	<0.010	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	<5.0	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	<0.000050	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 72011)						
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 72012)						
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	<0.00040	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 72012) - continued						
barium, dissolved	7440-39-3	E469S	0.001	mg/L	<0.0010	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	<0.30	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	<1.0	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	<0.00020	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	<0.020	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	<1.0	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	<0.00010	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	<1.0	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	<0.0050	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	<0.00050	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	<0.010	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	<5.0	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	<0.000050	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	<0.0010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 72012) - continued						
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	<0.00050	----
Volatile Organic Compounds (QCLot: 71091)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Hydrocarbons (QCLot: 70465)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 70869)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 71092)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70464)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 70464) - continued						
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70870)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Physical Tests (QCLot: 69714)									
turbidity	----	E121	0.1	NTU	200 NTU	104	85.0	115	----
Physical Tests (QCLot: 70147)									
solids, total suspended [TSS]	----	E160S	2	mg/L	150 mg/L	100	85.0	115	----
Physical Tests (QCLot: 70165)									
conductivity	----	E100S	2	µS/cm	146.9 µS/cm	101	80.0	120	----
Physical Tests (QCLot: 70166)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 70167)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	97.5	85.0	115	----
Anions and Nutrients (QCLot: 69527)									
chloride	16887-00-6	E235S.Cl	50	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 69528)									
bromide	24959-67-9	E235S.Br	5	mg/L	0.5 mg/L	94.8	85.0	115	----
Anions and Nutrients (QCLot: 70515)									
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	4 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 70517)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 70976)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 70977)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 70979)									
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	4 mg/L	118	75.0	125	----
Anions and Nutrients (QCLot: 71863)									
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	1 mg/L	107	90.0	110	----
Anions and Nutrients (QCLot: 71864)									
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	0.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 71865)									
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 71866)									
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 72767)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 72767) - continued									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 70516)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
Organic / Inorganic Carbon (QCLot: 70981)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Total Metals (QCLot: 70375)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----
Total Metals (QCLot: 70376)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	97.8	80.0	120	----
Total Metals (QCLot: 71895)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	98.3	80.0	120	----
Total Metals (QCLot: 72038)									
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	10 mg/L	104	80.0	120	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	50 mg/L	112	80.0	120	----
Total Metals (QCLot: 72039)									
aluminum, total	7429-90-5	E468S	0.005	mg/L	2 mg/L	99.5	80.0	120	----
antimony, total	7440-36-0	E468S	0.001	mg/L	1 mg/L	99.7	80.0	120	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	1 mg/L	95.2	80.0	120	----
barium, total	7440-39-3	E468S	0.001	mg/L	0.25 mg/L	97.2	80.0	120	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	1 mg/L	106	80.0	120	----
boron, total	7440-42-8	E468S	0.3	mg/L	10 mg/L	102	80.0	120	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E468S	1	mg/L	50 mg/L	98.4	80.0	120	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	0.05 mg/L	98.3	80.0	120	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
copper, total	7440-50-8	E468S	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, total	7439-89-6	E468S	0.01	mg/L	1 mg/L	96.3	80.0	120	----
lead, total	7439-92-1	E468S	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, total	7439-93-2	E468S	0.02	mg/L	0.25 mg/L	103	80.0	120	----
magnesium, total	7439-95-4	E468S	1	mg/L	50 mg/L	108	80.0	120	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	0.25 mg/L	96.1	80.0	120	----

Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72039) - continued									
nickel, total	7440-02-0	E468S	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, total	7440-09-7	E468S	1	mg/L	50 mg/L	97.9	80.0	120	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	0.1 mg/L	99.0	80.0	120	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	0.1 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	1 mg/L	99.5	80.0	120	----
silver, total	7440-22-4	E468S	0.0001	mg/L	0.1 mg/L	98.8	80.0	120	----
strontium, total	7440-24-6	E468S	0.01	mg/L	0.25 mg/L	97.4	80.0	120	----
sulfur, total	7704-34-9	E468S	5	mg/L	50 mg/L	99.0	80.0	120	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	0.1 mg/L	105	80.0	120	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	1 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	0.1 mg/L	91.4	80.0	120	----
tin, total	7440-31-5	E468S	0.001	mg/L	0.5 mg/L	97.7	80.0	120	----
titanium, total	7440-32-6	E468S	0.005	mg/L	0.25 mg/L	94.5	80.0	120	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	0.1 mg/L	94.3	80.0	120	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	0.005 mg/L	95.8	80.0	120	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	0.1 mg/L	94.6	80.0	120	----
zinc, total	7440-66-6	E468S	0.003	mg/L	0.5 mg/L	96.4	80.0	120	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	0.1 mg/L	88.7	80.0	120	----
Dissolved Metals (QCLot: 71067)									
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	0.0001 mg/L	89.8	80.0	120	----
Dissolved Metals (QCLot: 71616)									
Dissolved Metals (QCLot: 71857)									
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	10 mg/L	99.3	80.0	120	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	50 mg/L	92.8	80.0	120	----
Dissolved Metals (QCLot: 71858)									
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	2 mg/L	96.2	80.0	120	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	1 mg/L	97.1	80.0	120	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	1 mg/L	95.2	80.0	120	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	1 mg/L	103	80.0	120	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	10 mg/L	109	80.0	120	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	50 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 71858) - continued									
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	0.05 mg/L	92.6	80.0	120	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	1 mg/L	96.8	80.0	120	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	0.25 mg/L	103	80.0	120	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	50 mg/L	104	80.0	120	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	50 mg/L	102	80.0	120	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	0.1 mg/L	98.1	80.0	120	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	0.1 mg/L	98.2	80.0	120	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	1 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	50 mg/L	99.0	80.0	120	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	0.1 mg/L	111	80.0	120	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	1 mg/L	103	80.0	120	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	0.1 mg/L	88.8	80.0	120	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	0.5 mg/L	97.3	80.0	120	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	0.25 mg/L	94.3	80.0	120	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	0.1 mg/L	96.5	80.0	120	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	0.005 mg/L	94.7	80.0	120	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	0.1 mg/L	93.9	80.0	120	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	0.5 mg/L	99.9	80.0	120	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	0.1 mg/L	88.7	80.0	120	----
Dissolved Metals (QCLot: 72011)									
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	10 mg/L	101	80.0	120	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	50 mg/L	102	80.0	120	----
Dissolved Metals (QCLot: 72012)									
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	2 mg/L	101	80.0	120	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	1 mg/L	97.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 72012) - continued									
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	1 mg/L	96.3	80.0	120	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	1 mg/L	111	80.0	120	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	10 mg/L	99.7	80.0	120	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	0.1 mg/L	99.7	80.0	120	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	50 mg/L	99.7	80.0	120	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	0.05 mg/L	94.4	80.0	120	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	1 mg/L	95.0	80.0	120	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	50 mg/L	103	80.0	120	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	10 mg/L	104	80.0	120	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	50 mg/L	98.1	80.0	120	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	0.1 mg/L	101	80.0	120	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	0.1 mg/L	103	80.0	120	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	1 mg/L	101	80.0	120	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	0.1 mg/L	95.4	80.0	120	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	0.25 mg/L	93.5	80.0	120	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	50 mg/L	94.6	80.0	120	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	0.1 mg/L	106	80.0	120	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	0.1 mg/L	93.7	80.0	120	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	0.5 mg/L	96.7	80.0	120	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	0.25 mg/L	93.9	80.0	120	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	0.1 mg/L	95.4	80.0	120	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	0.005 mg/L	94.3	80.0	120	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	0.1 mg/L	95.5	80.0	120	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	0.5 mg/L	99.8	80.0	120	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	0.1 mg/L	86.4	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 71091)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.0	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	114	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	100	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	90.7	70.0	130	----
Hydrocarbons (QCLot: 70465)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	110	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	107	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	92.5	70.0	130	----
Hydrocarbons (QCLot: 70869)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	122	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	120	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	103	70.0	130	----
Hydrocarbons (QCLot: 71092)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	95.1	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70464)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	92.6	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	97.7	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	87.9	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	110	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	113	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.28328 µg/L	79.8	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	88.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	86.1	60.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 70464) - continued									
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	95.7	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	111	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	122	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 70870)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	116	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	110	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	115	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	98.4	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	95.2	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	114	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	120	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 69527)										
VA20B2123-002	Anonymous	chloride	16887-00-6	E235S.Cl	9370 mg/L	10000 mg/L	93.7	75.0	125	----
Anions and Nutrients (QCLot: 69528)										
VA20B2123-002	Anonymous	bromide	24959-67-9	E235S.Br	41.8 mg/L	50 mg/L	83.7	75.0	125	----
Anions and Nutrients (QCLot: 70515)										
VA20B2114-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318S	2.74 mg/L	2.5 mg/L	110	70.0	130	----
Anions and Nutrients (QCLot: 70517)										
VA20B2114-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.198 mg/L	0.2 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 70976)										
VA20B2096-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 70977)										
VA20B2125-008	ENE - 2	ammonia, total (as N)	7664-41-7	E298	0.205 mg/L	0.2 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 70979)										
VA20B2125-005	Source - 2	Kjeldahl nitrogen, total [TKN]	----	E318S	2.77 mg/L	2.5 mg/L	111	70.0	130	----
Anions and Nutrients (QCLot: 71863)										
VA20B2125-002	WNW - 1	fluoride	16984-48-8	E235S.F-L	10.5 mg/L	10 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 71864)										
VA20B2125-002	WNW - 1	nitrite (as N)	14797-65-0	E235S.NO2-L	5.24 mg/L	5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 71865)										
VA20B2125-002	WNW - 1	nitrate (as N)	14797-55-8	E235S.NO3-T	7.76 mg/L	7.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 71866)										
VA20B2125-002	WNW - 1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	1000 mg/L	1000 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 72767)										
VA20B2125-002	WNW - 1	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0296 mg/L	0.03 mg/L	98.5	70.0	130	----
Organic / Inorganic Carbon (QCLot: 70516)										
VA20B2114-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.11 mg/L	5 mg/L	102	70.0	130	----
Organic / Inorganic Carbon (QCLot: 70981)										
VA20B2095-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.18 mg/L	5 mg/L	104	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 70375)										
VA20B2114-002	Anonymous	mercury, total	7439-97-6	E508S	0.0000976 mg/L	0.0001 mg/L	97.6	70.0	130	----
Total Metals (QCLot: 70376)										
VA20B2125-007	North - 2	mercury, total	7439-97-6	E508S	0.0000973 mg/L	0.0001 mg/L	97.3	70.0	130	----
Total Metals (QCLot: 71895)										
VA20B2125-003	North - 1	mercury, total	7439-97-6	E508S	0.0000964 mg/L	0.0001 mg/L	96.4	70.0	130	----
Total Metals (QCLot: 72038)										
VA20B2125-002	WNW - 1	silicon, total	7440-21-3	E468S.NaSi	482 mg/L	500 mg/L	96.3	70.0	130	----
		sodium, total	7440-23-5	E468S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Total Metals (QCLot: 72039)										
VA20B2125-002	WNW - 1	aluminum, total	7429-90-5	E468S	0.412 mg/L	0.4 mg/L	103	70.0	130	----
		antimony, total	7440-36-0	E468S	0.0382 mg/L	0.04 mg/L	95.5	70.0	130	----
		arsenic, total	7440-38-2	E468S	0.0379 mg/L	0.04 mg/L	94.8	70.0	130	----
		barium, total	7440-39-3	E468S	0.0377 mg/L	0.04 mg/L	94.2	70.0	130	----
		beryllium, total	7440-41-7	E468S	0.0803 mg/L	0.08 mg/L	100	70.0	130	----
		bismuth, total	7440-69-9	E468S	0.0178 mg/L	0.02 mg/L	89.1	70.0	130	----
		boron, total	7440-42-8	E468S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E468S	0.00722 mg/L	0.008 mg/L	90.3	70.0	130	----
		calcium, total	7440-70-2	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E468S	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		chromium, total	7440-47-3	E468S	0.0790 mg/L	0.08 mg/L	98.8	70.0	130	----
		cobalt, total	7440-48-4	E468S	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		copper, total	7440-50-8	E468S	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		gallium, total	7440-55-3	E468S	0.00520 mg/L	0.005 mg/L	104	70.0	130	----
		iron, total	7439-89-6	E468S	3.90 mg/L	4 mg/L	97.5	70.0	130	----
		lead, total	7439-92-1	E468S	0.0360 mg/L	0.04 mg/L	89.9	70.0	130	----
		lithium, total	7439-93-2	E468S	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		magnesium, total	7439-95-4	E468S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E468S	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		molybdenum, total	7439-98-7	E468S	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		nickel, total	7440-02-0	E468S	0.0747 mg/L	0.08 mg/L	93.4	70.0	130	----
		phosphorus, total	7723-14-0	E468S	22.5 mg/L	20 mg/L	112	70.0	130	----
		potassium, total	7440-09-7	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, total	7440-15-5	E468S	0.00500 mg/L	0.005 mg/L	99.9	70.0	130	----
		rubidium, total	7440-17-7	E468S	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		selenium, total	7782-49-2	E468S	0.0774 mg/L	0.08 mg/L	96.7	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 72039) - continued										
VA20B2125-002	WNW - 1	silver, total	7440-22-4	E468S	0.00750 mg/L	0.008 mg/L	93.7	70.0	130	----
		strontium, total	7440-24-6	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E468S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E468S	0.0743 mg/L	0.08 mg/L	92.9	70.0	130	----
		thallium, total	7440-28-0	E468S	0.00710 mg/L	0.008 mg/L	88.7	70.0	130	----
		thorium, total	7440-29-1	E468S	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		tin, total	7440-31-5	E468S	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		titanium, total	7440-32-6	E468S	0.0800 mg/L	0.08 mg/L	100.0	70.0	130	----
		tungsten, total	7440-33-7	E468S	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		uranium, total	7440-61-1	E468S	0.00718 mg/L	0.008 mg/L	89.7	70.0	130	----
		vanadium, total	7440-62-2	E468S	0.203 mg/L	0.2 mg/L	101	70.0	130	----
		yttrium, total	7440-65-5	E468S	0.00525 mg/L	0.005 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E468S	0.702 mg/L	0.8 mg/L	87.7	70.0	130	----
		zirconium, total	7440-67-7	E468S	0.0834 mg/L	0.08 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 71067)										
VA20B2114-002	Anonymous	mercury, dissolved	7439-97-6	E509S	0.0000897 mg/L	0.0001 mg/L	89.7	70.0	130	----
Dissolved Metals (QCLot: 71857)										
VA20B2114-002	Anonymous	silicon, dissolved	7440-21-3	E469S.NaSi	462 mg/L	500 mg/L	92.3	70.0	130	----
		sodium, dissolved	7440-23-5	E469S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 71858)										
VA20B2114-002	Anonymous	aluminum, dissolved	7429-90-5	E469S	0.384 mg/L	0.4 mg/L	96.1	70.0	130	----
		antimony, dissolved	7440-36-0	E469S	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E469S	0.0362 mg/L	0.04 mg/L	90.4	70.0	130	----
		barium, dissolved	7440-39-3	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		beryllium, dissolved	7440-41-7	E469S	0.0776 mg/L	0.08 mg/L	97.0	70.0	130	----
		bismuth, dissolved	7440-69-9	E469S	0.0171 mg/L	0.02 mg/L	85.7	70.0	130	----
		boron, dissolved	7440-42-8	E469S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E469S	0.00698 mg/L	0.008 mg/L	87.3	70.0	130	----
		calcium, dissolved	7440-70-2	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E469S	0.0189 mg/L	0.02 mg/L	94.3	70.0	130	----
		chromium, dissolved	7440-47-3	E469S	0.0751 mg/L	0.08 mg/L	93.9	70.0	130	----
		cobalt, dissolved	7440-48-4	E469S	0.0353 mg/L	0.04 mg/L	88.3	70.0	130	----
		copper, dissolved	7440-50-8	E469S	0.0344 mg/L	0.04 mg/L	86.1	70.0	130	----
		gallium, dissolved	7440-55-3	E469S	0.00526 mg/L	0.005 mg/L	105	70.0	130	----
		iron, dissolved	7439-89-6	E469S	3.78 mg/L	4 mg/L	94.5	70.0	130	----
		lead, dissolved	7439-92-1	E469S	0.0354 mg/L	0.04 mg/L	88.4	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 71858) - continued										
VA20B2114-002	Anonymous	lithium, dissolved	7439-93-2	E469S	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		magnesium, dissolved	7439-95-4	E469S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E469S	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		molybdenum, dissolved	7439-98-7	E469S	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		nickel, dissolved	7440-02-0	E469S	0.0701 mg/L	0.08 mg/L	87.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E469S	20.8 mg/L	20 mg/L	104	70.0	130	----
		potassium, dissolved	7440-09-7	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, dissolved	7440-15-5	E469S	0.00458 mg/L	0.005 mg/L	91.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		selenium, dissolved	7782-49-2	E469S	0.0758 mg/L	0.08 mg/L	94.7	70.0	130	----
		silver, dissolved	7440-22-4	E469S	0.00741 mg/L	0.008 mg/L	92.6	70.0	130	----
		strontium, dissolved	7440-24-6	E469S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E469S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E469S	0.0752 mg/L	0.08 mg/L	94.0	70.0	130	----
		thallium, dissolved	7440-28-0	E469S	0.00712 mg/L	0.008 mg/L	89.0	70.0	130	----
		thorium, dissolved	7440-29-1	E469S	0.0359 mg/L	0.04 mg/L	89.6	70.0	130	----
		tin, dissolved	7440-31-5	E469S	0.0367 mg/L	0.04 mg/L	91.8	70.0	130	----
		titanium, dissolved	7440-32-6	E469S	0.0764 mg/L	0.08 mg/L	95.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E469S	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		uranium, dissolved	7440-61-1	E469S	0.00701 mg/L	0.008 mg/L	87.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E469S	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		yttrium, dissolved	7440-65-5	E469S	0.00505 mg/L	0.005 mg/L	101	70.0	130	----
		zinc, dissolved	7440-66-6	E469S	0.669 mg/L	0.8 mg/L	83.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E469S	0.0834 mg/L	0.08 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 72011)										
VA20B2125-005	Source - 2	silicon, dissolved	7440-21-3	E469S.NaSi	638 mg/L	500 mg/L	128	70.0	130	----
		sodium, dissolved	7440-23-5	E469S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 72012)										
VA20B2125-005	Source - 2	aluminum, dissolved	7429-90-5	E469S	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		antimony, dissolved	7440-36-0	E469S	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E469S	0.0376 mg/L	0.04 mg/L	94.1	70.0	130	----
		barium, dissolved	7440-39-3	E469S	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		beryllium, dissolved	7440-41-7	E469S	0.0798 mg/L	0.08 mg/L	99.7	70.0	130	----
		bismuth, dissolved	7440-69-9	E469S	0.0181 mg/L	0.02 mg/L	90.3	70.0	130	----
		boron, dissolved	7440-42-8	E469S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E469S	0.00740 mg/L	0.008 mg/L	92.5	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 72012) - continued										
VA20B2125-005	Source - 2	calcium, dissolved	7440-70-2	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E469S	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		chromium, dissolved	7440-47-3	E469S	0.0802 mg/L	0.08 mg/L	100	70.0	130	----
		cobalt, dissolved	7440-48-4	E469S	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		copper, dissolved	7440-50-8	E469S	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
		gallium, dissolved	7440-55-3	E469S	0.00526 mg/L	0.005 mg/L	105	70.0	130	----
		iron, dissolved	7439-89-6	E469S	3.78 mg/L	4 mg/L	94.6	70.0	130	----
		lead, dissolved	7439-92-1	E469S	0.0366 mg/L	0.04 mg/L	91.4	70.0	130	----
		lithium, dissolved	7439-93-2	E469S	0.201 mg/L	0.2 mg/L	100	70.0	130	----
		magnesium, dissolved	7439-95-4	E469S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E469S	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		molybdenum, dissolved	7439-98-7	E469S	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		nickel, dissolved	7440-02-0	E469S	0.0752 mg/L	0.08 mg/L	94.0	70.0	130	----
		phosphorus, dissolved	7723-14-0	E469S	22.1 mg/L	20 mg/L	110	70.0	130	----
		potassium, dissolved	7440-09-7	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, dissolved	7440-15-5	E469S	0.00504 mg/L	0.005 mg/L	101	70.0	130	----
		rubidium, dissolved	7440-17-7	E469S	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		selenium, dissolved	7782-49-2	E469S	0.0796 mg/L	0.08 mg/L	99.5	70.0	130	----
		silver, dissolved	7440-22-4	E469S	0.00739 mg/L	0.008 mg/L	92.4	70.0	130	----
		strontium, dissolved	7440-24-6	E469S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E469S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E469S	0.0745 mg/L	0.08 mg/L	93.1	70.0	130	----
		thallium, dissolved	7440-28-0	E469S	0.00737 mg/L	0.008 mg/L	92.2	70.0	130	----
		thorium, dissolved	7440-29-1	E469S	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		tin, dissolved	7440-31-5	E469S	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		titanium, dissolved	7440-32-6	E469S	0.0786 mg/L	0.08 mg/L	98.3	70.0	130	----
		tungsten, dissolved	7440-33-7	E469S	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		uranium, dissolved	7440-61-1	E469S	0.00746 mg/L	0.008 mg/L	93.3	70.0	130	----
		vanadium, dissolved	7440-62-2	E469S	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		yttrium, dissolved	7440-65-5	E469S	0.00530 mg/L	0.005 mg/L	106	70.0	130	----
		zinc, dissolved	7440-66-6	E469S	0.727 mg/L	0.8 mg/L	90.9	70.0	130	----
		zirconium, dissolved	7440-67-7	E469S	0.0803 mg/L	0.08 mg/L	100	70.0	130	----
Volatile Organic Compounds (QCLot: 71091)										
VA20B2114-006	Anonymous	benzene	71-43-2	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.6 µg/L	100 µg/L	87.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	95.9 µg/L	100 µg/L	95.9	60.0	140	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 71091) - continued										
VA20B2114-006	Anonymous	styrene	100-42-5	E611A	111 µg/L	100 µg/L	111	60.0	140	----
		toluene	108-88-3	E611A	93.7 µg/L	100 µg/L	93.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	196 µg/L	200 µg/L	98.0	60.0	140	----
		xylene, o-	95-47-6	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
Hydrocarbons (QCLot: 71092)										
VA20B2114-007	Anonymous	F1 (C6-C10)	----	E581.VH+F1	6460 µg/L	6310 µg/L	102	60.0	140	----

Saturday, August 29, 2020

Amber Springer
ALS Environmental
8081 Lougheed Hwy, Suite 100
Burnaby, BC V5A 1W9

Re: ALS Workorder: 2008281
Project Name:
Project Number: VA20B2125

Dear Ms. Springer:

Ten water samples were received from ALS Environmental, on 8/12/2020. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

2008281

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ADDRESS 225 Commerce Drive, Fort Collins Colorado 80524 USA | PHONE +1 970 490 1511 | FAX +1 970 490 1522
ALS GROUP USA, CORP. Part of the ALS Group An ALS Limited Company

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008281
Client Name: ALS Environmental
Client Project Name:
Client Project Number: VA20B2125
Client PO Number: VA20B2125

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
VA20B2125-001	2008281-1		WATER	01-Aug-20	13:46
VA20B2125-002	2008281-2		WATER	01-Aug-20	16:17
VA20B2125-003	2008281-3		WATER	01-Aug-20	14:18
VA20B2125-004	2008281-4		WATER	01-Aug-20	14:42
VA20B2125-005	2008281-5		WATER	01-Aug-20	17:41
VA20B2125-006	2008281-6		WATER	01-Aug-20	16:57
VA20B2125-007	2008281-7		WATER	01-Aug-20	17:25
VA20B2125-008	2008281-8		WATER	01-Aug-20	16:41
VA20B2125-009	2008281-9		WATER	01-Aug-20	14:00
VA20B2125-010	2008281-10		WATER	01-Aug-20	18:25

Chain of Custody
Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

3753

Destination Lab:	**USA - Fort Collins**
Address:	225 Commerce Drive Fort Collins CO United States 80524
Client:	Golder Associates Ltd.
Work Order Number:	**VA20B2125**
Original Receipt Date/Time	Instructions Received
07/08/2020 10:05	

#2008281 #

Relinquished By	
Date/Time	
Received By	EMILY LYONS el
Date/Time	AUG 12 2020 1450
Receipt Temp	

Return as Indicated: Results: Invoice: Electronic Data:

Attention: Amber Springer

	ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
1	VA20B2125-001	Source - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 13:46	
2	VA20B2125-002	WNW - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 16:17	
3	VA20B2125-003	North - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 14:18	
4	VA20B2125-004	ENE - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 14:42	
5	VA20B2125-005	Source - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 17:41	
6	VA20B2125-006	WNW - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 16:57	
7	VA20B2125-007	North - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 17:25	
8	VA20B2125-008	ENE - 2	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 16:41	
9	VA20B2125-009	DUP - A	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 14:00	
10	VA20B2125-010	Site - 1	Water	HDPE total (nitric acid)	RA226-MMER	Radium-226 by Radon Emanation	04-09-2020	01/08/2020 18:25	

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: ALS Canada_Burnaby | Workorder No: 2008281
Project Manager: KMO | Initials: ERL | Date: 08.13.20

Question			
1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO
2. Are custody seals on **shipping** containers intact?	☑ NONE	☐ YES	☐ NO*
3. Are custody seals on **sample** containers intact?	☑ NONE	☐ YES	☐ NO*
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*
6. Are short-hold samples present?		☐ YES	☑ NO
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☑ YES	☐ NO*
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO
14. Were the samples shipped on ice?		☐ YES	☑ NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used*: ☐ #3 ☐ #5	☑ Rad Only	☐ YES	☐ NO

Cooler #:	1	2	3
Temperature (°C):	Amb	Amb	Amb
# of custody seals on cooler:	0	0	0
External mR/hr reading:	10	11	11
Background mR/hr reading:	11		

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☑ N/A ☐ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: ERL

If applicable, was the client contacted? ☐ YES ☐ NA Contact Name: Date:

Project Manager Signature / Date: [signature] 8/13/20

Form 201r30.xls
(06/04/2020)

*IR Gun #3, VWR SN 170647571
*IR Gun #5, VWR SN 192272629

EXPRESS WORLDWIDE WPX DHL

2020-08-10 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

Origin:
YVR

10-0
amb

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 32.0/96.0 lbs

Piece 2 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 95 2605 4145

(2L)US80524+48000001

(J) JD01 4600 0080 3226 0228

EXPRESS WORLDWIDE WPX DHL

2020-08-10 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

11-0

Origin:
YVR

To: ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Amb

Contact:
Sample Receiving

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight: 32.0/96.0 lbs

Piece: 3 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 95 2605 4145

(2L)US80524+48000001

(J) JD01 4600 0080 3226 0229

EXPRESS WORLDWIDE WPX DHL

2020-08-10 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Paul Chandra
100 - 8081 Lougheed Highway

V5A 1W9 BURNABY BC
Canada

11-Ø

Origin:
YVR

To : ALS Environmental - Fort Collins
Sample Receiving
225 Commerce Drive

Contact:
Sample Receiving

Amb

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref: Sublets

Pce/Shpt Weight 32.0/96.0 lbs

Piece 1 / 3

Contents:
Environmental W ater
Samples for Research

WAYBILL 95 2605 4145

(2L)US80524+48000001

(J) JD01 4600 0080 3226 0227

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-001	**Lab ID:**	2008281-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 13:46	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0013 (+/- 0.0043)	U	0.0078	BQ/l	NA	8/26/2020 13:53
Carr: BARIUM	*95.2*		*40-110*	*%REC*	DL = NA	8/26/2020 13:53

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-002	**Lab ID:**	2008281-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 16:17	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0041 (+/- 0.0054)	U	0.0087	BQ/l	NA	8/26/2020 13:53
Carr: BARIUM	*93.3*		*40-110*	*%REC*	DL = NA	8/26/2020 13:53

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-003	**Lab ID:**	2008281-3
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 14:18	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0017 (+/- 0.0052)	U	0.0094	BQ/l	NA	8/26/2020 13:53
Carr: BARIUM	*98.5*		*40-110*	*%REC*	DL = NA	8/26/2020 13:53

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-004	**Lab ID:**	2008281-4
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 14:42	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0015 (+/- 0.0047)	U	0.0085	BQ/l	NA	8/27/2020 12:58
Carr: BARIUM	*96.5*		*40-110*	*%REC*	DL = NA	8/27/2020 12:58

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-005	**Lab ID:**	2008281-5
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 17:41	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0014 (+/- 0.0044)	U	0.0079	BQ/l	NA	8/27/2020 12:58
Carr: BARIUM	*97.6*		*40-110*	*%REC*	DL = NA	8/27/2020 12:58

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-006	**Lab ID:**	2008281-6
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 16:57	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0043 (+/- 0.0041)	U	0.0058	BQ/l	NA	8/27/2020 12:58
Carr: BARIUM	*97.7*		*40-110*	*%REC*	DL = NA	8/27/2020 12:58

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-007	**Lab ID:**	2008281-7
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 17:25	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0031 (+/- 0.0045)	Y1,U	0.0073	BQ/l	NA	8/27/2020 12:58
Carr: BARIUM	*101*	Y1	*40-110*	*%REC*	DL = NA	8/27/2020 12:58

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-008	**Lab ID:**	2008281-8
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 16:41	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0077 (+/- 0.0057)	Y1,U	0.0077	BQ/l	NA	8/27/2020 13:29
Carr: BARIUM	*101*	Y1	*40-110*	*%REC*	DL = NA	8/27/2020 13:29

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-009	**Lab ID:**	2008281-9
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 14:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0023 (+/- 0.0048)	U	0.0082	BQ/l	NA	8/27/2020 13:29
Carr: BARIUM	*99.6*		*40-110*	*%REC*	DL = NA	8/27/2020 13:29

SAMPLE SUMMARY REPORT

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-010	**Lab ID:**	2008281-10
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 18:25	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/17/2020**		PrepBy: **TRW**
Ra-226	0.0031 (+/- 0.0033)	Y1,U	0.0048	BQ/l	NA	8/27/2020 13:29
Carr: BARIUM	*102*	Y1	*40-110*	*%REC*	DL = NA	8/27/2020 13:29

Client:	ALS Environmental	**Date:**	*29-Aug-20*
Project:	VA20B2125	**Work Order:**	2008281
Sample ID:	VA20B2125-010	**Lab ID:**	2008281-10
Legal Location:		**Matrix:**	WATER
Collection Date:	8/1/2020 18:25	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
U or ND - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
U or ND - Indicates that the compound was analyzed for but not detected.
E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
M - Duplicate injection precision was not met.
N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
* - Duplicate analysis (relative percent difference) not within control limits.
S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
E - Analyte concentration exceeds the upper level of the calibration range.
J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
A - A tentatively identified compound is a suspected aldol-condensation product.
X - The analyte was diluted below an accurate quantitation level.
* - The spike recovery is equal to or outside the control criteria used.
+ - The relative percent difference (RPD) equals or exceeds the control criteria.
G - A pattern resembling gasoline was detected in this sample.
D - A pattern resembling diesel was detected in this sample.
M - A pattern resembling motor oil was detected in this sample.
C - A pattern resembling crude oil was detected in this sample.
4 - A pattern resembling JP-4 was detected in this sample.
5 - A pattern resembling JP-5 was detected in this sample.
H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

ALS -- Fort Collins

Date: *8/29/2020 12:58*

Client: ALS Environmental
Work Order: 2008281
Project: VA20B2125

QC BATCH REPORT

Batch ID: **RE200817-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE200817-2** Units: **BQ/l** Analysis Date: **8/27/2020 14:12**
Client ID: Run ID: **RE200817-2A** Prep Date: **8/17/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.55 (+/- 0.387)	0.00967	1.719		90.3	67-120					P,Y1
Carr: BARIUM	16700		16070		104	40-110					Y1

LCSD Sample ID: **RE200817-2** Units: **BQ/l** Analysis Date: **8/27/2020 14:12**
Client ID: Run ID: **RE200817-2A** Prep Date: **8/17/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.51 (+/- 0.378)	0.0111	1.719		87.8	67-120		1.55	0.08	2.1	P,Y1,M3
Carr: BARIUM	16500		16070		103	40-110		16700			Y1

MB Sample ID: **RE200817-2** Units: **BQ/l** Analysis Date: **8/27/2020 14:12**
Client ID: Run ID: **RE200817-2A** Prep Date: **8/17/2020** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0039)	0.0065									Y1,U
Carr: BARIUM	16500		16070		103	40-110					Y1

The following samples were analyzed in this batch:

2008281-1	2008281-2	2008281-3
2008281-4	2008281-5	2008281-6
2008281-7	2008281-8	2008281-9
2008281-10		

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 766326

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd.
Contact:	Christine Bylenga / Brett Lucas
Phone:	1 (250) 881-7372
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4

Invoice To	
Same as Report To	☑ YES ☐ NO
Copy of Invoice with Report	☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: cbylenga@golder.com

Email 2: blucas@golder.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ 3 day [P3-25%] ☐ 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/03

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): 2125

ALS Contact: Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	General (pH, alkalinity, TSS, turbidity, conductivity, anions)	TOC, Ammonia, TKN	Dissolved metals	Total metals	Dissolved mercury	Total mercury	Hydrocarbons (LEPH/HEPH) F2-F4	Fecal coliforms	Radium-226	BTEX/F1	Total nutrients	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
							P		P		P	P	P	P	P	P		
1	Source-1	01-AUG-20	12:46	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
2	WNW-1	01-AUG-20	1517	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
3	North-1	01-AUG-20	1318	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
4	ENE-1	01-AUG-20	1342	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
5	Source-2	01-AUG-20	1641	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
6	WNW-2	01-AUG-20	1557	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
7	North-2	01-AUG-20	16:25	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
8	ENE-2	01-AUG-20	1541	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
9	DUP-A	01-AUG-20	13:00	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
10	Site-1	01-Aug-20	1725		12	X	X	X	X	X	X	X	X	X	X	X		

Environmental Division
Vancouver
Work Order Reference
VA20B2125
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Note: dissolved metals and mercury are unpreserved and unfiltered

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C:

FINAL COOLER TEMPERATURES °C: 12

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: JL	Date: Aug 7, 2020	Time: 09:05a

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2016 FRONT

A3

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B3145**	Page	: 1 of 14
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/3	Date Samples Received	: 20-Aug-2020 09:00
PO	: ----	Date Analysis Commenced	: 20-Aug-2020
C-O-C number	: 17-766311	Issue Date	: 15-Sep-2020 10:04
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Internal Subcontracting, Fort Collins, Colorado
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Nicole Briceelion	Analsyt	Microbiology, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
Bq/L	Becquerels per litre
CFU/100mL	colony forming units per 100 mL
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as “Preliminary Report” are considered authorized for use.

Workorder Comments

August 31/20: Draft file issued. R226 analysis is still in progress.

Qualifiers

Qualifier	*Description*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Source-1	WNW-1	North-1	ENE-1	Source-2
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
					VA20B3145-001	VA20B3145-002	VA20B3145-003	VA20B3145-004	VA20B3145-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	88.5	84.9	85.0	84.0	83.0
conductivity	----	E100S	2.0	µS/cm	16800	18000	19900	18500	20700
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	1820	2000	2110	2040	2430
pH	----	E108	0.10	pH units	8.06	8.02	8.02	8.02	8.01
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
turbidity	----	E121	0.10	NTU	0.41	0.23	0.22	0.24	0.44
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	1800	2000	2090	2000	2320
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	20.4	22.2	25.2	23.0	27.1
chloride	16887-00-6	E235S.Cl	50	mg/L	5810	6290	7040	6460	7330
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.29	0.30	0.32	0.32	0.38
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.099	0.102	0.084	0.093	0.112
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	0.134	<0.010	0.010	0.013	0.280
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0160	0.0055	0.0060	0.0057	0.0055
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	788	847	962	882	1030
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.39	1.18	1.36	1.51	1.16
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	<1	<1	<1
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0080	0.0065	0.0099	0.0072	0.0242
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00070	0.00070	0.00072	0.00066	0.00080
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0060	0.0065	0.0067	0.0066	0.0074
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	1.42	1.49	1.51	1.53	1.73
cadmium, total	7440-43-9	E468S	0.000010	mg/L	0.000015	<0.000010	<0.000010	<0.000010	0.000010

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source-1	WNW-1	North-1	ENE-1	Source-2
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
Analyte	CAS Number	Method	LOR	Unit	VA20B3145-001	VA20B3145-002	VA20B3145-003	VA20B3145-004	VA20B3145-005
					Result	Result	Result	Result	Result
Total Metals									
calcium, total	7440-70-2	E468S	1.0	mg/L	152	158	162	156	176
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000130
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00065
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	0.014
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.059	0.062	0.061	0.060	0.069
magnesium, total	7439-95-4	E468S	1.0	mg/L	345	389	408	391	457
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00170	0.00114	0.00110	0.00112	0.0336
mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00320	0.00343	0.00357	0.00364	0.00394
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	125	144	144	140	165
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0352	0.0395	0.0397	0.0387	0.0454
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	3220	3670	3870	3770	4620
strontium, total	7440-24-6	E468S	0.010	mg/L	2.18	2.46	2.54	2.56	2.83
sulfur, total	7704-34-9	E468S	5.0	mg/L	319	355	368	361	426
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00203	0.00175	0.00172	0.00170	0.00369

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Source-1	WNW-1	North-1	ENE-1	Source-2
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
					VA20B3145-001	VA20B3145-002	VA20B3145-003	VA20B3145-004	VA20B3145-005
					Result	Result	Result	Result	Result
Total Metals									
vanadium, total	7440-62-2	E468S	0.00050	mg/L	0.00066	0.00066	0.00070	0.00064	0.00074
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00070	0.00075	0.00079	0.00072	0.00088
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0061	0.0063	0.0064	0.0062	0.0072
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.37	1.42	1.52	1.41	1.64
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	<0.000010	0.000014	0.000011
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	138	151	162	153	178
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000122
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00034	0.00027	0.00024	0.00029	0.00045
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.054	0.056	0.059	0.058	0.067
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	359	394	415	401	482
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00120	0.00080	0.00077	0.00082	0.0298
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00315	0.00361	0.00365	0.00381	0.00427
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	119	131	136	136	160
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0338	0.0373	0.0382	0.0376	0.0445

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Source-1	WNW-1	North-1	ENE-1	Source-2
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
					VA20B3145-001	VA20B3145-002	VA20B3145-003	VA20B3145-004	VA20B3145-005
					Result	Result	Result	Result	Result
Dissolved Metals									
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.15	2.45	2.60	2.54	2.98
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	319	364	388	361	451
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00196	0.00176	0.00177	0.00180	0.00370
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	0.00052	0.00052	0.00058	0.00054	0.00064
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3260	3660	3740	3700	4240
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	96.6	94.2	96.4	94.5	91.2
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	99.3	100.0	101	102	101

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	**Source-1**	**WNW-1**	**North-1**	**ENE-1**	**Source-2**
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B3145-001**	**VA20B3145-002**	**VA20B3145-003**	**VA20B3145-004**	**VA20B3145-005**
					Result	Result	Result	Result	Result
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	42.2 SUR-ND	47.1 SUR-ND	55.6 SUR-ND	49.4 SUR-ND	56.6 SUR-ND
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	94.5	78.2	93.1	82.4	83.8
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	Source-1	WNW-1	North-1	ENE-1	Source-2
				Client sampling date / time	15-Aug-2020 14:46	15-Aug-2020 14:55	15-Aug-2020 15:07	15-Aug-2020 15:23	15-Aug-2020 13:31
Analyte	CAS Number	Method	LOR	Unit	VA20B3145-001	VA20B3145-002	VA20B3145-003	VA20B3145-004	VA20B3145-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	83.3	85.0	77.7	82.7	81.4
chrysene-d12	1719-03-5	E641A	0.010	%	93.9	97.8	80.0	96.2	88.2
naphthalene-d8	1146-65-2	E641A	0.010	%	81.2	87.2	81.4	87.1	87.4
phenanthrene-d10	1517-22-2	E641A	0.010	%	94.9	98.9	86.9	96.6	93.5
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0044	Bq/L	0.008	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0059	Bq/L	----	0.0066	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0079	Bq/L	----	----	<0.0079	----	----
radium-226	13982-63-3	RA226-MMER	0.0085	Bq/L	----	----	----	<0.0085	----
radium-226	13982-63-3	RA226-MMER	0.0086	Bq/L	----	----	----	----	<0.0086

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	WNW-2	North-2	ENE-2	DUP E	DUP-D
				Client sampling date / time	15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
					VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	83.7	83.2	83.4	82.9	85.3
conductivity	----	E100S	2.0	µS/cm	21100	21200	21100	21000	20700
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	2470	2380	2510	2340	2280
pH	----	E108	0.10	pH units	8.02	8.01	8.01	8.00	8.03
solids, total suspended [TSS]	----	E160S	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
turbidity	----	E121	0.10	NTU	0.26	0.25	0.24	0.22	0.24
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	2370	2110	2380	2350	2240
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
bromide	24959-67-9	E235S.Br	5.0	mg/L	27.2	27.3	27.4	26.3	26.6
chloride	16887-00-6	E235S.Cl	50	mg/L	7540	7540	7530	7270	7410
fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.37	0.37	0.36	0.35	0.34
Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.090	0.087	0.089	0.097	0.120
nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0059	0.0061	0.0064	0.0062	0.0064
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	1030	1020	1040	1000	1000
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.06	1.21	1.15	0.99	1.25
Bacteriological Tests									
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	<1	<1	<1
Total Metals									
aluminum, total	7429-90-5	E468S	0.0050	mg/L	0.0060	0.0054	0.0064	0.0069	0.0071
antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00083	0.00068	0.00076	0.00075	0.00074
barium, total	7440-39-3	E468S	0.0010	mg/L	0.0067	0.0061	0.0067	0.0070	0.0065
beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, total	7440-42-8	E468S	0.30	mg/L	1.77	1.54	1.71	1.70	1.52
cadmium, total	7440-43-9	E468S	0.000010	mg/L	<0.000010	0.000012	<0.000010	0.000010	0.000010
calcium, total	7440-70-2	E468S	1.0	mg/L	182	163	175	178	165

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW-2	North-2	ENE-2	DUP E	DUP-D
				Client sampling date / time	15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Total Metals									
cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, total	7440-47-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, total	7440-50-8	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
gallium, total	7440-55-3	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, total	7439-89-6	E468S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, total	7439-92-1	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, total	7439-93-2	E468S	0.020	mg/L	0.068	0.061	0.067	0.067	0.062
magnesium, total	7439-95-4	E468S	1.0	mg/L	466	414	471	463	443
manganese, total	7439-96-5	E468S	0.00020	mg/L	0.00114	0.00116	0.00112	0.00117	0.00120
mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E468S	0.00010	mg/L	0.00403	0.00367	0.00413	0.00404	0.00377
nickel, total	7440-02-0	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E468S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E468S	1.0	mg/L	169	143	164	166	151
rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0463	0.0403	0.0443	0.0455	0.0427
selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	4490	4430	4560	4520	4270
strontium, total	7440-24-6	E468S	0.010	mg/L	2.89	2.68	2.96	3.04	2.76
sulfur, total	7704-34-9	E468S	5.0	mg/L	426	376	422	418	390
tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, total	7440-32-6	E468S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00168	0.00148	0.00174	0.00169	0.00173
vanadium, total	7440-62-2	E468S	0.00050	mg/L	0.00074	0.00060	0.00074	0.00072	0.00071

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW-2	North-2	ENE-2	DUP E	DUP-D
				Client sampling date / time	15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
					VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Total Metals									
yttrium, total	7440-65-5	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E468S	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
zirconium, total	7440-67-7	E468S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals									
aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00086	0.00084	0.00085	0.00078	0.00084
barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0069	0.0067	0.0069	0.0068	0.0067
beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.64	1.69	1.62	1.58	1.56
cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0.000013	<0.000010	<0.000010
calcium, dissolved	7440-70-2	E469S	1.0	mg/L	184	181	178	173	174
cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00023	0.00024	0.00024	0.00024	0.00028
gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.067	0.066	0.068	0.065	0.063
magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	488	469	501	465	448
manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00078	0.00073	0.00086	0.00080	0.00089
mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00408	0.00413	0.00430	0.00385	0.00414
nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E469S	1.0	mg/L	163	159	166	154	151
rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0454	0.0437	0.0456	0.0428	0.0423
selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW-2	North-2	ENE-2	DUP E	DUP-D
				Client sampling date / time	15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Dissolved Metals									
silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.97	3.02	3.11	2.85	3.02
sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	440	437	447	420	407
tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00168	0.00165	0.00173	0.00170	0.00184
vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	0.00063	0.00061	0.00062	0.00065	0.00060
yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
dissolved mercury filtration location	----	EP509	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
dissolved metals filtration location	----	EP421	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	4260	4220	4350	4130	4050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	91.2	95.1	94.4	94.6	92.4
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	99.4	98.2	107	103	104
Hydrocarbons									

Analytical Results

Sub-Matrix: Seawater

(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	WNW-2	North-2	ENE-2	DUP E	DUP-D
Client sampling date / time					15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
					VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	100	µg/L	<100	<100	<100	<100	<100
F3 (C16-C34)	----	E601	250	µg/L	<250	<250	<250	<250	<250
F4 (C34-C50)	----	E601	250	µg/L	<250	<250	<250	<250	<250
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%	52.8 SUR-ND	79.7	83.1	80.1	78.6
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	79.6	107	94.1	100	94.0
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Seawater**

(Matrix: **Water**)

				Client sample ID	WNW-2	North-2	ENE-2	DUP E	DUP-D
				Client sampling date / time	15-Aug-2020 13:50	15-Aug-2020 13:42	15-Aug-2020 14:23	15-Aug-2020	15-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B3145-006	VA20B3145-007	VA20B3145-008	VA20B3145-009	VA20B3145-010
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	85.3	87.7	90.8	86.2	97.8
chrysene-d12	1719-03-5	E641A	0.010	%	96.2	105	108	103	110
naphthalene-d8	1146-65-2	E641A	0.010	%	93.0	95.8	95.8	94.6	90.8
phenanthrene-d10	1517-22-2	E641A	0.010	%	98.3	92.8	93.1	91.1	90.0
Radiological Parameters									
radium-226	13982-63-3	RA226-MMER	0.0037	Bq/L	0.004	----	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0047	Bq/L	----	0.0057	----	----	----
radium-226	13982-63-3	RA226-MMER	0.0049	Bq/L	----	----	----	<0.0049	----
radium-226	13982-63-3	RA226-MMER	0.0057	Bq/L	----	----	0.0057	----	----
radium-226	13982-63-3	RA226-MMER	0.0081	Bq/L	----	----	----	----	<0.0081

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B3145**	Page	: 1 of 41
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/3	Date Samples Received	: 20-Aug-2020 09:00
PO	: ----	Issue Date	: 15-Sep-2020 10:05
C-O-C number	: 17-766311		
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Polycyclic Aromatic Hydrocarbons	QC-77870-002	----	acridine	260-94-6	E641A	3.30 % LCS-ND	60.0-130%	Recovery less than lower control limit
Polycyclic Aromatic Hydrocarbons	QC-77918-002	----	acridine	260-94-6	E641A	4.64 % LCS-ND	60.0-130%	Recovery less than lower control limit

Result Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Regular Sample Surrogates

Sub-Matrix: **Seawater**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	VA20B3145-001	Source-1	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	42.2 %	60.0-140 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B3145-002	WNW-1	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	47.1 %	60.0-140 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B3145-003	North-1	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	55.6 %	60.0-140 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B3145-004	ENE-1	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	49.4 %	60.0-140 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B3145-005	Source-2	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	56.6 %	60.0-140 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B3145-006	WNW-2	bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	52.8 %	60.0-140 %	Recovery less than lower data quality objective

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE-1	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North-1	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW-1	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP E	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP-D	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ENE-2	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) North-2	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source-1	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Source-2	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WNW-2	E298	15-Aug-2020	----	----	----		26-Aug-2020	28 days	11 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE DUP E	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE DUP-D	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE-1	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE ENE-2	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North-1	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE North-2	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source-1	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE Source-2	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW-1	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Bromide in Seawater by IC										
HDPE WNW-2	E235S.Br	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE DUP E	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE DUP-D	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE-1	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE ENE-2	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North-1	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Chloride in Seawater by IC										
HDPE North-2	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source-1	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE Source-2	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW-1	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Chloride in Seawater by IC										
HDPE WNW-2	E235S.Cl	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP E	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP-D	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE-1	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE ENE-2	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North-1	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE North-2	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source-1	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Source-2	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW-1	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE WNW-2	E378-U	15-Aug-2020	----	----	----		21-Aug-2020	3 days	6 days	× EHTR
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE DUP E	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE DUP-D	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE-1	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE ENE-2	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North-1	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE North-2	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source-1	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE Source-2	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW-1	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Fluoride in Seawater by IC (Low Level)										
HDPE WNW-2	E235S.F-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE DUP E	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE DUP-D	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR

Matrix: **Water**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE-1	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE ENE-2	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North-1	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE North-2	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source-1	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE Source-2	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW-1	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrate in Seawater by IC (Trace Level)										
HDPE WNW-2	E235S.NO3-T	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE DUP E	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	✘ EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE DUP-D	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE-1	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE ENE-2	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North-1	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE North-2	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source-1	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE Source-2	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW-1	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR
Anions and Nutrients : Nitrite in Seawater by IC (Low Level)										
HDPE WNW-2	E235S.NO2-L	15-Aug-2020	----	----	----		23-Aug-2020	3 days	7 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE DUP E	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE DUP-D	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE-1	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE ENE-2	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North-1	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE North-2	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source-1	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE Source-2	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW-1	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓

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Anions and Nutrients : Sulfate in Seawater by IC (Low Level)										
HDPE WNW-2	E235S.SO4-L	15-Aug-2020	----	----	----		23-Aug-2020	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) DUP E	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) DUP-D	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE-1	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) ENE-2	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
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Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW-1	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence										
Amber glass total (sulfuric acid) WNW-2	E318S	15-Aug-2020	25-Aug-2020	28 days	9 days	✓	26-Aug-2020	18 days	0 days	✓
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ENE-1	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	120 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) North-1	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	120 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) DUP E	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	121 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) DUP-D	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	121 hrs	× EHTR
Bacteriological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ENE-2	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	121 hrs	× EHTR
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Sterile HDPE (Sodium thiosulphate) North-2	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	122 hrs	× EHTR
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Sterile HDPE (Sodium thiosulphate) Source-2	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	122 hrs	× EHTR
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Sterile HDPE (Sodium thiosulphate) WNW-2	E012.FC	15-Aug-2020	----	----	----		20-Aug-2020	30 hrs	122 hrs	× EHTR
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) DUP E	E509S	15-Aug-2020	24-Aug-2020	28 days	8 days	✓	24-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) DUP-D	E509S	15-Aug-2020	24-Aug-2020	28 days	8 days	✓	24-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Seawater by CVAAS										
Glass vial - dissolved (lab preserved) ENE-1	E509S	15-Aug-2020	24-Aug-2020	28 days	8 days	✓	24-Aug-2020	19 days	0 days	✓
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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
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Glass vial - dissolved (lab preserved) WNW-2	E509S	15-Aug-2020	24-Aug-2020	28 days	8 days	✓	24-Aug-2020	19 days	0 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) DUP E	E469S	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	24-Aug-2020	174 days	3 days	✓
Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) DUP-D	E469S	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	24-Aug-2020	174 days	3 days	✓
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Dissolved Metals : Dissolved Metals in Seawater by CRC ICPMS (HMI)										
HDPE - dissolved (lab preserved) WNW-2	E469S	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	24-Aug-2020	174 days	3 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) DUP E	E469S.NaSi	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	25-Aug-2020	174 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) DUP-D	E469S.NaSi	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	25-Aug-2020	174 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) ENE-1	E469S.NaSi	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	25-Aug-2020	174 days	4 days	✓
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Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW-1	E469S.NaSi	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	25-Aug-2020	174 days	4 days	✓
Dissolved Metals : Dissolved Sodium and Silicon in Seawater by CRC ICPMS										
HDPE - dissolved (lab preserved) WNW-2	E469S.NaSi	15-Aug-2020	21-Aug-2020	180 days	5 days	✓	25-Aug-2020	174 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP E	E601	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP-D	E601	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE-1	E601	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓

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Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ENE-2	E601	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
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Amber glass/Teflon lined cap (sodium bisulfate) WNW-2	E601	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP E	E581.VH+F1	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	25-Aug-2020	4 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP-D	E581.VH+F1	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	25-Aug-2020	4 days	0 days	✓

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Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ENE-1	E581.VH+F1	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
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Glass vial (sodium bisulfate) North-1	E581.VH+F1	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
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Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) WNW-2	E581.VH+F1	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP E	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓

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Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP-D	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE-1	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ENE-2	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North-1	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) North-2	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source-1	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Source-2	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
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Amber glass total (sulfuric acid) WNW-1	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓
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Amber glass total (sulfuric acid) WNW-2	E355-L	15-Aug-2020	----	----	----		25-Aug-2020	28 days	9 days	✓

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Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE DUP E	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP-D	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE-1	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ENE-2	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North-1	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE North-2	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source-1	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Source-2	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WNW-1	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Alkalinity Species by Titration										
HDPE WNW-2	E290	15-Aug-2020	----	----	----		21-Aug-2020	14 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE DUP E	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE DUP-D	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE-1	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE ENE-2	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North-1	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE North-2	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source-1	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE Source-2	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Conductivity in Seawater										
HDPE WNW-1	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : Conductivity in Seawater										
HDPE WNW-2	E100S	15-Aug-2020	----	----	----		21-Aug-2020	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE ENE-1	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North-1	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE WNW-1	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP E	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP-D	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE ENE-2	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source-1	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE WNW-2	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE North-2	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	147 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Source-2	E108	15-Aug-2020	----	----	----		21-Aug-2020	0.25 hrs	147 hrs	× EHTR-FM
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE DUP E	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE DUP-D	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE-1	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE ENE-2	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North-1	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE North-2	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times Rec*	*Holding Times Actual*	*Eval*	*Analysis Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source-1	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE Source-2	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW-1	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Seawater)										
HDPE WNW-2	E160S	15-Aug-2020	----	----	----		21-Aug-2020	7 days	5 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE DUP E	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE DUP-D	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE ENE-1	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE ENE-2	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE North-1	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE North-2	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Source-1	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Source-2	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE WNW-1	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE WNW-2	E121	15-Aug-2020	----	----	----		21-Aug-2020	3 days	5 days	× EHTR
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) DUP E	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) DUP-D	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE-1	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ENE-2	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North-1	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) North-2	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source-1	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Source-2	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW-1	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) WNW-2	E641A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) DUP E	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) DUP-D	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE-1	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Eval
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) ENE-2	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North-1	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) North-2	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source-1	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) Source-2	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW-1	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Radiological Parameters : Radium-226 by Radon Emanation										
HDPE total (nitric acid) WNW-2	RA226-MMER	15-Aug-2020	----	----	----		10-Sep-2020	180 days	25 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) DUP E	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) DUP-D	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE-1	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) ENE-2	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North-1	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) North-2	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source-1	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) Source-2	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW-1	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Mercury in Seawater by CVAAS										
Glass vial total (hydrochloric acid) WNW-2	E508S	15-Aug-2020	----	----	----		24-Aug-2020	28 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) DUP E	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓

Matrix: **Water**

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Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) DUP-D	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE-1	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) ENE-2	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North-1	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) North-2	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source-1	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) Source-2	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW-1	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓
Total Metals : Total Metals in Seawater by CRC ICPMS (HMI)										
HDPE total (nitric acid) WNW-2	E468S	15-Aug-2020	----	----	----		24-Aug-2020	180 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North-2	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	10 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source-2	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	10 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) DUP E	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) DUP-D	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE-1	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) ENE-2	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) North-1	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) Source-1	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW-1	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Sodium and Silicon in Seawater by CRC ICPMS										
HDPE total (nitric acid) WNW-2	E468S.NaSi	15-Aug-2020	----	----	----		25-Aug-2020	180 days	9 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP E	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	25-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP-D	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	25-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE-1	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ENE-2	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	25-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North-1	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) North-2	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source-1	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Source-2	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW-1	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) WNW-2	E611A	15-Aug-2020	25-Aug-2020	14 days	9 days	✓	26-Aug-2020	4 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	75128	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	76642	1	10	10.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	75049	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	76562	2	27	7.4	5.0	✓
Chloride in Seawater by IC	E235S.Cl	75050	1	10	10.0	5.0	✓
Conductivity in Seawater	E100S	75127	1	10	10.0	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	76070	1	10	10.0	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	74965	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	75026	1	20	5.0	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	74964	1	10	10.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	75051	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	75053	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	75052	1	10	10.0	5.0	✓
pH by Meter	E108	75129	1	10	10.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	75054	1	10	10.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	74812	1	10	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	76643	1	10	10.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	75943	1	10	10.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	76091	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	76641	1	10	10.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	76092	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	75095	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	76561	2	34	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	75128	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	76642	1	10	10.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	75049	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	76562	2	27	7.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	77871	2	10	20.0	5.0	✓
Chloride in Seawater by IC	E235S.Cl	75050	1	10	10.0	5.0	✓
Conductivity in Seawater	E100S	75127	1	10	10.0	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	76070	1	10	10.0	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	74965	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	75026	1	20	5.0	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	74964	1	10	10.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	75051	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	75053	1	10	10.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Control Samples (LCS) - Continued							
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	75052	1	10	10.0	5.0	✓
PAHs by LVI GC-MS	E641A	77870	2	17	11.7	5.0	✓
pH by Meter	E108	75129	1	10	10.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	75054	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	76643	1	10	10.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	75943	1	10	10.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	76091	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	76641	1	10	10.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	76092	1	13	7.6	5.0	✓
TSS by Gravimetry (Seawater)	E160S	75103	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	75095	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	76561	2	34	5.8	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	75128	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	76642	1	10	10.0	5.0	✓
Bromide in Seawater by IC	E235S.Br	75049	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	76562	2	27	7.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	77871	2	10	20.0	5.0	✓
Chloride in Seawater by IC	E235S.Cl	75050	1	10	10.0	5.0	✓
Conductivity in Seawater	E100S	75127	1	10	10.0	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	76070	1	10	10.0	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	74965	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	75026	1	20	5.0	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	74964	1	10	10.0	5.0	✓
Fluoride in Seawater by IC (Low Level)	E235S.F-L	75051	1	10	10.0	5.0	✓
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	75053	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	75052	1	10	10.0	5.0	✓
PAHs by LVI GC-MS	E641A	77870	2	17	11.7	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	75054	1	10	10.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	74812	1	10	10.0	10.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	76643	1	10	10.0	5.0	✓
Total Mercury in Seawater by CVAAS	E508S	75943	1	10	10.0	5.0	✓
Total Metals in Seawater by CRC ICPMS (HMI)	E468S	76091	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	76641	1	10	10.0	5.0	✓
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi	76092	1	13	7.6	5.0	✓
TSS by Gravimetry (Seawater)	E160S	75103	1	10	10.0	5.0	✓
Turbidity by Nephelometry	E121	75095	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	76561	2	34	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	76642	1	10	10.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Bromide in Seawater by IC	E235S.Br	75049	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	76562	2	27	7.4	5.0	✓
Chloride in Seawater by IC	E235S.Cl	75050	1	10	10.0	5.0	✓
Dissolved Mercury in Seawater by CVAAS	E509S	76070	1	10	10.0	5.0	✓
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S	74965	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	75026	1	20	5.0	5.0	✓
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi	74964	1	10	10.0	5.0	✓
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Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T	75053	1	10	10.0	5.0	✓
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L	75052	1	10	10.0	5.0	✓
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L	75054	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence	E318S	76643	1	10	10.0	5.0	✓
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VH and F1 by Headspace GC-FID	E581.VH+F1	76561	2	34	5.8	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC Vancouver - Environmental	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 45.5 ±0.2°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
Conductivity in Seawater	E100S Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry (Seawater)	E160S Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Seawater by IC	E235S.Br Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Seawater by IC	E235S.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Seawater by IC (Low Level)	E235S.F-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Seawater by IC (Low Level)	E235S.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Seawater by IC (Trace Level)	E235S.NO3-T Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Seawater by IC (Low Level)	E235S.SO4-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence	E318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Seawater by CRC ICPMS (HMI)	E468S Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode). This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Total Sodium and Silicon in Seawater by CRC ICPMS	E468S.NaSi Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Seawater samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. This method is compliant with digestion requirements of the British Columbia Environmental Laboratory Manual.
Dissolved Metals in Seawater by CRC ICPMS (HMI)	E469S Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS (HMI Mode).
Dissolved Sodium and Silicon in Seawater by CRC ICPMS	E469S.NaSi Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Seawater samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Seawater by CVAAS	E508S Vancouver - Environmental	Water	EPA 1631E (mod)	Seawater samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Mercury in Seawater by CVAAS	E509S Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Seawater samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fractions 2-4 (F2-F4) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
Radium-226 by Radon Emanation	RA226-MMER Fort Collins - Environmental - 225 Commerce Drive Fort Collins Colorado United States 80524	Water	EPA 903.1	Radium-226 in sample was analyzed according to the current revision of SOP 783.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in Seawater	EP318S Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent and H2SO4.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: VA20B3145	Page	: 1 of 24
Client	: Golder Associates Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/3	Date Samples Received	: 20-Aug-2020 09:00
PO	: ----	Date Analysis Commenced	: 20-Aug-2020
C-O-C number	: 17-766311	Issue Date	: 15-Sep-2020 10:04
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 10		
No. of samples analysed	: 10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Internal Subcontracting, Fort Collins, Colorado
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Nicole Briceelion	Analsyt	Microbiology, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 75095)											
VA20B3108-001	Anonymous	turbidity	----	E121	0.10	NTU	0.27	0.26	0.01	Diff <2x LOR	----
Physical Tests (QC Lot: 75127)											
VA20B3145-001	Source-1	conductivity	----	E100S	2.0	µS/cm	16800	16800	0.298%	20%	----
Physical Tests (QC Lot: 75128)											
VA20B3145-001	Source-1	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	88.5	86.7	2.05%	20%	----
Physical Tests (QC Lot: 75129)											
VA20B3145-001	Source-1	pH	----	E108	0.10	pH units	8.06	8.06	0.00%	4%	----
Anions and Nutrients (QC Lot: 75026)											
VA20B2888-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 75049)											
VA20B3145-001	Source-1	bromide	24959-67-9	E235S.Br	5.0	mg/L	20.4	21.2	0.8	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 75050)											
VA20B3145-001	Source-1	chloride	16887-00-6	E235S.Cl	50	mg/L	5810	5810	0.0820%	20%	----
Anions and Nutrients (QC Lot: 75051)											
VA20B3145-001	Source-1	fluoride	16984-48-8	E235S.F-L	0.20	mg/L	0.29	0.30	0.010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 75052)											
VA20B3145-001	Source-1	nitrite (as N)	14797-65-0	E235S.NO2-L	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 75053)											
VA20B3145-001	Source-1	nitrate (as N)	14797-55-8	E235S.NO3-T	0.010	mg/L	0.134	0.137	2.19%	20%	----
Anions and Nutrients (QC Lot: 75054)											
VA20B3145-001	Source-1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	3.0	mg/L	788	782	0.761%	20%	----
Anions and Nutrients (QC Lot: 76642)											
VA20B3145-001	Source-1	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 76643)											
VA20B3145-001	Source-1	Kjeldahl nitrogen, total [TKN]	----	E318S	0.050	mg/L	0.099	0.098	0.0008	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 76641)											
VA20B3145-001	Source-1	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.39	1.54	0.15	Diff <2x LOR	----
Bacteriological Tests (QC Lot: 74812)											
VA20B3145-001	Source-1	coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 75943)											
VA20B3145-001	Source-1	mercury, total	7439-97-6	E508S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 76091)											
VA20B3070-002	Anonymous	aluminum, total	7429-90-5	E468S	0.0050	mg/L	2.87	2.78	3.05%	20%	----
		antimony, total	7440-36-0	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E468S	0.00040	mg/L	0.00416	0.00403	3.34%	20%	----
		barium, total	7440-39-3	E468S	0.0010	mg/L	0.0228	0.0226	0.862%	20%	----
		beryllium, total	7440-41-7	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E468S	0.30	mg/L	2.20	2.17	0.02	Diff <2x LOR	----
		cadmium, total	7440-43-9	E468S	0.000010	mg/L	0.000140	0.000129	8.03%	20%	----
		calcium, total	7440-70-2	E468S	1.0	mg/L	224	220	1.85%	20%	----
		cesium, total	7440-46-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E468S	0.00050	mg/L	0.00689	0.00689	0.0234%	20%	----
		cobalt, total	7440-48-4	E468S	0.000050	mg/L	0.00214	0.00214	0.220%	20%	----
		copper, total	7440-50-8	E468S	0.00050	mg/L	0.00688	0.00694	0.793%	20%	----
		gallium, total	7440-55-3	E468S	0.00050	mg/L	0.00092	0.00085	0.00007	Diff <2x LOR	----
		iron, total	7439-89-6	E468S	0.010	mg/L	5.56	5.52	0.700%	20%	----
		lead, total	7439-92-1	E468S	0.000050	mg/L	0.00241	0.00232	3.76%	20%	----
		lithium, total	7439-93-2	E468S	0.020	mg/L	0.092	0.090	0.002	Diff <2x LOR	----
		magnesium, total	7439-95-4	E468S	1.0	mg/L	574	586	2.17%	20%	----
		manganese, total	7439-96-5	E468S	0.00020	mg/L	0.114	0.112	1.65%	20%	----
		molybdenum, total	7439-98-7	E468S	0.00200	mg/L	0.00623	0.00593	0.00030	Diff <2x LOR	----
		nickel, total	7440-02-0	E468S	0.00050	mg/L	0.00684	0.00684	0.0101%	20%	----
		phosphorus, total	7723-14-0	E468S	0.050	mg/L	0.650	0.663	2.03%	20%	----
		potassium, total	7440-09-7	E468S	1.0	mg/L	201	195	3.38%	20%	----
		rhenium, total	7440-15-5	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E468S	0.0050	mg/L	0.0602	0.0582	3.37%	20%	----
		selenium, total	7782-49-2	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, total	7440-22-4	E468S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E468S	0.010	mg/L	4.07	3.98	2.43%	20%	----
		sulfur, total	7704-34-9	E468S	5.0	mg/L	505	532	5.19%	20%	----
		tellurium, total	13494-80-9	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E468S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E468S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, total	7440-31-5	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E468S	0.0050	mg/L	0.134	0.132	1.56%	20%	----
		tungsten, total	7440-33-7	E468S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E468S	0.000050	mg/L	0.00170	0.00172	1.03%	20%	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 76091) - continued											
VA20B3070-002	Anonymous	vanadium, total	7440-62-2	E468S	0.00050	mg/L	0.0105	0.0104	0.973%	20%	----
		yttrium, total	7440-65-5	E468S	0.00050	mg/L	0.00205	0.00206	0.000007	Diff <2x LOR	----
		zinc, total	7440-66-6	E468S	0.0030	mg/L	0.0195	0.0188	0.0007	Diff <2x LOR	----
		zirconium, total	7440-67-7	E468S	0.00050	mg/L	0.00053	<0.00050	0.00003	Diff <2x LOR	----
Total Metals (QC Lot: 76092)											
VA20B3070-002	Anonymous	silicon, total	7440-21-3	E468S.NaSi	1.0	mg/L	9.7	10.7	10.1%	20%	----
		sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	5940	6140	3.30%	20%	----
Dissolved Metals (QC Lot: 74964)											
VA20B3145-001	Source-1	silicon, dissolved	7440-21-3	E469S.NaSi	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	3260	3230	0.878%	20%	----
Dissolved Metals (QC Lot: 74965)											
VA20B3145-001	Source-1	aluminum, dissolved	7429-90-5	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E469S	0.00040	mg/L	0.00070	0.00066	0.00004	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E469S	0.0010	mg/L	0.0061	0.0059	0.0002	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E469S	0.30	mg/L	1.37	1.32	0.05	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E469S	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E469S	1.0	mg/L	138	139	0.946%	20%	----
		cesium, dissolved	7440-46-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E469S	0.00020	mg/L	0.00034	0.00033	0.00001	Diff <2x LOR	----
		gallium, dissolved	7440-55-3	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E469S	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E469S	0.020	mg/L	0.054	0.053	0.001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E469S	1.0	mg/L	359	357	0.735%	20%	----
		manganese, dissolved	7439-96-5	E469S	0.00010	mg/L	0.00120	0.00120	0.0193%	20%	----
		molybdenum, dissolved	7439-98-7	E469S	0.00010	mg/L	0.00315	0.00320	1.48%	20%	----
		nickel, dissolved	7440-02-0	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E469S	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E469S	1.0	mg/L	119	116	2.30%	20%	----
		rhenium, dissolved	7440-15-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Dissolved Metals (QC Lot: 74965) - continued											
VA20B3145-001	Source-1	rubidium, dissolved	7440-17-7	E469S	0.0050	mg/L	0.0338	0.0335	0.0003	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E469S	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E469S	0.010	mg/L	2.15	2.22	3.08%	20%	----
		sulfur, dissolved	7704-34-9	E469S	5.0	mg/L	319	324	1.59%	20%	----
		tellurium, dissolved	13494-80-9	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E469S	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E469S	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E469S	0.000050	mg/L	0.00196	0.00194	1.02%	20%	----
		vanadium, dissolved	7440-62-2	E469S	0.00050	mg/L	0.00052	<0.00050	0.00002	Diff <2x LOR	----
		yttrium, dissolved	7440-65-5	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E469S	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E469S	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 76070)											
VA20B3145-001	Source-1	mercury, dissolved	7439-97-6	E509S	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 76562)											
VA20B3145-001	Source-1	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 76693)											
VA20B3145-008	ENE-2	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 76561)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Hydrocarbons (QC Lot: 76561) - continued											
VA20B3145-001	Source-1	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----
Hydrocarbons (QC Lot: 76692)											
VA20B3145-008	ENE-2	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 75095)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 75103)						
solids, total suspended [TSS]	----	E160S	2	mg/L	<2.0	----
Physical Tests (QCLot: 75127)						
conductivity	----	E100S	2	µS/cm	<2.0	----
Physical Tests (QCLot: 75128)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	1.0	----
Anions and Nutrients (QCLot: 75026)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 75049)						
bromide	24959-67-9	E235S.Br	5	mg/L	<5.0	----
Anions and Nutrients (QCLot: 75050)						
chloride	16887-00-6	E235S.Cl	50	mg/L	<50	----
Anions and Nutrients (QCLot: 75051)						
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	<0.20	----
Anions and Nutrients (QCLot: 75052)						
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 75053)						
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 75054)						
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 76642)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 76643)						
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 76641)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Bacteriological Tests (QCLot: 74812)						
coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Total Metals (QCLot: 75943)						
mercury, total	7439-97-6	E508S	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 76091)						
aluminum, total	7429-90-5	E468S	0.005	mg/L	<0.0050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 76091) - continued						
antimony, total	7440-36-0	E468S	0.001	mg/L	<0.0010	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	<0.00040	----
barium, total	7440-39-3	E468S	0.001	mg/L	<0.0010	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	<0.00050	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	<0.00050	----
boron, total	7440-42-8	E468S	0.3	mg/L	<0.30	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	<0.000010	----
calcium, total	7440-70-2	E468S	1	mg/L	<1.0	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	<0.00050	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	<0.000050	----
copper, total	7440-50-8	E468S	0.0005	mg/L	<0.00050	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E468S	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E468S	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E468S	0.02	mg/L	<0.020	----
magnesium, total	7439-95-4	E468S	1	mg/L	<1.0	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	<0.00020	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	<0.00010	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E468S	1	mg/L	<1.0	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	<0.00050	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	<0.0050	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	<0.00050	----
silver, total	7440-22-4	E468S	0.0001	mg/L	<0.00010	----
strontium, total	7440-24-6	E468S	0.01	mg/L	<0.010	----
sulfur, total	7704-34-9	E468S	5	mg/L	<5.0	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	<0.00050	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	<0.000050	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	<0.00050	----
tin, total	7440-31-5	E468S	0.001	mg/L	<0.0010	----
titanium, total	7440-32-6	E468S	0.005	mg/L	<0.0050	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	<0.000050	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 76091) - continued						
yttrium, total	7440-65-5	E468S	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E468S	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	<0.00050	----
Total Metals (QCLot: 76092)						
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	<1.0	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 74964)						
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	<1.0	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	<2.5	----
Dissolved Metals (QCLot: 74965)						
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	<0.0050	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	<0.0010	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	<0.00040	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	<0.0010	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	<0.00050	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	<0.00050	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	<0.30	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	<0.000010	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	<1.0	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	<0.00050	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	<0.000050	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	<0.00020	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	<0.00050	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	<0.020	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	<1.0	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	<0.00010	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	<1.0	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	<0.00050	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	<0.0050	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 74965) - continued						
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	<0.00010	----
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	<0.010	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	<5.0	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	<0.00050	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	<0.000050	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	<0.00050	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	<0.0010	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	<0.0050	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	<0.0010	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	<0.000050	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	<0.00050	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	<0.00050	----
Dissolved Metals (QCLot: 76070)						
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	<0.0000050	----
Volatile Organic Compounds (QCLot: 76562)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Volatile Organic Compounds (QCLot: 76693)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
Hydrocarbons (QCLot: 76561)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 76692)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 77871)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 77917)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77870)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77918)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 77918) - continued						
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 75095)									
turbidity	----	E121	0.1	NTU	200 NTU	104	85.0	115	----
Physical Tests (QCLot: 75103)									
solids, total suspended [TSS]	----	E160S	2	mg/L	150 mg/L	97.9	85.0	115	----
Physical Tests (QCLot: 75127)									
conductivity	----	E100S	2	µS/cm	146.9 µS/cm	101	80.0	120	----
Physical Tests (QCLot: 75128)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	99.3	85.0	115	----
Physical Tests (QCLot: 75129)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 75026)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.2	80.0	120	----
Anions and Nutrients (QCLot: 75049)									
bromide	24959-67-9	E235S.Br	5	mg/L	0.5 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 75050)									
chloride	16887-00-6	E235S.Cl	50	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 75051)									
fluoride	16984-48-8	E235S.F-L	0.2	mg/L	1 mg/L	96.3	90.0	110	----
Anions and Nutrients (QCLot: 75052)									
nitrite (as N)	14797-65-0	E235S.NO2-L	0.01	mg/L	0.5 mg/L	97.1	90.0	110	----
Anions and Nutrients (QCLot: 75053)									
nitrate (as N)	14797-55-8	E235S.NO3-T	0.01	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 75054)									
sulfate (as SO4)	14808-79-8	E235S.SO4-L	3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 76642)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	97.9	85.0	115	----
Anions and Nutrients (QCLot: 76643)									
Kjeldahl nitrogen, total [TKN]	----	E318S	0.05	mg/L	4 mg/L	120	75.0	125	----
Organic / Inorganic Carbon (QCLot: 76641)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	98.9	80.0	120	----
Total Metals (QCLot: 75943)									
mercury, total	7439-97-6	E508S	0.000005	mg/L	0.0001 mg/L	85.1	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 76091)									
aluminum, total	7429-90-5	E468S	0.005	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E468S	0.001	mg/L	1 mg/L	93.8	80.0	120	----
arsenic, total	7440-38-2	E468S	0.0004	mg/L	1 mg/L	99.5	80.0	120	----
barium, total	7440-39-3	E468S	0.001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E468S	0.0005	mg/L	0.1 mg/L	95.4	80.0	120	----
bismuth, total	7440-69-9	E468S	0.0005	mg/L	1 mg/L	113	80.0	120	----
boron, total	7440-42-8	E468S	0.3	mg/L	10 mg/L	95.8	80.0	120	----
cadmium, total	7440-43-9	E468S	0.00001	mg/L	0.1 mg/L	104	80.0	120	----
calcium, total	7440-70-2	E468S	1	mg/L	50 mg/L	95.2	80.0	120	----
cesium, total	7440-46-2	E468S	0.0005	mg/L	0.05 mg/L	88.6	80.0	120	----
chromium, total	7440-47-3	E468S	0.0005	mg/L	0.25 mg/L	108	80.0	120	----
cobalt, total	7440-48-4	E468S	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
copper, total	7440-50-8	E468S	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
gallium, total	7440-55-3	E468S	0.0005	mg/L	0.25 mg/L	114	80.0	120	----
iron, total	7439-89-6	E468S	0.01	mg/L	1 mg/L	101	80.0	120	----
lead, total	7439-92-1	E468S	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E468S	0.02	mg/L	0.25 mg/L	97.0	80.0	120	----
magnesium, total	7439-95-4	E468S	1	mg/L	50 mg/L	96.6	80.0	120	----
manganese, total	7439-96-5	E468S	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
molybdenum, total	7439-98-7	E468S	0.0001	mg/L	0.25 mg/L	90.8	80.0	120	----
nickel, total	7440-02-0	E468S	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
phosphorus, total	7723-14-0	E468S	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, total	7440-09-7	E468S	1	mg/L	50 mg/L	108	80.0	120	----
rhenium, total	7440-15-5	E468S	0.0005	mg/L	0.1 mg/L	101	80.0	120	----
rubidium, total	7440-17-7	E468S	0.005	mg/L	0.1 mg/L	109	80.0	120	----
selenium, total	7782-49-2	E468S	0.0005	mg/L	1 mg/L	104	80.0	120	----
silver, total	7440-22-4	E468S	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
strontium, total	7440-24-6	E468S	0.01	mg/L	0.25 mg/L	98.1	80.0	120	----
sulfur, total	7704-34-9	E468S	5	mg/L	50 mg/L	114	80.0	120	----
tellurium, total	13494-80-9	E468S	0.0005	mg/L	0.1 mg/L	104	80.0	120	----
thallium, total	7440-28-0	E468S	0.00005	mg/L	1 mg/L	105	80.0	120	----
thorium, total	7440-29-1	E468S	0.0005	mg/L	0.1 mg/L	90.2	80.0	120	----
tin, total	7440-31-5	E468S	0.001	mg/L	0.5 mg/L	91.5	80.0	120	----
titanium, total	7440-32-6	E468S	0.005	mg/L	0.25 mg/L	96.8	80.0	120	----
tungsten, total	7440-33-7	E468S	0.001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E468S	0.00005	mg/L	0.005 mg/L	94.9	80.0	120	----
vanadium, total	7440-62-2	E468S	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
yttrium, total	7440-65-5	E468S	0.0005	mg/L	0.1 mg/L	98.9	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 76091) - continued									
zinc, total	7440-66-6	E468S	0.003	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, total	7440-67-7	E468S	0.0005	mg/L	0.1 mg/L	90.9	80.0	120	----
Total Metals (QCLot: 76092)									
silicon, total	7440-21-3	E468S.NaSi	1	mg/L	10 mg/L	111	80.0	120	----
sodium, total	7440-23-5	E468S.NaSi	2.5	mg/L	50 mg/L	110	80.0	120	----
Dissolved Metals (QCLot: 74964)									
silicon, dissolved	7440-21-3	E469S.NaSi	1	mg/L	10 mg/L	108	80.0	120	----
sodium, dissolved	7440-23-5	E469S.NaSi	2.5	mg/L	50 mg/L	109	80.0	120	----
Dissolved Metals (QCLot: 74965)									
aluminum, dissolved	7429-90-5	E469S	0.005	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E469S	0.001	mg/L	1 mg/L	89.7	80.0	120	----
arsenic, dissolved	7440-38-2	E469S	0.0004	mg/L	1 mg/L	100	80.0	120	----
barium, dissolved	7440-39-3	E469S	0.001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, dissolved	7440-41-7	E469S	0.0005	mg/L	0.1 mg/L	96.4	80.0	120	----
bismuth, dissolved	7440-69-9	E469S	0.0005	mg/L	1 mg/L	118	80.0	120	----
boron, dissolved	7440-42-8	E469S	0.3	mg/L	10 mg/L	94.6	80.0	120	----
cadmium, dissolved	7440-43-9	E469S	0.00001	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E469S	1	mg/L	50 mg/L	97.4	80.0	120	----
cesium, dissolved	7440-46-2	E469S	0.0005	mg/L	0.05 mg/L	89.5	80.0	120	----
chromium, dissolved	7440-47-3	E469S	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
cobalt, dissolved	7440-48-4	E469S	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
copper, dissolved	7440-50-8	E469S	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
gallium, dissolved	7440-55-3	E469S	0.0005	mg/L	0.25 mg/L	109	80.0	120	----
iron, dissolved	7439-89-6	E469S	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, dissolved	7439-92-1	E469S	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, dissolved	7439-93-2	E469S	0.02	mg/L	0.25 mg/L	97.6	80.0	120	----
magnesium, dissolved	7439-95-4	E469S	1	mg/L	50 mg/L	105	80.0	120	----
manganese, dissolved	7439-96-5	E469S	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
molybdenum, dissolved	7439-98-7	E469S	0.0001	mg/L	0.25 mg/L	91.8	80.0	120	----
nickel, dissolved	7440-02-0	E469S	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
phosphorus, dissolved	7723-14-0	E469S	0.05	mg/L	10 mg/L	96.7	80.0	120	----
potassium, dissolved	7440-09-7	E469S	1	mg/L	50 mg/L	104	80.0	120	----
rhenium, dissolved	7440-15-5	E469S	0.0005	mg/L	0.1 mg/L	100	80.0	120	----
rubidium, dissolved	7440-17-7	E469S	0.005	mg/L	0.1 mg/L	105	80.0	120	----
selenium, dissolved	7782-49-2	E469S	0.0005	mg/L	1 mg/L	108	80.0	120	----
silver, dissolved	7440-22-4	E469S	0.0001	mg/L	0.1 mg/L	93.9	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 74965) - continued									
strontium, dissolved	7440-24-6	E469S	0.01	mg/L	0.25 mg/L	100	80.0	120	----
sulfur, dissolved	7704-34-9	E469S	5	mg/L	50 mg/L	120	80.0	120	----
tellurium, dissolved	13494-80-9	E469S	0.0005	mg/L	0.1 mg/L	104	80.0	120	----
thallium, dissolved	7440-28-0	E469S	0.00005	mg/L	1 mg/L	106	80.0	120	----
thorium, dissolved	7440-29-1	E469S	0.0005	mg/L	0.1 mg/L	93.6	80.0	120	----
tin, dissolved	7440-31-5	E469S	0.001	mg/L	0.5 mg/L	91.3	80.0	120	----
titanium, dissolved	7440-32-6	E469S	0.005	mg/L	0.25 mg/L	99.7	80.0	120	----
tungsten, dissolved	7440-33-7	E469S	0.001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, dissolved	7440-61-1	E469S	0.00005	mg/L	0.005 mg/L	94.2	80.0	120	----
vanadium, dissolved	7440-62-2	E469S	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
yttrium, dissolved	7440-65-5	E469S	0.0005	mg/L	0.1 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E469S	0.001	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, dissolved	7440-67-7	E469S	0.0005	mg/L	0.1 mg/L	93.6	80.0	120	----
Dissolved Metals (QCLot: 76070)									
mercury, dissolved	7439-97-6	E509S	0.000005	mg/L	0.0001 mg/L	95.6	80.0	120	----
Volatile Organic Compounds (QCLot: 76562)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	104	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	104	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
Volatile Organic Compounds (QCLot: 76693)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	89.7	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	95.6	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	104	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
Hydrocarbons (QCLot: 76561)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	113	70.0	130	----
Hydrocarbons (QCLot: 76692)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	96.2	70.0	130	----

Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Hydrocarbons (QCLot: 77871)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	128	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	119	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	124	70.0	130	----
Hydrocarbons (QCLot: 77917)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	122	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	115	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	118	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77870)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	# 3.30	60.0	130	LCS-ND
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	96.6	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	96.3	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	105	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	96.8	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	101	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	98.0	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	97.0	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	97.1	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	125	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77918)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	96.5	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	98.4	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	# 4.64	60.0	130	LCS-ND
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	95.2	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	112	60.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 77918) - continued									
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	96.0	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	103	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	92.5	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	103	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	95.4	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	89.4	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	95.8	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	90.5	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	88.5	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	96.3	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	89.3	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	117	60.0	130	----

Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 75026)										
VA20B2888-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0299 mg/L	0.03 mg/L	99.6	70.0	130	----
Anions and Nutrients (QCLot: 75049)										
VA20B3145-002	WNW-1	bromide	24959-67-9	E235S.Br	61.0 mg/L	50 mg/L	122	75.0	125	----
Anions and Nutrients (QCLot: 75050)										
VA20B3145-002	WNW-1	chloride	16887-00-6	E235S.Cl	10200 mg/L	10000 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 75051)										
VA20B3145-002	WNW-1	fluoride	16984-48-8	E235S.F-L	9.71 mg/L	10 mg/L	97.1	75.0	125	----
Anions and Nutrients (QCLot: 75052)										
VA20B3145-002	WNW-1	nitrite (as N)	14797-65-0	E235S.NO2-L	4.83 mg/L	5 mg/L	96.6	75.0	125	----
Anions and Nutrients (QCLot: 75053)										
VA20B3145-002	WNW-1	nitrate (as N)	14797-55-8	E235S.NO3-T	7.69 mg/L	7.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 75054)										
VA20B3145-002	WNW-1	sulfate (as SO4)	14808-79-8	E235S.SO4-L	1000 mg/L	1000 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 76642)										
VA20B3145-002	WNW-1	ammonia, total (as N)	7664-41-7	E298	0.210 mg/L	0.2 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 76643)										
VA20B3145-002	WNW-1	Kjeldahl nitrogen, total [TKN]	----	E318S	2.95 mg/L	2.5 mg/L	118	70.0	130	----
Organic / Inorganic Carbon (QCLot: 76641)										
VA20B3145-002	WNW-1	carbon, total organic [TOC]	----	E355-L	5.34 mg/L	5 mg/L	107	70.0	130	----
Total Metals (QCLot: 75943)										
VA20B3145-002	WNW-1	mercury, total	7439-97-6	E508S	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Total Metals (QCLot: 76091)										
VA20B3070-016	Anonymous	aluminum, total	7429-90-5	E468S	0.366 mg/L	0.4 mg/L	91.6	70.0	130	----
		antimony, total	7440-36-0	E468S	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		arsenic, total	7440-38-2	E468S	0.0362 mg/L	0.04 mg/L	90.5	70.0	130	----
		barium, total	7440-39-3	E468S	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		beryllium, total	7440-41-7	E468S	0.0720 mg/L	0.08 mg/L	90.0	70.0	130	----
		bismuth, total	7440-69-9	E468S	0.0180 mg/L	0.02 mg/L	90.2	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 76091) - continued										
VA20B3070-016	Anonymous	boron, total	7440-42-8	E468S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E468S	0.00712 mg/L	0.008 mg/L	89.0	70.0	130	----
		calcium, total	7440-70-2	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E468S	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		chromium, total	7440-47-3	E468S	0.0782 mg/L	0.08 mg/L	97.8	70.0	130	----
		cobalt, total	7440-48-4	E468S	0.0352 mg/L	0.04 mg/L	87.9	70.0	130	----
		copper, total	7440-50-8	E468S	0.0327 mg/L	0.04 mg/L	81.8	70.0	130	----
		gallium, total	7440-55-3	E468S	0.00519 mg/L	0.005 mg/L	104	70.0	130	----
		iron, total	7439-89-6	E468S	3.78 mg/L	4 mg/L	94.6	70.0	130	----
		lead, total	7439-92-1	E468S	0.0370 mg/L	0.04 mg/L	92.5	70.0	130	----
		lithium, total	7439-93-2	E468S	0.161 mg/L	0.2 mg/L	80.5	70.0	130	----
		magnesium, total	7439-95-4	E468S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E468S	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
		nickel, total	7440-02-0	E468S	0.0671 mg/L	0.08 mg/L	83.8	70.0	130	----
		phosphorus, total	7723-14-0	E468S	20.5 mg/L	20 mg/L	102	70.0	130	----
		potassium, total	7440-09-7	E468S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, total	7440-15-5	E468S	0.00481 mg/L	0.005 mg/L	96.2	70.0	130	----
		rubidium, total	7440-17-7	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E468S	0.0821 mg/L	0.08 mg/L	103	70.0	130	----
		silver, total	7440-22-4	E468S	0.00781 mg/L	0.008 mg/L	97.6	70.0	130	----
		strontium, total	7440-24-6	E468S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E468S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E468S	0.0755 mg/L	0.08 mg/L	94.4	70.0	130	----
		thallium, total	7440-28-0	E468S	0.00738 mg/L	0.008 mg/L	92.2	70.0	130	----
		thorium, total	7440-29-1	E468S	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		tin, total	7440-31-5	E468S	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		titanium, total	7440-32-6	E468S	0.0808 mg/L	0.08 mg/L	101	70.0	130	----
		tungsten, total	7440-33-7	E468S	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		uranium, total	7440-61-1	E468S	0.00779 mg/L	0.008 mg/L	97.3	70.0	130	----
		vanadium, total	7440-62-2	E468S	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		yttrium, total	7440-65-5	E468S	0.00586 mg/L	0.005 mg/L	117	70.0	130	----
		zinc, total	7440-66-6	E468S	0.665 mg/L	0.8 mg/L	83.2	70.0	130	----
		zirconium, total	7440-67-7	E468S	0.0840 mg/L	0.08 mg/L	105	70.0	130	----
Total Metals (QCLot: 76092)										
VA20B3070-016	Anonymous	silicon, total	7440-21-3	E468S.NaSi	537 mg/L	500 mg/L	107	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 76092) - continued										
VA20B3070-016	Anonymous	sodium, total	7440-23-5	E468S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 74964)										
VA20B3145-002	WNW-1	silicon, dissolved	7440-21-3	E469S.NaSi	486 mg/L	500 mg/L	97.1	70.0	130	----
		sodium, dissolved	7440-23-5	E469S.NaSi	ND mg/L	4 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 74965)										
VA20B3145-002	WNW-1	aluminum, dissolved	7429-90-5	E469S	0.415 mg/L	0.4 mg/L	104	70.0	130	----
		antimony, dissolved	7440-36-0	E469S	0.0371 mg/L	0.04 mg/L	92.8	70.0	130	----
		arsenic, dissolved	7440-38-2	E469S	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		barium, dissolved	7440-39-3	E469S	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		beryllium, dissolved	7440-41-7	E469S	0.0795 mg/L	0.08 mg/L	99.4	70.0	130	----
		bismuth, dissolved	7440-69-9	E469S	0.0183 mg/L	0.02 mg/L	91.7	70.0	130	----
		boron, dissolved	7440-42-8	E469S	ND mg/L	0.2 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E469S	0.00739 mg/L	0.008 mg/L	92.4	70.0	130	----
		calcium, dissolved	7440-70-2	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E469S	0.0178 mg/L	0.02 mg/L	89.1	70.0	130	----
		chromium, dissolved	7440-47-3	E469S	0.0813 mg/L	0.08 mg/L	102	70.0	130	----
		cobalt, dissolved	7440-48-4	E469S	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		copper, dissolved	7440-50-8	E469S	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		gallium, dissolved	7440-55-3	E469S	0.00577 mg/L	0.005 mg/L	115	70.0	130	----
		iron, dissolved	7439-89-6	E469S	4.02 mg/L	4 mg/L	100	70.0	130	----
		lead, dissolved	7439-92-1	E469S	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		lithium, dissolved	7439-93-2	E469S	0.203 mg/L	0.2 mg/L	101	70.0	130	----
		magnesium, dissolved	7439-95-4	E469S	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E469S	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		molybdenum, dissolved	7439-98-7	E469S	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		nickel, dissolved	7440-02-0	E469S	0.0756 mg/L	0.08 mg/L	94.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E469S	22.1 mg/L	20 mg/L	110	70.0	130	----
		potassium, dissolved	7440-09-7	E469S	ND mg/L	8 mg/L	ND	70.0	130	----
		rhenium, dissolved	7440-15-5	E469S	0.00504 mg/L	0.005 mg/L	101	70.0	130	----
		rubidium, dissolved	7440-17-7	E469S	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		selenium, dissolved	7782-49-2	E469S	0.0824 mg/L	0.08 mg/L	103	70.0	130	----
		silver, dissolved	7440-22-4	E469S	0.00709 mg/L	0.008 mg/L	88.6	70.0	130	----
		strontium, dissolved	7440-24-6	E469S	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E469S	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E469S	0.0729 mg/L	0.08 mg/L	91.1	70.0	130	----
		thallium, dissolved	7440-28-0	E469S	0.00766 mg/L	0.008 mg/L	95.8	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Dissolved Metals (QCLot: 74965) - continued										
VA20B3145-002	WNW-1	thorium, dissolved	7440-29-1	E469S	0.0373 mg/L	0.04 mg/L	93.3	70.0	130	----
		tin, dissolved	7440-31-5	E469S	0.0366 mg/L	0.04 mg/L	91.4	70.0	130	----
		titanium, dissolved	7440-32-6	E469S	0.0830 mg/L	0.08 mg/L	104	70.0	130	----
		tungsten, dissolved	7440-33-7	E469S	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		uranium, dissolved	7440-61-1	E469S	0.00712 mg/L	0.008 mg/L	89.0	70.0	130	----
		vanadium, dissolved	7440-62-2	E469S	0.205 mg/L	0.2 mg/L	102	70.0	130	----
		yttrium, dissolved	7440-65-5	E469S	0.00593 mg/L	0.005 mg/L	119	70.0	130	----
		zinc, dissolved	7440-66-6	E469S	0.745 mg/L	0.8 mg/L	93.1	70.0	130	----
		zirconium, dissolved	7440-67-7	E469S	0.0819 mg/L	0.08 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 76070)										
VA20B3145-002	WNW-1	mercury, dissolved	7439-97-6	E509S	0.0000920 mg/L	0.0001 mg/L	92.0	70.0	130	----
Volatile Organic Compounds (QCLot: 76562)										
VA20B3145-003	North-1	benzene	71-43-2	E611A	94.6 µg/L	100 µg/L	94.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	95.2 µg/L	100 µg/L	95.2	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		styrene	100-42-5	E611A	97.2 µg/L	100 µg/L	97.2	60.0	140	----
		toluene	108-88-3	E611A	96.9 µg/L	100 µg/L	96.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	185 µg/L	200 µg/L	92.7	60.0	140	----
		xylene, o-	95-47-6	E611A	95.6 µg/L	100 µg/L	95.6	60.0	140	----
Volatile Organic Compounds (QCLot: 76693)										
VA20B3145-010	DUP-D	benzene	71-43-2	E611A	89.5 µg/L	100 µg/L	89.5	60.0	140	----
		ethylbenzene	100-41-4	E611A	89.7 µg/L	100 µg/L	89.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	105 µg/L	100 µg/L	105	60.0	140	----
		styrene	100-42-5	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		toluene	108-88-3	E611A	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	208 µg/L	200 µg/L	104	60.0	140	----
		xylene, o-	95-47-6	E611A	91.5 µg/L	100 µg/L	91.5	60.0	140	----
Hydrocarbons (QCLot: 76561)										
VA20B3145-002	WNW-1	F1 (C6-C10)	----	E581.VH+F1	5970 µg/L	6310 µg/L	94.6	60.0	140	----
Hydrocarbons (QCLot: 76692)										
VA20B3145-009	DUP E	F1 (C6-C10)	----	E581.VH+F1	5970 µg/L	6310 µg/L	94.7	60.0	140	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 766311

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder associates
Contact:	Christine Bylenga / Brett Lucas
Phone:	1-250-881-7372
	Company address below will appear on the final report
Street:	200-2920 virtual way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4

Invoice To	
Same as Report To	[x] YES [ ] NO
Copy of Invoice with Report	[ ] YES [x] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [x] PDF [x] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [ ] YES [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [x] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: cbylenga@golder.com

Email 2: blucas@golder.com

Email 3:

Invoice Distribution

Select Invoice Distribution: [x] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [x] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ] 3 day [P3-25%] [ ] 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/3

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only)

ALS Contact: | Sampler:

Environmental Division
Vancouver
Work Order Reference
VA20B3145
Telephone : +1 604 253 4188

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	General (pH, alkalinity, TSS, turbidity, cond, anions)	P: TOC, ammonia, TKN	Dissolved metals	P: Total metals	Dissolved mercury	P: Total mercury	P: Hydrocarbons (LEPH/HEPH) F2-F4	P: Fecal coliforms	P: Radium-226	P: BTEX/F1	P: Total Nutrients	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	Source-1	15-aug-20	14:46	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
2	WNW-1	15-aug-20	14:55	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
3	North-1	15-aug-20	15:07	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
4	ENE-1	15-aug-20	15:23	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
5	Source-2	15-aug-20	13:31	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
6	WNW-2	15-aug-20	13:50	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
7	North-2	15-aug-20	13:42	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
8	ENE-2	15-aug-20	14:23	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
9	~~DUPE~~ DUPE	15-aug-20	—	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		
10	DUP-D	15-aug-20	—	Seawater	12	X	X	X	X	X	X	X	X	X	X	X		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO

Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C: 9°C

FINAL COOLER TEMPERATURES °C:

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: KSS	Date: 20 Aug 2020	Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION   WHITE - LABORATORY COPY   YELLOW - CLIENT COPY   JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX 2C

Water Screening Table

1.0 QAQC RESULTS

This appendix describes the QAQC results for surface water sampled for the 2020 MEEMP conducted at Milne Port and in Milne Inlet during the 2020 open-water season. Water quality samples were collected during five sampling events scheduled between 26 July and 16 August 2020, to monitor for potential changes in water quality associated with site drainage and treated effluent discharges to the marine environment (including iron ore stockpile run-off). Samples were typically collected weekly over this period; however, the second and third sampling events were conducted 3 days apart in order to align with the confirmed active site discharge at MP-05. Four additional water quality stations at MP-06 were monitored in 2020 downstream from the discharge.

Most chemical analyses on surface water samples were completed within the sample hold time requirements. Hold time exceedances were limited to:

- pH and orthophosphate for samples taken on the 04-August 2020, 10-August 2020, and 15-August 2020 sampling events.
- Measurements of fecal coliform by membrane filtration in four out of the five sampling events
- Nitrite for samples taken on 27-July 2020, 01-August 2020, and 10-August 2020
- Turbidity and nitrate for samples taken on 10-August 2020.
- Total suspended solids for samples taken on 27-July 2020 and 01-August 2020

Although exceedances of sample hold time requirements have been documented, the hold times for the parameters in question are relatively short. Given the remote location of the site, such exceedances were unavoidable. The data should still be comparable to previous yearly measurements as similar issues with hold time exceedances have been encountered.

ALS is certified by the Canadian Association for Laboratory Accreditation (CALA) for the analyses conducted. The analytical laboratory also incorporated and reported the results of internal QA/QC checks. These were used to assess the reliability, accuracy, and reproducibility of the data. Reports from the laboratory are provided in Appendix B and were reviewed by Golder.

The data reported by the laboratory were considered reliable based on the following QA/QC results:

- Analytical blanks were generally measured at concentrations less than the analytical detection limit, with the following exceptions[1]:
  - Surrogates for 4-bromofluorobenzene, 1,4- difluorobenzene, 3,4-dichlorotoluene, 2-bromobenzotrifluoride (EPH surrogate), 2-bromobenzotrifluoride (F2-F4 surrogate), acridine-d9, chrysene-d12, naphthalene-d8, phenanthrene-d10 that were higher than their respective detection limits. This suggests that concentrations for these parameters for all samples may have been biased high. Since these parameters were not identified at elevated concentrations in samples, this was not considered a major data quality issue.
- Laboratory relative percent differences (RPDs) for duplicates fell within the DQOs set by the laboratory.
- Laboratory spike samples fell within the DQOs set by the laboratory, with the following exceptions[2]:

[1] These parameters with method blank exceedances were not key parameters and, thus, these exceedances were not considered to have had a considerable impact on the interpretation of the report results.

[2] The laboratory did not consider these discrepancies to be problematic as they occurred with less than 10% of the analytes tested and percentages were only slightly outside of DQO.

- During the 27 July 2020 sampling event, F2 (C10-C16) and F3 (C16-C34) marginally exceeded the laboratory DQO (70–130%) in one laboratory control sample, as percent recovery was 132% and 133% respectively.
- During the 15 August 2020 sampling event, acridine did not meet the laboratory DQO (60-130%) in laboratory control samples, as percent recovery was 3.3% to 4.6%.

- Analytical results for reference materials fell within the target specified by the laboratory.
- Matrix spike results fell within the DQOs set by the laboratory, with the following exceptions:
  - Matrix spike recovery could not be accurately calculated due to high analyte background in the sample for total and dissolved boron, calcium, magnesium, potassium, strontium, sulfur, sodium. This was related to the elevated concentrations for these parameters in Site sediments relative to the amount that was spiked into the matrix, rather than a data quality issue.
- From the field blanks collected during the field program, measured concentrations were generally less than the analytical detection limit, with the following exceptions[3]:
  - Total alkalinity (as $CaCO_3$) was 1.7 mg/L, whereas the detection limit was <1.0 mg/L.
  - Conductivity was 3.2 and 97 µS/cm, whereas the detection limit was <2.0 µS/cm.
  - Hardness (as $CaCO_3$) was 8.59 mg/L, whereas the detection limit was <0.6 mg/L.
  - Sulphate was 3.5 mg/L, whereas the detection limit was <3.0 mg/L.
  - Total and dissolved magnesium was 1.7 mg/L, whereas the detection limit was <1.0 mg/L.
  - Dissolved sodium was 16 mg/L, whereas the detection limit was <2.5 mg/L.
  - 4-bromofluorobenzene, 1,4-difluorobenzene, 2-bromobenzotrifluoride, 3,4-dichlorotoluene, acridine-d9, chrysene-d12, naphthalene-d8, and phenanthrene-d10 were measured above their respective detection limits.
- To demonstrate that the samples and analytical results can be considered valid, representative, and reproducible, five field duplicate samples were collected. Golder targets a duplicate submission rate of approximately 10% for laboratory analyses to evaluate the accuracy of results. The RPD between field duplicate sample results was used to assess duplicate sample data. The RPD is a measure of the variability between two outcomes from the same procedure or process and is calculated as:

$$RPD = \frac{absolute\ value\ (sample\ concentration - duplicate\ concentration)}{mean\ concentration} \times 100$$

An RPD less than 20% for inorganic parameters in water is considered acceptable (BC ENV 2020[4]). The QA/QC results of field RPDs are provided in Appendix D. For this sample pair, the data quality objective of RPDs less than 20% were met, where they could be calculated, except for select total metals (aluminum and iron which ranged from 24% to 33% RPDs), and dissolved manganese with an RPD of 67%. The QA/QC results indicate that the water chemistry data collected during the 2020 MEEMP were of acceptable quality.

[3] These low-level detects were not considered to represent a significant data quality issue.
[4] BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. British Columbia Environmental Laboratory Manual, Section A: Laboratory Quality Assurance/Quality Control. 2020 Edition. April 2020. Available online at: <https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/lab-manual/title-page-2020.pdf>.

Appendix C-1: Water Quality Relative Percent Difference
Table for Marine Environmental Effects Monitoring Program 2020

Golder Sample ID Sample Matrix Sampling Date	Units	DUP-A WATER 1-Aug-20	SOURCE-1 WATER 1-Aug-20	Calculated RPD (%)	DUP-B WATER 4-Aug-20	NORTH-2 WATER 4-Aug-20	Calculated RPD (%)	DUP-C WATER 10-Aug-20	ENE-2 WATER 10-Aug-20	Calculated RPD (%)	DUP-D WATER 15-Aug-20	NORTH-1 WATER 15-Aug-20	Calculated RPD (%)	DUP-E WATER 15-Aug-20	WNW-2 WATER 15-Aug-20	Calculated RPD (%)
Anions + Nutrients																
Alkalinity, Total as CaCO3	ug/L	71000	70800	0.3	73000	74400	1.9	73900	73800	0.1	85300	85000	0.4	82900	83700	1.0
Bromide (Br)	ug/L	10600	11000	3.7	19400	17000	13.2	19300	21600	11.2	26600	25200	5.4	26300	27200	3.4
Chloride (Cl)	ug/L	2900000	3040000	4.7	5170000	4480000	14.3	4940000	5470000	10.2	7410000	7040000	5.1	7270000	7540000	3.6
Fluoride (F)	mg/L	0.24	0.24	0.0	0.28	0.26	7.4	< 1.0	< 1.0	-	0.34	0.32	6.1	0.35	0.37	5.6
Nitrate (as N)	ug/L	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-	< 10	10	-	< 10	< 10	-
Nitrite (as N)	ug/L	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-
Ammonia (as N)	ug/L	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-
Total Kjeldahl Nitrogen	ug/L	91	99	8.4	88	91	3.4	103	82	22.7	120	84	35.3	97	90	7.5
Sulfate (SO4)	ug/L	456000	453000	0.7	732000	617000	17.0	657000	756000	14.0	1000000	962000	3.9	1000000	1030000	3.0
Phosphorus, Total	ug/L	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-
Phosphorus, Dissolved	ug/L	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-
Phosphorus, Total Orthophosphate	ug/L	4.3	4.2	2.4	4.1	3.2	24.7	3.9	4.3	9.8	6.4	6	6.5	6.2	5.9	5.0
Bacteriological				-			-			-			-			-
Fecal Coliform	CFU/100mL	-	-	-	-	-	-	< 1	< 1	-	< 1	< 1	-	< 1	< 1	-
Fecal Coliform	mpn/100mL	< 10	< 10	-	< 10	< 10	-	-	-	-	-	-	-	-	-	-
Field + Physical																
Dissolved Oxygen, field measured	mg/L	10.7	10.7	0.0	11.04	11.04	0.0	-	-	-	11.31	11.31	0.0	11.25	11.25	0.0
pH, field measured	pH units	7.95	7.95	0.0	7.99	7.99	0.0	-	-	-	8.1	8.1	0.0	8.04	8.04	0.0
Specific conductivity, field measured	uS/cm	70073	70073	0.0	18681.08	18681.08	0.0	-	-	-	19122	19122	0.0	22180	22180	0.0
Temperature, field measured	°C	11.1	11.1	0.0	9	9	0.0	-	-	-	7.6	7.6	0.0	7.6	7.6	0.0
Turbidity, field measured	NTU	1.8	1.8	0.0	0.31	0.31	0.0	-	-	-	0.43	0.43	0.0	0.4	0.4	0.0
Conductivity	uS/cm	9920	9800	1.2	15700	13600	14.3	14800	16100	8.4	20700	19900	3.9	21000	21100	0.5
Total Suspended Solids	mg/L	< 2.0	2	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-
Turbidity	NTU	0.54	0.66	20.0	0.29	0.28	3.5	0.32	0.24	28.6	0.24	0.22	8.7	0.22	0.26	16.7
Salinity	mg/L	6300	6200	1.6	10100	8600	16.0	9600	10500	9.0	-	-	-	-	-	-
Total Organic Carbon	mg/L	1.08	1.1	1.8	1.14	1.29	12.3	0.7	0.73	4.2	1.25	1.36	8.4	0.99	1.06	6.8
Hardness, Calcium Carbonate	mg/L	1160	1080	7.1	1800	1570	13.6	1680	1860	10.2	2280	2110	7.7	2340	2470	5.4
Hydrocarbons																
Acenaphthene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Acenaphthylene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Acridine	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Anthracene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benz(a)anthracene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(a)pyrene	ug/L	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Benzo(g,h,i)perylene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(k)fluoranthene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Chrysene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Dibenz(a,h)anthracene	ug/L	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Fluoranthene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(b,j) fluoranthene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Fluorene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Indeno(1,2,3-c,d)pyrene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Naphthalene	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Phenanthrene	ug/L	< 0.020	< 0.020	-	< 0.020	< 0.020	-	< 0.020	< 0.020	-	< 0.020	< 0.020	-	< 0.020	< 0.020	-
Pyrene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Quinoline	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
2-methylnaphthalene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.050	< 0.050	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
VPH (C6-C10)	ug/L	-	-	-	-	-	-	< 100	< 100	-	< 100	< 100	-	< 100	< 100	-
Petroleum Hydrocarbons - F1 (C6-C10)	ug/L	< 100	< 100	-	< 100	< 100	-	< 100	< 100	-	< 100	< 100	-	< 100	< 100	-
Petroleum Hydrocarbons - F2 (C10-C16)	ug/L	< 100	< 100	-	< 100	< 100	-	< 300	< 300	-	< 100	< 100	-	< 100	< 100	-
Petroleum Hydrocarbons - F3 (C16-C34)	ug/L	< 250	< 250	-	< 250	< 250	-	< 300	< 300	-	< 250	< 250	-	< 250	< 250	-
Petroleum Hydrocarbons - F4 (C34-C50)	ug/L	< 250	< 250	-	< 250	< 250	-	< 300	< 300	-	< 250	< 250	-	< 250	< 250	-
1-Methylnaphthalene	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.050	< 0.050	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo[b,j,k]fluoranthene	ug/L	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-
Metals, Dissolved																
pH	pH units	8	8	0.0	7.96	7.98	0.3	7.96	7.93	0.4	8.03	8.02	0.1	8	8.02	0.2
Aluminum	ug/L	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-
Antimony	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Arsenic	ug/L	< 0.40	< 0.40	-	0.48	0.43	11.0	0.52	0.48	8.0	0.84	0.79	6.1	0.78	0.86	9.8
Barium	ug/L	4.7	4.7	0.0	5.7	5.2	9.2	5.7	5.9	3.4	6.7	6.4	4.6	6.8	6.9	1.5
Beryllium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Bismuth	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Boron	ug/L	750	790	5.2	1300	1120	14.9	1180	1270	7.3	1560	1520	2.6	1580	1640	3.7
Cadmium	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	0.011	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Calcium	ug/L	82100	85900	4.5	133000	113000	16.3	128000	136000	6.1	174000	162000	7.1	173000	184000	6.2
Chromium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Cobalt	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Copper	ug/L	0.24	0.25	4.1	0.24	< 0.20	-	0.27	0.3	10.5	0.28	0.24	15.4	0.24	0.23	4.3
Iron	ug/L	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-	< 10	< 10	-
Lead	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Lithium	ug/L	28	29	3.5	49	42	15.4	47	52	10.1	63	59	6.6	65	67	3.0
Magnesium	ug/L	217000	222000	2.3	375000	310000	19.0	330000	369000	11.2	448000	415000	7.6	465000	488000	4.8
Manganese	ug/L	0.1	0.2	66.7	0.31	0.33	6.3	0.62	0.73	16.3	0.89	0.77	14.5	0.8	0.78	2.5
Mercury	ug/L	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Molybdenum	ug/L	1.89	1.91	1.1	3.02	2.57	16.1	3.06	3.55	14.8	4.14	3.65	12.6	3.85	4.08	5.8
Nickel	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Phosphorus	ug/L	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-
Potassium	ug/L	65400	65100	0.5	110000	93400	16.3	109000	122000	11.3	151000	136000	10.5	154000	163000	5.7
Selenium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Silicon	ug/L	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-
Silver	ug/L	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-
Sodium	ug/L	1790000	1620000	10.0	2780000	2290000	19.3	2900000	3150000	8.3	4050000	3740000	8.0	4130000	4260000	3.1
Strontium	ug/L	1250	1290	3.1	2190	1790	20.1	2010	2290	13.0	3020	2600	14.9	2850	2970	4.1
Sulphur (Colloidal)	ug/L	159000	164000	3.1	294000	253000	15.0	261000	291000	10.9	407000	388000	4.8	420000	440000	4.7
Tellurium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Thallium	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Thorium-232	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Tin	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Titanium	ug/L	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-
Uranium	ug/L	1.38	1.49	7.7	1.25	1.22	2.4	1.35	1.35	0.0	1.84	1.77	3.9	1.7	1.68	1.2
Vanadium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	0.6	0.58	3.4	0.65	0.63	3.1
Zinc	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Zirconium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Hardness, Calcium Carbonate	mg/L	1100	1130	2.7	1880	1560	18.6	-	-	-	2280	2110	7.7	2340	2470	5.4
Cesium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Rhenium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Rubidium	ug/L	18.6	18.6	0.0	30	25.2	17.4	31.7	34.3	7.9	42.3	38.2	10.2	42.8	45.4	5.9
Tungsten	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Gallium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Yttrium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Metals, Total																
pH	pH units	8	8	0.0	7.96	7.98	0.3	7.96	7.93	0.4	8.03	8.02	0.1	8	8.02	0.2
Aluminum	ug/L	30	26.5	12.4	11.3	10.4	8.3	11	10.2	7.5	7.1	9.9	32.9	6.9	6	14.0
Antimony	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Arsenic	ug/L	< 0.40	< 0.40	-	0.5	0.41	19.8	0.48	0.52	8.0	0.74	0.72	2.7	0.75	0.83	10.1
Barium	ug/L	5.3	4.5	16.3	5.3	5.4	1.9	5.9	6.1	3.3	6.5	6.7	3.0	7	6.7	4.4
Beryllium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Bismuth	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Boron	ug/L	740	740	0.0	1220	1060	14.0	1190	1290	8.1	1520	1510	0.7	1700	1770	4.0
Cadmium	ug/L	< 0.010	< 0.010	-	< 0.010	< 0.010	-	0.011	< 0.010	-	0.01	< 0.010	-	0.01	< 0.010	-
Calcium	ug/L	86000	82000	4.8	131000	114000	13.9	131000	141000	7.4	165000	162000	1.8	178000	182000	2.2
Chromium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Cobalt	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Copper	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Iron	ug/L	33	33	0.0	11	14	24.0	15	11	30.8	< 10	< 10	-	< 10	< 10	-
Lead	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Lithium	ug/L	29	29	0.0	49	42	15.4	48	53	9.9	62	61	1.6	67	68	1.5
Magnesium	ug/L	228000	214000	6.3	358000	312000	13.7	344000	379000	9.7	443000	408000	8.2	463000	466000	0.6
Manganese	ug/L	1.76	1.77	0.6	0.95	0.92	3.2	1.09	1.06	2.8	1.2	1.1	8.7	1.17	1.14	2.6
Mercury	ug/L	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Molybdenum	ug/L	1.94	1.79	8.0	3.01	2.61	14.2	3.04	3.22	5.8	3.77	3.57	5.4	4.04	4.03	0.2
Nickel	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Phosphorus	ug/L	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-	< 50	< 50	-
Potassium	ug/L	70300	63900	9.5	111000	96500	14.0	115000	125000	8.3	151000	144000	4.7	166000	169000	1.8
Selenium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Silicon	ug/L	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-
Silver	ug/L	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-
Sodium	ug/L	1840000	1840000	0.0	2680000	2280000	16.1	2880000	3110000	7.7	4270000	3870000	9.8	4520000	4490000	0.7
Strontium	ug/L	1320	1210	8.7	2170	1820	17.5	1940	2140	9.8	2760	2540	8.3	3040	2890	5.1
Sulphur (Colloidal)	ug/L	162000	155000	4.4	273000	228000	18.0	253000	286000	12.2	390000	368000	5.8	418000	426000	1.9
Tellurium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Thallium	ug/L	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Thorium-232	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Tin	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Titanium	ug/L	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-	< 5.0	< 5.0	-
Uranium	ug/L	1.41	1.37	2.9	1.32	1.31	0.8	1.3	1.33	2.3	1.73	1.72	0.6	1.69	1.68	0.6
Vanadium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	0.71	0.7	1.4	0.72	0.74	2.7
Zinc	ug/L	< 3.0	< 3.0	-	3.7	< 3.0	-	< 3.0	< 3.0	-	< 3.0	< 3.0	-	< 3.0	< 3.0	-
Zirconium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Tungsten	ug/L	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-	< 1.0	< 1.0	-
Rubidium	ug/L	20.1	18.2	9.9	30	26.8	11.3	31.4	34.8	10.3	42.7	39.7	7.3	45.5	46.3	1.7
Rhenium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Cesium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Yttrium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Gallium	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Ungrouped Analytes																
Radium-226	Bq/l	< 0.0082	< 0.0078	-	< 0.0039	< 0.0073	-	< 0.0063	< 0.0045	-	< 0.0081	< 0.0079	-	< 0.0049	0.004	-
VOCs + BTEX																
Benzene	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Ethylbenzene	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Styrene	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Toluene	ug/L	0.61	0.63	3.2	< 0.50	< 0.50	-	< 0.45	< 0.45	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Xylenes, Total	ug/L	< 0.75	< 0.75	-	< 0.75	< 0.75	-	< 0.75	< 0.75	-	< 0.75	< 0.75	-	< 0.75	< 0.75	-
o-Xylene	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
m,p-Xylenes	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
Methyl tert-Butyl Ether	ug/L	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-
SUM OF BTEX	ug/L	< 1.2	< 1.2	-	< 1.2	< 1.2	-	-	-	-	-	-	-	-	-	-

Notes:

RPD - realtive percentage difference; mg/L - miligram per litre, µm - microgram per liter; µS/cm - milliSiemens per centimeter; pH - scale of acidity; NTU - Nephelometric Turbidity Units ; % - percentage; "-" - no value; CFU/100mL - coliform bacteria per 100 mL; mpn/100mL - most probable number; °C - degrees Celsius

Value

					Station	MP-06	MP-05	MP-06	MP-05
					Client Sample ID	SITE-2	SITE-1	SITE-2	SITE-1
					Date Sampled	10-Aug-2020	01-Aug-2020	Is result >5X RDL	
					Time Sampled	17:20	17:25		
					ALS Sample ID	L2487406-10	VA20B2125-010		
	Units	Lowest DL	Alternate Lowest DL	5X DL	5X Alternate DL	FB	FB		
Field + Physical									
Conductivity	uS/cm	2.0	-	10	-	3.2	98.6	No	Yes
Hardness (as CaCO3)	mg/L	4.8	0.60	24	3	<4.8	8.59	No	Yes
pH	pH	0.10	-	0.5	-	5.51	6.24	Yes	Yes
Salinity	psu	1.0	-	5	-	<1.0	<1.0	No	No
Total Suspended Solids	mg/L	2.0	-	10	-	<2.0	<2.0	No	No
Turbidity	NTU	0.10	-	0.5	-	<0.10	<0.10	No	No
Total Organic Carbon	mg/L	0.50	-	2.5	-	<0.50	<0.50	No	No
Anions + Nutrients									
Alkalinity, Total (as CaCO3)	mg/L	1.0	-	5	-	<1.0	1.7	No	No
Ammonia, Total (as N)	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Bromide (Br)	mg/L	5.0	-	25	-	<5.0	<5.0	No	No
Chloride (Cl)	mg/L	50	-	250	-	<50	<50	No	No
Fluoride (F)	mg/L	1.0	-	5	-	<1.0	<0.20	No	No
Nitrate (as N)	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Nitrite (as N)	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Total Kjeldahl Nitrogen	mg/L	0.050	-	0.25	-	0.064	<0.050	No	No
Fecal Coliforms	CFU/100mL	1	10	5	50	<1	<10	No	No
Orthophosphate-Dissolved (as P)	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Sulfate (SO4)	mg/L	30	3.0	150	15	<30	3.5	No	No
VOCs + BTEX									
Benzene	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Ethylbenzene	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Methyl t-butyl ether (MTBE)	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Styrene	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Toluene	mg/L	0.00045	-	0.00225	-	<0.00045	<0.00045	No	No
ortho-Xylene	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
meta- & para-Xylene	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Xylenes	mg/L	0.00075	-	0.00375	-	<0.00075	<0.00075	No	No
Hydrocarbons									
Acenaphthene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Acenaphthylene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Acridine	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Anthracene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Benz(a)anthracene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Benzo(a)pyrene	mg/L	0.0000050	-	0.000025	-	<0.0000050	<0.0000050	No	No
Benzo(b&j)fluoranthene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Benzo(b+j+k)fluoranthene	mg/L	0.000015	-	0.000075	-	<0.000015	<0.000015	No	No
Benzo(g,h,i)perylene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Benzo(k)fluoranthene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Chrysene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Dibenz(a,h)anthracene	mg/L	0.0000050	-	0.000025	-	<0.0000050	<0.0000050	No	No
Fluoranthene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Fluorene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Indeno(1,2,3-c,d)pyrene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
1-Methylnaphthalene	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
2-Methylnaphthalene	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Naphthalene	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Phenanthrene	mg/L	0.000020	-	0.0001	-	<0.000020	<0.000020	No	No
Pyrene	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Quinoline	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
F1-BTEX	mg/L	0.10	-	0.5	-	<0.10	<0.10	No	No
F2 (C10-C16)	mg/L	0.30	0.10	1.5	0.5	<0.30	<0.10	No	No
F3 (C16-C34)	mg/L	0.30	0.25	1.5	1.25	<0.30	<0.25	No	No
F4 (C34-C50)	mg/L	0.30	0.25	1.5	1.25	<0.30	<0.25	No	No
Ungrouped Analytes									
Ra-226	Bq/L	0.0045	0.01	0.0225	0.05	<0.0083	-	No	-
Metals, Total									
Aluminum	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Antimony	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Arsenic	mg/L	0.00040	-	0.002	-	<0.00040	<0.00040	No	No
Barium	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Beryllium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Bismuth	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Boron	mg/L	0.30	-	1.5	-	<0.30	<0.30	No	No
Cadmium	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Calcium	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Cesium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Chromium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Cobalt	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Copper	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Gallium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Iron	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Lead	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Lithium	mg/L	0.020	-	0.1	-	<0.020	<0.020	No	No
Magnesium	mg/L	1.0	-	5	-	<1.0	1.7	No	No
Manganese	mg/L	0.00020	-	0.001	-	<0.00020	<0.00020	No	No
Mercury	mg/L	0.0000050	-	0.000025	-	<0.0000050	<0.0000050	No	No
Molybdenum	mg/L	0.00010	-	0.0005	-	<0.00010	<0.00010	No	No
Nickel	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Phosphorus	mg/L	0.050	-	0.25	-	<0.050	<0.050	No	No
Potassium	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Rhenium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Rubidium	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Selenium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Silicon	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Silver	mg/L	0.00010	-	0.0005	-	<0.00010	<0.00010	No	No
Sodium	mg/L	2.5	-	12.5	-	<2.5	15.1	No	Yes
Strontium	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Sulfur	mg/L	5.0	-	25	-	<5.0	<5.0	No	No
Tellurium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Thallium	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Thorium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Tin	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Titanium	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Tungsten	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Uranium	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Vanadium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Yttrium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Zinc	mg/L	0.0030	-	0.015	-	<0.0030	<0.0030	No	No
Zirconium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Metals, Dissolved									
Aluminum	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Antimony	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Arsenic	mg/L	0.00040	-	0.002	-	<0.00040	<0.00040	No	No
Barium	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Beryllium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Bismuth	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Boron	mg/L	0.30	-	1.5	-	<0.30	<0.30	No	No
Cadmium	mg/L	0.000010	-	0.00005	-	<0.000010	<0.000010	No	No
Calcium	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Cesium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Chromium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Cobalt	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Copper	mg/L	0.00020	-	0.001	-	<0.00020	<0.00020	No	No
Gallium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Iron	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Lead	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Lithium	mg/L	0.020	-	0.1	-	<0.020	<0.020	No	No
Magnesium	mg/L	1.0	-	5	-	<1.0	1.7	No	No
Manganese	mg/L	0.00010	-	0.0005	-	<0.00010	<0.00010	No	No
Mercury	mg/L	0.0000050	-	0.000025	-	<0.0000050	<0.0000050	No	No
Molybdenum	mg/L	0.00010	-	0.0005	-	<0.00010	<0.00010	No	No
Nickel	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Phosphorus	mg/L	0.050	-	0.25	-	<0.050	<0.050	No	No
Potassium	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Rhenium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Rubidium	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Selenium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Silicon	mg/L	1.0	-	5	-	<1.0	<1.0	No	No
Silver	mg/L	0.00010	-	0.0005	-	<0.00010	<0.00010	No	No
Sodium	mg/L	2.5	-	12.5	-	<2.5	16	No	Yes
Strontium	mg/L	0.010	-	0.05	-	<0.010	<0.010	No	No
Sulfur	mg/L	5.0	-	25	-	<5.0	<5.0	No	No
Tellurium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Thallium	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Thorium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Tin	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Titanium	mg/L	0.0050	-	0.025	-	<0.0050	<0.0050	No	No
Tungsten	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Uranium	mg/L	0.000050	-	0.00025	-	<0.000050	<0.000050	No	No
Vanadium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Yttrium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No
Zinc	mg/L	0.0010	-	0.005	-	<0.0010	<0.0010	No	No
Zirconium	mg/L	0.00050	-	0.0025	-	<0.00050	<0.00050	No	No

Notes:

CFU/100mL - coliform bacteria per 100 mL; mpn/100mL - most probable number; °C - degrees Celsius; NTU - Nephelometric Turbidity Units ; mg/L = milligrams per Litre; FB = field blank; sample; NTU = nephlometric turbidity units; "-" = not calculated or not reported; DL = detection limit; ; % = percent; 5X DL -five times the detection limit

Yes detected concentration greater than 5X the lowest detection limit

APPENDIX 2D

RPD Table

Station				MP-05					MP-06					MP-05					MP-06					MP-05						
Location				ENE-1	ENE-1	ENE-1	ENE-1	ENE-1	ENE-2	ENE-2	ENE-2	ENE-2	ENE-2	NORTH-1	NORTH-1	NORTH-1	NORTH-1	NORTH-1	NORTH-2	NORTH-2	NORTH-2	NORTH-2	NORTH-2	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-2	SOURCE-2
Sample Name				ENE - 1	ENE - 1	ENE - 1	ENE-1	ENE-1	ENE - 2	ENE - 2	ENE - 2	ENE-2	ENE-2	North - 1	North - 1	North - 1	NORTH-1	North-1	North - 2	North - 2	North - 2	NORTH-2	North-2	Source - 1	Source - 1	Source - 1	SOURCE-1	Source-1	Source - 2	Source - 2
Sample Date				2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01
FIELD_SDG				VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125
PARENT_SAMPLE_CODE																														
SAMPLE_TYPE_CODE				N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SYS_SAMPLE_CODE				VA20B2123-004	VA20B2125-004	VA20B2114-004	L2487406-4	VA20B3145-004	VA20B2123-008	VA20B2125-008	VA20B2114-008	L2487406-8	VA20B3145-008	VA20B2123-003	VA20B2125-003	VA20B2114-003	L2487406-3	VA20B3145-003	VA20B2123-007	VA20B2125-007	VA20B2114-007	L2487406-7	VA20B3145-007	VA20B2123-001	VA20B2125-001	VA20B2114-001	L2487406-1	VA20B3145-001	VA20B2123-005	VA20B2125-005
Parameter	**CCME Aquatic Marine Water Short Term**	**CCME Aquatic Marine Water Long Term**	**Unit**																											
Anions + Nutrients																														
Alkalinity, Total as CaCO3	-	-	ug/L	71400	70100	72600	78400	84000	67600	107000	75400	73800	83400	71600	70400	72400	78100	85000	67700	105000	74400	76800	83200	71200	70800	72000	78600	88500	67600	70500
Bromide (Br)	-	-	ug/L	7800	11100	20800	14700	23000	8500	52300	15500	21600	27400	7700	12200	20400	16900	25200	10000	51300	17000	15800	27300	8200	11000	20500	12800	20400	9700	11500
Chloride (Cl)	-	-	ug/L	1980000	3150000	5470000	3630000	6460000	2420000	15600000	4040000	5470000	7530000	2050000	3260000	5440000	4090000	7040000	2730000	15300000	4480000	4060000	7540000	2020000	3040000	5410000	3520000	5810000	2550000	3050000
Fluoride (F)	-	-	mg/L	< 0.20	0.23	0.32	< 1.0	0.32	< 0.20	0.91	0.25	< 1.0	0.36	< 0.20	0.25	0.31	< 1.0	0.32	< 0.20	0.9	0.26	< 1.0	0.37	< 0.20	0.24	0.32	< 1.0	0.29	< 0.20	0.23
Nitrate (as N)	339,000	45,000	ug/L	< 10	< 10	13	< 10	13	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	12	134	< 10	< 10
Nitrite (as N)	-	-	ug/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ammonia (as N)	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	8.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Kjeldahl Nitrogen	-	-	ug/L	98	99	107	119	93	82	87	94	82	89	91	86	84	118	84	84	106	91	94	87	112	99	72	149	99	78	75
Sulfate (SO4)	-	-	ug/L	283000	459000	818000	505000	882000	355000	2320000	592000	756000	1040000	289000	493000	794000	563000	962000	353000	2260000	617000	549000	1020000	286000	453000	796000	465000	788000	360000	448000
Phosphorus, Total	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	57	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Phosphorus, Dissolved	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Phosphorus, Total Orthophosphate	-	-	ug/L	2.3	3.7	4.8	5.3	5.7	1.6	19.6	3.1	4.3	6.4	1.4	3.3	4	4.3	6	2	19.1	3.2	4.3	6.1	2.5	4.2	4.5	6.7	16	1.4	2.7
Bacteriological																														
Fecal Coliform	-	-	CFU/1(	-	-	-	< 1	< 1	-	-	-	< 1	< 1	-	-	-	< 1	< 1	-	-	-	< 1	< 1	-	-	-	< 1	< 1	-	-
Fecal Coliform	-	-	mpn/1	< 10	< 10	< 10	-	-	< 10	< 10	< 10	-	-	< 10	< 10	< 10	-	-	< 10	< 10	< 10	-	-	< 10	< 10	< 10	-	-	< 10	< 10
Field + Physical																														
Dissolved Oxygen, field measured	-	-	mg/L	11.38	10.8	11.15	-	11.26	11.38	13.3	11.15	-	11.23	11.38	10.8	10.99	-	11.31	11.38	13.7	11.04	-	11.25	11.23	10.7	11.08	-	11.48	11.38	10.9
pH, field measured	-	7.0 - 8.7	pH uni	8.01	8	7.91	-	8.1	8.01	7.9	8.03	-	8.05	8.01	8.1	7.89	-	8.1	8.01	8	7.99	-	8	8.01	7.95	7.97	-	8.11	8.01	8
Specific conductivity, field measured	-	-	uS/cm	18681.08	7542	12558	-	19412	18681.08	25491	12806	-	22671	18681.08	7513	12226	-	19122	18681.08	25332	18681.08	-	22461	21481.01	70073	12375	-	18091	18681.08	7235
Temperature, field measured	-	-	deg c	8.03	11.4	8.6	-	7.9	8.03	1.9	9.1	-	7.6	8.03	11.1	8.8	-	7.6	8.03	1.6	9	-	7.4	8.43	11.1	8.7	-	7.8	8.03	11.7
Turbidity, field measured	-	-	NTU	0.7	1.6	0.63	-	0.4	0.7	0.3	0.26	-	0.42	0.7	1.5	0.91	-	0.43	0.7	0.3	0.31	-	0.43	0.68	1.8	0.55	-	0.13	0.7	2.4
Conductivity	-	-	uS/cm	6680	9840	17600	11200	18500	8090	40800	13000	16100	21100	6770	10500	17000	12600	19900	8070	39500	13600	12500	21200	6700	9800	17200	11100	16800	8240	9710
Total Suspended Solids	-	-	mg/L	< 2.0	2.6	< 2.0	< 2.0	< 2.0	< 2.0	7.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2	< 2.0	< 2.0	< 2.0	< 2.0	2.6
Turbidity	-	-	NTU	0.25	0.42	0.37	0.36	0.24	0.18	< 0.10	0.27	0.24	0.24	0.33	0.45	0.29	0.48	0.22	0.18	0.18	0.28	0.33	0.25	0.24	0.66	0.31	0.64	0.41	0.17	0.44
Salinity	-	-	mg/L	4100	6200	11400	7000	-	5000	29400	8200	10500	-	4200	6700	11000	8000	-	5000	28400	8600	7900	-	4100	6200	11100	7000	-	5100	6100
Total Organic Carbon	-	-	mg/L	0.9	1.08	1.12	0.81	1.51	1.08	1.14	1.08	0.73	1.15	1.09	1.09	1.11	0.9	1.36	0.98	1.17	1.29	0.83	1.21	1.1	1.1	1.26	0.78	1.39	1.1	0.97
Hardness, Calcium Carbonate	-	-	mg/L	742	1160	2200	1320	2040	899	6260	1480	1860	2510	764	1210	2100	1480	2110	898	6160	1570	1400	2380	743	1080	2000	1240	1820	922	1050
Hydrocarbons																														
Acenaphthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acridine	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benz(a)anthracene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Benzo(g,h,i)perylene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	-	1.4	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	-	-	ug/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Pyrene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-methylnaphthalene	-	-	ug/L	< 0.010	< 0.010	0.018	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010
VPH (C6-C10)	-	-	ug/L	-	-	-	< 100	< 100	-	-	-	< 100	< 100	-	-	-	< 100	< 100	-	-	-	< 100	< 100	-	-	-	< 100	< 100	-	-
Petroleum Hydrocarbons - F1 (C6-C10)	-	-	ug/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Petroleum Hydrocarbons - F2 (C10-C16)	-	-	ug/L	< 100	< 100	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 100
Petroleum Hydrocarbons - F3 (C16-C34)	-	-	ug/L	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250
Petroleum Hydrocarbons - F4 (C34-C50)	-	-	ug/L	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250
1-Methylnaphthalene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010
Benzo[b,j,k]fluoranthene	-	-	ug/L	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015

Station				MP-05					MP-06				
Location				ENE-1	ENE-1	ENE-1	ENE-1	ENE-1	ENE-2	ENE-2	ENE-2	ENE-2	ENE-2
Sample Name				ENE - 1	ENE - 1	ENE - 1	ENE-1	ENE-1	ENE - 2	ENE - 2	ENE - 2	ENE-2	ENE-2
Sample Date				2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15
FIELD_SDG				VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145
PARENT_SAMPLE_CODE													
SAMPLE_TYPE_CODE				N	N	N	N	N	N	N	N	N	N
SYS_SAMPLE_CODE				VA20B2123-004	VA20B2125-004	VA20B2114-004	L2487406-4	VA20B3145-004	VA20B2123-008	VA20B2125-008	VA20B2114-008	L2487406-8	VA20B3145-008
Parameter	**CCME Aquatic Marine Water Short Term**	**CCME Aquatic Marine Water Long Term**	**Unit**										
Metals, Dissolved													
pH	-	7.0 - 8.7	pH uni	8.05	8.01	7.97	7.98	8.02	8	8	7.98	7.93	8.01
Aluminum	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Antimony	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	-	12.5	ug/L	< 0.40	< 0.40	0.53	< 0.40	0.72	< 0.40	1.42	< 0.40	0.48	0.85
Barium	-	-	ug/L	3.9	4.3	5.9	5.2	6.2	4.4	9	5	5.9	6.9
Beryllium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	-	-	ug/L	520	780	1460	890	1410	680	4230	1050	1270	1620
Cadmium	-	0.12	ug/L	< 0.010	< 0.010	0.012	< 0.010	0.014	< 0.010	0.022	< 0.010	< 0.010	0.013
Calcium	-	-	ug/L	62000	84700	148000	102000	153000	75200	447000	112000	136000	178000
Chromium	-	1.5 (VI)	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	-	-	ug/L	0.25	0.26	0.24	0.28	0.29	0.32	0.2	0.27	0.3	0.24
Iron	-	-	ug/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Lead	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	-	-	ug/L	< 20	31	57	35	58	24	172	40	52	68
Magnesium	-	-	ug/L	141000	212000	415000	258000	401000	177000	1260000	296000	369000	501000
Manganese	-	-	ug/L	0.25	0.13	0.8	0.6	0.82	0.42	0.63	0.38	0.73	0.86
Mercury	-	0.016	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	-	-	ug/L	1.25	1.86	3.48	2.42	3.81	1.61	9.87	2.57	3.55	4.3
Nickel	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	-	-	ug/L	40200	63800	128000	81000	136000	53100	416000	90700	122000	166000
Selenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	-	-	ug/L	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	7.5	-	ug/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	-	-	ug/L	1060000	1830000	3130000	2120000	3700000	1320000	9620000	2270000	3150000	4350000
Strontium	-	-	ug/L	839	1230	2490	1510	2540	1060	7070	1830	2290	3110
Sulphur (Colloidal)	-	-	ug/L	101000	162000	347000	185000	361000	129000	1220000	237000	291000	447000
Tellurium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thallium	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	-	-	ug/L	1.24	1.33	1.66	1.48	1.8	1.08	2.48	1.2	1.35	1.73
Vanadium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	0.54	< 0.50	1.32	< 0.50	< 0.50	0.62
Zinc	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zirconium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hardness, Calcium Carbonate	-	-	mg/L	736	1080	2080	-	2040	918	6310	1500	-	2510
Cesium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rhenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rubidium	-	-	ug/L	12.1	18.6	34.1	23.4	37.6	15.4	105	24.9	34.3	45.6
Tungsten	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Gallium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Metals, Total													
pH	-	7.0 - 8.7	pH uni	8.05	8.01	7.97	7.98	8.02	8	8	7.98	7.93	8.01
Aluminum	-	-	ug/L	12.2	19.9	16.3	9.3	7.2	10.8	9.2	9.2	10.2	6.4
Antimony	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	-	12.5	ug/L	< 0.40	< 0.40	0.56	0.4	0.66	< 0.40	1.4	< 0.40	0.52	0.76
Barium	-	-	ug/L	4	4.7	6.1	5.4	6.6	4.2	10	4.9	6.1	6.7
Beryllium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	-	-	ug/L	510	780	1530	880	1530	590	4080	1050	1290	1710
Cadmium	-	0.12	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.017	< 0.010	< 0.010	< 0.010
Calcium	-	-	ug/L	64400	88700	157000	99400	156000	69800	421000	113000	141000	175000
Chromium	-	1.5 (VI)	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Iron	-	-	ug/L	15	26	18	13	< 10	10	< 10	10	11	< 10
Lead	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	-	-	ug/L	< 20	30	57	34	60	23	164	42	53	67
Magnesium	-	-	ug/L	141000	229000	439000	254000	391000	176000	1260000	290000	379000	471000
Manganese	-	-	ug/L	1.18	1.47	1.87	1.15	1.12	0.82	1.12	0.9	1.06	1.12
Mercury	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	-	-	ug/L	1.3	1.92	3.41	2.34	3.64	1.55	9.94	2.34	3.22	4.13
Nickel	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	-	-	ug/L	43300	72400	136000	80800	140000	53400	419000	89700	125000	164000
Selenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	-	-	ug/L	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	7.5	-	ug/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	-	-	ug/L	1050000	1820000	3180000	2160000	3770000	1310000	9670000	2260000	3110000	4560000
Strontium	-	-	ug/L	832	1290	2420	1510	2560	1030	7460	1630	2140	2960
Sulphur (Colloidal)	-	-	ug/L	99100	166000	326000	185000	361000	123000	1180000	227000	286000	422000
Tellurium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.51	< 0.50	< 0.50	< 0.50
Thallium	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	-	-	ug/L	1.19	1.28	1.65	1.37	1.7	0.991	2.28	1.23	1.33	1.74
Vanadium	-	-	ug/L	< 0.50	< 0.50	0.51	< 0.50	0.64	< 0.50	1.38	< 0.50	< 0.50	0.74
Zinc	-	-	ug/L	5.6	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Zirconium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tungsten	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Rubidium	-	-	ug/L	12.5	20.1	36.9	23.3	38.7	15.8	106	24.3	34.8	44.3
Rhenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cesium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Gallium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ungrouped Analytes													
Radium-226	-	-	Bq/l	< 0.0084	< 0.0085	< 0.0068	< 0.0069	< 0.0085	< 0.0071	0.0077	< 0.0083	< 0.0045	0.0057
VOCs + BTEX													
Benzene	-	110	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	-	25	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	-	215	ug/L	< 0.50	0.82	0.65	< 0.45	< 0.50	< 0.50	< 0.50	< 0.50	< 0.45	< 0.50
Xylenes, Total	-	-	ug/L	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
o-Xylene	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylenes	-	-	ug/L	< 0.50	0.56	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methyl tert-Butyl Ether	-	5000	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
SUM OF BTEX	-	-	ug/L	< 1.2	1.4	< 1.2	-	-	< 1.2	< 1.2	< 1.2	-	-

Station	MP-05					MP-06					MP-05						
Location	NORTH-1	NORTH-1	NORTH-1	NORTH-1	NORTH-1	NORTH-2	NORTH-2	NORTH-2	NORTH-2	NORTH-2	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-1	SOURCE-2	SOURCE-2
Sample Name	North - 1	North - 1	North - 1	NORTH-1	North-1	North - 2	North - 2	North - 2	NORTH-2	North-2	Source - 1	Source - 1	Source - 1	SOURCE-1	Source-1	Source - 2	Source - 2
Sample Date	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01
FIELD_SDG	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125
PARENT_SAMPLE_CODE																	
SAMPLE_TYPE_CODE	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SYS_SAMPLE_CODE	VA20B2123-003	VA20B2125-003	VA20B2114-003	L2487406-3	VA20B3145-003	VA20B2123-007	VA20B2125-007	VA20B2114-007	L2487406-7	VA20B3145-007	VA20B2123-001	VA20B2125-001	VA20B2114-001	L2487406-1	VA20B3145-001	VA20B2123-005	VA20B2125-005
Parameter																	
Metals, Dissolved																	
pH	8.03	8	7.96	7.98	8.02	7.99	7.99	7.98	7.97	8.01	8.02	8	7.96	7.97	8.06	8	8.01
Aluminum	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Antimony	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	< 0.40	< 0.40	0.52	0.43	0.79	< 0.40	1.29	0.43	< 0.40	0.84	< 0.40	< 0.40	0.57	< 0.40	0.7	< 0.40	< 0.40
Barium	4.1	4.8	5.6	5.7	6.4	4.3	9	5.2	5.5	6.7	3.8	4.7	5.9	5	6.1	4.4	4.8
Beryllium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	540	860	1500	1030	1520	670	4030	1120	940	1690	540	790	1430	830	1370	650	690
Cadmium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.02	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium	62500	95100	148000	112000	162000	73000	411000	113000	106000	181000	62200	85900	146000	92700	138000	74000	82000
Chromium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	0.26	0.3	0.23	0.3	0.24	0.23	< 0.20	< 0.20	0.26	0.24	0.24	0.25	0.22	0.38	0.34	0.25	0.24
Iron	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Lead	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	20	32	57	41	59	24	164	42	38	66	20	29	58	34	54	25	26
Magnesium	144000	243000	405000	291000	415000	171000	1220000	310000	275000	469000	140000	222000	429000	246000	359000	182000	210000
Manganese	0.36	0.26	0.58	0.64	0.77	0.23	0.65	0.33	0.2	0.73	< 0.10	0.2	0.71	0.59	1.2	0.4	0.1
Mercury	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	1.34	2.16	3.36	2.57	3.65	1.59	9.89	2.57	2.66	4.13	1.2	1.91	3.37	2.13	3.15	1.61	1.88
Nickel	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	40200	72100	126000	91400	136000	51000	403000	93400	91000	159000	39500	65100	128000	77400	119000	53200	63900
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	1060000	1720000	3010000	2400000	3740000	1330000	9230000	2290000	2420000	4220000	1130000	1620000	3070000	1960000	3260000	1360000	1650000
Strontium	885	1470	2440	1660	2600	1030	7160	1790	1740	3020	836	1290	2430	1400	2150	1100	1190
Sulphur (Colloidal)	109000	178000	334000	219000	388000	130000	1130000	253000	209000	437000	103000	164000	334000	184000	319000	134000	154000
Tellurium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thallium	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	1.35	1.47	1.3	1.88	1.77	1.07	2.42	1.22	1.3	1.65	1.24	1.49	1.49	1.47	1.96	1.11	1.16
Vanadium	< 0.50	< 0.50	< 0.50	< 0.50	0.58	< 0.50	1.28	< 0.50	< 0.50	0.61	< 0.50	< 0.50	< 0.50	< 0.50	0.52	< 0.50	< 0.50
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zirconium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hardness, Calcium Carbonate	751	1240	2040	-	2110	885	6050	1560	-	2380	732	1130	2130	-	1820	934	1070
Cesium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rhenium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rubidium	12.4	20.7	34.2	26.9	38.2	15.1	100	25.2	26.4	43.7	12	18.6	35.2	21.5	33.8	15.8	18
Tungsten	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Gallium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Metals, Total																	
pH	8.03	8	7.96	7.98	8.02	7.99	7.99	7.98	7.97	8.01	8.02	8	7.96	7.97	8.06	8	8.01
Aluminum	12.8	23.6	11.5	11.8	9.9	10.8	10.5	10.4	9.2	5.4	12.4	26.5	13.8	13	8	12.4	14.3
Antimony	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	< 0.40	< 0.40	0.55	0.44	0.72	< 0.40	1.4	0.41	0.43	0.68	< 0.40	< 0.40	0.52	< 0.40	0.7	< 0.40	< 0.40
Barium	4	4.7	5.9	5.6	6.7	4.3	9.2	5.4	5.4	6.1	4.1	4.5	5.7	5.2	6	4.4	4.8
Beryllium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	490	860	1470	1010	1510	580	4050	1060	990	1540	520	740	1460	890	1420	630	690
Cadmium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.018	< 0.010	< 0.010	0.012	< 0.010	< 0.010	< 0.010	< 0.010	0.015	< 0.010	< 0.010
Calcium	63500	91900	150000	110000	162000	69200	417000	114000	108000	163000	62300	82000	146000	96900	152000	75800	80200
Chromium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Iron	13	28	12	16	< 10	11	12	14	53	< 10	13	33	16	15	< 10	12	18
Lead	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	< 20	32	56	40	61	23	159	42	38	61	20	29	56	35	59	26	27
Magnesium	147000	237000	419000	283000	408000	176000	1240000	312000	289000	414000	143000	214000	397000	246000	345000	178000	206000
Manganese	1.18	1.3	1.01	1.24	1.1	0.79	1.23	0.92	1.3	1.16	1.01	1.77	1.21	1.25	1.7	0.88	1.09
Mercury	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	1.28	2.12	3.35	2.66	3.57	1.52	10	2.61	2.51	3.67	1.25	1.79	3.43	2.29	3.2	1.56	1.77
Nickel	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.13	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	< 50	< 50	< 50	< 50	< 50	< 50	57	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	44300	71200	130000	93500	144000	53000	410000	96500	95500	143000	43900	63900	125000	80300	125000	54000	63000
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	1090000	1930000	3010000	2540000	3870000	1320000	9480000	2280000	2410000	4430000	1100000	1840000	2980000	2120000	3220000	1320000	1690000
Strontium	869	1400	2460	1610	2540	1070	7020	1820	1590	2680	832	1210	2350	1440	2180	1050	1240
Sulphur (Colloidal)	103000	170000	324000	219000	368000	126000	1040000	228000	213000	376000	99900	155000	318000	189000	319000	128000	146000
Tellurium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thallium	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	1.22	1.38	1.32	1.8	1.72	1.04	2.32	1.31	1.26	1.48	1.16	1.37	1.48	1.46	2.03	1.09	1.13
Vanadium	< 0.50	< 0.50	< 0.50	< 0.50	0.7	< 0.50	1.41	< 0.50	< 0.50	0.6	< 0.50	< 0.50	< 0.50	< 0.50	0.66	< 0.50	< 0.50
Zinc	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Zirconium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tungsten	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Rubidium	12.6	20.4	35.2	26.3	39.7	15	103	26.8	26.9	40.3	12	18.2	34.4	23	35.2	16	18.2
Rhenium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cesium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Gallium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ungrouped Analytes																	
Radium-226	< 0.0083	< 0.0094	< 0.0068	0.0068	< 0.0079	< 0.0071	< 0.0073	< 0.0073	0.006	0.0057	< 0.0069	< 0.0078	< 0.0064	< 0.0058	0.008	< 0.0074	< 0.0079
VOCs + BTEX																	
Benzene	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	< 0.50	0.74	0.8	< 0.45	< 0.50	< 0.50	< 0.50	< 0.50	< 0.45	< 0.50	< 0.50	0.63	< 0.50	< 0.45	< 0.50	< 0.50	< 0.50
Xylenes, Total	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
o-Xylene	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylenes	< 0.50	0.51	0.62	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methyl tert-Butyl Ether	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
SUM OF BTEX	< 1.2	1.2	1.4	-	-	< 1.2	< 1.2	< 1.2	-	-	< 1.2	< 1.2	< 1.2	-	-	< 1.2	< 1.2

Notes:

(VI)- hexavalent chromium

CCME - Canadian Council of Ministers for the Environment; FD - field duplicate; FB - field blank; mg/L - miligram per litre, µm - microgram per liter; µS/cm - milliSiemens per centimeter; pH - scale of acidity; NTU - Nephelometric Turbidity Units ; % - percentage; "-" - no value; CFU/100mL - coliform bacteria per 100 mL; mpn/100mL - most probable number; °C - degrees Celsius < - less than detection limit; Bq/L - Becquerel; VOC - volatile organic carbons; BTEX - Benzene, Toluene, Ethylene and Xylene; F1, F2, F3. F4 - Fractions of hydrocarbons; N - nitrogen; MP-05 - monitoring stations west of the

Station				MP-06			MP-05					MP-06					MP-05	MP-06	MP-06	MP-05	MP-06	MP-06	MP-05
Location				SOURCE-2	SOURCE-2	SOURCE-2	WNW-1	WNW-1	WNW-1	WNW-1	WNW-1	WNW-2	WNW-2	WNW-2	WNW-2	WNW-2	SITE-1	SITE-2	WNW-2	NORTH-1	ENE-2	NORTH-2	SOURCE-1
Sample Name				Source - 2	SOURCE-2	Source-2	WNW - 1	WNW - 1	WNW - 1	WNW-1	WNW-1	WNW - 2	WNW - 2	WNW - 2	WNW-2	WNW-2	Site - 1	SITE-2	DUP E	DUP-D	DUPC	DUP - B	DUP - A
Sample Date				2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-08-01	2020-08-10	2020-08-15	2020-08-15	2020-08-10	2020-08-04	2020-08-01
FIELD_SDG				VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2125	L2487406	VA20B3145	VA20B3145	L2487406	VA20B2114	VA20B2125
PARENT_SAMPLE_CODE																			VA20B3145-006	VA20B3145-003	L2487406-8	VA20B2114-007	VA20B2125-001
SAMPLE_TYPE_CODE				N	N	N	N	N	N	N	N	N	N	N	N	N	FB	FB	FD	FD	FD	FD	FD
SYS_SAMPLE_CODE				VA20B2114-005	L2487406-5	VA20B3145-005	VA20B2123-002	VA20B2125-002	VA20B2114-002	L2487406-2	VA20B3145-002	VA20B2123-006	VA20B2125-006	VA20B2114-006	L2487406-6	VA20B3145-006	VA20B2125-010	L2487406-10	VA20B3145-009	VA20B3145-010	L2487406-9	VA20B2114-009	VA20B2125-009
Parameter	**CCME Aquatic Marine Water Short Term**	**CCME Aquatic Marine Water Long Term**	**Unit**																				
Anions + Nutrients																							
Alkalinity, Total as CaCO3	-	-	ug/L	72600	74900	83000	70900	71000	72900	77500	84900	68100	73600	73800	76400	83700	1700	< 1000	82900	85300	73900	73000	71000
Bromide (Br)	-	-	ug/L	18200	19300	27100	8000	10500	19800	15700	22200	8800	8300	17800	15800	27200	< 5000	< 5000	26300	26600	19300	19400	10600
Chloride (Cl)	-	-	ug/L	4820000	4820000	7330000	2200000	3000000	5170000	3810000	6290000	2410000	2330000	4680000	4000000	7540000	< 50000	< 50000	7270000	7410000	4940000	5170000	2900000
Fluoride (F)	-	-	mg/L	0.3	< 1.0	0.38	< 0.20	0.23	0.32	< 1.0	0.3	< 0.20	< 0.20	0.27	< 1.0	0.37	< 0.20	< 1.0	0.35	0.34	< 1.0	0.28	0.24
Nitrate (as N)	339,000	45,000	ug/L	< 10	< 10	280	< 10	22	35	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Nitrite (as N)	-	-	ug/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	14	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ammonia (as N)	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	40.8	19.3	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Kjeldahl Nitrogen	-	-	ug/L	84	90	112	98	121	94	117	102	85	75	81	108	90	< 50	64	97	120	103	88	91
Sulfate (SO4)	-	-	ug/L	721000	673000	1030000	308000	441000	789000	508000	847000	347000	338000	663000	554000	1030000	3500	< 30000	1000000	1000000	657000	732000	456000
Phosphorus, Total	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Phosphorus, Dissolved	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Phosphorus, Total Orthophosphate	-	-	ug/L	3.7	3.8	5.5	1.8	8	6.8	6.3	5.5	1.8	3.8	3.5	4.7	5.9	< 1.0	< 1.0	6.2	6.4	3.9	4.1	4.3
Bacteriological																							
Fecal Coliform	-	-	CFU/1(	-	< 1	< 1	-	-	-	< 1	< 1	-	-	-	< 1	< 1	-	< 1	< 1	< 1	< 1	-	-
Fecal Coliform	-	-	mpn/1	< 10	-	-	< 10	< 10	< 10	-	-	< 10	< 10	< 10	-	-	< 10	-	-	-	-	< 10	< 10
Field + Physical																							
Dissolved Oxygen, field measured	-	-	mg/L	11.11	-	11.29	11.38	10.9	11.14	-	11.32	11.38	13.2	11.06	-	11.25	11.38	-	11.25	11.31	-	11.04	10.7
pH, field measured	-	7.0 - 8.7	pH unit	8	-	7.88	8.01	8.1	7.98	-	8.08	8.01	7.9	8.03	-	8.04	8.01	-	8.04	8.1	-	7.99	7.95
Specific conductivity, field measured	-	-	uS/cm	11989	-	22890	18681.08	7380	11815	-	19127	18681.08	25401	10540	-	22180	18681.08	-	22180	19122	-	18681.08	70073
Temperature, field measured	-	-	deg c	8.3	-	7.9	8.03	11.7	8.6	-	7.6	8.03	1.7	9.1	-	7.6	8.03	-	7.6	7.6	-	9	11.1
Turbidity, field measured	-	-	NTU	0.29	-	0.33	0.7	2.1	0.9	-	0.44	0.7	0.2	0.31	-	0.4	0.7	-	0.4	0.43	-	0.31	1.8
Conductivity	-	-	uS/cm	15500	14400	20700	7200	9590	16800	11800	18000	7920	7520	14400	12300	21100	98.6	3.2	21000	20700	14800	15700	9920
Total Suspended Solids	-	-	mg/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.3	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Turbidity	-	-	NTU	0.34	0.28	0.44	0.22	0.64	0.4	0.46	0.23	0.2	0.39	0.31	0.29	0.26	< 0.10	< 0.10	0.22	0.24	0.32	0.29	0.54
Salinity	-	-	mg/L	9900	9300	-	4400	6000	10800	7500	-	4900	4600	9200	7800	-	< 1000	< 1000	-	-	9600	10100	6300
Total Organic Carbon	-	-	mg/L	1.14	0.74	1.16	0.97	1.11	1.32	0.82	1.18	0.96	0.92	1.09	0.91	1.06	< 0.50	< 0.50	0.99	1.25	0.7	1.14	1.08
Hardness, Calcium Carbonate	-	-	mg/L	1830	1680	2430	804	1140	2020	1350	2000	945	846	1660	1410	2470	8.52	< 4.8	2340	2280	1680	1800	1160
Hydrocarbons																							
Acenaphthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acridine	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benz(a)anthracene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Benzo(g,h,i)perylene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	0.025	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	-	1.4	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	-	-	ug/L	< 0.020	< 0.020	< 0.020	< 0.020	0.049	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Pyrene	-	-	ug/L	< 0.010	< 0.010	< 0.010	< 0.010	0.019	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-methylnaphthalene	-	-	ug/L	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010
VPH (C6-C10)	-	-	ug/L	-	< 100	< 100	-	-	-	< 100	< 100	-	-	-	< 100	< 100	-	< 100	< 100	< 100	< 100	-	-
Petroleum Hydrocarbons - F1 (C6-C10)	-	-	ug/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Petroleum Hydrocarbons - F2 (C10-C16)	-	-	ug/L	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 100	< 100	< 300	< 100	< 100	< 300	< 100	< 100	< 300	< 100	< 100
Petroleum Hydrocarbons - F3 (C16-C34)	-	-	ug/L	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 300	< 250	< 250	< 300	< 250	< 250
Petroleum Hydrocarbons - F4 (C34-C50)	-	-	ug/L	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 250	< 250	< 300	< 250	< 250	< 300	< 250	< 250	< 300	< 250	< 250
1-Methylnaphthalene	-	-	ug/L	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010
Benzo[b,j,k]fluoranthene	-	-	ug/L	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015

			Station	MP-06			MP-05					MP-06					MP-05	MP-06	MP-06	MP-05	MP-06	MP-06	MP-05
			Location	SOURCE-2	SOURCE-2	SOURCE-2	WNW-1	WNW-1	WNW-1	WNW-1	WNW-1	WNW-2	WNW-2	WNW-2	WNW-2	WNW-2	SITE-1	SITE-2	WNW-2	NORTH-1	ENE-2	NORTH-2	SOURCE-1
			Sample Name	Source - 2	SOURCE-2	Source-2	WNW - 1	WNW - 1	WNW - 1	WNW-1	WNW-1	WNW - 2	WNW - 2	WNW - 2	WNW-2	WNW-2	Site - 1	SITE-2	DUP E	DUP-D	DUPC	DUP - B	DUP - A
			Sample Date	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-07-27	2020-08-01	2020-08-04	2020-08-10	2020-08-15	2020-08-01	2020-08-10	2020-08-15	2020-08-15	2020-08-10	2020-08-04	2020-08-01
			FIELD_SDG	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2123	VA20B2125	VA20B2114	L2487406	VA20B3145	VA20B2125	L2487406	VA20B3145	VA20B3145	L2487406	VA20B2114	VA20B2125
			PARENT_SAMPLE_CODE																VA20B3145-006	VA20B3145-003	L2487406-8	VA20B2114-007	VA20B2125-001
			SAMPLE_TYPE_CODE	N	N	N	N	N	N	N	N	N	N	N	N	N	FB	FB	FD	FD	FD	FD	FD
			SYS_SAMPLE_CODE	VA20B2114-005	L2487406-5	VA20B3145-005	VA20B2123-002	VA20B2125-002	VA20B2114-002	L2487406-2	VA20B3145-002	VA20B2123-006	VA20B2125-006	VA20B2114-006	L2487406-6	VA20B3145-006	VA20B2125-010	L2487406-10	VA20B3145-009	VA20B3145-010	L2487406-9	VA20B2114-009	VA20B2125-009
Parameter	CCME Aquatic Marine Water Short Term	CCME Aquatic Marine Water Long Term	Unit																				
Metals, Dissolved																							
pH	-	7.0 - 8.7	pH unit	7.95	7.95	8.01	8.02	7.99	7.98	7.96	8.02	8	8.02	7.97	7.96	8.02	6.24	5.51	8	8.03	7.96	7.96	8
Aluminum	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Antimony	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	-	12.5	ug/L	0.44	0.48	0.88	< 0.40	< 0.40	0.47	< 0.40	0.75	< 0.40	< 0.40	0.47	0.42	0.86	< 0.40	< 0.40	0.78	0.84	0.52	0.48	< 0.40
Barium	-	-	ug/L	5.6	5.6	7.2	4	4.6	5.8	5.1	6.3	4.3	4.4	5.4	5.5	6.9	< 1.0	< 1.0	6.8	6.7	5.7	5.7	4.7
Beryllium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	-	-	ug/L	1270	1120	1640	570	780	1400	890	1420	640	550	1190	960	1640	< 300	< 300	1580	1560	1180	1300	750
Cadmium	-	0.12	ug/L	< 0.010	< 0.010	0.011	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.011	< 0.010	< 0.010
Calcium	-	-	ug/L	130000	127000	178000	67600	84100	146000	100000	151000	71900	67900	124000	110000	184000	< 1000	< 1000	173000	174000	128000	133000	82100
Chromium	-	1.5 (VI)	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	-	-	ug/L	< 0.050	< 0.050	0.122	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	-	-	ug/L	0.23	0.28	0.45	0.35	0.31	0.25	0.27	0.27	0.5	0.45	0.36	0.89	0.23	< 0.20	< 0.20	0.24	0.28	0.27	0.24	0.24
Iron	-	-	ug/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Lead	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	-	-	ug/L	50	47	67	22	28	54	34	56	26	21	47	38	67	< 20	< 20	65	63	47	49	28
Magnesium	-	-	ug/L	364000	332000	482000	150000	212000	401000	267000	394000	180000	161000	335000	276000	488000	1700	< 1000	465000	448000	330000	375000	217000
Manganese	-	-	ug/L	0.53	0.67	29.8	0.27	< 0.10	0.74	0.43	0.8	0.28	< 0.10	0.42	0.22	0.78	< 0.10	< 0.10	0.8	0.89	0.62	0.31	0.1
Mercury	-	0.016	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	-	-	ug/L	3.16	2.97	4.27	1.38	1.95	3.55	2.54	3.61	1.53	1.43	2.79	2.53	4.08	< 0.10	< 0.10	3.85	4.14	3.06	3.02	1.89
Nickel	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	-	-	ug/L	113000	108000	160000	43800	62500	124000	86900	131000	53900	47000	102000	89100	163000	< 1000	< 1000	154000	151000	109000	110000	65400
Selenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	-	-	ug/L	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	7.5	-	ug/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	-	-	ug/L	2720000	2810000	4240000	1210000	1660000	3000000	2230000	3660000	1340000	1350000	2490000	2390000	4260000	16000	< 2500	4130000	4050000	2900000	2780000	1790000
Strontium	-	-	ug/L	2210	1960	2980	926	1290	2570	1570	2450	1000	927	1990	1660	2970	< 10	< 10	2850	3020	2010	2190	1250
Sulphur (Colloidal)	-	-	ug/L	294000	247000	451000	112000	158000	325000	198000	364000	126000	116000	263000	207000	440000	< 5000	< 5000	420000	407000	261000	294000	159000
Tellurium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thallium	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	-	-	ug/L	1.24	1.39	3.7	1.22	1.53	1.5	1.42	1.76	1.1	1.14	1.22	1.31	1.68	< 0.050	< 0.050	1.7	1.84	1.35	1.25	1.38
Vanadium	-	-	ug/L	< 0.50	< 0.50	0.64	< 0.50	< 0.50	< 0.50	< 0.50	0.52	< 0.50	< 0.50	< 0.50	< 0.50	0.63	< 0.50	< 0.50	0.65	0.6	< 0.50	< 0.50	< 0.50
Zinc	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zirconium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hardness, Calcium Carbonate	-	-	mg/L	1820	-	2430	787	1080	2020	-	2000	919	832	1690	-	2470	8.59	-	2340	2280	-	1880	1100
Cesium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rhenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Rubidium	-	-	ug/L	29.6	30.7	44.5	13.2	18.6	33.4	25	37.3	16	13.7	27.8	25.6	45.4	< 5.0	< 5.0	42.8	42.3	31.7	30	18.6
Tungsten	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Gallium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Metals, Total																							
pH	-	7.0 - 8.7	pH unit	7.95	7.95	8.01	8.02	7.99	7.98	7.96	8.02	8	8.02	7.97	7.96	8.02	6.24	5.51	8	8.03	7.96	7.96	8
Aluminum	-	-	ug/L	12.1	10.6	24.2	12.1	23.8	13.9	13.7	6.5	13.2	15.2	10.6	9.8	6	< 5.0	< 5.0	6.9	7.1	11	11.3	30
Antimony	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	-	12.5	ug/L	0.47	0.48	0.8	< 0.40	< 0.40	0.5	0.44	0.7	< 0.40	< 0.40	0.52	0.42	0.83	< 0.40	< 0.40	0.75	0.74	0.48	0.5	< 0.40
Barium	-	-	ug/L	5.6	5.8	7.4	4	5	5.6	5.5	6.5	4.4	4.3	5.4	5.5	6.7	< 1.0	< 1.0	7	6.5	5.9	5.3	5.3
Beryllium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bismuth	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	-	-	ug/L	1290	1150	1730	570	780	1460	910	1490	660	560	1230	950	1770	< 300	< 300	1700	1520	1190	1220	740
Cadmium	-	0.12	ug/L	< 0.010	< 0.010	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.01	0.01	0.011	< 0.010	< 0.010
Calcium	-	-	ug/L	135000	124000	176000	70100	87500	151000	103000	158000	76400	69600	126000	107000	182000	< 1000	< 1000	178000	165000	131000	131000	86000
Chromium	-	1.5 (VI)	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cobalt	-	-	ug/L	< 0.050	< 0.050	0.13	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	-	-	ug/L	< 0.50	< 0.50	0.65	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.57	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Iron	-	-	ug/L	13	11	14	12	29	15	23	< 10	12	20	14	10	< 10	< 10	< 10	< 10	< 10	15	11	33
Lead	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Lithium	-	-	ug/L	50	45	69	22	29	56	36	62	26	22	50	37	68	< 20	< 20	67	62	48	49	29
Magnesium	-	-	ug/L	362000	332000	457000	153000	223000	400000	260000	389000	183000	163000	326000	273000	466000	1700	< 1000	463000	443000	344000	358000	228000
Manganese	-	-	ug/L	1.02	1.01	33.6	1.05	1.92	1.6	1.31	1.14	0.88	1.04	1.01	0.94	1.14	< 0.20	< 0.20	1.17	1.2	1.09	0.95	1.76
Mercury	-	-	ug/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Molybdenum	-	-	ug/L	3	2.94	3.94	1.41	1.88	3.29	2.35	3.43	1.55	1.53	2.98	2.64	4.03	< 0.10	< 0.10	4.04	3.77	3.04	3.01	1.94
Nickel	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phosphorus	-	-	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Potassium	-	-	ug/L	114000	111000	165000	48100	68100	127000	86600	144000	56300	50000	108000	90500	169000	< 1000	< 1000	166000	151000	115000	111000	70300
Selenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silicon	-	-	ug/L	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Silver	7.5	-	ug/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium	-	-	ug/L	2690000	2780000	4620000	1190000	1860000	2970000	2280000	3670000	1310000	1380000	2450000	2430000	4490000	15100	< 2500	4520000	4270000	2880000	2680000	1840000
Strontium	-	-	ug/L	2160	1860	2830	910	1330	2360	1520	2460	1000	948	1870	1670	2890	< 10	< 10	3040	2760	1940	2170	1320
Sulphur (Colloidal)	-	-	ug/L	286000	249000	426000	110000	158000	307000	191000	355000	124000	117000	252000	206000	426000	< 5000	< 5000	418000	390000	253000	273000	162000
Tellurium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thallium	-	-	ug/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Thorium-232	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tin	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Titanium	-	-	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Uranium	-	-	ug/L	1.31	1.25	3.69	1.13	1.4	1.5	1.31	1.75	1.08	1.15	1.31	1.25	1.68	< 0.050	< 0.050	1.69	1.73	1.3	1.32	1.41
Vanadium	-	-	ug/L	< 0.50	< 0.50	0.74	< 0.50	< 0.50	< 0.50	< 0.50	0.66	< 0.50	< 0.50	< 0.50	< 0.50	0.74	< 0.50	< 0.50	0.72	0.71	< 0.50	< 0.50	< 0.50
Zinc	-	-	ug/L	4.3	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	3.7	< 3.0
Zirconium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tungsten	-	-	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Rubidium	-	-	ug/L	31	30.1	45.4	13.4	19.5	33.2	24.7	39.5	16.4	14.4	30.2	25.5	46.3	< 5.0	< 5.0	45.5	42.7	31.4	30	20.1
Rhenium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cesium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Yttrium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Gallium	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ungrouped Analytes																							
Radium-226	-	-	Bq/l	< 0.008	< 0.0083	< 0.0086	< 0.0085	< 0.0087	< 0.0086	< 0.0058	0.0066	< 0.0087	< 0.0058	< 0.007	< 0.0078	0.004	< 0.0048	< 0.0083	< 0.0049	< 0.0081	< 0.0063	< 0.0039	< 0.0082
VOCs + BTEX																							
Benzene	-	110	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	-	25	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	-	215	ug/L	< 0.50	< 0.45	< 0.50	< 0.50	< 0.50	< 0.50	< 0.45	< 0.50	< 0.50	< 0.50	< 0.50	< 0.45	< 0.50	< 0.50	< 0.45	< 0.50	< 0.50	< 0.45	< 0.50	0.61
Xylenes, Total	-	-	ug/L	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
o-Xylene	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylenes	-	-	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methyl tert-Butyl Ether	-	5000	ug/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
SUM OF BTEX	-	-	ug/L	< 1.2	-	-	< 1.2	< 1.2	< 1.2	-	-	< 1.2	< 1.2	< 1.2	-	-	< 1.2	-	-	-	-	< 1.2	< 1.2

Notes:

(VI)- hexavalent chromium

CCME - Canadian Council of Ministers for the Environment; FD - field duplicate; FB - field blae or dock; MP-06 - monitoring stations east of the ore doc

APPENDIX 2E

MEEMP ANNUAL COMPARISONS TABLES 2020

		2015				2016				2017				2018				2019				2020			
Parameter	**Units**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**	**Overall Mean**	**Overall Min**	**Overall Max**	**Overall Std. Dev.**
Conventional Parameters																									
pH	pH	7.8	7.5	7.9	0.1	7.9	7.7	7.9	0.1	7.8	7.0	8.0	0.3	8.0	7.1	8.1	0.2	8.0	7.9	8.2	0.1	8.0	7.9	8.11	0.1
Total Alkalinity	mg·L^{-1}	91	86	98	4	90	83	100	6	85	45	105	18	90	80	99	6	112	105	117	3	77	68	107	9
Conductivity	uS·cm^{-1}	29417	23000	33000	3013	29390	8800	47000	15000	22666	7470	38400	12055	14743	9460	29800	5915	31817	10900	47300	12165	14533	6680	40800	7387
Hardness	mg·L^{-1}	3358	2600	3800	315	3382	930	5500	1837	2467	828	4220	1326	1521	876	3440	677	-	-	-	-	1750	742	6260	1151
Turbidity	NTU	0.23	0.05	0.92	0.23	0.43	0.10	0.99	0.26	1.06	0.27	9.60	2.05	0.76	0.21	2.52	0.57	0.32	<0.1	0.67	0.17	0.32	< 0.10	0.66	0.13
TSS	mg·L^{-1}	1.20	0.50	2.20	0.57	1.61	1.00	3.00	0.71	4.44	2.00	25.50	6.69	2.19	<2	4.30	0.57	2.07	<2	2.90	0.22	2.18	< 2.0	7.5	2.06
Total Organic Carbon	mg·L^{-1}	0.99	0.25	1.70	0.56	0.71	0.55	0.92	0.12	9.25	1.07	31.80	10.76	1.27	0.92	1.77	0.23	1.28	0.96	1.96	0.28	1.07	0.73	1.51	0.18
Nutrients																									
Nitrite	mg·L^{-1}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	<0.1	0.18	0.02	<0.1	<0.1	<0.1	<0.1	0.10	<0.1	0.12	0.00	0.01	<0.01	<0.01	0.00
Nitrate	mg·L^{-1}	0.04	0.03	0.16	0.04	0.16	0.05	0.58	0.24	<0.5	<0.5	<0.5	0.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	0.02	<0.01	0.28	0.09
Nitrogen (Ammonia Nitrogen)	mg·L^{-1}	0.390	0.170	0.870	0.180	0.150	0.060	0.230	0.050	<0.005	<0.005	<0.005	0.000	0.005	<0.005	0.014	0.002	0.006	<0.005	0.002	0.002	0.006	<0.005	0.041	0.013
Major Ions																									
Total Calcium	mg·L^{-1}	227	180	250	18	230	76	380	119	189	64	335	103	114	76	229	43	259	99	402	97	130	62	421	76
Total Magnesium	mg·L^{-1}	680	520	770	65	674	180	1100	368	495	150	829	272	296	178	674	137	689	217	1050	267	342	141	1260	231
Total Potassium	mg·L^{-1}	212	170	240	20	207	54	350	117	149	46	275	82	88	49	200	42	245	70	432	114	112	43	419	79
Total Sodium	mg·L^{-1}	5583	4300	6300	527	5595	1500	9100	3098	4139	1300	7490	2271	2351	1410	5390	1101	6348	2030	9730	2549	2841	1050	9670	1846
Dissolved Chloride	mg·L^{-1}	107,67	8500	13000	1410	10100	2800	17000	5494	8654	2290	14900	4992	4623	2950	9550	1859	11107	3240	17800	4637	4889	1980	15600	2941
Dissolved Sulphate	mg·L^{-1}	1101	790	1300	164	1119	340	1900	507	1220	319	2100	709	626	396	1330	262	1530	411	2510	649	694	283	2320	432
Metals																									
Total Aluminum	µg·L^{-1}	-	-	50.0	-	16.0	9.0	25.0	7.0	25.4	7.7	142.0	29.7	18.0	47.8	9.1	9.6	25.3	5.0	334.0	66.4	12.5	5.4	26.5	4.9
Total Antimony	µg·L^{-1}	<10	<10	<10	<10	<10	<10	<10	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	0.0
Total Arsenic	µg·L^{-1}	<10	<10	<10	<10	<10	<10	<10	<10	<2	<2	<2	<2	<2	<2	<2	<2	1.00	<0.4	1.62	0.39	0.54	< 0.40	1.4	0.26
Total Barium	µg·L^{-1}	<10	<10	<10	<10	5.80	5.20	6.70	0.50	6.74	4.60	9.30	1.69	5.68	4.60	8.00	0.95	7.81	6.10	9.50	1.07	5.56	4	10	1.27
Total Beryllium	µg·L^{-1}	<10	<10	<10	<10	<10	<10	<10	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Bismuth	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Boron	µg·L^{-1}	2450	2000	2900	278	2501	660	4400	1444	2038	600	3710	1176.46	1193	2610	710	557	2555	1010	4130	1026	1210	490	4080	760
Total Cadmium	µg·L^{-1}	<0.01	<0.01	<0.01	<0.01	0.016	0.013	0.018	0.003	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.027	<0.01	0.046	0.012	0.011	< 0.010	0.018	0.003
Total Cesium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.0
Total Chromium	µg·L^{-1}	<10	<10	<10	<10	<10	<10	<10	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.50	<0.5	0.54	0.01	0.55	< 0.50	2.4	0.00
Total Cobalt	µg·L^{-1}	<4	<4	<4	<4	<4	<4	<4	<4	0.06	<0.05	0.15	0.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	< 0.050	0.13	0.00
Total Copper	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	0.61	<0.5	0.97	0.15	0.59	<0.5	0.88	0.15	1.74	<0.5	11.00	2.52	0.51	< 0.50	0.65	0.04
Total Gallium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Iron	µg·L^{-1}	<500	<500	<500	<500	<500	<500	<500	<500	37.1	<10	286.0	60.5	25.3	<10	93.0	21.1	14.0	<10	20.0	3.7	15.6	< 10	53	8.7
Total Lead	µg·L^{-1}	<5	<5	<5	<5	<5	<5	<5	<5	0.30	<0.3	0.35	0.01	<0.3	<0.3	<0.3	<0.3	0.05	<0.05	0.12	0.01	<0.05	<0.05	<0.05	<0.05
Lithium	µg·L^{-1}	-	-	-	-	-	-	-	-	87.4	30.0	171.0	52.9	45.6	101.0	27.0	20.8	95.6	33.0	159.0	36.5	47.7	< 20	164	30.4
Total Manganese	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	1.42	0.64	6.54	1.29	1.35	3.66	0.79	0.70	1.11	0.69	2.66	0.42	1.99	0.79	33.6	5.07
Total Mercury	µg·L^{-1}	0.010	0.010	0.030	0.010	<0.013	<0.013	<0.013	<0.013	0.011	<0.01	<0.03	0.004	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Molybdenum	µg·L^{-1}	<20	<20	<20	<20	2.90	2.10	3.60	0.60	4.89	<2	9.30	2.73	2.87	<2	6.30	1.25	6.75	2.05	10.90	2.87	2.93	1.25	10	1.82
Total Nickel	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.512	<0.5	0.600	0.028	0.516	< 0.50	1.13	0.000
Total Phosphorus	µg·L^{-1}	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	430.0	<50	<1000	477.5	<50	<50	<50	<50	<50	<50	<50	<50	50.2	< 50	57	0.0
Total Rhenium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Rubidium	µg·L^{-1}	-	-	-	-	-	-	-	-	57.2	18.2	109.0	34.0	29.0	66.3	17.1	13.8	66.6	21.0	117.0	29.3	30.7	12	106	19.6
Total Selenium	µg·L^{-1}	<10	<10	<10	<10	<10	<10	<10	<10	<2	<2	<2	<2	<2	<2	<2	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Silicon	µg·L^{-1}	-	-	-	-	-	-	-	-	800.0	<500	<1000	251.3	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Silver	µg·L^{-1}	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	µg·L^{-1}	4067	3100	4600	370	4155	1200	7000	2316	2780	896	4610	1378	1802	3980	1140	789	4673	1370	7570	2087	2025	832	7460	1354
Total Sulfur	µg·L^{-1}	-	-	-	-	-	-	-	-	482083	177000	656000	207923	222316	514000	137000	104842	620000	168000	1090000	293840	277600	99100	1180000	215327
Total Tellurium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	< 0.50	0.51	0.0
Total Thallium	µg·L^{-1}	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	0.050	<0.05	0.057	0.002	0.050	<0.05	0.058	0.002	<0.05	<0.05	< 0.050	< 0.050
Total Thorium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.50	< 0.50
Total Tin	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	< 1	< 1
Total Titanium	µg·L^{-1}	<20	<20	<20	<20	2.6	2.6	2.6	NA	5.2	<5	8.8	0.8	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	< 5	< 5
Total Tungsten	µg·L^{-1}	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	< 1	< 1
Total Uranium	µg·L^{-1}	2.13	2.00	2.30	0.11	2.30	1.40	3.20	0.70	2.06	0.93	4.23	0.77	1.81	2.81	1.15	0.44	2.83	2.41	4.20	0.36	1.48	0.991	3.69	0.47
Total Vanadium	µg·L^{-1}	<20	<20	<20	<20	<20	<20	<20	<20	0.69	<0.5	1.37	0.26	0.52	<0.5	0.69	0.06	0.91	<0.5	1.57	0.34	0.58	< 0.50	1.41	0.29
Total Yttrium	µg·L^{-1}	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Zinc	µg·L^{-1}	<50	<50	<50	<50	15.0	5.0	25.0	14.0	3.2	<3	4.3	0.4	3.0	3.1	3.0	0.0	3.1	<3	4.3	0.3	3.1	< 3.0	5.6	0.7
Total Zirconium	µg·L^{-1}	-	-	-	-	-	-	-	-	0.51	<0.5	0.70	0.04	<0.5	<0.5	<0.5	<0.5	0.50	<0.5	0.51	0.00	<0.5	<0.5	< 0.50	< 0.50

Notes; Min = minimum; Max = maximum; Std. Dev. = Standard Deviation; TSS=Total Suspended Solids; mg/L = miligrams per liter; uS/cm = micro siemens per centimetre; NTU = nephelometric turbidity unit; µg/L = micrograms per liter; < = less than; NA = not applicable; - = no value recorded

GOLDER
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Chapter 3.0 Marine Sediment Quality

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

Submitted to:

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1663724-281b-R-Rev1-34000

18 August 2021

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FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
Adj. R^2	Adjusted R^2
ALS	ALS Canada Ltd.
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
BACI	Before/After Control/Impact
BC	British Columbia
BC MOE	BC Ministry of Environment and Climate Change Strategy
CCME	Canadian Council of Ministers of the Environment
Df	Degree of freedom
DL	Detection limit
DQOs	data quality objectives
ERL	Effects Range-Low
ERP	Early Revenue Phase
FCSAP	Federal Contaminated Sites Action Plan
FEIS	Final Environmental Impact Statement
IDW	Inverse Distance Weighting
ISQGs	Interim Sediment Quality Guidelines
m	metres
m^2	metre squared
mg/kg	milligram per kilogram
MDL	Method Detection Limit
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environmental Working Group
NOAA	National Oceanic and Atmospheric Administration
NWB	Nunavut Water Board
PAHs	Polycyclic aromatic hydrocarbons
PC	Project Certificate
PCA	Principal Component Analysis
PELs	Probable Effect Level
QA/QC	Quality Assurance / Quality Check
QC	Quality Check

Acronym or Abbreviation	Definition
RM	repeated measures
RPD	Relative Percent Difference
SE	East Transect
SNE	Northeast Transect
SNW	Northwest Transect
SW	West Transect
TEL	Threshold Effect Level
TOC	Total organic carbon
VOCs	volatile organic compounds
WSQG	Working Sediment Quality Guidelines

3.0 SEDIMENT QUALITY

3.1 Introduction

This chapter presents the results of the marine sediment quality monitoring program, a component of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted within the vicinity of Milne Port in Milne Inlet, during the 2020 open-water season. This component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the Project Certificate (PC) Conditions described in Chapter 1.0, Table 1-2. Project Certificate Conditions related to the monitoring of marine sediment include PC Conditions No. 76, 83 (a), 87, 99 (a), and 99 (c).

3.1.1 Objectives

The MEEMP objectives are outlined in Section 1.3 for the overall program. Objectives specific to the marine sediment quality component are to:

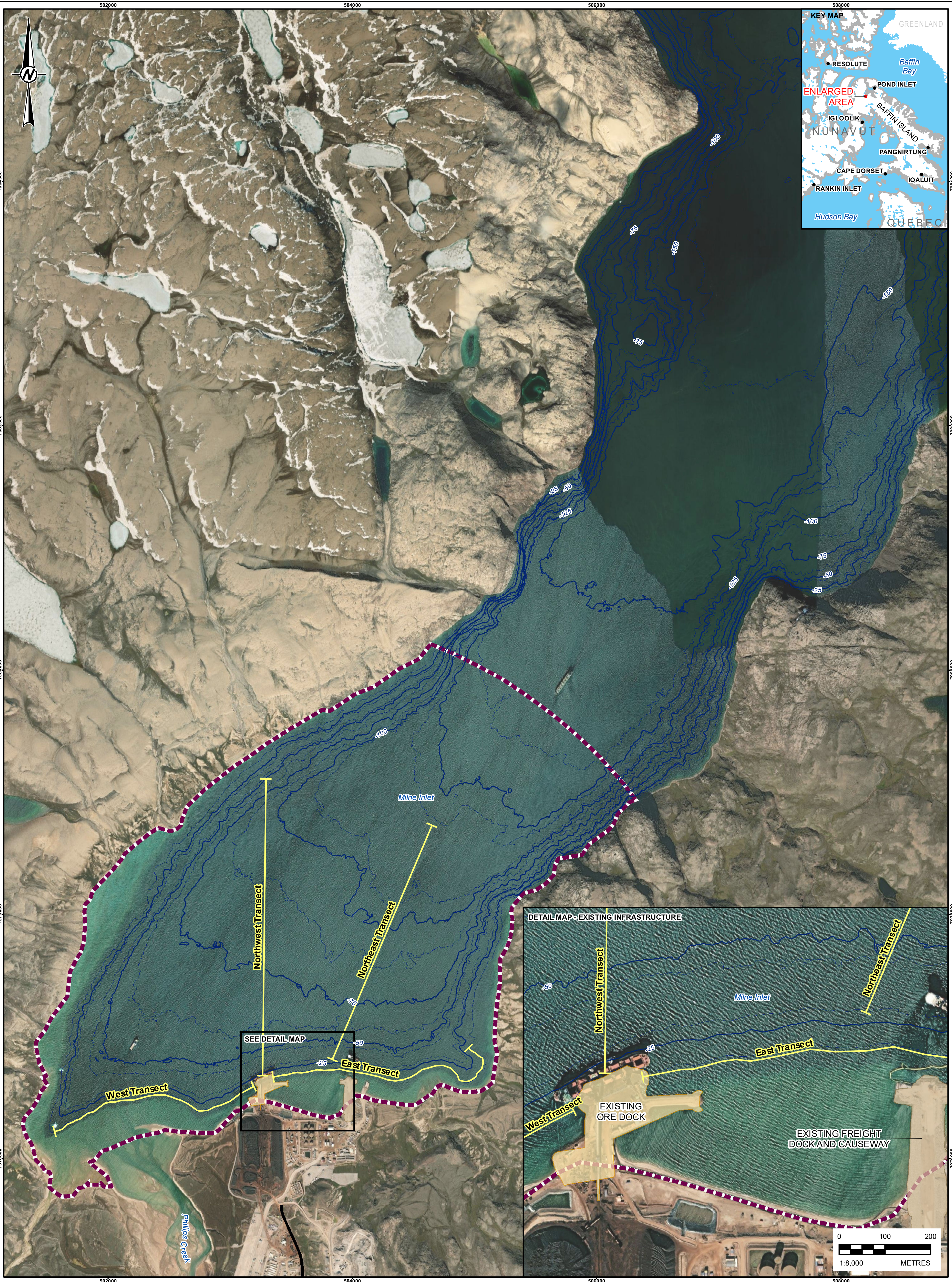
- Characterize and interpret marine sediment quality in Milne Port for the purpose of identifying Project-related effects.
- Verify predictions made in the FEIS and other submissions to the Nunavut Water Board (NWB) regarding effects on marine sediment quality, as applicable.
- Collect marine sediment quality data to support interpretation of the benthic infauna component.
- Recommend necessary and appropriate changes to the sediment quality component of the MEEMP for future years.

3.2 Study Design

The MEEMP sampling design for marine sediment quality and benthic infauna is based on a radial gradient transect design extending out from the Ore Dock (Figure 3-1) which represents a potential point source for the Project (e.g., for ore dust, hydrocarbon release, wastewater, and site runoff) and physical changes as a result of Project activities (e.g., sediment re-suspension and transportation). The radial pattern was designed to detect potential Project-related effects on marine sediment quality and benthic infaunal communities along four transects (East, West, Northeast and Northwest) with increasing distance from the point source (15 stations per transect). From the Ore Dock, stations have been established along the distance gradient which allows for the spatial assessment of physical, chemical, and biological changes (SEM 2015). To address the component objectives stated above, this design is also used to identify the occurrence or likelihood of adverse (negative) environmental effects to inform further mitigation measures, and/or alterations to Project activities to reduce or eliminate effects.

The 15 stations per transect are co-located with benthic infauna stations (Section 4.0) to allow for evaluation of exposure data (sediment quality) in relation to biological variables (benthic infauna community characteristics). The two Coastal Transects (East and West) and the two Northern Offshore Transects (Northwest and Northeast) are described below.

- *East and West Transects*: arranged along the 15 metre (m) depth contour to minimize the confounding influence of water depth on sediment and associated biota. The 15 m depth contour is considered to be unaffected by winter ice scour and has been associated with relatively higher species counts and increased species diversity for both marine flora and fauna (SEM 2015). The East and West Transects extend approximately 1,500 m to the east and the west of the ore dock, respectively.
- *Northwest and Northeast Transects*: extend directly offshore from the existing and proposed ore docks, respectively, out to a distance of 2,000 m, corresponding with water depths of approximately 100 m and 120 m. These transects include both distance and depth gradients for consideration in the analysis, such that both distance and depth along a transect represent potential confounding factors in the evaluation of potential effects on sediment quality from the Project.



LEGEND

- BATHYMETRIC CONTOUR (15 m INTERVAL)
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- MILNE INLET TOTE ROAD
- TRANSECT
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK
- LOCAL STUDY AREA

0 500 1,000
1:30,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
RADIAL GRADIENT STUDY DESIGN FOR 2020 MEEMP

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	GZ
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	3-1

3.2.1 Modifications to the Program (2020)

A Coastal Transect starting at the eastern terminus of the East Transect and extending north along the 15 m depth contour for approximately 4,250 m, has historically been sampled as part of the MEEMP. This transect extends outside the predicted zone of influence for the Project; as such, the stations along this transect are more similar to control/reference conditions instead of areas potentially impacted by port operations. Further review of the study design in the 2019 MEEMP report (Golder 2019) concluded that the Coastal Transect was likely redundant and did not add significant value towards the identification of Project-related effects, thus the Coastal Transect was removed from the study design in 2020 with notification provided to the Marine Environmental Working Group (MEWG) on June 25, 2020.

The 2020 MEEMP sampling program was the first year that all 15 stations along each of the four transects (East, West, Northwest and Northeast) were sampled as intended for the gradient sampling design. In 2020, sediment samples were consistently collected at each station using a Van Veen grab rather than either a standard Ponar or Van Veen grab as was done in 2019.

3.2.2 Sampling Parameters and Indicators

For marine sediment quality, a number of parameters are measured in the MEEMP including particle size, organic carbon, nutrients, metals, and hydrocarbons. A sub-set of these parameters (i.e., percent fines, nutrients, metals, and hydrocarbons) were identified as sediment quality indicators to assess the potential for environmental effects from the Project. To provide early warning of environmental effects from the Project, applicable sediment quality guidelines are used as thresholds, where they exist (i.e., Canadian Council of Ministers of the Environment [CCME] sediment quality guidelines for the protection of aquatic life in marine environments [CCME 2014]). For indicators of particular concern for the Project, with no associated sediment quality guideline (i.e., percent fines and sediment iron), data are analyzed statistically to evaluate Project-related effects within the Milne Inlet study area. The purpose of the radial transect design adopted for the sediment and benthic MEEMP surveys is to assess sediment quality and benthic invertebrate communities over time, and relative to previous years, in order to evaluate the potential for project-related effects on these components. The overall trend in percent fines and iron is compared spatially and temporally.

3.3 Materials and Methods

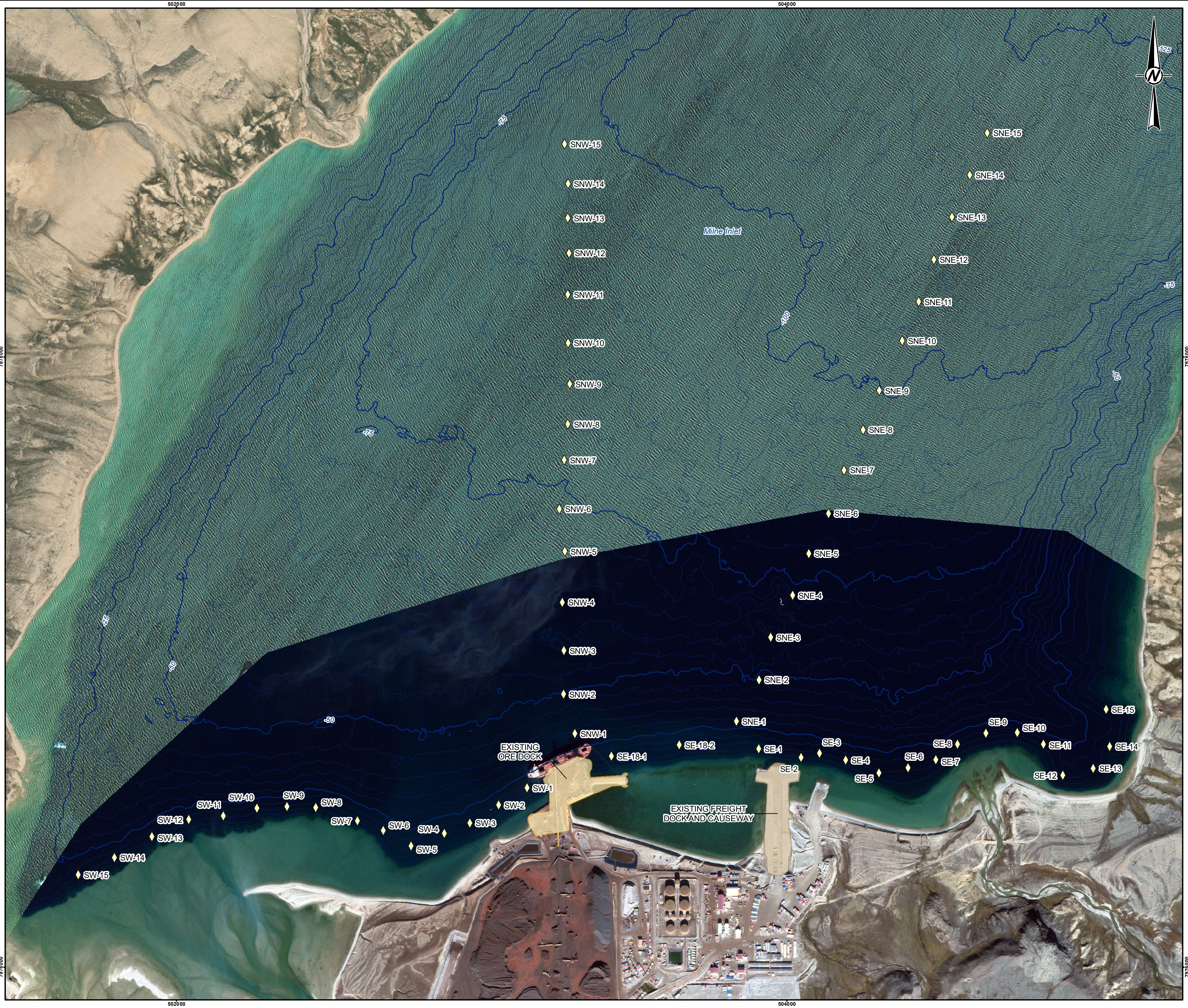
3.3.1 Field Methodology

In addition to the 60 transect stations sampled as part of the 2020 MEEMP (15 per transect x 4 transects), sediment samples from two additional stations (SE18-1 and SE18-2) were collected and submitted for chemical analyses (Table 3-1; Figure 3-2). These two stations were included for consistency with previous MEEMP programs but were not part of the updated radial gradient sampling design, and so are not subject to the same analysis and interpretation.

Table 3-1: Sediment Stations Sampled Along the Four Transects in Milne Inlet, 2020

Station Name	UTM Coordinates (Zone 17W)		Approximate Lateral Distance Along Transect (m)	Water Depth (m)
	Easting	Northing		
East Transect				
SE-1	503907	7976727	651	14.6
SE-2	504009	7976714	750	19.6
SE-3	504106	7976700	845	19.3
SE-4	504202	7976677	939	18.6
SE-5	504299	7976648	1,035	17.6
SE-6	504400	7976654	1,136	17.3
SE-7	504480	7976667	1,217	16.3
SE-8	504559	7976721	1,298	16.1
SE-9	504651	7976754	1,393	15.3
SE-10	504749	7976762	1,491	12.4
SE-11	504839	7976720	1,578	15.5
SE-12	504903	7976629	1,639	21
SE-13	505003	7976652	1,739	16
SE-14	505057	7976724	1,796	16.7
SE-15	505045	7976845	1,794	16.5
Northeast Transect				
SNE-1	503839	7976800	601	27.9
SNE-2	503897	7976938	706	47
SNE-3	503955	7977076	825	55
SNE-4	504014	7977214	953	67.3
SNE-5	504072	7977352	1,086	79.6
SNE-6	504131	7977490	1,224	90
SNE-7	504189	7977629	1,364	94.8
SNE-8	504248	7977767	1,507	99
SNE-9	504306	7977905	1,650	103
SNE-10	504364	7978043	1,794	105
SNE-11	504423	7978181	1,939	108
SNE-12	504481	7978319	2,085	109
SNE-13	504540	7978458	2,233	110
SNE-14	504598	7978596	2,379	115
SNE-15	504656	7978734	2,526	120
Northwest Transect				
SNW-1	503303	7976751	131	32.7
SNW-2	503263	7976884	258	50.5
SNW-3	503262	7977040	414	63.8
SNW-4	503266	7977199	573	66.1
SNW-5	503273	7977355	729	68.5
SNW-6	503267	7977496	870	73
SNW-7	503268	7977649	1,023	79
SNW-8	503277	7977790	1,164	83.8
SNW-9	503276	7977915	1,289	88
SNW-10	503280	7978056	1,430	90.7
SNW-11	503282	7978204	1,578	92
SNW-12	503286	7978340	1,714	94

Station Name	UTM Coordinates (Zone 17W)		Approximate Lateral Distance Along Transect (m)	Water Depth (m)
	Easting	Northing		
SNW-13	503282	7978455	1,829	96
SNW-14	503283	7978567	1,941	98
SNW-15	503271	7978697	2,071	98
West Transect				
SW-1	503147	7976571	129	15.5
SW-2	503064	7976526	224	17.7
SW-3	502975	7976472	327	15.5
SW-4	502874	7976431	436	15.6
SW-5	502771	7976394	545	16
SW-6	502674	7976444	617	17.8
SW-7	502587	7976495	690	15.8
SW-8	502486	7976534	783	15.1
SW-9	502362	7976527	907	15.8
SW-10	502255	7976511	1,016	90.7
SW-11	502146	7976494	1,126	17.2
SW-12	502037	7976473	1,237	17.7
SW-13	501920	7976428	1,359	13.5
SW-14	501797	7976360	1,491	18.2
SW-15	501678	7976303	1,619	14
Additional Non-transect Stations				
SE18-1	503433	7976699	Not on transect	17.3
SE18-2	503646	7976741	Not on transect	21



LEGEND

- 2020 SEDIMENT AND BENTHIC INFAUNA SAMPLING STATIONS
- BATHYMETRIC CONTOUR (5 m INTERVAL)
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500
1:12,500 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
MEEMP SEDIMENT QUALITY AND BENTHIC INFAUNA SAMPLING STATIONS 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	GZ
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	3-2

Sediment samples were collected using a standard Van Veen grab sampler (area of 0.1 m^2). At each station, depending on grab volume and penetration depth, multiple grab samples were collected by lowering the sediment sampler in adjacent deployment positions to obtain a sufficient volume of surficial sediments for the selected analyses. Each grab sample was examined for acceptability based on the following criteria:

- The sampler was fully closed
- There was adequate penetration depth (i.e., sediment volume greater than 25% full)
- The sample did not appear overfilled or disturbed, and the sample did not appear to have been collected on an angle
- The sampler did not appear to be leaking sediment at a substantial rate (i.e., the top of the sediment profile did not appear to be sloping inwards)

Upon acceptance, the overlying water in the grab was removed using a siphon tube or turkey baster, taking care to minimize the loss of sediment from the surface of the grab contents. After decanting, the sample consisted of sediment with minimal overlying water visible. Two terra core samples were taken from the undisturbed sediments and placed into pre-labeled methanol preserved vials for volatile organic compounds (VOCs). A description of the sediment with respect to colour, particle size, depth of sediment horizon sampled, grab penetration depth and presence of non-sediment materials (e.g., shells, debris, biota) was recorded on the sediment collection log. Prior to the sample collection, a stainless-steel spoon and bowl were cleaned with laboratory-grade detergent and rinsed with de-ionized (analyte-free) water. The remaining top 5 cm of sediment from the grab sample or multiple grab samples was removed from the center of the grab using a stainless-steel spoon and transferred to a stainless-steel bowl. The sediment was then homogenized, and aliquots transferred to clean, laboratory supplied sampling containers. Photographs were taken of each sample in the grab and homogenized (Appendix 3A).

Physical and chemical parameters were analyzed in sediment samples collected from a total of 60 stations along four transects in Milne Inlet, as well as at two additional non-transect stations (18SED-01 and 18SED-02) and field duplicate quality check (QC) samples collected from 6 randomly selected stations (approximately 10% of total number of stations). These samples were sent to ALS Canada Ltd. (ALS) for analysis of the following parameters:

- Particle size distribution (Wentworth scale)
- Organic and inorganic carbon
- Total petroleum hydrocarbons
- Volatile organic compounds
- Polycyclic aromatic hydrocarbons (PAHs)
- Trace metals (including mercury)

3.3.2 Data Analysis

For the marine sediment component, the physical composition of sediments along the four transects is characterized and parameters are screened against applicable sediment quality guidelines. A Principal Component Analysis (PCA) is performed to investigate the relationship between all measured physical and chemical parameters. To address the objectives outlined in Section 3.1.1, further statistical evaluation of marine sediment quality focussed on the distribution of fine sediments and iron concentrations along the four transects. Iron is of primary importance because of the potential for increased deposition of iron ore in the form of dust or in runoff from storage stockpiles, generated from the Project. An increase in iron content over time in Milne Inlet sediments could represent a Project-related effect due to the potential for release of iron ore in the form of dust, stockpile runoff, or during loading of ore onto vessels at the Port. Given that the iron ore consists primarily of iron (>65%; FEIS; Baffinland 2013), monitoring for changes in the concentration of this element in marine sediments is an important component of the MEEMP.

There is no iron marine sediment quality guideline in Canada, so sediment data for iron and fine sediments were evaluated spatially and temporally along the transects using general linear modeling. The statistical approach is based on repeated measures (RM) distance regression analyses, with each station re-sampled over time. The RM distance regression analysis is an alternative to the Before/After Control/Impact (BACI) analysis of variance (ANOVA) design and has higher sensitivity to change and is more robust than simple comparison of parameters between control and impact areas.

3.3.2.1 Comparison to Sediment Quality Guidelines

Analytical results were compiled and parameter concentrations compared to applicable sediment quality guidelines. Concentrations of metals and hydrocarbons were compared to CCME Interim Sediment Quality Guidelines (ISQGs) and Probable Effect Level (PELs) for the protection of aquatic life in the marine environment (CCME 2014) that apply in the Project jurisdiction. The CCME ISQGs are intended to represent concentrations below which adverse biological effects are rarely expected to occur. By comparison, the CCME PELs are intended to represent concentrations above which adverse effects are predicted to occur frequently, based on a concurrence data set with sediment chemical concentration and benthic invertebrate effects data from other sites. Notably, the Federal Contaminated Sites Action Plan (FCSAP) guidance for working harbours (FCSAP 2018) recommends use of PELs over ISQGs for screening primary contaminants of potential concern, as screening with ISQGs is considered overly conservative and does not always correlate well with observed effects under field conditions (FCSAP 2018).

To provide a screening value to inform the sediment evaluation, in the absence of a CCME guideline, metals and hydrocarbons were compared to British Columbia Working Sediment Quality Guidelines (WSQG) (BC MOE 2020), and the National Oceanic and Atmospheric Administration (NOAA) sediment benchmarks (Buchman 2008), following feedback received from MEWG.

3.3.2.2 Statistical Analysis

Principal Component Analysis

PCA is an ordination technique that examines ecological distances (differences or similarities) between samples and allows plotting of high dimensional data in two or three-dimensional graphs, with the distances between the samples in the graphs representing the degree of similarity or difference in chemistry indicators. Essentially, a PCA takes a large data set (in this case, sediment chemistry data) and reduces it to a small number of variables (i.e., principal components) that characterize the variability inherent in the data set. The magnitude of concentration is less important than variability in the analysis, which makes it useful to evaluate spatial patterns that could otherwise be missed because of the influence of stations with highly variable sediment parameters.

For this assessment, a PCA was undertaken to evaluate the following:

- Whether there is an association between metal concentrations measured in the sediments and distance from the Ore Dock in the 2020 sediment program. Any direct impacts on sediment quality resulting from Port operations (i.e., prop wash scouring, ore dust, hydrocarbon leaks, wastewater, and site runoff) would be greatest within the vicinity of the Ore Dock, with direct effects progressively decreasing with distance away from the Ore Dock.
- The relationship between sediment physical and chemical data collected during the 2020 field program. Metals, in general, tend to accumulate to a greater degree in finer sediments due to a combination of physical (e.g. increased surface area to volume ratio) and chemical (e.g. geochemical substrate) factors (Jones and Bowser 1978; Horowitz 1991).

The PCA was conducted on all sediment physical and chemical parameters measured in sediment samples collected from the four transects. For the analysis all concentrations were transformed into their square roots. In cases where all measured concentrations were below DLs, these parameters were excluded from the PCA (e.g., hydrocarbons, volatile organic compounds). The PCA was conducted in the statistical environment R v. 4.0.3 (R 2020), using the package FactoMineR (Le et al. 2008).

General Linear Models

The use of general linear models to analyse the transect data for sediment fines and iron concentrations required the use of a distance variable as a predictor in the models. Previously, the distances used were distances from the Ore Dock. To standardize the values and improve interpretation, a single origin point was used for the analyses described below. This point, an imaginary intersection between the East, West, and Northwest transects, was determined to be at coordinates of -80.905917°, 71.889649°. This point is found at the center of the Ore Dock, and all distances reported in the analyses were calculated as straight-line distances from each sampling location to this point of origin.

Analysis of covariance (ANCOVA) is applied to baseline and annual monitoring data to compare gradients in the regression lines for the four transects in order to determine if monitoring results are significantly different from baseline conditions or previous MEEMP years.

Fines Content in Sediments

Fines content (i.e., sum of clay and silt fractions) was analyzed separately for the 2019 and 2020 data and the combined 2014–2020 data to assess spatial and temporal gradients. Both analyses were conducted using general linear modelling and both models included main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. The effect of distance was modeled as a second-degree polynomial to account for the non-linearity in percent fines relative to distance from the Ore Dock. Model residuals were examined to identify departures from linear regression assumptions – normality, homoscedasticity (equal variances), and linearity in predictors. One outlier value was removed during the analysis of the 2019-2020 dataset and the 2014-2020 dataset, based on examination of the residuals (i.e., 2020, West Transect at 1,237 m). The outlier is shown on the plots depicting raw values and model predictions in Section 3.4. Following both linear regressions, multiple comparisons to assess differences in fines content were performed at distances of 200 m, 500 m, 1,000 m, 1,500 m, and 2,000 m along each transect for each year, as applicable based on the length of the transect. The Holm-Sidak method was used for P-value adjustments.

Sediment Iron Concentrations

The analysis of iron sediment concentrations was performed in a similar manner to the analysis of fines content. However, to account for the strong relationship between iron concentrations and fines content, the normalized concentration of iron relative to percent fines content (iron concentrations/(fines content/100) was analyzed, rather than the raw iron concentrations. Normalized iron concentrations were natural-log transformed prior to analysis to address departures from linear regression assumptions. The effect of distance was modeled as a second-degree polynomial. Three outlier values were removed during the 2019-2020 analysis based on examination of residuals (i.e., 2020, West Transect at 1,237 m; 2019, East Transect at 784 m; 2020, East Transect at 184 m). One outlier value was removed during the 2014-2020 analysis based on examination of residuals (i.e., 2017, East Transect at 159 m). All outliers are shown on the plots depicting normalized values and model predictions. Multiple comparisons were performed for normalized iron concentrations at each transect-distance-year combination for each of the models. Comparisons for the 2019-2020 and 2014-2020 analyses assessed differences among years at each distance-transect combination. The analysis of both fines and iron concentration were performed in the statistical environment R v.4.0.3 (R 2020), using the packages “car” (Fox and Weisberg 2019), “emmeans” (Lenth 2020), and “multcomp” (Hothorn et al. 2008).

Inverse Distance Weighting (IDW) of the Distribution of Fine Sediments and Sediment Iron Concentrations

An Inverse Distance Weighting (IDW) interpolation method in ArcGIS was used to create figures to provide a visual depiction of the spatial variability in fine sediments and sediment iron concentrations across the study area, as informed by the results of the radial study design in 2020. IDW is a deterministic interpolation method that assumes the variable being interpolated decreases in influence (its weight) with increased distance from its sample location, or the reverse, that an interpolated value is most influenced by the known sample(s) closest to it.

3.3.3 Quality Management

The overall goal of the sediment quality sampling program was to collect quality data, which was achieved through the consistent application of QA/QC measures. These quality management procedures were applied to the field collection, data analysis, and reporting tasks for the water quality program to verify that the data presented were valid and of acceptable quality to address MEEMP objectives.

3.3.3.1 Field QA/QC

Field staff were trained to be proficient in standardized sampling procedures, data recording using standard forms, and equipment operations applicable to the monitoring program. Field work was completed according to specified instructions and established technical procedures for standard sample collection, preservation, handling, storage, and shipping procedures.

General quality assurance and quality control (QA/QC) tasks applicable to the sediment quality program included, but were not limited to, the following:

- Preparing geo-referenced field maps for use during the surveys to accurately document sampling locations and project-specific data collection forms to standardize the field data collection process.
- Maintaining regular communications between the Project Manager and field staff.
- Collecting and processing samples by qualified experienced personnel.
- Examining each grab sample for acceptability based on the following criteria:
  - the sampler was fully closed
  - there was adequate penetration depth (i.e., sediment volume greater than 25% full) and sediment volume was consistent between all composite grab samples
  - the sample did not appear overfilled or disturbed, and the sample did not appear to have been collected on an angle
  - the sampler did not appear to be leaking sediment at a substantial rate (i.e., the top of the sediment profile did not appear to be sloping inwards).
- Placing samples in appropriate clean containers in such a way that no foreign material was introduced to the sample and handled carefully so there would be no loss of material.
- Collecting Quality Control (duplicate) samples in the field. Specifically, field duplicates (8) were collected during each sampling event to represent at least 10% of the total number of collected samples.
- Rinsing and filtering equipment including the Van Veen grab sampler, materials collection totes, field splitter and sieves with seawater between stations. Visual inspection confirmed that materials were not retained on equipment before use on the next station.
- Checking and validating field survey data sheets before leaving the station.
- Selecting accredited laboratories for sample analysis. Performance quality of selected laboratories were verified through Golder’s internal vendor approval and assessment procedures.
- Using chain-of-custody documentation to track sample shipments to the individual subcontractor laboratories.
- Packaging and shipping samples to the laboratory in accordance with required holding times and storage conditions.

3.3.3.2 Laboratory and Data Analysis QA/QC

Laboratory QA/QC reports were reviewed upon receipt to confirm adherence to sample hold times and laboratory data quality objectives (DQOs), and that the appropriate QA/QC information had been reported. Laboratory QA/QC included verification of recommended sample holding times and the analysis of laboratory control samples, laboratory duplicates, and spiked samples to assess precision and accuracy of analytical methods.

Field duplicates were sampled from eight randomly selected replicate samples (approximately 10% of total number of stations). Field duplicates were blind sample (identified as Duplicate A to H) collected from the same discrete homogenized grab sample (a split sample) as the “original” sample. To assess variability between field duplicates, the Relative Percent Difference (RPD) was calculated as follows:

$$RPD = \left(\frac{sample - duplicate}{(sample + duplicate)/2}\right) \times 100$$

In accordance with the BC Field Sampling Manual (BC MOE 2013) and CCME (2016), an RPD value of >50% was used to identify differences between original and duplicate samples. Values less than five times the Method Detection Limit (MDL) were not included in the RPD calculations because analytical variability near the MDL is higher and does not provide a good measure of variability associated with the collection of field samples.

3.4 Results

Field data sheets and representative photographs from the field program are provided in Appendix 3A and Appendix 3B, respectively. Analytical laboratory reports are provided in Appendix 3C and the compiled dataset screened to applicable sediment quality guidelines is provided in Appendix 3D.

3.4.1 QA/QC Results

The 2020 sediment quality data were considered valid based on the results of the QA/QC assessment provided in Appendix 3E. Briefly,

- chemical analyses on sediment samples were completed within the sample hold time requirements
- data reported by the laboratory were considered reliable according to the accredited laboratory QA/QC assessment
- there was low variability and high precision between duplicates consistent with sediment quality

Overall, the QA/QC results indicate that the sediment quality data collected during the 2020 sampling program are of acceptable quality to address the objectives stated in Section 3.1.

3.4.2 Sediment Grain Size Composition

The physical composition of sediments differed among stations and transects in 2020 (Figure 3-3). Sediments from the West (SW) and East (SE) Transects consisted of a variable mix of sand and silt, while the Northern Offshore Transects (SNW and SNE) sediments consistently had higher proportions of fines (i.e., silt and clay), which appeared to increase with greater distance from the Ore Dock. These observations were consistent with previous MEEMP years and the observed difference in physical composition between coastal and offshore sediments is expected. Coastal sediments located at shallower depths tend to be influenced by the nearshore environment and features such as rivers and streams, whereas offshore sediments are more isolated to these influences because they are located in progressively deeper waters at a distance from the shore. Offshore sediments are more influenced by internal mixing and sediment redistribution processes such that finer sediments tend to deposit and accumulate in sediments further from shore. Accordingly, in the 2020 program, the proportion of fine-grained sediments tended to increase along the Northern Offshore transects with greater distance from the shore (Figure 3-3).

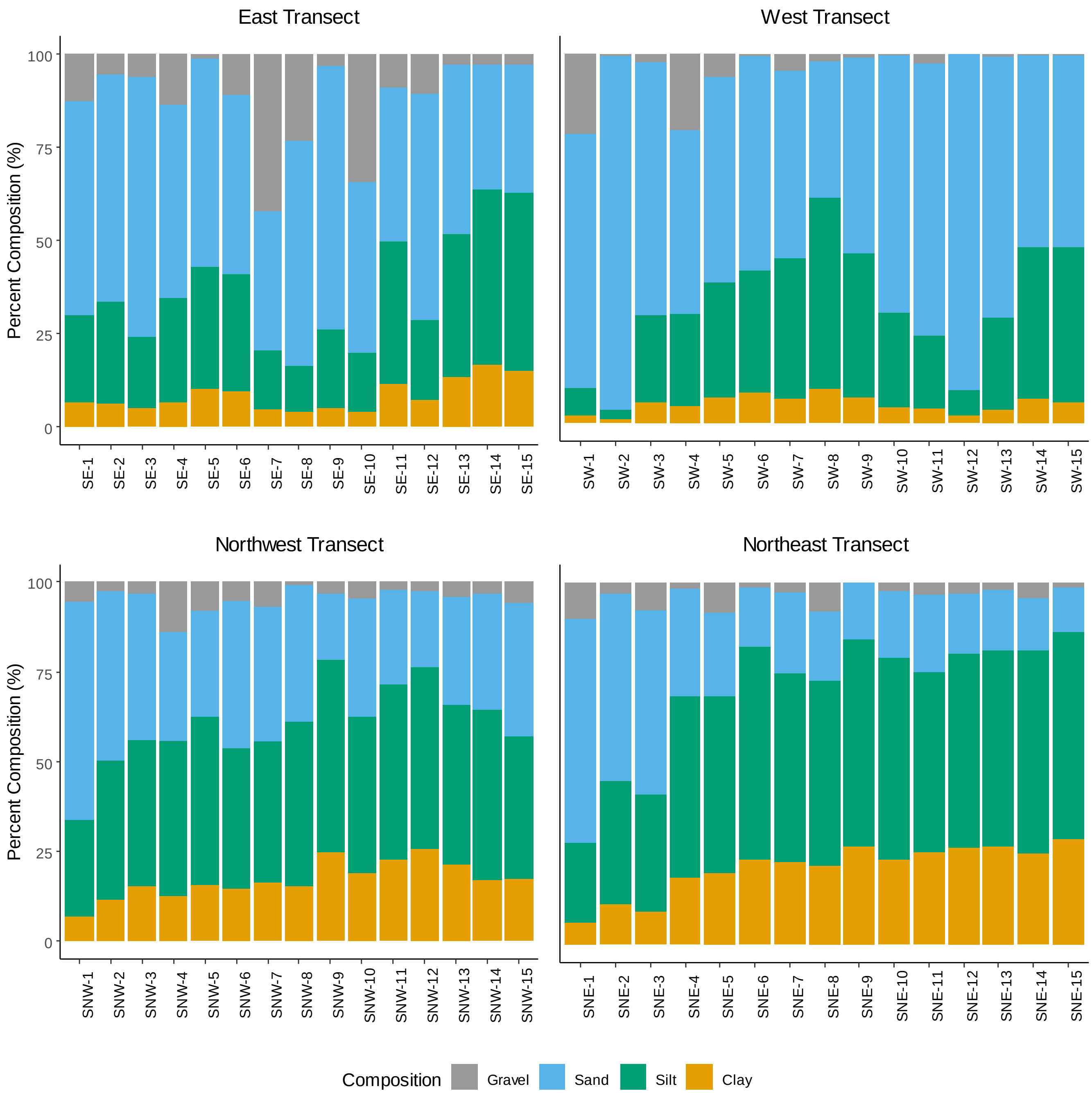


Figure 3-3: Mean sediment particle size distribution for stations located along transects radiating out from the ore dock in Milne Port, 2020

3.4.3 Spatial Relationships between Sediment Parameters

The results of the PCA shown in Figure 3-4 for sediment data collected in 2020 showed strong linear relationships between sediment metal concentrations and the proportion of fine-grained sediments. The PCA showed three components with eigenvalues >1 that accounted for 91% of the total variance. The first component explained the highest percentage of the variance in the original data (82%). The other two principal components accounted for the remaining 9% of the explained variance and will not be discussed further. Details of the PCA, including the eigenvalues, loadings, correlations, and quality of representation are presented in Appendix 3F.

As depicted in Figure 3-4, PC1 positively correlated strongly with fine fractions of sediments (silt and clay), iron, concentrations of metals (loading coefficient ≥0.9) and, to a lesser extent, with moisture (loading coefficient = 0.88) and inorganic carbon (loading coefficient = 0.83). PC1 strongly negatively correlated with sand (loading coefficient = -0.96) and pH (loading coefficient = -0.64), and, to a lesser extent with gravel (loading coefficient = -0.28).

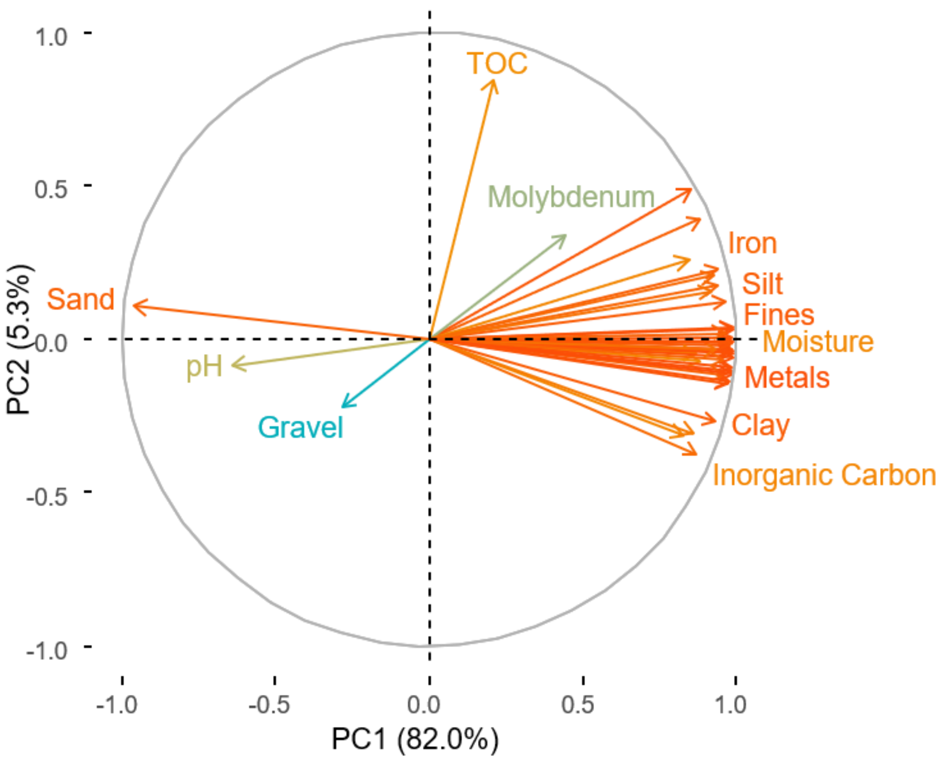


Figure 3-4: Principal component analysis (PCA) of sediment quality at stations located along transects radiating out from the ore dock in Milne Port, 2020

PC1 and PC2 were plotted to identify where samples lie in two-dimensional ordinal space, allowing for further interpretation of the data (Figure 3-5). The right half of Figure 3-5 represents higher silt and clay content, inorganic carbon, and concentrations of metals, with lower pH and sand content; the left half of the figure represents higher sand content, higher pH, and lower metal concentrations. The upper half of Figure 3-5 represents higher total organic carbon (TOC) concentrations; the lower half of the figure represents higher gravel and inorganic carbon concentrations. Most stations on the two Northern Offshore Transects that extend out into the inlet (Northeast (SNE) and Northwest (SNW)) are oriented on the right side of the graph, reflective of the finer sediments and higher inorganic carbon and metal concentrations. Stations along the coastal transects (East (SE) and West (SW) Transects), which are closer to the shore, can be seen in the left half of the graph, reflective of shallower environments with a variable mix of sand and fine sediments, and subsequently lower metal concentrations overall.

More specifically, stations along the East Transect are located primarily in the lower-left part of the graph indicative of higher relative gravel content, whereas stations along the West Transect are located in the upper-left part of the graph, indicative of a higher relative sand content. Stations from the Northern Offshore transects (Northeast and Northwest) position in the right half of the graph have higher concentrations of silt, clay, and other metals, and lower pH and sand content.

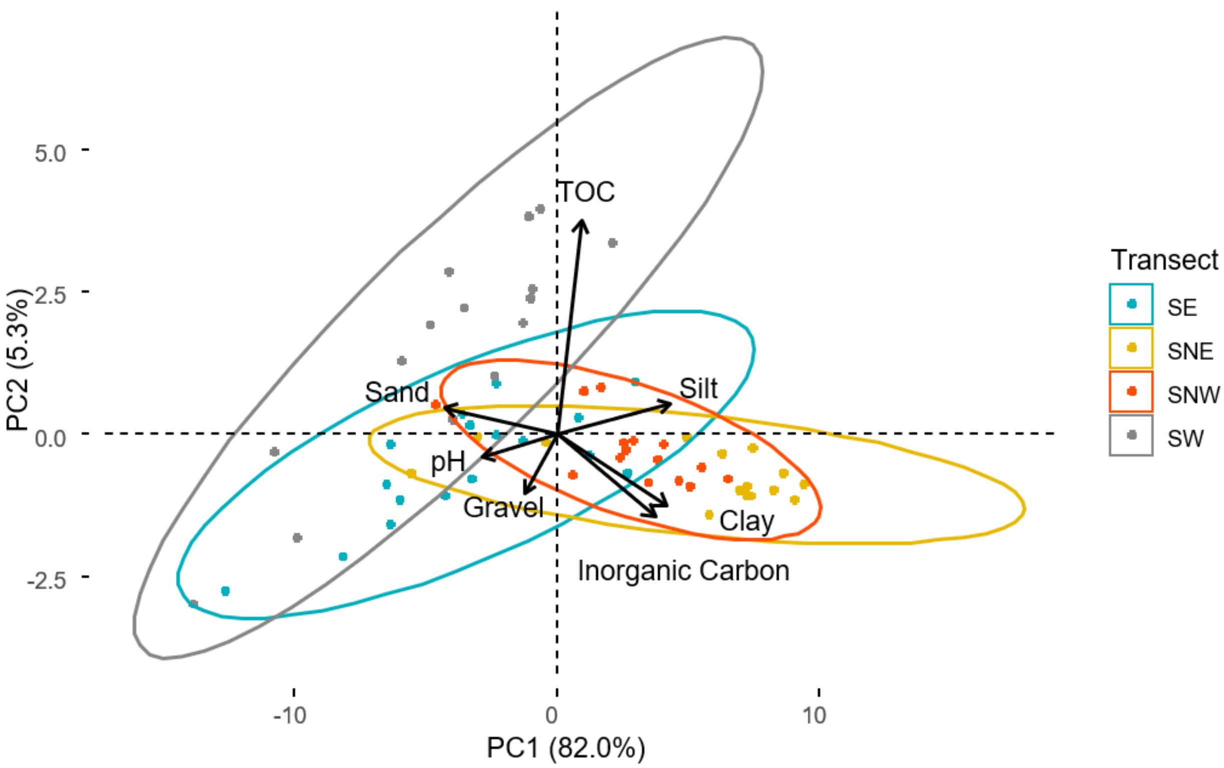


Figure 3-5: Principal component scores for sediment quality stations located along transects radiating out from the ore dock in Milne Port, 2020

Overall, the results of the 2020 PCA suggested that:

- As is common in sediment quality data, there is a relationship between sediment metal concentrations, and the proportion of fine-grained sediments (i.e., silt and clay). Strong linear relationships were also observed between sediment metal concentrations, and the proportion of fine-grained sediments (i.e., clay and silt sediment fractions) in Milne Inlet during baseline programs (Baffinland 2013; SEM 2014; 2015), and previous MEEMP years between 2014 and 2019.
- The chemical profile of the sediments along the transects appear to be driven by substrate type rather than Port activities. Similarly, the type of substrate along each transect seems to differ based on natural depositional forces (i.e., coastal transects tend to have more variable sediment compositions than deeper offshore sediments along the northern transects), rather than Project activities.

Detected metal concentrations in sediments were greater in areas with proportionally more fines which increased with distance from the Ore Dock (Figure 3-3, Figure 3-4, Figure 3-5). For example, aluminum (Figure 3-6) and iron (Figure 3-7) concentrations generally increased with greater distance from the Ore Dock particularly along the Northwest and Northeast Transects. Variability in concentrations of these metals and in percent fines was lower along the West and East Transects because they are situated parallel to the coast and samples were collected along the same shallow depth profile.

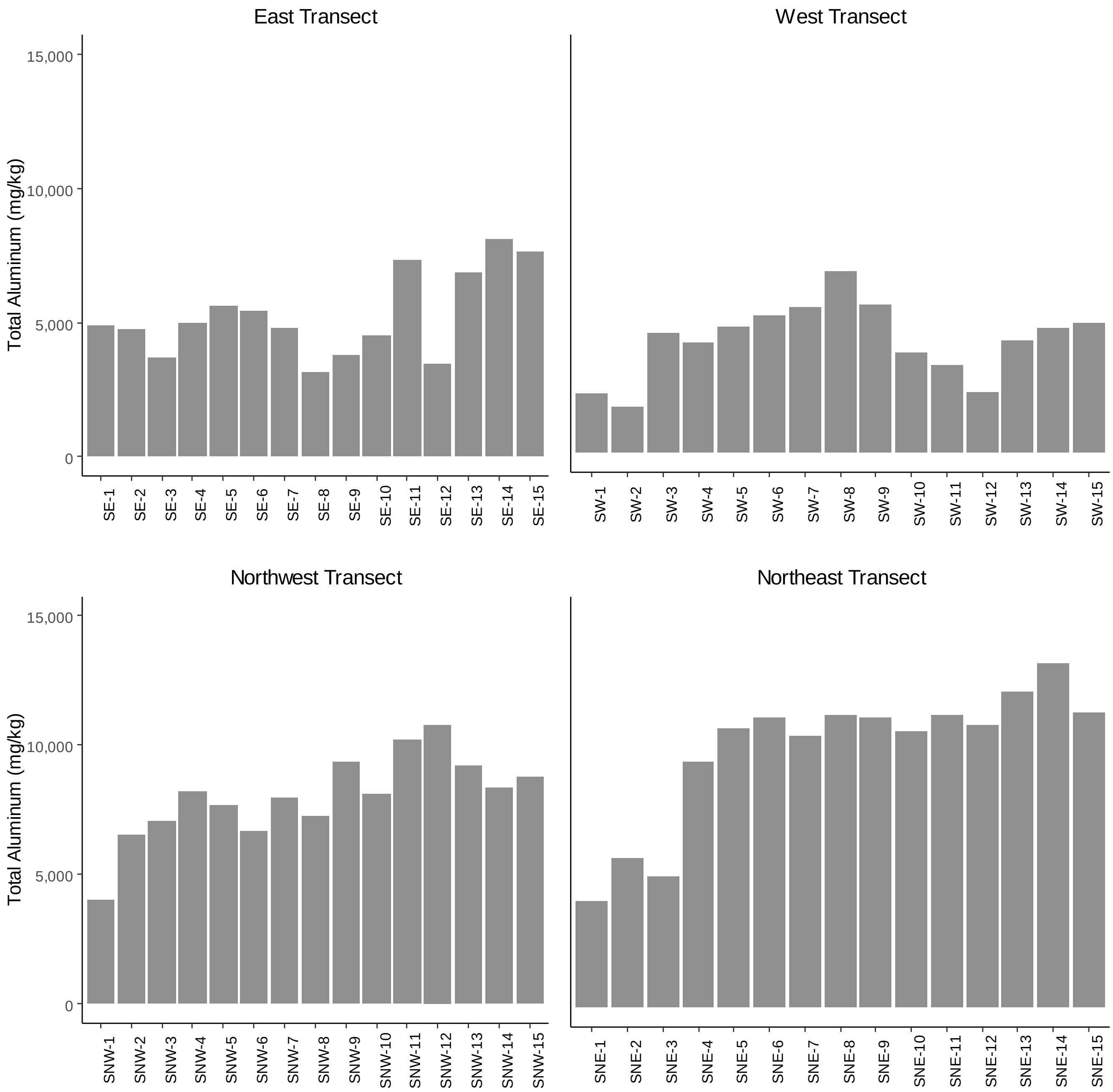


Figure 3-6: Sediment aluminum concentrations at stations located along transects radiating out from the ore dock in Milne Port, 2020

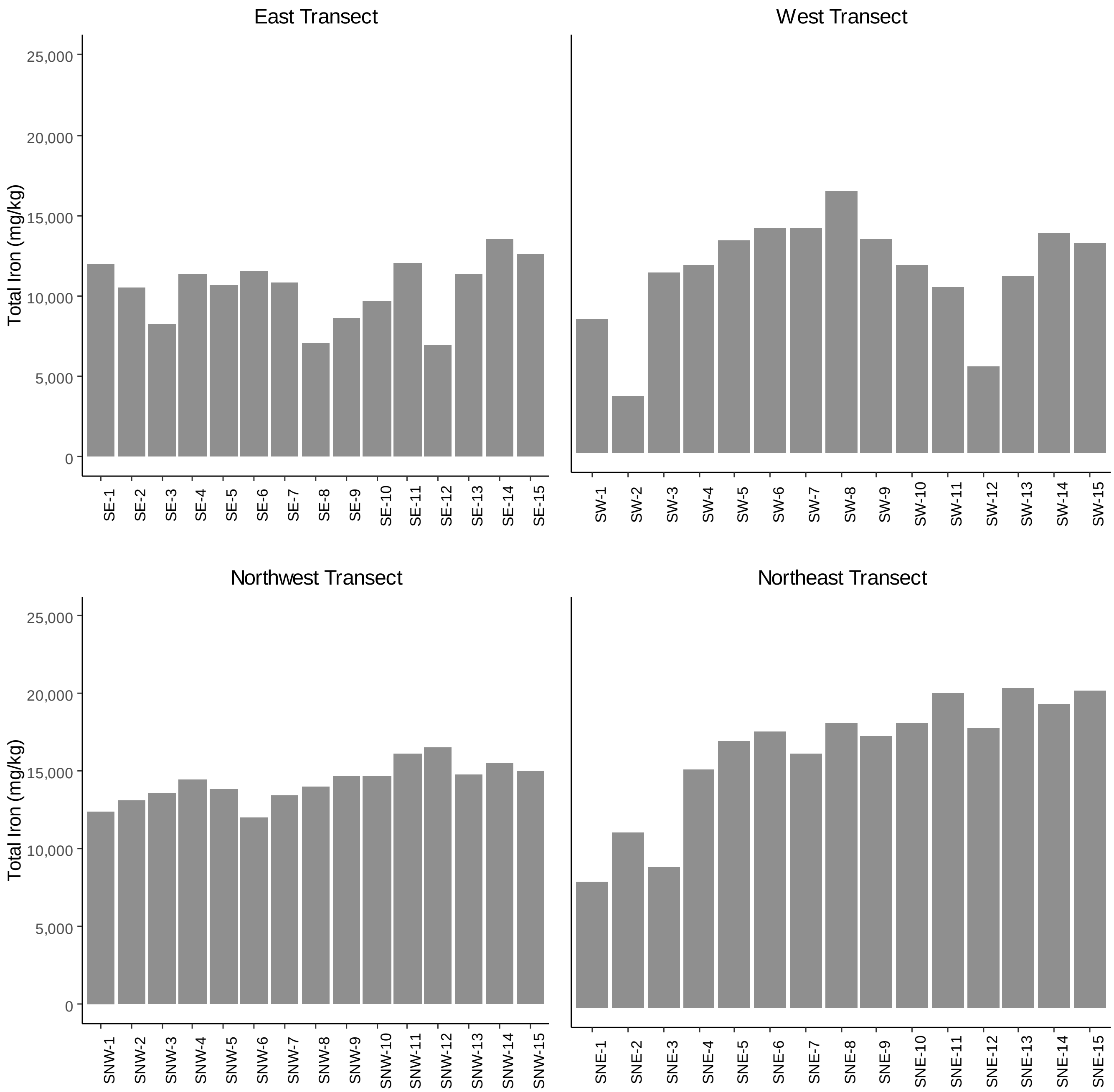


Figure 3-7: Sediment iron concentrations at stations located along transects radiating out from the ore dock in Milne Port, 2020

3.4.4 Comparison to Sediment Quality Guidelines

Sediment metal concentrations at stations sampled in 2020 were lower than applicable sediment quality guidelines, with the exceptions of arsenic and nickel.

Arsenic concentrations measured during the 2020 MEEMP were below applicable guidelines along the East and West transects, but were slightly above the conservatively derived CCME ISQG (7.24 mg/kg) at seven stations[1] sampled along the two Northern Transects (Figure 3-8) by up to 1.4 times. Arsenic concentrations in 2020 did not approach the CCME PEL of 41.6 mg/kg in any sample. Concentrations in these seven samples were also marginally above the NOAA T20 benchmark (7.4 mg/kg; Buchman 2008) and four of those samples were marginally above the NOAA Effects Range-Low (ERL) of 8.2 mg/kg (Buchman 2008). Concentrations appeared to increase with greater distance from the Ore Dock along the two northern transects (Figure 3-8). The 2020 results are consistent with those reported during previous MEEMP programs (2014–2019), which documented sporadic and marginal exceedances of arsenic ISQGs in sediments. Exceedance of generic CCME ISQGs for sediment metals in Northern Canada is not uncommon under naturally occurring background conditions, as evident under baseline conditions in Milne Inlet, where arsenic concentrations up to 9.0 mg/kg were measured in sediments collected during the baseline sampling programs.

Nickel concentrations appeared to increase with distance from the Ore Dock along the two northern transects (Figure 3-9). This is further supported by the results of the PCA, which suggest that reported nickel concentrations were related to sediment grain size (fines). CCME guidelines are not available for nickel but sediment concentrations were less than the lower (30 mg/kg) and upper (50 mg/kg) BC Working sediment guidelines. When compared to NOAA guidelines, concentrations were slightly above the T_{20} benchmark (15 mg/kg) at 14 stations located along the Northern Offshore Transects (Figure 3-9) by up to 1.3 times, in addition to the Threshold Effect Level (TEL) of 15.9 mg/kg at 11 stations by up to 1.2 times. Similar to arsenic, the highest sediment nickel concentration of 19.5 mg/kg in 2020 was lower than nickel concentrations previously measured during baseline studies in Milne Inlet (25 mg/kg) (SEM 2015), indicating that measured concentrations were within expected natural variability.

Measured concentrations and spatial patterns for both arsenic and nickel were well explained by the variability in percent fines, which was shown to increase with greater distance from the Ore Dock due to natural coastal sorting processes. Therefore, the infrequent low magnitude exceedances of the conservatively derived ISQG in some samples along the Northern Offshore transects are likely reflective of background conditions and related to physical sediment properties (i.e., percent fines due to natural coastal sorting processes), rather than the influence of Port activities. Arsenic and nickel are not associated with ore processing at Mary River (Baffinland 2012) and are not present in elevated concentrations close to the Ore Dock, further supporting the likelihood that the observed concentrations reflect regional background concentrations.

[1]: One station along the Northwest Transect (i.e., SNW-10) and six stations along the Northeast Transect (i.e., SNE-8, -10, -11, -12, -13, and -15).

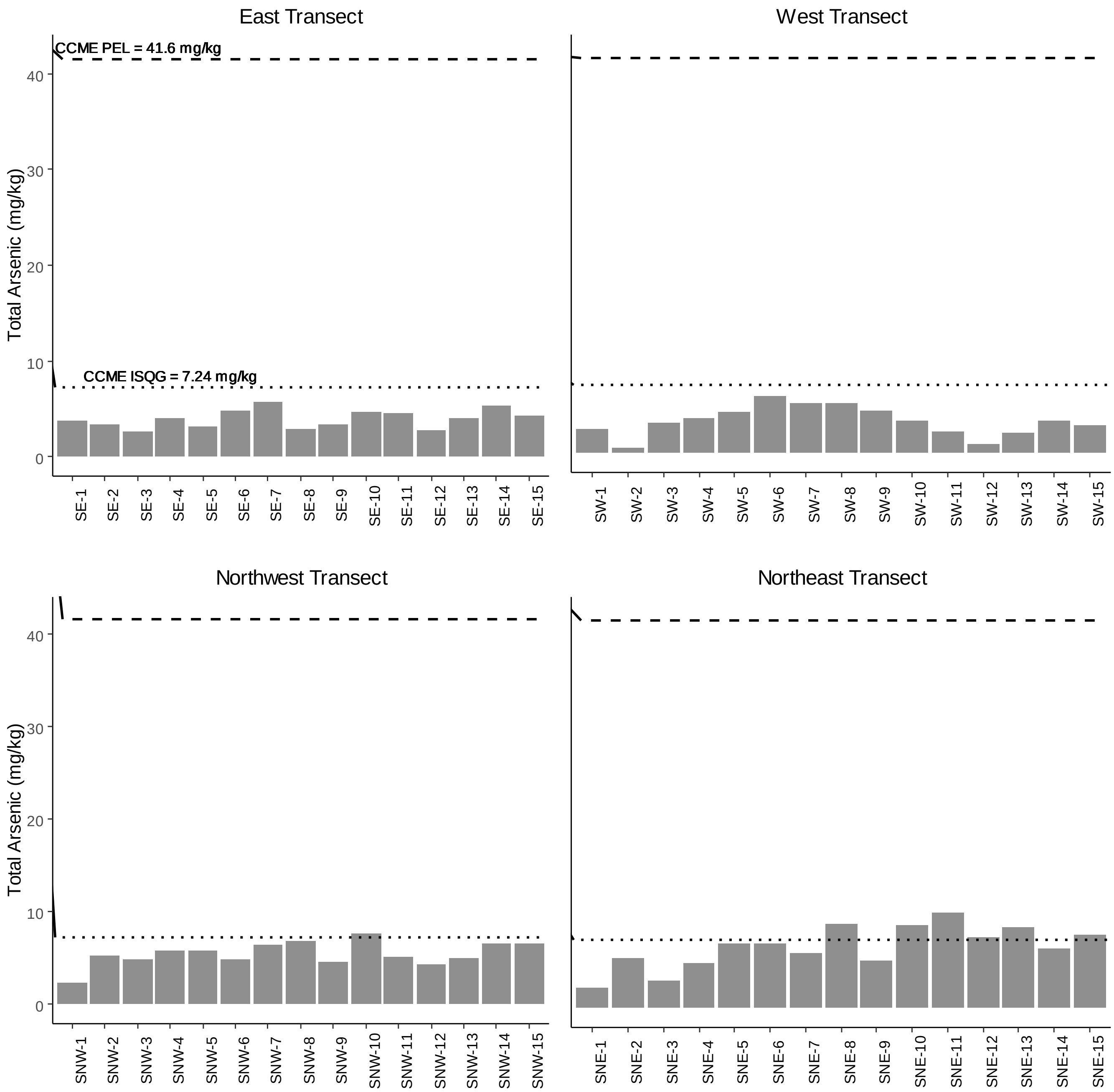


Figure 3-8: Sediment arsenic concentrations at stations located along transects radiating out from the ore dock in Milne Port, 2020

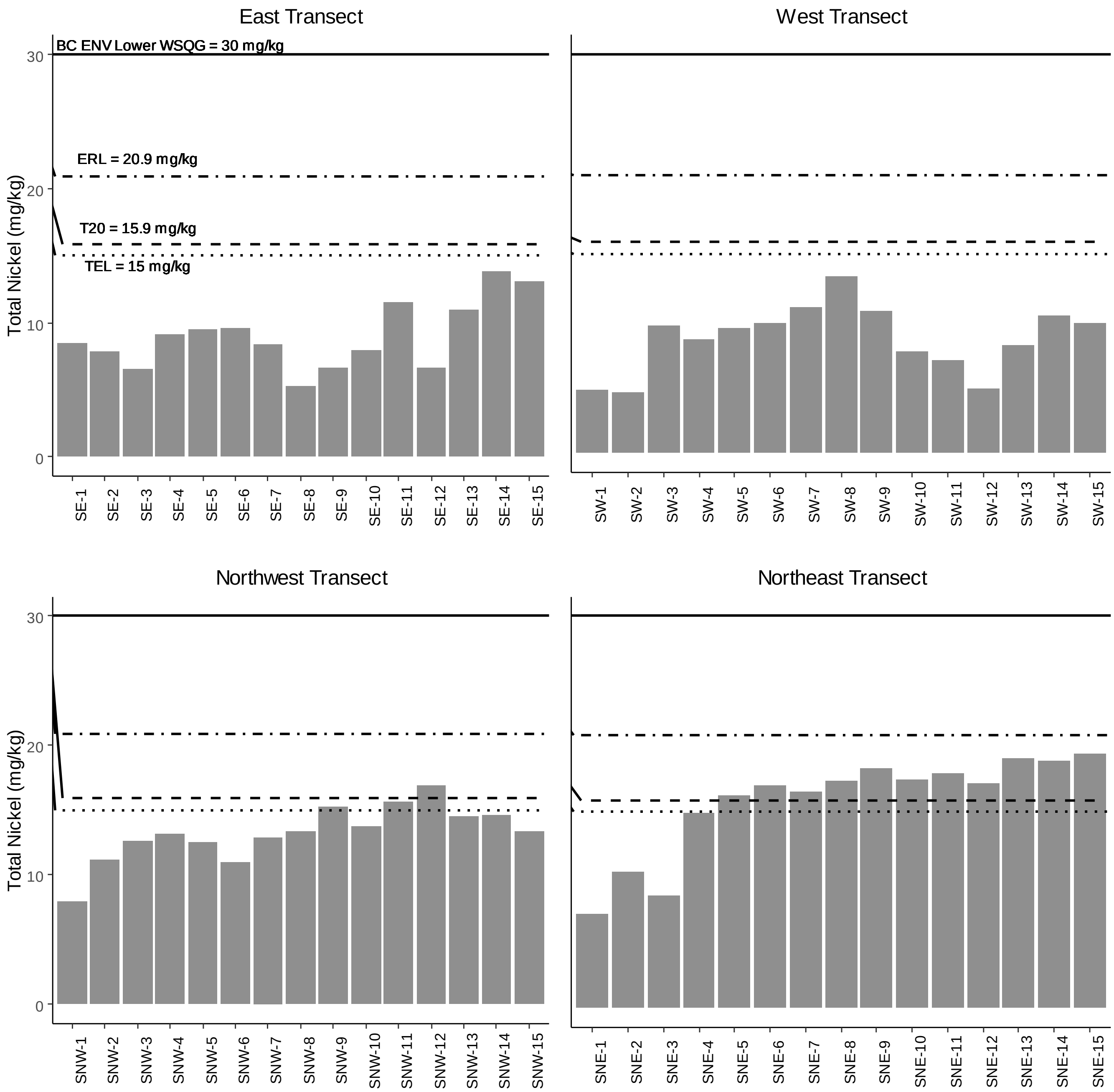


Figure 3-9: Sediment nickel concentrations at stations located along transects radiating out from the ore dock in Milne Port, 2020

Sediment volatile organic compounds, extractable petroleum hydrocarbons, and PAHs were, with few exceptions, determined to be less than their respective analytical detection limits (Appendix 3D). Stations with detectable concentrations for these parameters included:

- VOCs**:** Dichloromethane was detected at stations SE-6 (0.059 mg/kg), SNE-4 (0.086 mg/kg), and DUP-F (0.072 mg/kg), while toluene was found in SNE-4 (0.061 mg/kg), and Xylene in SNW-5 (0.056 mg/kg).
- PAHs were measured to be less than the detection limit in each of the samples analyzed.
- Petroleum hydrocarbons were measured to be less than the detection limit in each of the samples analyzed.

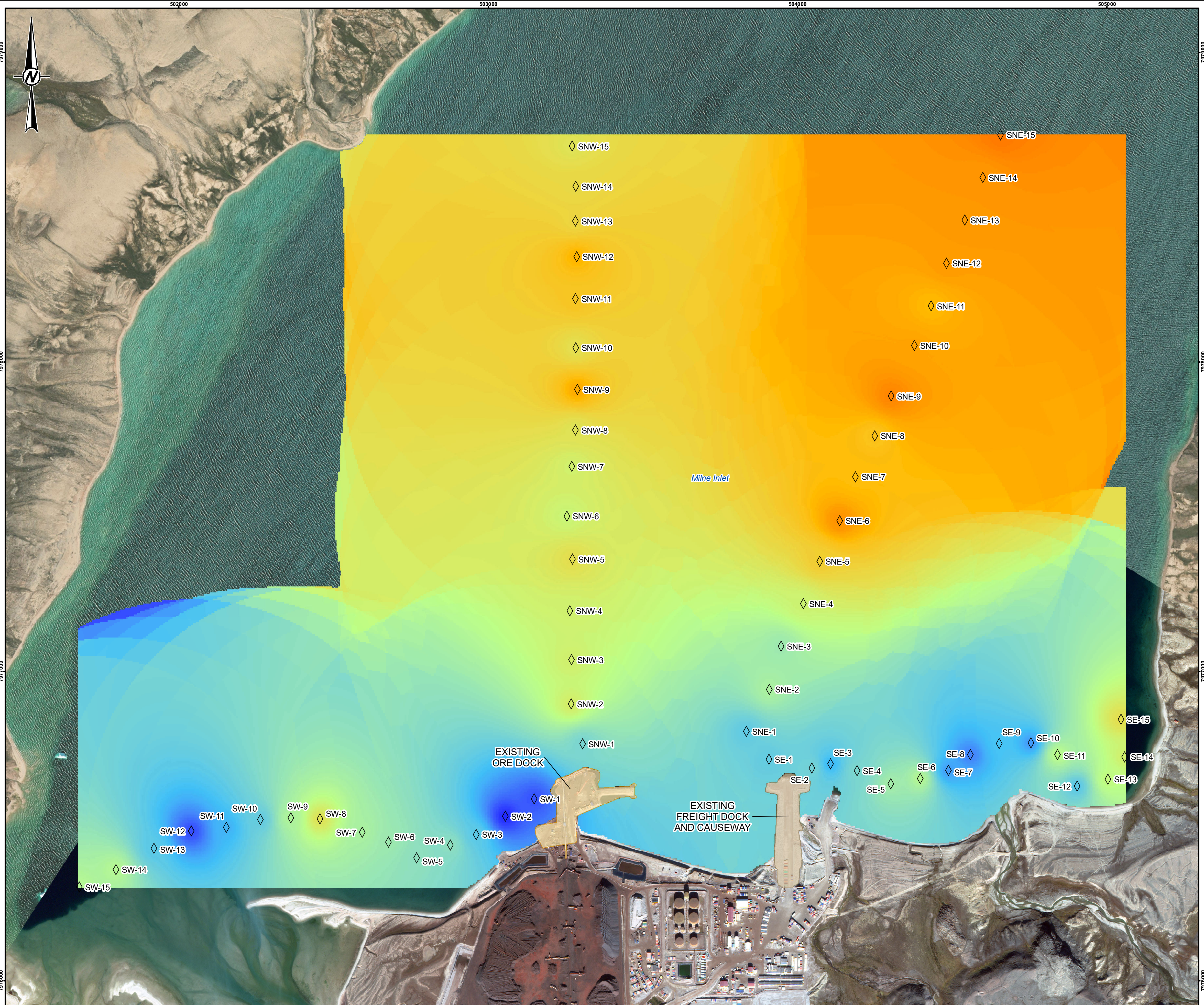
The infrequent instances where a VOC was detected was limited to three compounds and the measured concentrations were considered to be low and close to detection. Similar to previous MEEMP years, VOCs and hydrocarbons have been largely below detection in Milne inlet sediments, with only sporadic detected low concentrations that have rarely been above conservative guidelines.

In 2020, no organic parameter measured in sediments sampled during the 2020 sediment program exceeded sediment quality guidelines.

3.4.5 Distribution of Fines in Sediments

The relationship between the proportion of fine-grained sediments and distance from the Ore Dock is depicted in Figure 3-3 and Figure 3-10. In Figure 3-10, the proportion of fine-grained sediments tended to increase with distance (yellow to dark orange shade) to north of the ore-dock along the Northern Offshore Transects. Although both of these transects showed a pattern of increasing fines with distance from the Ore Dock, the Northeast Transect had a slightly higher fines content at stations a greater distance from the Ore Dock relative to the other offshore transect.

This relationship was not observed for the Coastal Transects to the east and west of the Ore Dock, where the percent fines was more variable and tended to be concentrated in sheltered areas along the coastline, as is expected under natural conditions. Correspondingly, in less sheltered areas consistent with the natural topography of the coastline, coarser sediments were present, as shown on Figure 3-10 (blue shade). As discussed in previous MEEMP reports (Golder 2019), the influence of Phillips Creek on the composition of nearshore sediments downstream of the creek mouth is also evident with more spatial variation in grain size due to downstream transport and the deposition of sediment in the Milne Inlet nearshore environment.



LEGEND

◊ 2020 BENTHIC INFAUNA SAMPLING STATIONS

EXISTING FREIGHT DOCK AND CAUSEWAY

EXISTING ORE DOCK

FINE-GRAINED SEDIMENTS (%)

High : 100

75

50

25

Low : 0

0 250 500

1:12,500 METRES

NOTE(S)

IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
INVERSE DISTANCE WEIGHTING (IDW) FOR 2020 MEEMP FINE-GRAINED SEDIMENTS

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	GZ
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	3-10

3.4.5.1 2019/2020: Spatial and Temporal Comparison

The percentage of fines at stations sampled in 2019 and 2020 was analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions. The effect of distance was modeled as a second-degree polynomial to account for the non-linearity in percent fines relative to distance from the Ore Dock. The model explained 79% of the data variability; the three-way interaction between distance, year, and transect was statistically significant (*P*=0.041;Table 3-2), indicating differences in the relationship between fines and distance at different transects in different years (Figure 3-11).

Table 3-2: ANOVA Summary of Percent Fines in Sediments by Year and Transect in 2019 and 2020

Adj. R^2	Parameter	Df	*F* value	*P*-value
0.79	Distance from Northeast	2	43.1	<0.001
	Year	3	0.9	0.459
	Transect	5	38.0	<0.001
	Distance × Year	2	3.0	0.057
	Distance × Transect	6	7.3	<0.001
	Year × Transect	3	0.3	0.794
	Distance × Year × Transect	6	2.3	**0.041**

Notes: Adj. R^2= Adjusted *R* squared value; Df= degrees of freedom. Distance was modeled as a second-degree polynomial. *P*-values of significant interactions ($P<0.05$) and significant main effects (where no significant interactions were found) are shown in bold

Fines generally had a somewhat dome-shaped relationship with distance from the ore dock along the West, Northwest, and Northeast transects, with a steady increase with distance before levelling off or decreasing. This general pattern was most pronounced for the West Transect in 2019 but was not observed along the other Coastal Transect in either year. The percent fines steadily increased along the East Transect with distance from the Ore Dock with no decrease or levelling off (Figure 3-11). The greater variability in percent fines along the Coastal Transects, compared with the Northern Offshore Transects is discussed above and in Section 3.4.2, and is also depicted in Figure 3-11. In both years, the sediment grain size and the distribution of fines was more variable along the Coastal Transects due to the natural influence of the coastline natural topography and features, including Phillips Creek to the west of the local study area.

Up to a distance of 1,000 m from the Ore Dock, the distribution of fines along each transect was reasonably similar in 2018 and 2019 and showed an increasing pattern with distance from the Ore Dock; after that point, the fines content began to decrease in 2019, but only levelled off in 2020. There were, however, no statistically significant differences between 2019 and 2020 for the four transects (Table 3-3), except at the furthest distance sampled in 2019 ($P>0.05$). In 2020, the percent fines plateaued and remained fairly constant at distances beyond 2,000 m along this transect.

- **East Transect**—in both years percent fines showed an overall increase with distance from the Ore Dock (Figure 3-11) and there was no significant difference between 2019 and 2020 (Table 3-3).

- **West Transect**—fines content was generally low at the Ore Dock but increased with distance from the dock, peaking at ~600 m in 2019 and ~1,000 m in 2020, followed by a general decrease at greater distances (Figure 3-11). There was no significant difference between 2019 and 2020 (Table 3-3).
- **Northeast Transect**—fines content was the highest along this transect (Figure 3-11) and there was no significant difference between years, except at one station 2,000 m from the ore dock (Table 3-3).
- **Northwest Transect**—fines content was slightly higher at each distance compared to the coastal transects, but the increasing relationship between fines content and distance from the Ore Dock was less pronounced compared to the Northeast Transect. Fines content was not significantly different between years at any of the distances tested along the transect (Figure 3-11 and Table 3-3).

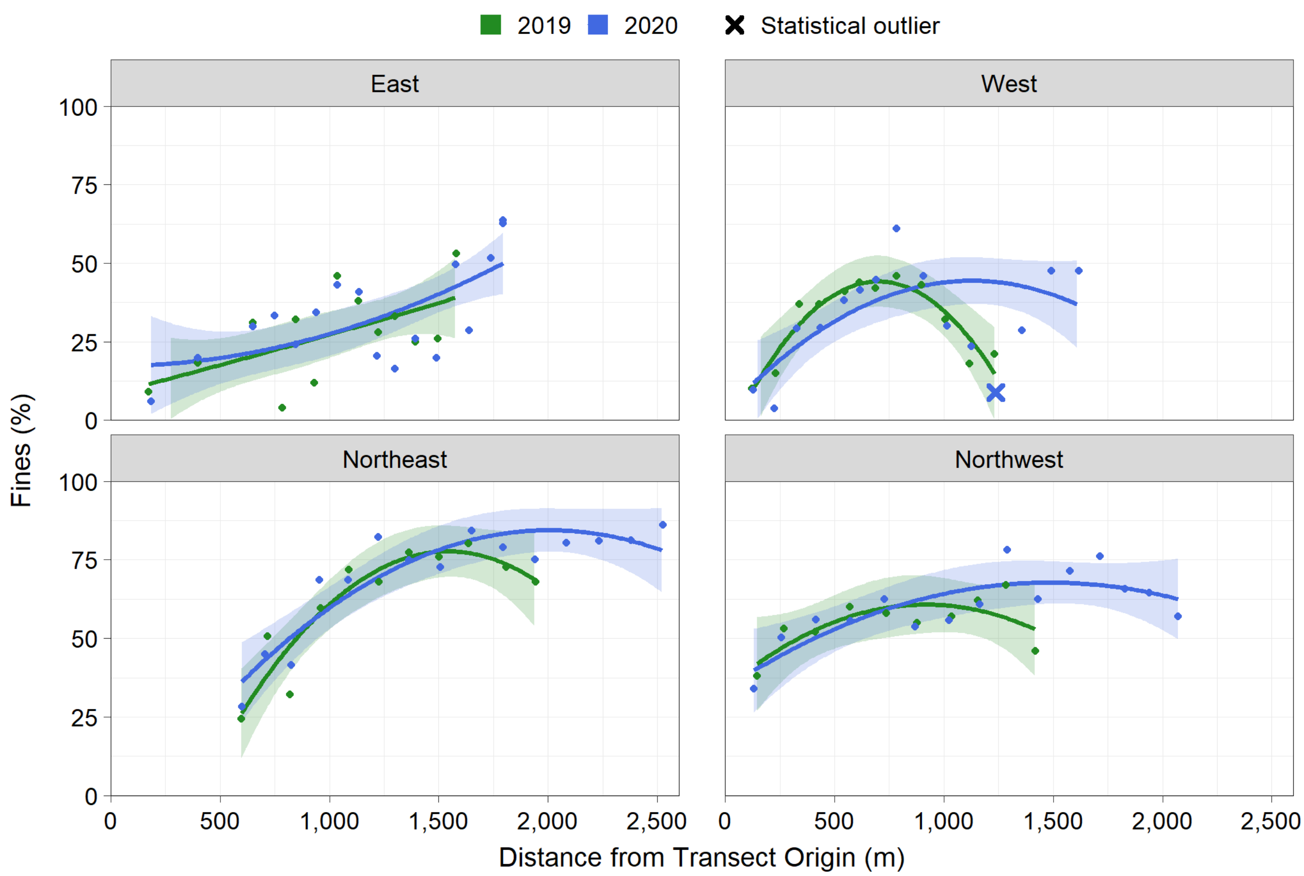


Figure 3-11: Observed (points) and estimated (lines) percent fines in sediment relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

Table 3-3: Multiple Comparisons of Percent Fines between Years, within Distance/Transect Combinations in 2019 and 2020

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
200	a	a
500	a	a
1,000	a	a
1,500	a	a
West Transect		
200	a	a
500	a	a
1,000	a	a
1,500	—	—
Northeast Transect		
200	—	—
500	a	a
1,000	a	a
1,500	a	a
2,000	a	b
Northwest Transect		
200	a	a
500	a	a
1,000	a	a
1,500	a	a
2,000	—	—

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: “a” is the lowest estimated fines value, “b” representing is the second lowest, and so on. “—” represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period. *P*-values of significant interactions (P<0.05).

3.4.5.2 2014-2020: Temporal Comparison

Fines content at sediment stations sampled during the 2014-2020 MEEMP programs was also evaluated using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. The effect of distance was modeled as a second-degree polynomial to account for the non-linearity in percent fines relative to distance from the Ore Dock. The model explained 66% of the data variability. The three-way interaction between distance, year, and transect was not statistically significant (P=0.653; Table 3-4). The only statistically significant two-way interaction was between distance and transect (P<0.001; Table 3-4), indicating differences in the relationship between fines and distance at different transects, but no differences in trends between years. Comparison of trends between years was not possible for the Northeast Transect because 2019 was the first year that this transect was sampled; thus, results for the Northeast Transect are included in the 2019/2020 analysis only. The 'North' Transect referred to in this section refers to the 'Northwest Transect in the 2019 and 2020 MEEMP years'.

Table 3-4: ANOVA Summary of Percent Fines in Sediments by Year and Transect

Adj. R^2	Parameter	Df	*F* value	*P*-value
0.661	Distance from Ore Dock	2	31.4	<0.001
	Year	12	0.3	0.982
	Transect	8	28.5	<0.001
	Distance × Year	12	1.0	0.442
	Distance × Transect	4	8.8	**<0.001**
	Year × Transect	12	0.4	0.962
	Distance × Year × Transect	24	0.9	0.653

Notes: Adj. R^2= Adjusted R squared value; Df= degrees of freedom. Distance was modeled as a second-degree polynomial. P-values of significant interactions (P<0.05) and significant main effects (where no significant interactions were found) are shown in bold

General linear model results suggest that there was no significant temporal trend in sediment fines content from 2014 to 2020 for the Coastal and Northern Offshore Transects (Table 3-5; Figure 3-12), indicating that the distribution of fines has not significantly changed since before the Port was constructed (baseline: 2014).

- **East Transect and the North Transect (Northwest Transect in 2019-2020 MEEMP years)**——there was an overall steady increase in fines with distance from the Ore Dock for each MEEMP year, with small inter-annual differences in the relationship (Figure 3-12) but no significant differences between years at any distance from the Ore Dock (P>0.05) Table 3-5). The increase in fines with distance from the Ore Dock was more pronounced for the Northern Transect.
- **West Transect**—fines generally increased with distance from the Ore Dock, peaking at a distance between 500 m and 1,000 m, with a tendency for sediment with fewer percent fines at the western end of the transect beyond 1,000 m. The increase in fines at the first portion of the transect may be related to sedimentation patterns resulting from the outflow of Phillips Creek. Although variability between years was observed, there were no significant differences between years at any distance from the Ore Dock (P>0.05) (Table 3-5). For

example, at 1,500 m from the Ore Dock, the fines content was higher in 2020 relative to previous years, but not significantly so. The observed variability was likely due to a varying influence of Phillips Creek dependant on the nature of sediment transport downstream into Milne Inlet in a given year. Interpretation of this spatial pattern in 2016 and 2017 was confounded by a lack of data beyond 1000 m (Figure 3-12).

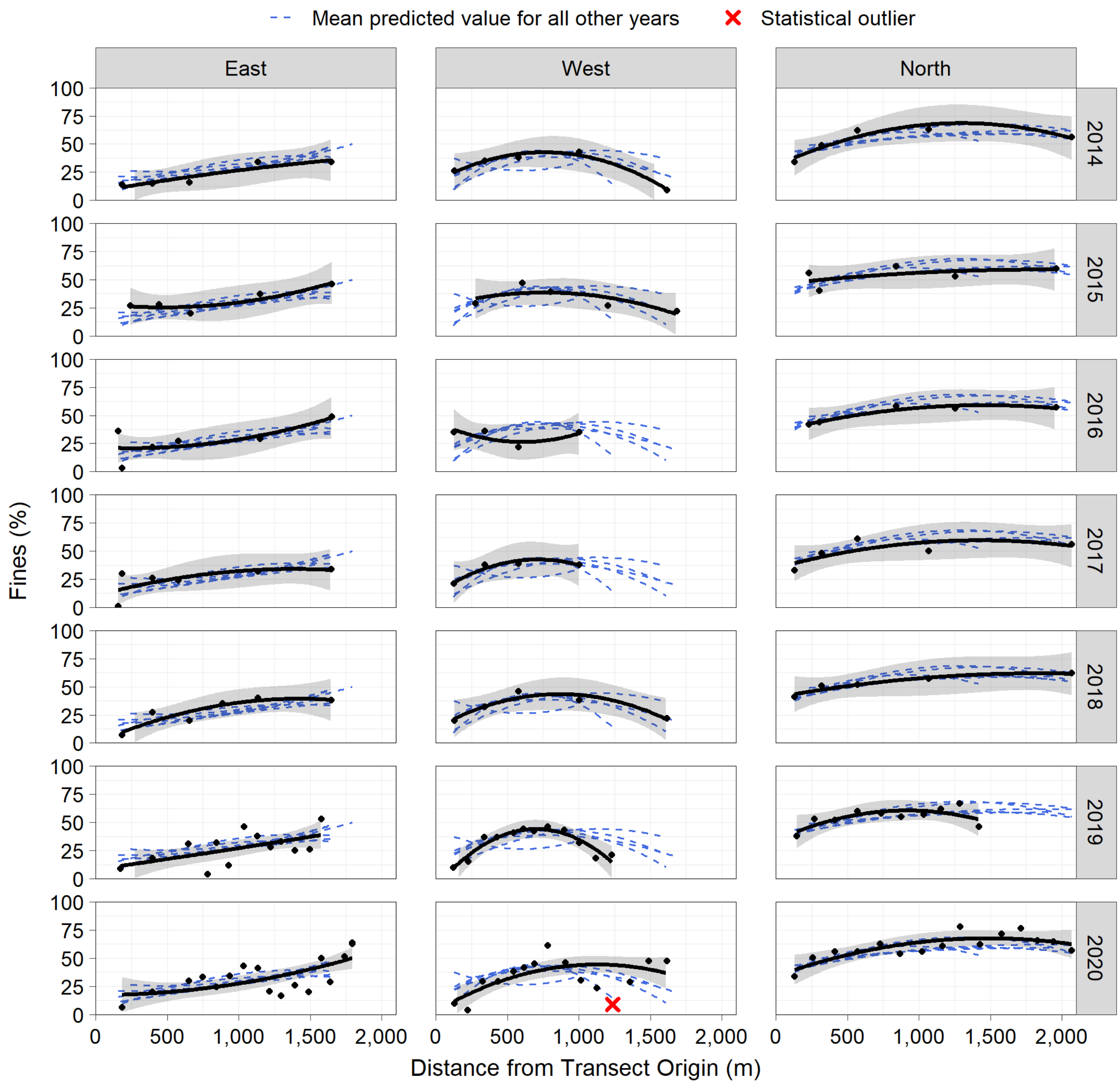


Figure 3-12: Observed (points) and estimated (lines) percent fines in sediment relative to sampling distance along transects, 2014 to 2020. Grey ribbons are 95% confidence intervals. thick black lines and ribbons show each year's predicted values, whereas thin blue dashed lines show predicted values from all other years.

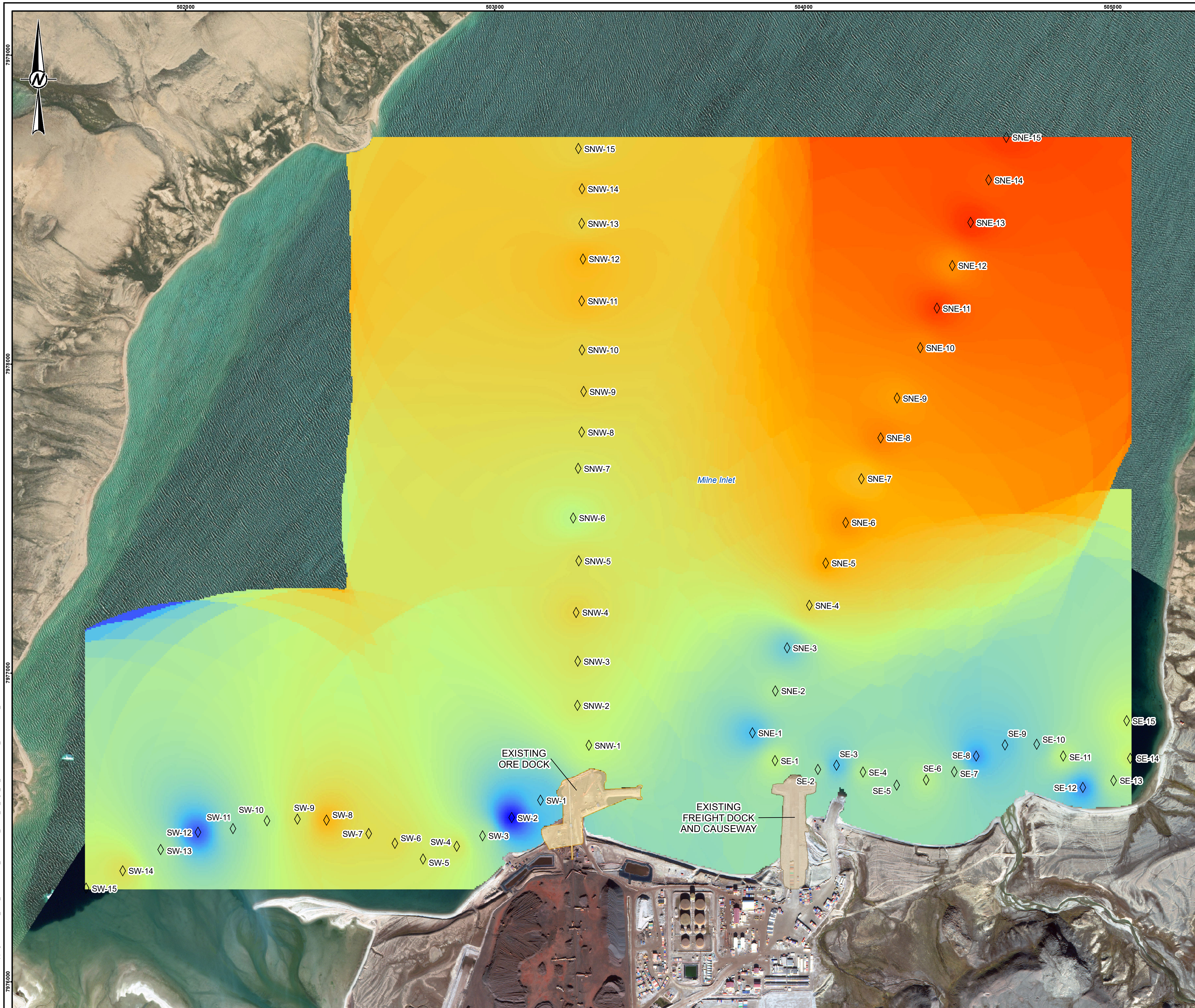
Table 3-5: Multiple Comparisons of Percent Fines between Years, within Distance/Transect Combinations

Transect and Distance from Origin (m)	Sampling Year						
	2014	2015	2016	2017	2018	2019	2020
East Transect							
200	a	a	a	a	a	a	a
500	a	a	a	a	a	a	a
1,000	a	a	a	a	a	a	a
1,500	a	a	a	a	a	a	a
North Transect							
200	a	a	a	a	a	a	a
500	a	a	a	a	a	a	a
1,000	a	a	a	a	a	a	a
1,500	a	a	a	a	a	a	a
2,000	a	a	a	a	a	—	a
West Transect							
200	a	a	a	a	a	a	a
500	a	a	a	a	a	a	a
1,000	a	a	a	a	a	a	a
1,500	ab	ab	—	—	ab	—	b

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: “a” is the lowest estimated fines value, “b” representing is the second lowest, and so on. “—” represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period. *P*-values of significant interactions ($P<0.05$)

3.4.6 Sediment Iron Concentrations

The relationship between the distance from the ore-dock and sediment iron concentrations is depicted in Figure 3-7 and Figure 3-13. The sediment iron content tends to increase with distance (yellow to orange to red shade) to north of the ore-dock along the Northern Offshore Transects (Figure 3-13). This relationship was not observed for the Coastal Transects to the east and west of the ore-dock, where iron concentrations were lower and more variable, a pattern that mirrored that described for the distribution of fines in Section 3.4.5. There was a strong linear relationship between percent fines in sediments and the iron content in the recent 2019 and 2020 dataset (Figure 3-14 and the 2014 to 2020 longer-term dataset (Figure 3-15).



LEGEND

2020 BENTHIC INFAUNA SAMPLING STATIONS

EXISTING FREIGHT DOCK AND CAUSEWAY

EXISTING ORE DOCK

IRON CONCENTRATION (mg/kg)

High : 21000

16650

12300

7950

Low : 3600

0 250 500

1:12,500 METRES

NOTE(S)

IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
INVERSE DISTANCE WEIGHTING (IDW) FOR 2020 MEEMP TOTAL IRON CONCENTRATIONS IN SEDIMENT

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	GZ
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	3-13

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig3_13_BenthicInverts_IronConcIDW_RevB.mxd PRINTED ON: 2021-08-03 AT: 1:24:32 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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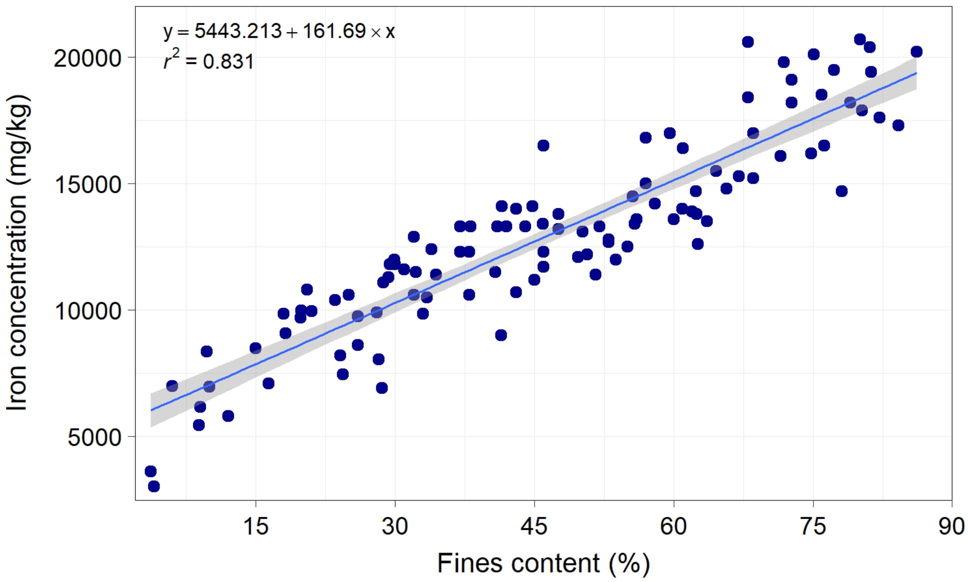

Figure 3-14: Relationship between iron concentration and fines content in sediment in 2019 and 2020. Grey ribbon is 95% confidence interval.

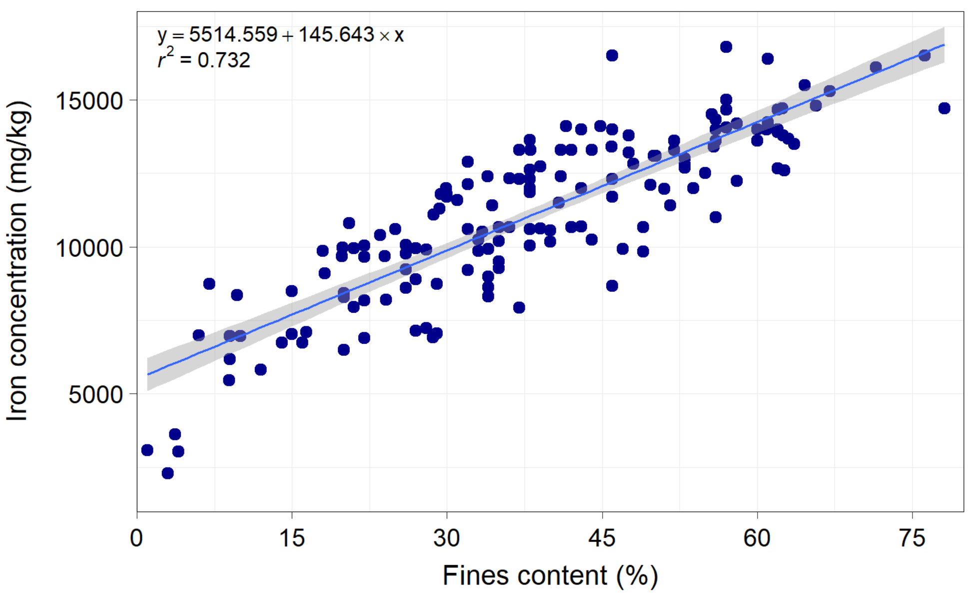

Figure 3-15: Relationship between iron concentration and fines content in sediment, 2014-2020. Grey ribbon is 95% confidence interval.

3.4.6.1 2019/2020 Spatial and Temporal Comparison

To evaluate the potential for iron ore dust and runoff to impact the marine environment, sediment iron concentrations were analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. To account for the strong relationship with percent fines (Figure 3-14), iron concentrations were divided by the value of fines content and multiplied by 100, to create a fines-adjusted iron concentration (Figure 3-14). The effect of distance was modeled as a second-degree polynomial to account for non-linearity and normalized iron concentrations were natural-log transformed prior to analysis. The model explained 66% of the data variability; the three-way interaction between distance, year, and transect was statistically significant (P=0.001; Table 3-6) indicating among-year differences in the interaction between the relationship between normalized iron and distance from ore dock along the different transects.

Table 3-6: ANOVA Summary of Iron Content in Sediments by Transect in 2019 and 2020

Adj. R^2	Parameter	Df	F value	P-value
0.663	Distance from Ore Dock	2	23.3	<0.001
	Year	3	1.3	0.294
	Transect	5	18.4	<0.001
	Distance x Year	2	3.9	0.024
	Distance × Transect	6	4.5	0.001
	Year x Transect	3	0.3	0.807
	Distance x Year x Transect	6	4.1	**0.001**

Notes: Adj. R_2= Adjusted R squared value; Df= degrees of freedom. Distance was modeled as a second-degree polynomial and normalized iron was log-transformed prior to analysis. P-values of significant interactions (P<0.05) and significant main effects (where no significant interactions were found) are shown in bold

Natural log-transformed, fines-adjusted iron decreased with distance along the East Transect but had a U-shaped relationship with distance along the West Transect, likely due to the influence of sediment transport down Philips Creek to Milne Inlet. By comparison, when adjusted for fines, the Northern Offshore Transects showed less of a relationship with distance from the Ore Dock (Figure 3-16). There were no statistically significant differences in fines-adjusted iron concentrations between the two samplings years along the four transects (P>0.05) (Table 3-7), except for two isolated instances; i.e., at a distance of 1,500 along the Northwest Transect (2020<2019) and at distance of 500 m along the West Transect (2020>2019).

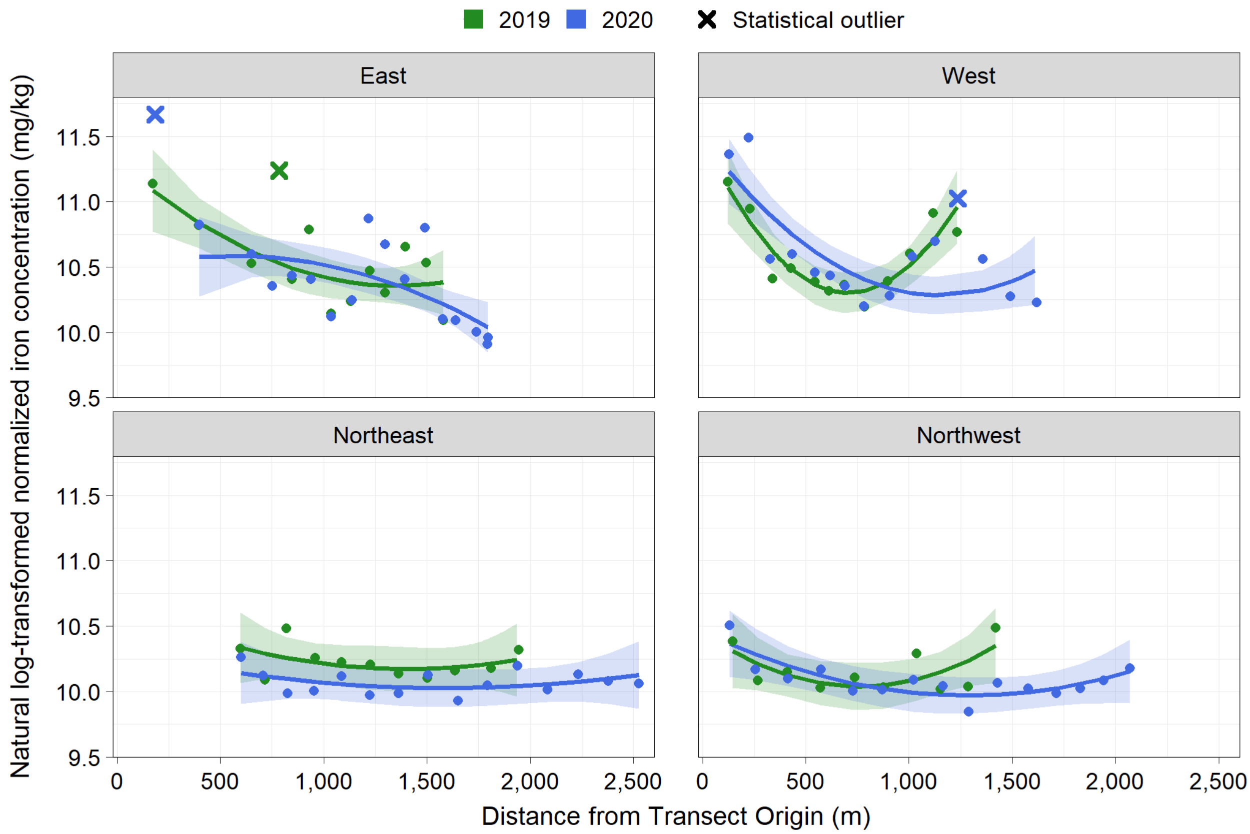

Figure 3-16: Fines-adjusted iron (points) and mean predicted iron content at an average value of fines (lines) in sediment relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

Table 3-7: Multiple Comparisons of Normalized Iron Content between Years, within Distance/Transect Combinations in 2019 and 2020

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
200	a	a
500	a	a
1,000	a	a
1,500	a	a
West Transect		
200	a	a
500	a	b
1,000	a	a
1,500	—	-
Northeast Transect		
200	—	—
500	a	a
1,000	a	a
1,500	a	a
2,000	a	a
2,500	—	-
Northwest Transect		
200	a	a
500	a	a
1,000	a	a
1,500	b	a
2,000	—	-

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: “a” is the lowest estimated fines value, “b” representing is the second lowest, and so on. Grey shading depicts significant, increasing trends between consecutive years. “—” represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period. *P*-values of significant interactions ($P<0.05$).

3.4.6.2 2014-2020 Temporal Comparison

To evaluate temporal trends in sediment iron concentrations collected during the MEEMP between 2014 and 2020, sediment samples were analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. To account for the strong relationship with percent fines, iron concentrations were divided by the value of fines content and multiplied by 100, to create a fines-adjusted iron concentration (Table 8). The effect of distance was modeled as a second-degree polynomial to account for non-linearity in iron concentrations relative to distance from the Ore Dock and fines-adjusted iron concentrations were natural-log transformed prior to analysis. The model explained 57% of the data variability; the three-way interaction between distance, year, and transect was not statistically significant (P=0.363; Table 3-8). Only the two-way interaction between distance and transect was significant (P<0.001; Table 3-8), indicating differences in the relationship between iron and distance along different transects.

Results shown here differ from the 2019 MEEMP results (Golder 2019) because the current analysis was performed on fines-adjusted iron concentration, whereas the previous analysis was performed on raw iron concentrations, with a covariate of fines content.

Table 3-8: ANOVA Summary of Iron Content in Sediments by Year and Transect

Adj. R^2	Parameter	Df	*F* value	*P*-value
0.567	Distance from Ore Dock	2	25.5	<0.001
	Year	12	3.1	0.001
	Transect	8	12.4	<0.001
	Distance × Year	12	1.8	0.059
	Distance × Transect	4	14.2	**<0.001**
	Year × Transect	12	1.1	0.378
	Distance × Year × Transect	24	1.1	0.363

Notes: Adj. R^2= Adjusted *R* squared value; Df= degrees of freedom. Distance was modeled as a second-degree polynomial. Iron concentrations were normalized to account for percent fines content and log transformed prior to analysis. *P*-values of significant interactions (P<0.05) and significant main effects (where no significant interactions were found) are shown in bold

The East and West Transects had some variability in fines-adjusted iron concentrations year-over-year in contrast to the North Transect, where fines- adjusted concentrations were more similar year-over-year, and not significantly different (P>0.05) (Table 3-9; Figure 3-17). There were some isolated instances where 2020 concentrations measured on the Coastal Transects closer to the Ore Dock were significantly different from previous years (2015 East at 500 m; 2016 West at 200 m, 2015 West at 500 m), however, the 2020 fines-adjusted iron concentrations along both transects were not significantly different from the 2014 baseline concentrations (P>0.05). Therefore, the results of the linear regression indicate there is no significant temporal trend in fines-adjusted iron content from 2014 to 2020 for all four sediment transects.

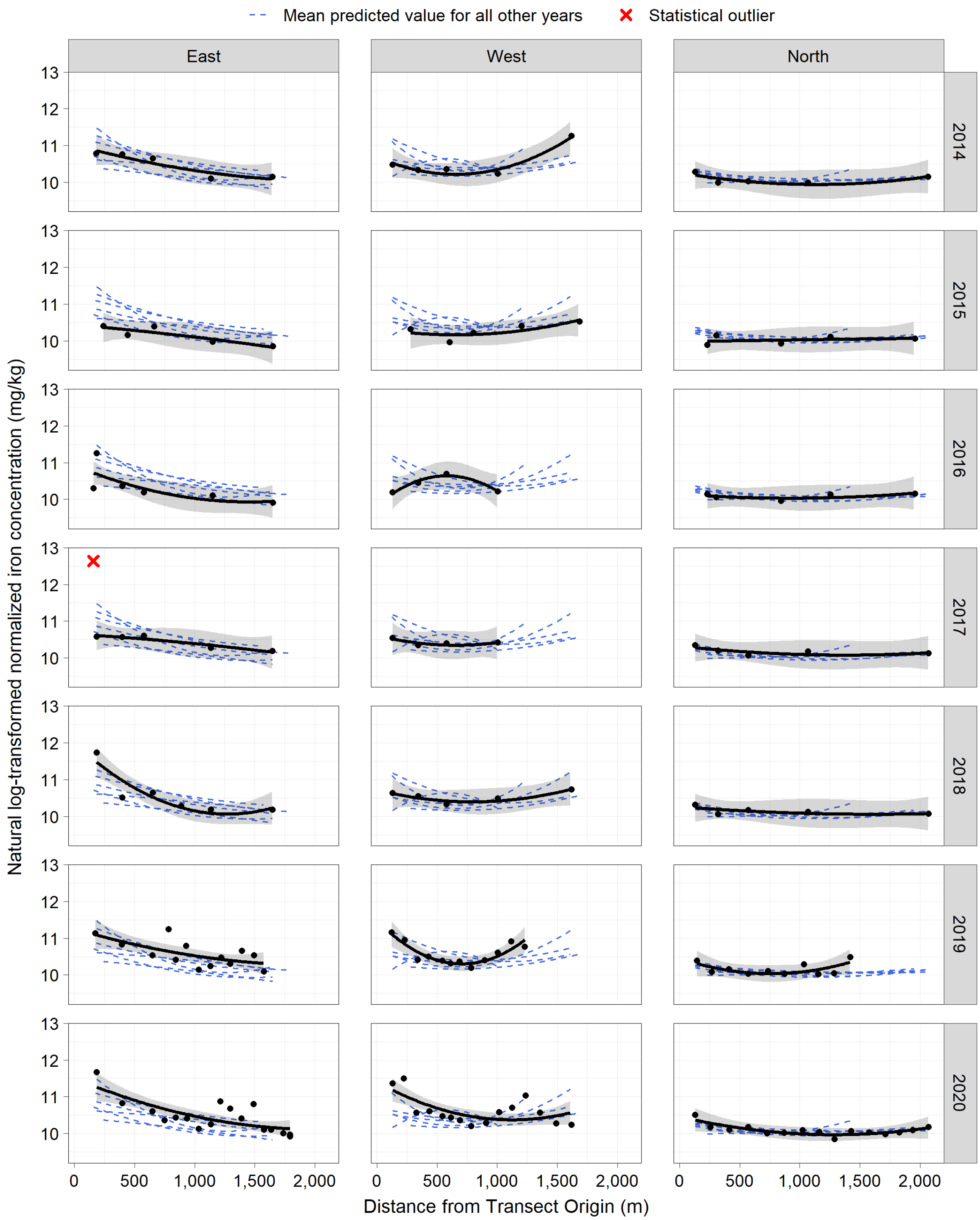

Figure 3-17: Fines-adjusted iron (points) and mean predicted iron content at an average value of fines (lines) in sediment relative to sampling distance along transects, 2014-2020. Grey ribbons are 95% confidence intervals. thick black lines and ribbons show each year's predicted values, whereas thin blue dashed lines show predicted values from all other years.

Table 3-9: Multiple Comparisons of Normalized Iron Content between Years, within Distance/Transect Combinations (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year						
	2014	2015	2016	2017	2018	2019	2020
East Transect							
200	ab	a	a	a	b	ab	ab
500	abc	a	ab	abc	abc	bc	c
1,000	a	a	a	a	a	a	a
1,500	a	a	a	a	a	a	a
North Transect							
200	a	a	a	a	a	a	a
500	a	a	a	a	a	a	a
1,000	a	a	a	a	a	a	a
1,500	a	a	a	a	a	—	a
2,000	a	—	—	a	a	—	a
West Transect							
200	ab	ab	a	—	ab	ab	b
500	ab	a	ab	ab	ab	ab	b
1,000	a	a	a	a	a	a	a
1,500	ab	a	—	—	ab	—	a

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: “a” is the lowest estimated fines value, “b” representing is the second lowest, and so on. “—” represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period. *P*-values of significant interactions ($P<0.05$).

3.5 Discussion

Both Northern Offshore Transects showed a pattern of increasing fines with distance from the Ore Dock, with a slightly higher fines content at stations furthest from the Ore Dock on the Northeast Transect. This pattern of sediment distribution, that occurs along a depth gradient, is reflective of natural sediment processes by which finer sediments accumulate in offshore deeper waters over time. When compared to 2014 (pre-project baseline) the percentage of finer sediments along the Northern Offshore Transects was not significantly different in 2020, indicating the Project has not had an effect on fine sediments distribution in Milne Inlet. Closer to the Port along the Coastal Transects, the sediment grain size is naturally more variable, with both sand and fines present in differing proportions depending on the station location. As found for the offshore environment, the percentage of finer sediments along the Coastal Transects was not significantly different in 2020 compared to baseline conditions, again suggesting the Project has not caused material changes in fine sediment distribution within the nearshore environment.

The results of PCA confirmed a strong positive relationship between metal sediment concentrations and the proportion of fine sediments, consistent with baseline observations in Milne Inlet (Baffinland 2013; SEM 2014; 2015) and observations made in previous sampling years (2014-2019). Given that sediment metal concentrations tended to be higher in areas with finer sediments whose distribution followed natural patterns, the PCA did not suggest that sediment metal concentrations were accumulating at elevated levels close to the Ore Dock relative to other locations sampled within Milne Port.

In 2020, concentrations of metals in sediments sampled along the four transects were below applicable guidelines. The only exceptions were arsenic and nickel, where there were infrequent and minor exceedances of conservative interim guidelines, as was also observed in 2014 under baseline conditions (pre-Project). Marginal exceedances of the CCME interim guidelines in sediments from Northern environments is not uncommon, especially in mineralized areas where these exceedances can routinely be reported under naturally occurring baseline/reference conditions. Arsenic and nickel are not associated with ore processing at Mary River (Baffinland 2012) and are not present in elevated concentrations close to the Ore Dock, further supporting the likelihood that the observed concentrations reflect regional background concentrations. Concentrations of VOCs, hydrocarbons, and PAHs measured in 2020 were mostly below detection limits and, where detected, were low (i.e., close to the detection limit) and below conservatively established guidelines – consistent with the sediment organic data collected in Milne Inlet to date.

Due to the observed relationship between the percentage of fines and total metal concentrations, it was considered important to undertake statistical general linear modelling analysis to assess whether spatial and temporal changes in sediment percent fines that have occurred could be Project-related. The results indicated no statistically significant differences were observed between years (2014-2020) at any of the distances evaluated along the transects extending out from the Ore Dock, suggesting that sediment percent fines have not been significantly impacted by Port operations relative to 2014 pre-Project conditions, but instead, reflect natural sediment processes within Milne Inlet.

Inuit have flagged iron concentrations in Milne Inlet to be of concern due to the potential for increased deposition of iron ore in the form of dust or in runoff from storage stockpiles. Marine sediment guidelines for iron are not currently available and, as such, the sediment data for iron were also evaluated spatially and temporally along the transects using general linear modeling. Results found that the iron content in sediments in 2020 was not significantly greater than that observed in 2014 during baseline sampling (pre-Project), indicating concentrations had not increased over time. Spatially, iron behaved like the other metals and was strongly associated with finer sediments whose distribution followed natural sediment processes within Milne Inlet and was not significantly affected by the Project. Where sediment distribution and metals concentrations along the Northern Offshore Transects were influenced by increasing water depth with distance from the Ore Dock, the Coastal transects were influenced by the coastline topography and features, including Phillips Creek.

Overall, monitoring results remain within original FEIS predictions, which forecasted no significant residual effects on sediment quality but indicated the potential for minor localized increases in nutrient, metal, or hydrocarbon concentrations.

3.6 Conclusions and Recommendations

The successful implementation of the fully expanded sediment sampling program in 2020 and subsequent comprehensive data analysis indicate that the Project has not significantly impacted Milne Inlet sediment quality in 2020 or years previous. Evidence for this conclusion is validated from the continued measurement of key sediment parameters below applicable guidelines, and/ or are reflective of naturally occurring background conditions. Further, as was demonstrated through multiple statistical analyses, distribution of fine sediment (which closely correlates with concentrations of sediment metals) in Milne Inlet is not influenced by Project activities but, rather by natural coastal processes that differed between the Northern Offshore Transects and the Coastal Transects.

Sediment monitoring to date suggests that mitigation measures are functioning as intended and that Project activities are being managed in a way that has not adversely affected marine sediment within the Milne Inlet study area. Given this, the data suggest that monitoring of sediment quality is not required annually. Moving forward, it is recommended that monitoring of sediment quality within the study area should continue, but at reduced frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on sediment quality within Milne Inlet.

3.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

Golder Associates Ltd.

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APPENDIX 3A

Sediment Photo Log

Photo 1 – Homogenous sediment sample collected at station SW-3 on 05 August 20

Photo 2 – Homogenous sediment sample collected at station SW-4 on 06 Aug 2020

Photo 3 – Sediment sample collected with a Van Veen Grab sampler at station SNW-1 on 06 August 2020

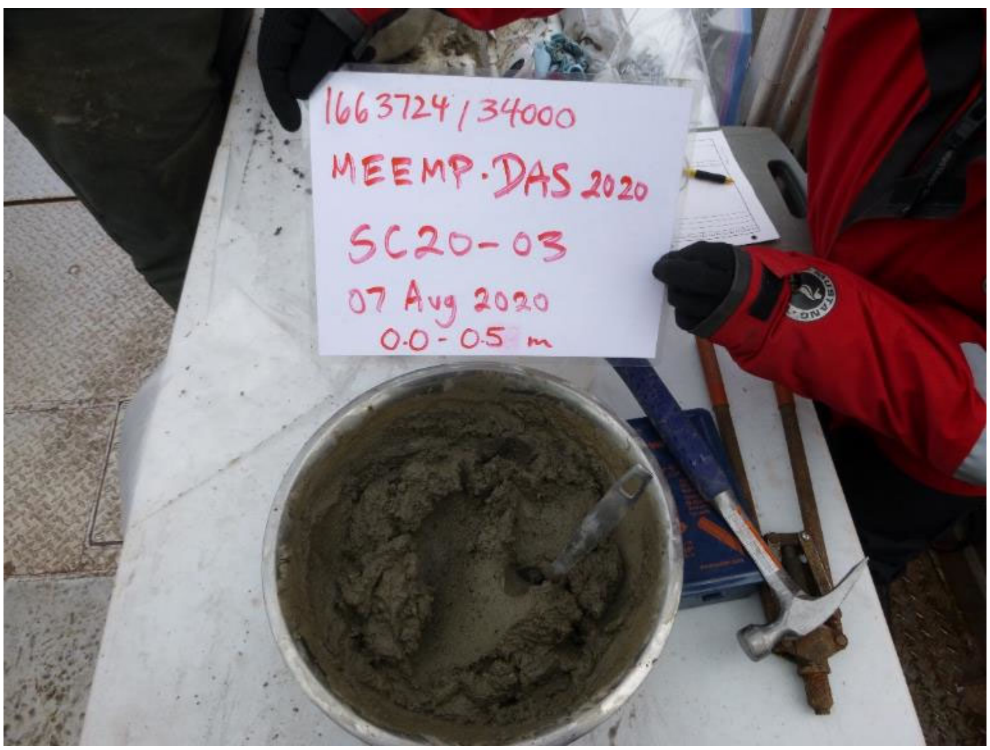


Photo 4 – Homogenous sediment sample collected at station SC20-03 on 07 August 2020

Photo 5 – Homogenous sediment sample collected at station SE-01 on 09 August 2020

Photo 6 – Homogenous sediment sample collected at station SW-14 on 12 August 2020

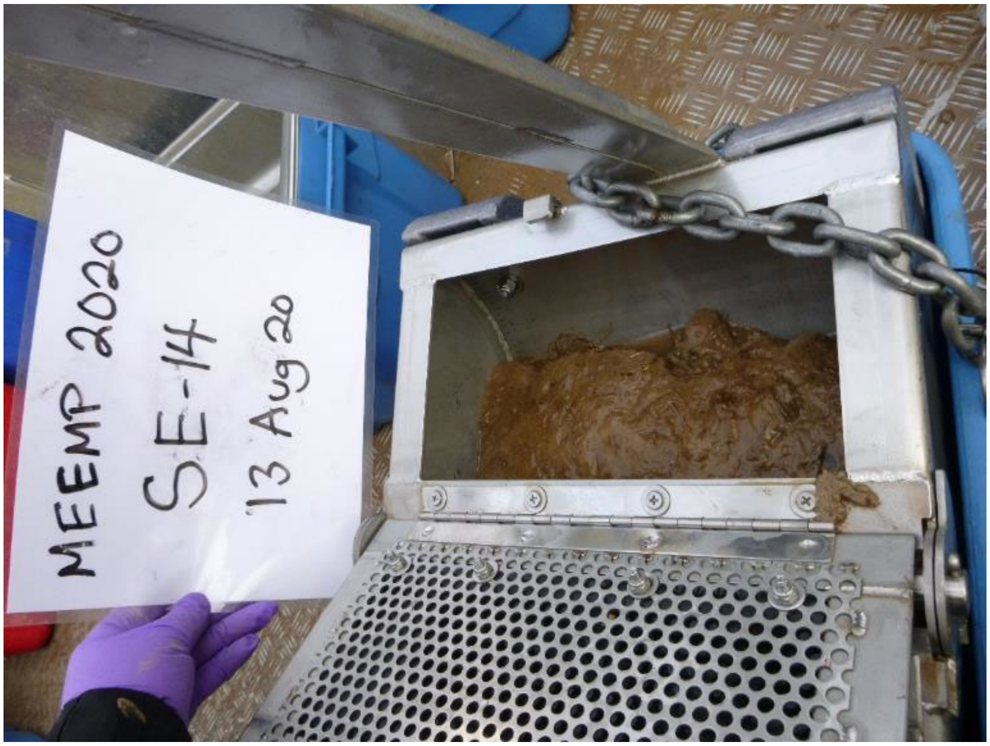


Photo 7 – Sediment in an Van Veen Grab sampler collected at station SE-14 on 13 August 2020

Photo 8 – Homogenous sediment sample collected at station SNW-2 on 15 August 2020

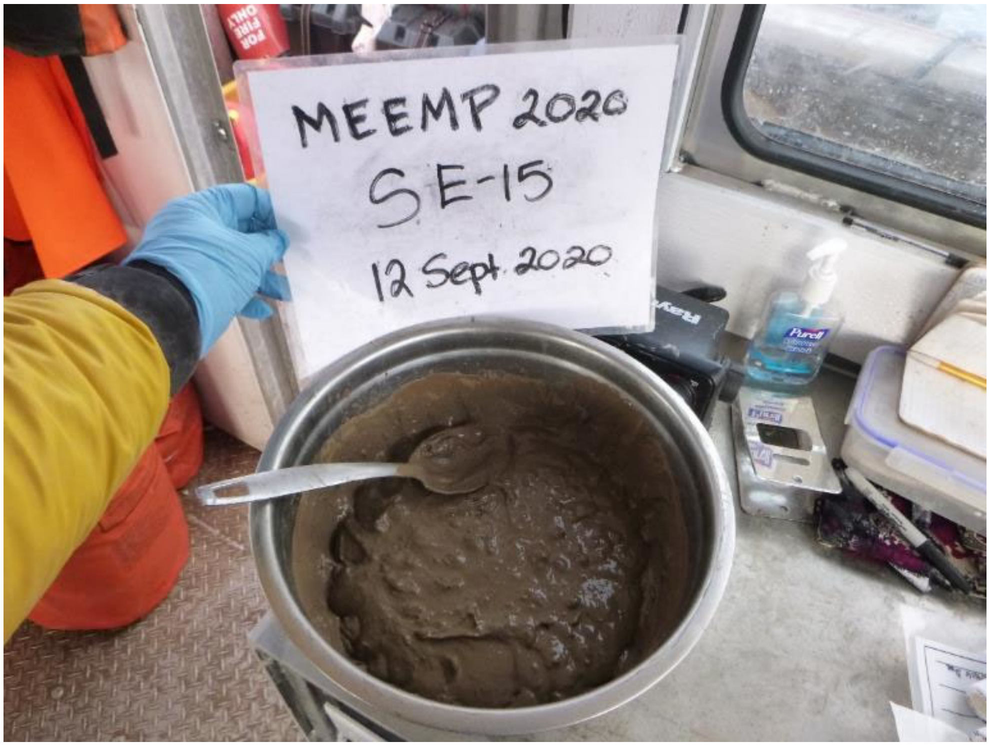


Photo 9 – Homogenous sediment sample collected at station SE-15 on 12 September 2020

Photo 10 – Homogenous sediment sample collected at station SW-2 on 05 August 2020

APPENDIX 3B

Sediment Field Data Sheets

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 09 Aug 2020
Inspected by: TT
Station Number (ID): SE-01
Sampling Method: Van Veen
Weather: Clear skies, 10-14 °C, <5 knots
Lat/Longitude:
Sampling Depth: 14.6m
# of Attempts to Obtain Sample: 1
Time of Collection: 11:08 – 11:40

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab, jaws closed, overlying water

SAND with SILT, soft, moist, brownish grey substrate over top of a firmer grey SAND with SILT, 80% fine grained sand, 20% fines, medium plasticity, trace gravel, shell debris, contains Hiatella, Astarte, Nephtys, other polychaetes, no sheen or odour noted

Approx % collected in grab sample 1 (30%, 5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:
- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:
# of Grabs for Analysis:
Other Notes:

3 jars (120 mL), 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 09 Aug 20

Inspected by: TT

Station Number (ID): SE-2 / DUP B

Sampling Method: Van Veen

Weather: Clear skies, 10-14°C, <5km

Lat/Longitude:

Sampling Depth: 19.6m

# of Attempts to Obtain Sample: 1

Time of Collection: 13:48 - 14:35

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - jaws closed, overlying water

SAND with SILT, moist, soft, brownish grey, 70% fine grained sands, 30% fines, medium plasticity, contains trace gravel and shell debris, contains urchin, brittle star, amphipod, polychaetes, no sheen and no odour noted

Approx % collected in grab sample 1(45%, 6.5cm) %

~~Site photos, sample in grab, homogine~~

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized grab

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars (120mL), 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	09 Aug 2020	Inspected by:	TT
Station Number (ID):	SE-3	Sampling Method:	Van Veen
Weather:	Clear skies, 10-14°C, no winds	Lat/Longitude:	
Sampling Depth:	19.3m		
# of Attempts to Obtain Sample:	1	Time of Collection:	15:55 - 16:27

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - jaws closed, overlying water

SAND and SILT, wet, soft, brown, 60% fine to coarse grained sand, 40% fines, medium plasticity, contains trace gravel (subangular, contains scallops (Semiplecten), brittle star, polys, no odour and no sheen noted

Approx % collected in grab sample 1 (25%, 4.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ________ # of Grabs for Analysis: ________

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	13 Aug 20	Inspected by:	TT, CB
Station Number (ID):	SE-4	Sampling Method:	Van Veen
Weather:	Overcast, periods of light rain, 3-5°C, 7-8 knots	Lat/Longitude:	
Sampling Depth:	18.6m		
# of Attempts to Obtain Sample:	1111	Time of Collection:	12:01 - 13:00

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1- ~10-15%, 2- gravel caught in jaws of grab

SAND and SILT with GRAVEL, moist, soft, brownish grey, 45% fine to Coarse sand, 40% fines, 15% gravel (rounded, subrounded and angular), medium plasticity, contains trace shell debris, polychaete tubes, amphipods, Sea spider, no odour and no sheen noted

Approx % collected in grab sample 4 (35%, 7cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ____ # of Grabs for Analysis: ____

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 13 Aug 20

Inspected by: TT

Station Number (ID): SE-5

Sampling Method: Van Veen

Weather: Light rain, 3-5°C, 7-8kts

Lat/Longitude:

Sampling Depth: 17.6m

# of Attempts to Obtain Sample: 1

Time of Collection: 14:50 - 15:15

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - overlying water, surface intact

SILT and SAND with GRAVEL, wet, soft, brownish grey with some black mottling, 45% fines, 40% fine to coarse sand, 15% gravel (small rounded and subangular), medium plasticity, contains polychaetes, brittle star, poly tubes, some shell debris, no odour and no sheen noted

Approx % collected in grab sample 1 (35%, 4.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo of sample in grab, photo of homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	27 Aug 2020	Inspected by:	CHB, WOB
Station Number (ID):	SE-06 /DUPE	Sampling Method:	Van Veen
Weather:	Overcast, Wind (S), 10-15 Kn	Lat/Longitude:	
Sampling Depth:	17.3 m		
# of Attempts to Obtain Sample:	1	Time of Collection:	08:49 - 09:07

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grey / brown, light brown soft silty layer over dark brown/Grey Clay/mud layer w/gravel mud/with sand.
medium plasticity, moist, shell debris

polychaetes

Approx % collected in grab sample 70% (9 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:
- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TIC TOC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: __________ # of Grabs for Analysis: __________

Other Notes:

1 bag, 2 Vials, 3 Jars

~~SAT~~

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 27 Aug 2020

Inspected by: CHB NOB

Station Number (ID): SE-07

Sampling Method: Van Veen

Weather: Overcast, Wind (S) 10-15Km

Lat/Longitude: SE-7 (boat WP)

Sampling Depth: 16.3

# of Attempts to Obtain Sample: 11

Time of Collection: 10:08 – 1029

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1cm silt layer on top

20% gravel, 30% fine sand, 50% silt, light grey-brown, medium plasticity, soft, moist subangular shell debris, ~~too~~ small subangular cobbles, polychaetes, pectinarids

Approx % collected in grab sample #2 (30%) 7cm %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other VOC TOC TIC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 27 Aug 2020
Inspected by: CB, NOB
Station Number (ID): SE-08
Sampling Method: van veen
Weather: overcast, winds 10-15kn
Lat/Longitude: SE-08
Sampling Depth: 16.1m
# of Attempts to Obtain Sample: ||||
Time of Collection: 1152-1220

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

silt layer 4cm deep, large cobble, polychaetes, brittle star, shrimp, mysids, bivalves, hiatella

light grey-brown, medium plasticity, moist, 10% gravel, 60% fine sands, 30% silt, subangular gravel

Approx % collected in grab sample 35% (6cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:
- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TIC TOC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: __________ # of Grabs for Analysis: __________

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 27 Aug 2020

Inspected by: OB, NOB, JR

Station Number (ID): SE-09

Sampling Method: van veen

Weather: overcast, 10-15km winds

Lat/Longitude: SE-09 (WP)

Sampling Depth: 15.3m

# of Attempts to Obtain Sample: 11

Time of Collection: 1405 – 1430

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): light grey-brown color, moist, medium plasticity, shell debris, darker layer after unknown depth of silt, gravel, polychaete 70% fine sand, 30% silt, hiatella

Approx % collected in grab sample 30% (7 cm), ~~30%~~ %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☑ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: __________ # of Grabs for Analysis: __________

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 27 Aug 2020

Inspected by: NOB JKR

Station Number (ID): SE-10

Sampling Method: Van veen

Weather: winds 10-15 kn overcast, light rain

Lat/Longitude: SE-10 (WP)

Sampling Depth: 12.4m

# of Attempts to Obtain Sample: 1

Time of Collection: 1510-1530

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

5.5 cm Depth

brittle star, annelids, algae, small cobble (1 piece)
dark layer (small)
light grey-brown, moist, ~~[illegible]~~, 20% gravel, 20% silt, 60% fine sand, shell debris

Approx % collected in grab sample 35% (5.5 cm), ~~[illegible]~~ %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC TIC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

2 vials, 1 bag, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 27 August 2020

Inspected by: NOB JKR

Station Number (ID): SE-11

Sampling Method: Van veen

Weather: overcast, 10-15 kn winds

Lat/Longitude: SE-11 (WP)

Sampling Depth: 15.5m

# of Attempts to Obtain Sample: 11

Time of Collection: 1640-1701

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

annelids, bivalves, algae, tube worms, shell debris
dark layer at 3cm depth, gravel, amphipods

light grey-brown, moist, medium plasticity,
20% fine sands, 20% gravel, 60% silt

Approx % collected in grab sample 30% (7.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: __________

# of Grabs for Analysis: __________

Other Notes:

1 bag, 2 vials, 3 Jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 30 Aug 2020

Inspected by: NO JR TS RH

Station Number (ID): SE-12

Sampling Method: Van veen

Weather: cloudy, 10-15km wind

Lat/Longitude:

Sampling Depth: 21m

# of Attempts to Obtain Sample: 11

Time of Collection: 1600-1620

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

shell debris, amphipod, brittle star, annelid
color changeat 2cm depth
grey-brown, 70% fine sand, 30% silt, medium plasticity, moist, trace gravel

Approx % collected in grab sample 40% (10.4cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC TIC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 11 Sept.20
Inspected by: TT, BC
Station Number (ID): SE-13
Sampling Method: Van Veen
Weather: Overcast, 0-2°C, 4-6kts
Lat/Longitude:
Sampling Depth: 16m
# of Attempts to Obtain Sample: 11
Time of Collection: 15:15 - 15:50

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1-rock caught in grab jaws, 2 - surface intact, overlying water, jaws closed

SAND and SILT, moist, soft, brownish grey (1cm silty sand substrate overtop of a grey and black mottled clayey silt substrate) 60% fines, 40% f-coarse sand, medium plasticity, contains red/brown filamentous algae, trace gravel (angular, subangular), trace clay, Pectinaria, polys, bivalves

Approx % collected in grab sample 2(60%, 8cm, sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [ ] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:
# of Grabs for Analysis:
Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 13 Aug 20

Inspected by: TT

Station Number (ID): SE-14 / DUP C

Sampling Method: Van Veen

Weather: Overcast, light rain, 3-5°C, <5 knots

Lat/Longitude:

Sampling Depth: 16.7 m

# of Attempts to Obtain Sample: 11

Time of Collection: 16:40 - 17:45

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 2 - jaws sealed, overlying water, surface intact

SILTY SAND with GRAVEL, moist, soft, 3-4 mm brown substrate over top of a grey and black mottled substrate, 55% fines, 30% fine to coarse sand and 15% gravel (small to medium), rounded, subrounded and angular, medium plasticity contains red filamentous algae, Hiatella, Polychaetes no odour and no sheen noted

Approx % collected in grab sample 2(65%, 7.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab and sample homogenized

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag and 2 vials (for DUP C as well)

SAMPLE NUMBER: _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	12 Sept. 20	Inspected by:	TT, BC
Station Number (ID):	SE-15	Sampling Method:	Van Veen
Weather:	Overcast, -2 to 1°C, 4-8 kts	Lat/Longitude:	
Sampling Depth:	16.5m		
# of Attempts to Obtain Sample:	1	Time of Collection:	16:05 - 16:32

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1-surface intact, overlying water, jaws closed
SILT and SAND with CLAY, moist, soft, brownish grey (2-3 cm brown silty sand over top of a grey and black mottled clayey silt substrate), 60% fines, 40% f-coarse sand, medium plasticity, contains tube worms, ~~trace~~ gravel (subangular), Hiatella, trace shell debris, no odour and no sheen noted

Approx % collected in grab sample 1 (60%, 8cm, sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: # of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 28 Aug 2020

Inspected by: NOB JKR TS

Station Number (ID): SNE-01

Sampling Method: van veen

Weather: winds 0-2 kn partly cloudy

Lat/Longitude: ~~SE~~ SNE-01 (WP)

Sampling Depth: 27.9m

# of Attempts to Obtain Sample: III

Time of Collection: 1235 - 1305

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

brittle star, tunicate, amphipod, shell debris,
rust layer 5cm depth
medium plasticity, moist, light grey-brown, gravel, 80% fine sand, 20% silt

Approx % collected in grab sample 45% (10cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ________

# of Grabs for Analysis: ________

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: Aug 28, 2020

Inspected by: Rob

Station Number (ID): SNE-2

Sampling Method: Van Veen

Weather: Partly Cloudy

Lat/Longitude: SNE-02 (wp)

Sampling Depth: 47m

# of Attempts to Obtain Sample: 1

Time of Collection: 14:20-1440

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): Brownish Grey, 15% Sandy, silt, moist, worms, amphipods, No sheen no odour, No Dark layer, some shell
15% Sand
5% Gravel (subangular)
80% Silt

Approx % collected in grab sample 60% (10cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ PAH
- ☐ TBT
- ☑ Grain Size
- ☐ Benthic
- ☐ AVS CEM
- ☑ PCB
- ☐ Dioxins and Furans
- ☐ PFOA/PFOS
- ☑ Other TOC ~~T~~IC, VOC

AEC:

# of Grabs for Analysis:

Other Notes:

3 Jars, 2 viles, 1 Bag

SAMPLE NUMBER: ________

Page ________ of ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 28 Aug 2020

Inspected by: ~~WB~~ JKR TS

Station Number (ID): SNE-3

Sampling Method: van veen

Weather: winds 5-10 kn partly cloudy

Lat/Longitude: SNE-3 (WP)

Sampling Depth: ~~50m~~ 55m

# of Attempts to Obtain Sample: 1

Time of Collection: 1630-1653

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

shell debris, bivalves, light grey brown, moist, med. plasticity
70% fine sands, 30% silt

Approx % collected in grab sample 50% (7 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☐ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ________

# of Grabs for Analysis: ________

Other Notes:

1 bag, 2 vials, 3 Jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 29 Aug 2020

Inspected by: NOB JKR

Station Number (ID): SNE-4

Sampling Method: van veen

Weather: sunny, 0-5 kn winds

Lat/Longitude: SNE-4 (WP

Sampling Depth: 67.3m

# of Attempts to Obtain Sample: 1

Time of Collection: 956 - 1034

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

brittle stars

sandy silt (90% silt), trace gravel, moist, cohesive, grey-brown
no aroma, no streaking

Approx % collected in grab sample 70%. (7.6cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ____________

# of Grabs for Analysis: ____________

Other Notes:

1 bag, 2 vials, 3 jars

DUP G

SAMPLE NUMBER: ________

Page ______ of ______

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	29 Aug 2020	Inspected by:	JKR NOB TS
Station Number (ID):	SNE-5	Sampling Method:	van veen
Weather:	sunny, winds 0-5km	Lat/Longitude:	SNE-5 (WP)
Sampling Depth:	79.6cm		
# of Attempts to Obtain Sample:	11	Time of Collection:	1240 - 1320

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

brownish grey, Sandy SILT (10%, 90%), some shell, sea spider ~~stems~~ worms, no sheen, no staining, moist, cohesive (plasticity high?) no odour

Approx % collected in grab sample 85% (11 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC TIC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ______ # of Grabs for Analysis: ______

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

Page ________ of ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 30 Aug 2020

Inspected by: NOB JR TS RH

Station Number (ID): SNE-6

Sampling Method: van veen

Weather: Cloudy, 5-10kn winds

Lat/Longitude: ________

Sampling Depth: 90m

# of Attempts to Obtain Sample: 1

Time of Collection: 855 - 915

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

grey brown, trace gravel, 90% silt, 10% fine sand, cohesive, moist
no sheen/odor

brittle stars, tube worm debris

Approx % collected in grab sample 80% (12 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [ ] PCB
- [x] Other TOC TIC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ________

# of Grabs for Analysis: ________

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

Station?

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 28 Aug 2020

Inspected by: NGB JKR TS

Station Number (ID): DUP-F

Sampling Method: Van veen

Weather: winds 0-5 kn partly sunny

Lat/Longitude:

Sampling Depth: 27.9m

# of Attempts to Obtain Sample: III

Time of Collection: 1235-1300

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

brittle star, tunicate, amphipod, shell debris

rust-colored layer 5cm depth

medium plasticity, moist, gravel, light grey-brown, 80% fine sands, 20% silt

Approx % collected in grab sample 45% (6cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 2 vials, 1 bag

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 07 Sept. 20

Inspected by: TT

Station Number (ID): SNE-7

Sampling Method: Van Veen

Weather: Overcast- 2 to 3°C, 7-9 Kts

Lat/Longitude:

Sampling Depth: 94.8m

# of Attempts to Obtain Sample: 1

Time of Collection: 09:10 - 9:58

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water

SANDY SILT with CLAY, moist, firm, 1-2 mm of brown silt substrate overtop of a grey and black mottled silt and clay substrate, 20% f-coarse sand, 80% fines, medium plasticity, contains coarse subrounded gravel, trace shell debris, brittlestars, polychaetes, no noted sheen or odour present

Approx % collected in grab sample 1 (70%, 11.5 cm, sampled top 5 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other BTEX/VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 07 Sept. 2020
Inspected by: TT
Station Number (ID): SNE-8
Sampling Method: Van Veen
Weather: Overcast, -2 to 3°C, 7-9kts
Lat/Longitude:
Sampling Depth: 99m
# of Attempts to Obtain Sample: 1
Time of Collection: 11:20 - on site
11:37 - 12:17

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SANDY SILT with CLAY, moist, firm, 1-3mm brown silt substrate over top of a grey and black mottled clayey silt layer, 80% fines, 20% f-coarse sand, medium plasticity, contains trace shell debris, trace gravel (subangular), brittle star, clam, tubeworm, no noted odour or sheen

Approx % collected in grab sample 1 (75%, 11cm, sampled top 5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:
- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: TOC, TIC
# of Grabs for Analysis:
Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 07 Sept. 2020
Inspected by: TT
Station Number (ID): SNE-9
Sampling Method: Van Veen
Weather: Overcast, -2 to 3'C, 7-9 kts
Lat/Longitude:
Sampling Depth: 103m
# of Attempts to Obtain Sample: 1
Time of Collection: 14:50 - 15:20

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - overlying water, surface intact, grab jaws closed
CLAYEY SILT with SAND, moist, firm, 2cm layer of brownish silt substrate over top of a grey and black mottled clay/silt substrate, ~~medium plastic~~ 85% fines, 15% f-coarse sand, medium plasticity, no odour and no sheen noted

Approx % collected in grab sample 1 (55%, 6.5cm, sampled 5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:
- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other VOC, TOC, TIC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:
# of Grabs for Analysis:
Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	07 Sept. 2020	Inspected by:	TT
Station Number (ID):	SNE-10	Sampling Method:	Van Veen
Weather:	Overcast, -2 to 3°C, 7-9kts	Lat/Longitude:	
Sampling Depth:	108 m		
# of Attempts to Obtain Sample:	1	Time of Collection:	16:44 - 17:30

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - overlying water, surface intact, jaws of grab closed
SILTY CLAY with SAND, moist, firm, 1-2 cm sandy silt substrate overtop of a grey and black mottled silty clay layer, 85% fines, 15% f-coarse sand, medium plasticity, contains trace shell debris, tube worms (coddisfly tube), brittlestars, trace subangular gravel no odour or sheen noted

Approx % collected in grab sample 65%, 11.5cm, sampled 5cm depth %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, ~~ko~~ sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 10 Sept. 20

Inspected by: TT, BC

Station Number (ID): SNE-11

Sampling Method: Van Veen

Weather: Overcast, -1 to 2°C, ~~3-4~~ 0-2 kts

Lat/Longitude:

Sampling Depth: 109 m

# of Attempts to Obtain Sample: 1

Time of Collection: 13:16 - 14:09

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SANDY SILT with CLAY, moist, soft, brownish grey (2-3 cm sandy silt substrate overtop of a silty clay, grey and black mottled substrate), 70% fines, 30% f-coarse, medium plasticity, contains trace gravel (~~subangular~~ subrounded), trace shell debris, brittlestars, polychaetes (Nephtys, caddisfly tube), bivalves, no odour and no sheen present

Approx % collected in grab sample 1 (70%, 10.5 cm), %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 10 Sept.20

Inspected by: TT, BC

Station Number (ID): SNE-12

Sampling Method: Van Veen

Weather: Overcast, -1 to 2°C, 0-2kts

Lat/Longitude:

Sampling Depth: 110m

# of Attempts to Obtain Sample: 1

Time of Collection: 15:30 - 16:08

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab - surface intact, overlying water, jaws closed

SANDY SILT with CLAY, moist, firm, brownish grey (1-2cm sandy silt brown substrate over top of a grey and black mottled silty clay layer), 70% fines, 30% f.-coarse sand, medium plasticity, contains trace gravel (subangular, subrounded), trace shells (gastropod), brittlestars, no odour and no sheen noted

Approx % collected in grab sample 1 (75%, 12 cm, sampled 5 cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, grab in sample, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 12 Sept. 20
Inspected by: TT, BC

Station Number (ID): SNE-13
Sampling Method: Van Veen

Weather: Overcast, -2 to 1°C, 4-8 kts
Lat/Longitude:

Sampling Depth: 115 m

# of Attempts to Obtain Sample: 1
Time of Collection: 10:35 - 11:30

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1- surface intact, overlying water, grab jaws closed

SANDY SILT with CLAY, moist, soft, brownish grey (1-2cm sandy silt layer overtop of a grey and black mottled clayey silt substrate), 80% fines, 20% f-coarse sand, medium plasticity contains trace gravel (subangular, flat, subrounded), trace shell debris, tube worms (caddisfly), brittle stars no odour and no sheen noted

Approx % collected in grab sample 1 (75%, 11cm, sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample (photo label says SE-13)

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:
# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 31 Aug 2020

Inspected by: NO JR TS

Station Number (ID): SNE-14

Sampling Method: Van Veen

Weather: cloudy 10-15km winds

Lat/Longitude:

Sampling Depth: 120m

# of Attempts to Obtain Sample: 1

Time of Collection: 1035 - 1100

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

brittle star, tube worms

grey brown, cohesive, moist, 90% silt, 10% fine sands
no odor/sheen

Approx % collected in grab sample 80% (12 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 10 Sept. 2020

Inspected by: TT, BC

Station Number (ID): SE18-1

Sampling Method: Van Veen

Weather: Overcast, -1 to 2°C, 0-2 kts

Lat/Longitude:

Sampling Depth: 17.3 m

# of Attempts to Obtain Sample: ||||

Time of Collection: 16:44 - 17:40

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1 - gravel caught in grab jaws, 2 - surface intact, overlying water, 3 - gravel caught in grab jaws, 4 - surface intact, overlying water
Composite of grabs 2,4

SAND, wet, loose, redish brown, 95% f-coarse sand, 5% fines, low plasticity, contains trace shell debris, amphipods, polys, bivalves, no odour and no sheen noted

Approx % collected in grab sample 2 (15%, 4.5cm), 4 (20%, 4.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab (grab 2+4), homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TIC, TOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 12 Sept 20

Inspected by: TT, BC

Station Number (ID): SNE-15

Sampling Method: Van Veen

Weather: Overcast, -2 to 1°C, 4-8 kts

Lat/Longitude:

Sampling Depth: 122m

# of Attempts to Obtain Sample: 1

Time of Collection: 14:30 - 15:10

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, jaws closed

CLAYEY SILT with SAND, moist, soft, brownish grey (2-3 cm brown sandy silt over top of a grey and black mottled silty clay substrate) 85% fines, 15% f-coarse sand, medium plasticity, contains tubeworms (caddisfly), brittlestars, trace subangular coarse gravel

Approx % collected in grab sample 1 (85%, 11 cm, sampled 5 cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, TOC, TIC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	06 Aug 20	Inspected by:	TT
Station Number (ID):	SNW-1	Sampling Method:	Van Veen
Weather:	Overcast, 7-9°C, 5knots	Lat/Longitude:	
Sampling Depth:	32.7m		
# of Attempts to Obtain Sample:	11	Time of Collection:	16:35- 17:05

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1- gravel caught in jaws

Grab 2 - overlying water, jaws of grab closed

SILT and SAND with gravel, moist, brownish grey, 50% fine, 35% sand (fine to coarse), 15% subrounded gravel, medium plasticity, contains amphipods, Hiatella, Semiplecten scallops, no odour and no sheen noted

Approx % collected in grab sample 2(35%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TIC, TOC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ______ # of Grabs for Analysis: ______

Other Notes:

3 jars (120 mL), 1 sed bag, 2 methanol vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 15 Aug 20
Inspected by: TT
Station Number (ID): SNW-2 / DUP D
Sampling Method: Van Veen
Weather: Blue skies, 7-10°C, 15 kts
Lat/Longitude:
Sampling Depth: 50.5 m
# of Attempts to Obtain Sample: 1
Time of Collection: 10:40 - 11:26

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, jaws closed
SILT and SAND, moist, soft, brownish grey (1-2 mm brown substrate overtop of a grey and black mottled (striated sediment), medium plasticity, 60% fines, 40% fine to coarse grained sand, trace subangular gravel, contains, shell debris, brittlestars, red filamentous algae no odour and no sheen noted

Approx % collected in grab sample 1 (45%, 9 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:
- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:
# of Grabs for Analysis:
Other Notes:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	15 Aug 20	Inspected by:	TT
Station Number (ID):	SNW-3	Sampling Method:	Van Veen
Weather:	Blue skies, 7-10°C, 10-15 kts	Lat/Longitude:	
Sampling Depth:	63.8m		
# of Attempts to Obtain Sample:	1	Time of Collection:	14:32 - 15:09

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): Grab 1, overlying water, surface intact

SANDY SILT, moist, soft, brownish grey (1-2 mm brown substrate over top of a grey substrate), 80% fines, 20% fine to coarse sand, medium plasticity, contains brittle stars, some shell debris, poly tubes, trace gravel subangular, no odour and no sheen noted, trace clay

Approx % collected in grab sample 1 (35%, 6cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ____ # of Grabs for Analysis: ____

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 25 Aug 2020

Inspected by: CHB

Station Number (ID): SNW-04

Sampling Method: Van Veen

Weather: Partly Cloudy, Wind 5kn(SW) 5°C

Lat/Longitude:

Sampling Depth: 66.1m

# of Attempts to Obtain Sample: 1

Time of Collection: 09:06 - 09:34

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): Light brown, mud/clay with trace sand. Trace gravel, shell debris small lighter brown organic layer (1cm) over, darker brown clay like layer. Firm, moist

Seaspider.

Approx % collected in grab sample 50% (9.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Location, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	25 Aug 2020	Inspected by:	CHB
Station Number (ID):	SNW-05	Sampling Method:	Van Veen
Weather:	Partly cloudy 8° light wind	Lat/Longitude:	
Sampling Depth:	68.5 m		
# of Attempts to Obtain Sample:	1	Time of Collection:	1125 - 1205

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): light brown. Firm mud w/ trace sand. Gravel. 1-2cm soft silty organic layer (loose) over a firmer darker brown clay like mud.

Firm, moist. With trace shell debris

Flat polychaete in stone fly like casing

Approx % collected in grab sample (75%, 11cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc): Location, sample in grab homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TIC TOC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ________ # of Grabs for Analysis: ________

Other Notes:

1 bag 2 vials 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 25 Aug 2020

Inspected by: CHB

Station Number (ID): SNW-06

Sampling Method: Van Veen

Weather: Partly cloudy, 5km wind 25-30cm waves

Lat/Longitude:

Sampling Depth: 73m

# of Attempts to Obtain Sample: 1

Time of Collection: 1353- 1415

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grey/brown sandymud with small gravel. Trace large gravel/cobble
Firm, moist, shell debris no organics
gravel layer at surface w/ thin organic layer (light brown) over thick clay/mud layer

Approx % collected in grab sample 75% (10cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

location, grab sample, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: _ _ _ _ _ _ _ _

MS UWC

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 04 Sept 2020

Inspected by: TT

Station Number (ID): SNW-7

Sampling Method: Van Veen

Weather: Overcast, 8-10kts, 1-3°C

Lat/Longitude:

Sampling Depth: 79m

# of Attempts to Obtain Sample: 1

Time of Collection: 12:07 – 12:51

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

SILT and SAND, moist firm, (1-2 mm brown silt substrate overtop of a brownish grey firm silt and trace clay substrate) brownish grey, 60% fines, 40% fine to coarse sand, medium plasticity contains some coarse gravel (subrounded and subangular), brittle star, polychaetes, poly tubes, trace shell debris, no odour and no sheen noted

Approx % collected in grab sample 25% (6.5cm, top 5 sampled) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other VOC/BTEX
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	08 Sept. 2020	Inspected by:	TT
Station Number (ID):	SNW-8	Sampling Method:	Van Veen
Weather:	Overcast, 0-2°C, 2-3 kts	Lat/Longitude:	
Sampling Depth:	83.8m		
# of Attempts to Obtain Sample:	1	Time of Collection:	10:57 - 11:32

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, jaws closed, overlying water

SILTY SAND with CLAY, moist, firm, 1-2 cm of a silty sand substrate over top of a gravelly clay grey and black mottled substrate, 70% fines, 30% f-coarse sand, medium plasticity. Contains some gravel (subangular), trace shell debris, brittlestars, clams, polys (caddisfly tube), no odour and no sheen noted

Approx % collected in grab sample 60%, 10cm (sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photo, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ______ # of Grabs for Analysis: ______

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 08 Sept. 2020

Inspected by: TT

Station Number (ID): SNW-9

Sampling Method: Van Veen

Weather: Overcast, 0-2c, 2-3 kts

Lat/Longitude:

Sampling Depth: 88 m

# of Attempts to Obtain Sample: 1

Time of Collection: 13:23-14:07

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, jaws closed, overlying water

SILTY SAND with CLAY, moist, firm, 1-2cm of a sandy silt substrate overtop of a gravelly clay grey and black mottled substrate, 70% fines, 30% f-coarse sand, contains trace coarse gravel (subangular) trace shell debris, tube worms (caddisfly), bivalves, no sheen and no odour noted

Approx % collected in grab sample 1-(60%, 7.1cm, sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] PAH
- [ ] TBT
- [x] Grain Size
- [ ] Benthic
- [ ] AVS CEM
- [x] PCB
- [ ] Dioxins and Furans
- [ ] PFOA/PFOS
- [x] Other TOC, TIC, VOC

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	08 Sept. 2020	Inspected by:	TT
Station Number (ID):	SNW-10	Sampling Method:	Van Veen
Weather:	Overcast, 0-2°C, 2-3kts	Lat/Longitude:	
Sampling Depth:	90.7m		
# of Attempts to Obtain Sample:	1	Time of Collection:	15:40 - 16:15

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, jaws closed

SILTY SAND with CLAY, moist, firm, brownish grey (1cm silty sand substrate overtop of a grey and black mottled silty clay layer), 60% fines, 40% f-coarse sand, medium plasticity, contains trace coarse gravel (subrounded, subangular), trace shell debris, lrg cobble (12x8cm), brittlestars, abundant polys (caddisfly tubes), bivalves, no odour and no sheen noted

Approx % collected in grab sample 1-(70%, 10cm, 5cm depth sampled) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ____________ # of Grabs for Analysis: ____________

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 09 Sept 2020

Inspected by: TT, BC

Station Number (ID): SNW-11

Sampling Method: Van Veen

Weather: Overcast, -1 to 3°C, 1-5 kts

Lat/Longitude:

Sampling Depth: 92m

# of Attempts to Obtain Sample: 1

Time of Collection: 09:35 - 09:53

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SILTY SAND with CLAY, moist, firm, brownish grey (2-3cm silty sand layer overtop of a grey and black mottled clay with coarse gravel, 60% f-coarse sand, 40% fines, medium plasticity, contains some gravel (subrounded and subangular), brittle stars, tube worms (caddisfly),

Approx % collected in grab sample 1(40%, 7cm, sampled 5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	09 Sept. 2020	Inspected by:	TT, BC
Station Number (ID):	SNW-12	Sampling Method:	Van Veen
Weather:	Overcast, -1 to 3°C, 1-5kts	Lat/Longitude:	
Sampling Depth:	94m		
# of Attempts to Obtain Sample:	1	Time of Collection:	11:12 - 12:22

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SILTY SAND with CLAY, moist, firm, brownish grey (2-3 cm brown silty sand over top of a grey and black mottled gravelly clay substrate), 70% fines, 30% f-coarse sand, medium plasticity, contains brittlestars, tube worms (caddisfly), no odour and no sheen present

Approx % collected in grab sample 1 (40%, 7cm, 5cm depth sampled) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC: ______ # of Grabs for Analysis: ______

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 09 Sept 2020

Inspected by: TT, BC

Station Number (ID): SNW-13

Sampling Method: Van Veen

Weather: Overcast, -1 to 3°C, 1-5kts

Lat/Longitude:

Sampling Depth: 96m

# of Attempts to Obtain Sample: 1

Time of Collection: 14:21 – 15:33

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SILTY SAND and CLAY, moist, firm, brownish grey (2-3cm of brown silty sand overtop of a grey and black mottled gravelly clay), 60% fines, 40% f-coarse sand, medium plasticity, contains trace cobble, ~~some~~ trace gravel, tube worms (caddisfly tube)

Approx % collected in grab sample 1 (65-70%, 10cm, sampled 5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, photo of sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other VOC, TOC, TIC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 09 Sept 2020

Inspected by: TT, BC

Station Number (ID): SNW-14

Sampling Method: Van Veen

Weather: Overcast, -1 to 3°C, 1-5 kts

Lat/Longitude:

Sampling Depth: 98m

# of Attempts to Obtain Sample: 1

Time of Collection: 16:20 - 16:58

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, grab jaws closed

SAND and SILT with CLAY, moist, firm, brownish grey (3-4cm brown silty sand substrate overtop of a grey and black mottled clay with gravel and sand substrate) 60% fines, 40% f-coarse sand, medium plasticity, contains some gravel (subangular), tube worms (caddisfly), Nephtys, sea spider, brittle star

Approx % collected in grab sample 1 (65%, 10cm, sampled 5 cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 11 Sept. 20
Inspected by: TT, BC
Station Number (ID): SNW-15 / DUPH
Sampling Method: Van Veen
Weather: Overcast, 0-2°C, 4-6 kts
Lat/Longitude:
Sampling Depth: 98 m
# of Attempts to Obtain Sample: 1
Time of Collection: 11:15 – 11:55

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 1 - surface intact, overlying water, jaws closed

SAND and SILT with CLAY, moist, firm, brownish grey (1-2 cm brown silty sand overtop of a grey and black mottled gravelly clay substrate) 60% fines, 40% f-coarse sand, medium plasticity, contains some gravel (subangular, subrounded), tube worms (caddisfly tube), brittlestars, bivalves,

Approx % collected in grab sample 1(65%, 8cm, sampled 5cm depth) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:
# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 05 Aug 2020

Inspected by: TT

Station Number (ID): SW-1

Sampling Method: Van Veen

Weather: Clear skies, 7-9°C, N 10-20 Knots

Lat/Longitude:

Sampling Depth: ~~17.7m~~ 15.5 m

# of Attempts to Obtain Sample: ||||

Time of Collection: 10:48 - 12:00

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 4 - slight sheen on water

Fine sand with trace silt, trace gravel, brownish grey sand, wet, low plasticity, 90% sand, <5% silt, <5% gravel, Pectinaria, Hiatella, amphipod, Astarte, poly tubes, brittle star

Approx % collected in grab sample 1(10%), 2(10%), 3(15-20%) 4(30%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars (120 mL), 1 sediment bag, 2 methanol vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	05 Aug 2020	Inspected by:	TT
Station Number (ID):	SW-2	Sampling Method:	Van Veen
Weather:	Clear skies, 9-11°C N- 10 to 20 km	Lat/Longitude:	
Sampling Depth:	17.7m		
# of Attempts to Obtain Sample:	III	Time of Collection:	14:15-15:20

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 3

(1-2 mm brown sand overtop of grey sand)

SAND, wet, brownish grey, 100% fine well graded sand, <5% fines, low plasticity, lrg Amphipod, fine organic debris, no sheen and no odour, trace shell debris

Approx % collected in grab sample 1(15%), 2(15%), 3(50%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC/TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars (120mL), 1 sediment bag, 2 methanol vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	05 Aug 2020	Inspected by:	TT
Station Number (ID):	SW-3	Sampling Method:	Van Veen
Weather:	Clear skies, 9-11°C, N 10-20 kh	Lat/Longitude:	
Sampling Depth:	15.5 m		
# of Attempts to Obtain Sample:	III	Time of Collection:	17:02 - 17:32

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

First 2 grabs didn't trigger

Sandy silt, moist, brownish grey, 70% fines, 30% ~~f~~ fine grained sand, & medium plasticity, trace shell debris and gravel, polychaetes, trace algae, poly tupe

Approx % collected in grab sample 3 (40%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:
- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: # of Grabs for Analysis:

Other Notes:

3 jars (120 mL), 1 sediment bag, 2 methanol vials

SAMPLE NUMBER: ________

DUP-A

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	06 Aug 20	Inspected by:	TT
Station Number (ID):	SW-4 / DUP-A	Sampling Method:	Van Veen
Weather:	Overcast, 7-9°C, 5 knots	Lat/Longitude:	
Sampling Depth:	~~16.1m~~ 15.6m		
# of Attempts to Obtain Sample:	11	Time of Collection:	11:00 - 11:26

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 2 - jaws closed, overlying water, surface intact
SAND with SILT, moist, brownish grey, 60% sand, 40% fines, (8mm brown sediment overtop black/grey striated)
medium plasticity, shell debris, trace subangular gravel,
Hiatella, polychaete tubes, trace algae, no sheen and no
odour present

Approx % collected in grab sample 1(15%), 2(25%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos taken, sample in grab, sample homogenized

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC: ________ # of Grabs for Analysis: ________

Other Notes:

3 jars (120 mL), 1 sed bag, 2x VOC methanol vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 06 Aug 20

Inspected by: TT

Station Number (ID): SW-5

Sampling Method: Van Veen

Weather: Overcast, 7-9°C, 5 knots

Lat/Longitude:

Sampling Depth: 16.0 m

of Attempts to Obtain Sample: 1

Time of Collection: 14:30 - 15:06

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

SAND and SILT, moist, brown, ~1mm layer of grey sediment, 60% sand, 40% fines, medium plasticity, trace shell debris and trace rounded gravel, Pectinarid, brittle star, Polychaetes, Poly tube with filamentous algae, no odour and no sheen present

Approx % collected in grab sample 1 (20%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

site photos, photo in grab and homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars (120 mL), 1 sed bag, 2 methanol vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 14 Aug 20

Inspected by: TT

Station Number (ID): SW-6

Sampling Method: Van Veen

Weather: Clear skies, 9-10°C, 1-3kts

Lat/Longitude:

Sampling Depth: 17.8m

# of Attempts to Obtain Sample: 11

Time of Collection: 16:01-16:40

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Grab 2 - overlying water, surface intact, jaws closed

SANDY SILT, moist, soft, brown, 70% fines, 30% fine to coarse grained subangular sand, trace gravel, medium plasticity contains urchins, Mya, filamentous algae, polychaetes, brittle star, no odour and no sheen present, some shell debris

Approx % collected in grab sample 1(15%, 5.5cm), 2(25%, 6cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020
Date: 18 Aug 2020
Inspected by: CB NOB
Station Number (ID): SW07
Sampling Method: Van Veen
Weather: Overcast low lying cloud, misty rain
Lat/Longitude:
Sampling Depth: 15.8
# of Attempts to Obtain Sample: 1
Time of Collection: 1104 - 1136

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1-2 mm layer of organic
Silt with sand, moist & soft, 1-2 mm brown substrate overlying grayish brown (brown), medium plasticity, contains trace gravel, trace shell debris

Organisms:
Brittle stars, polychaetes, urchin

Approx % collected in grab sample (35%, 6.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):
Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:
- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:
# of Grabs for Analysis:
Other Notes:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 18 Aug 2020

Inspected by: CHB NOR

Station Number (ID): SW08

Sampling Method: Van Veen

Weather: Overcast

Lat/Longitude:

Sampling Depth: 15.1

# of Attempts to Obtain Sample: 1

Time of Collection: 1321 - 1336

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

Silt with sand, soft and moist, soft fine surface layer <1mm, brown with gray/brown under layer, Medium plasticity, contains shell debris no gravel

bivalve, polychaetes

Approx % collected in grab sample 30% 8cm %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

site photos, sample in grab
homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC TIC VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag 2 vials 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 29 Aug 2020

Inspected by: CHR, NOB

Station Number (ID): SW-9

Sampling Method: Van Veen

Weather: Partly cloudy, 8°C, waves 0.03m, wind 0-3km

Lat/Longitude: SW-9 (WP)

Sampling Depth: 15.8

# of Attempts to Obtain Sample: 1

Time of Collection: 1638-1652

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

dark layer 4cm depth, annelids, trace gravel
70% silt, 30% fine sand, dark grey brown, moist, medium plasticity

staghorn sculpin

Approx % collected in grab sample 35% (8cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other TOC, TIC, VOC
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: _ _ _ _ _ _ _ _

Page ________ of ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 30 Aug 2020

Inspected by: NOB JKR TS

Station Number (ID): SW-10

Sampling Method: van veen

Weather: winds 0-5kn partly cloudy

Lat/Longitude:

Sampling Depth: 17m

# of Attempts to Obtain Sample: III

Time of Collection: 1158 ~~1224~~ 1220

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

~~light grey~~ brown ~~SLIMY~~ SILTY, SAND (15%, 85%), shell, polychae, med plasticity, pectinarain, no odour, no sheen, no staining

Approx % collected in grab sample 30% (6.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

2 vials, 1 bag, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000
Project Title: Baffinland MEEMP 2020

Date: 30 Aug 2020
Inspected by: NO JR TS RH

Station Number (ID): SW-11
Sampling Method: van veen

Weather: wind 5kn cloudy
Lat/Longitude:

Sampling Depth: 17.2m

# of Attempts to Obtain Sample: 1
Time of Collection: 1315 – 1325

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

80% Fine Sand
10% Silt

Annelids, shell debris, Pectinerids, amphipods
Brownish color, no dark layer

Approx % collected in grab sample 30%. (5.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:
# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

Page ______ of ______

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 30 Aug 2020

Inspected by: NO SR TS RH

Station Number (ID): SW-12

Sampling Method: van veen

Weather: Cloudy, 5-10 km winds

Lat/Longitude:

Sampling Depth: 17.7m

# of Attempts to Obtain Sample: 1

Time of Collection: 1445-1500

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

5% SILTY 95 SAND, Brownish Grey, moist, worm, no odour, no sheen, no stain

Approx % collected in grab sample 60% (11 cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 31 Aug 2020

Inspected by: NO JR TS RH

Station Number (ID): SW-13

Sampling Method: Van Veen

Weather: cloudy, 10-15 kn winds

Lat/Longitude:

Sampling Depth: 13.5m

# of Attempts to Obtain Sample: 11

Time of Collection: 1340 - 1358

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.): 15% SILTY 85% SAND, Greyish brown, organic (anthropods, polyphae, pectinaerid), moist,

Approx % collected in grab sample 30% (7.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC TIC VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

1 bag, 2 vials, 3 Jars

SAMPLE NUMBER: ________

SEDIMENT SAMPLING LOG

Project No:	1663724-34000	Project Title:	Baffinland MEEMP 2020
Date:	12 Aug 20	Inspected by:	TT
Station Number (ID):	SW-14	Sampling Method:	Van Veen
Weather:	Overcast, 7-9°C, 5 knots	Lat/Longitude:	Composite sample from Grabs 4 and 6
Sampling Depth:	18.2m		
# of Attempts to Obtain Sample:	~~||||~~ I	Time of Collection:	15:47 – 17:41

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1- not enough penetration, gravel caught in jaws of grab
Grab 4 - overlying water, surface intact, 5-3cm penetration
SANDY SILT, soft, moist, brown, 80% fines, 20% fine grained sand, medium plasticity, contains organic debris (filamentous algae), Pectinaria, Hiatella, polychaetes

Approx % collected in grab sample 4(20%, 4.5cm), 6(10%) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Sample Control Number (SCN):

Analysis for:

- ☑ Full Metals
- ☑ Grain Size
- ☑ PCB
- ☑ Other TOC, TIC, VOC
- ☑ PAH
- ☐ Benthic
- ☐ Dioxins and Furans
- ☐ TBT
- ☐ AVS CEM
- ☐ PFOA/PFOS

AEC:
Other Notes:

\# of Grabs for Analysis:

3 jars, 1 sed bag and 2 vials

SAMPLE NUMBER: _ _ _ _ _ _ _ _

Composite sample

SEDIMENT SAMPLING LOG

Project No: 1663724-34000

Project Title: Baffinland MEEMP 2020

Date: 06 Sept. 2020

Inspected by: TT

Station Number (ID): SW-15

Sampling Method: Van Veen

Weather: Clear, -2 to 4°C, <5kts

Lat/Longitude:

Sampling Depth: 14.0m

# of Attempts to Obtain Sample: ~~||||~~ |

Time of Collection: 11:50 / 13:30

Sediment Description (including colour, type/grain size, anthropogenic debris, organic material, shell, wood, odour, HC sheen, staining, organisms/biota etc.):

1- low volume, gravel caught in grab jaws and not enough penetration
Grab 5,6 composite

SAND and SILT, wet, loose, brown, 60% f-sand, 40% fines, medium plasticity, contains trace gravel (subangular), trace shell debris, Pectinaria, sea cucumber, clams, algae, organic material, no odour and no sheen noted

Approx % collected in grab sample 2 (15-20%, 3cm), 5 (10-15%, 3.5cm), 6 (15%, 3.5cm) %

Photograph Notes (grab, sampling location, field sampling methods, public use, etc):

Site photos, sample in grab, homogenized sample

Sample Control Number (SCN):

Analysis for:

- [x] Full Metals
- [x] Grain Size
- [x] PCB
- [x] Other VOC, BTEX
- [x] PAH
- [ ] Benthic
- [ ] Dioxins and Furans
- [ ] TBT
- [ ] AVS CEM
- [ ] PFOA/PFOS

AEC:

# of Grabs for Analysis:

Other Notes:

3 jars, 1 sed bag, 2 vials

SAMPLE NUMBER: ________

APPENDIX 3C

Sediment Quality Analysis Data

GOLDER ASSOCIATES LTD.
ATTN: Brett Lucas
200-2920 Virtual Way
Vancouver BC V5M 0C4

Date Received: 12-AUG-20
Report Date: 26-AUG-20 19:42 (MT)
Version: FINAL

Client Phone: 604-298-6623

Certificate of Analysis

Lab Work Order #: L2487428

Project P.O. #:	NOT SUBMITTED
Job Reference:	1663724/34000/03
C of C Numbers:	17-766320
Legal Site Desc:	

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2487428-1 SEDIMENT 05-AUG-20 SW-1	L2487428-2 SEDIMENT 05-AUG-20 SW-2	L2487428-3 SEDIMENT 05-AUG-20 SW-3	L2487428-4 SEDIMENT 06-AUG-20 SW-4	L2487428-5 SEDIMENT 06-AUG-20 SW-5
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	17.2	18.1	20.5	21.9	22.3
	pH (1:2 soil:water) (pH)	8.37	8.98	8.51	8.41	8.36
Particle Size	% Gravel (>2mm) (%)	21.6	<1.0	2.1	20.7	6.3
	% Sand (2.0mm - 0.063mm) (%)	68.7	95.7	68.7	49.8	55.6
	% Silt (0.063mm - 4um) (%)	7.7	2.7	23.7	24.6	31.1
	% Clay (<4um) (%)	2.0	<1.0	5.6	4.8	7.0
	Texture	Sand	Sand	Sandy loam	Sandy loam	Sandy loam
Organic / Inorganic Carbon	Inorganic Carbon (%)	1.62	1.04	1.67	1.87	1.98
	Inorganic Carbon (as CaCO3 Equivalent) (%)	13.5	8.63	13.9	15.6	16.5
	Total Carbon by Combustion (%)	3.63	2.10	4.20	4.95	4.90
	Total Organic Carbon (%)	2.01	1.06	2.53	3.08	2.92
Metals	Aluminum (Al) (mg/kg)	2250	1710	4510	4150	4760
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	2.56	0.51	3.11	3.64	4.30
	Barium (Ba) (mg/kg)	8.76	5.11	15.5	14.0	15.3
	Beryllium (Be) (mg/kg)	0.15	0.10	0.27	0.27	0.31
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	15.6	9.9	28.5	29.5	34.8
	Cadmium (Cd) (mg/kg)	<0.020	<0.020	0.038	0.036	0.035
	Calcium (Ca) (mg/kg)	32600	22100	64700	70800	73100
	Chromium (Cr) (mg/kg)	8.55	7.02	16.9	15.5	17.2
	Cobalt (Co) (mg/kg)	1.60	1.23	3.12	2.73	3.06
	Copper (Cu) (mg/kg)	2.78	1.54	5.56	5.43	5.65
	Iron (Fe) (mg/kg)	8360	3610	11300	11800	13300
	Lead (Pb) (mg/kg)	2.10	1.26	3.73	3.77	4.26
	Lithium (Li) (mg/kg)	9.2	6.9	18.2	18.3	20.4
	Magnesium (Mg) (mg/kg)	16100	12200	30300	34800	37800
	Manganese (Mn) (mg/kg)	70.6	43.8	119	113	130
	Mercury (Hg) (mg/kg)	<0.0050	<0.0050	0.0073	0.0071	0.0089
	Molybdenum (Mo) (mg/kg)	0.18	0.20	0.32	2.13	0.30
	Nickel (Ni) (mg/kg)	4.81	4.56	9.57	8.59	9.42
	Phosphorus (P) (mg/kg)	265	135	308	416	479
	Potassium (K) (mg/kg)	1040	770	2040	1770	2090
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	3130	2150	3940	3600	5440

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2487428-6	L2487428-7	L2487428-8	L2487428-9	L2487428-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	06-AUG-20	09-AUG-20	09-AUG-20	09-AUG-20	06-AUG-20
	Sampled Time					
	Client ID	SNW-1	SE-1	SE-2	SE-3	DUPA
SOIL						
Physical Tests	Moisture (%)	20.2	25.6	22.3	23.5	21.8
	pH (1:2 soil:water) (pH)	8.52	8.40	8.39	8.48	8.54
Particle Size	% Gravel (>2mm) (%)	5.6	12.6	5.4	6.1	2.0
	% Sand (2.0mm - 0.063mm) (%)	60.5	57.5	61.1	69.9	60.1
	% Silt (0.063mm - 4um) (%)	27.2	23.4	27.2	19.3	31.5
	% Clay (<4um) (%)	6.7	6.5	6.2	4.8	6.4
	Texture	Sandy loam	Sandy loam	Sandy loam	Loamy sand	Sandy loam
Organic / Inorganic Carbon	Inorganic Carbon (%)	2.28	2.26	2.16	2.08	1.94
	Inorganic Carbon (as CaCO3 Equivalent) (%)	19.0	18.9	18.0	17.3	16.2
	Total Carbon by Combustion (%)	5.60	4.97	4.96	4.45	5.14
	Total Organic Carbon (%)	3.3	2.71	2.80	2.37	3.2
Metals	Aluminum (Al) (mg/kg)	4030	4870	4760	3680	5240
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	0.11
	Arsenic (As) (mg/kg)	2.33	3.74	3.35	2.57	3.89
	Barium (Ba) (mg/kg)	12.4	13.9	12.5	11.8	16.1
	Beryllium (Be) (mg/kg)	0.25	0.29	0.32	0.23	0.30
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	28.9	31.8	32.0	25.0	36.2
	Cadmium (Cd) (mg/kg)	0.052	0.035	0.034	0.024	0.029
	Calcium (Ca) (mg/kg)	61800	61000	61600	46300	75600
	Chromium (Cr) (mg/kg)	14.2	15.2	15.3	11.5	18.4
	Cobalt (Co) (mg/kg)	2.65	2.82	2.69	2.07	3.15
	Copper (Cu) (mg/kg)	5.59	5.33	5.15	3.95	6.38
	Iron (Fe) (mg/kg)	12400	12000	10500	8200	13400
	Lead (Pb) (mg/kg)	3.84	4.46	4.42	3.36	4.31
	Lithium (Li) (mg/kg)	17.1	19.2	19.9	14.4	21.3
	Magnesium (Mg) (mg/kg)	29600	30900	30900	24000	37900
	Manganese (Mn) (mg/kg)	112	120	109	86.0	128
	Mercury (Hg) (mg/kg)	0.0071	0.0080	0.0059	0.0060	0.0083
	Molybdenum (Mo) (mg/kg)	0.35	0.51	0.45	0.32	0.35
	Nickel (Ni) (mg/kg)	7.92	8.49	7.88	6.51	9.93
	Phosphorus (P) (mg/kg)	293	360	329	263	419
	Potassium (K) (mg/kg)	1680	1980	1990	1520	2240
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	3570	3770	4480	3610	4170

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-11				
	Description	SEDIMENT				
	Sampled Date	09-AUG-20				
	Sampled Time					
	Client ID	DUPB				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	21.3				
	pH (1:2 soil:water) (pH)	8.51				
Particle Size	% Gravel (>2mm) (%)	4.9				
	% Sand (2.0mm - 0.063mm) (%)	62.1				
	% Silt (0.063mm - 4um) (%)	26.2				
	% Clay (<4um) (%)	6.8				
	Texture	Sandy loam				
Organic / Inorganic Carbon	Inorganic Carbon (%)	2.03				
	Inorganic Carbon (as CaCO3 Equivalent) (%)	16.9				
	Total Carbon by Combustion (%)	4.67				
	Total Organic Carbon (%)	2.64				
Metals	Aluminum (Al) (mg/kg)	4670				
	Antimony (Sb) (mg/kg)	<0.10				
	Arsenic (As) (mg/kg)	3.20				
	Barium (Ba) (mg/kg)	13.2				
	Beryllium (Be) (mg/kg)	0.28				
	Bismuth (Bi) (mg/kg)	<0.20				
	Boron (B) (mg/kg)	30.6				
	Cadmium (Cd) (mg/kg)	0.034				
	Calcium (Ca) (mg/kg)	61500				
	Chromium (Cr) (mg/kg)	15.4				
	Cobalt (Co) (mg/kg)	2.65				
	Copper (Cu) (mg/kg)	5.05				
	Iron (Fe) (mg/kg)	10600				
	Lead (Pb) (mg/kg)	4.46				
	Lithium (Li) (mg/kg)	19.4				
	Magnesium (Mg) (mg/kg)	30400				
	Manganese (Mn) (mg/kg)	112				
	Mercury (Hg) (mg/kg)	0.0060				
	Molybdenum (Mo) (mg/kg)	0.43				
	Nickel (Ni) (mg/kg)	7.97				
	Phosphorus (P) (mg/kg)	312				
	Potassium (K) (mg/kg)	1910				
	Selenium (Se) (mg/kg)	<0.20				
	Silver (Ag) (mg/kg)	<0.10				
	Sodium (Na) (mg/kg)	3160				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-1	L2487428-2	L2487428-3	L2487428-4	L2487428-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	05-AUG-20	05-AUG-20	05-AUG-20	06-AUG-20	06-AUG-20
	Sampled Time					
	Client ID	SW-1	SW-2	SW-3	SW-4	SW-5
Grouping	**Analyte**					
SOIL						
Metals	Strontium (Sr) (mg/kg)	19.7	14.0	40.3	44.1	46.7
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.050	<0.050	0.098	0.081	0.087
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	150	136	289	220	261
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.413	0.250	0.616	0.609	0.661
	Vanadium (V) (mg/kg)	9.14	6.10	17.9	17.0	18.6
	Zinc (Zn) (mg/kg)	11.7	5.9	16.1	13.4	14.9
	Zirconium (Zr) (mg/kg)	2.3	1.7	4.3	3.9	4.7
Hydrocarbons	EPH10-19 (mg/kg)	<200	<200	<200	<200	<200
	EPH19-32 (mg/kg)	<200	<200	<200	<200	<200
	LEPH (mg/kg)	<200	<200	<200	<200	<200
	HEPH (mg/kg)	<200	<200	<200	<200	<200
	F2 (C10-C16) (mg/kg)	<30	<30	<30	<30	<30
	F2-Naphth (mg/kg)	<30	<30	<30	<30	<30
	F3 (C16-C34) (mg/kg)	<50	<50	<50	<50	<50
	F3-PAH (mg/kg)	<50	<50	<50	<50	<50
	F4 (C34-C50) (mg/kg)	<50	<50	<50	<50	<50
	Chrom. to baseline at nC50	YES	YES	YES	YES	YES
	Surrogate: 2-Bromobenzotrifluoride (%)	97.6	93.8	93.6	93.4	89.6
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	70.8	71.7	68.5	69.5	65.2
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.015	<0.015	<0.015	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-6	L2487428-7	L2487428-8	L2487428-9	L2487428-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	06-AUG-20	09-AUG-20	09-AUG-20	09-AUG-20	06-AUG-20
	Sampled Time					
	Client ID	SNW-1	SE-1	SE-2	SE-3	DUPA
Grouping	**Analyte**					
SOIL						
Metals	Strontium (Sr) (mg/kg)	38.3	40.6	46.6	30.7	45.1
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.077	0.084	0.092	0.061	0.090
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	197	242	224	193	284
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.614	1.00	0.920	0.590	0.700
	Vanadium (V) (mg/kg)	15.8	17.6	17.4	14.0	19.8
	Zinc (Zn) (mg/kg)	13.2	14.9	14.3	14.0	14.8
	Zirconium (Zr) (mg/kg)	4.6	5.0	5.3	4.0	5.4
Hydrocarbons	EPH10-19 (mg/kg)	<200	<200	<200	<200	<200
	EPH19-32 (mg/kg)	<200	<200	<200	<200	<200
	LEPH (mg/kg)	<200	<200	<200	<200	<200
	HEPH (mg/kg)	<200	<200	<200	<200	<200
	F2 (C10-C16) (mg/kg)	<30	<30	<30	<30	<30
	F2-Naphth (mg/kg)	<30	<30	<30	<30	<30
	F3 (C16-C34) (mg/kg)	<50	<50	<50	<50	<50
	F3-PAH (mg/kg)	<50	<50	<50	<50	<50
	F4 (C34-C50) (mg/kg)	<50	<50	<50	<50	<50
	Chrom. to baseline at nC50	YES	YES	YES	YES	YES
	Surrogate: 2-Bromobenzotrifluoride (%)	93.8	90.0	87.2	90.6	84.8
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	74.3	70.3	65.2	72.5	65.1
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.015	<0.015	<0.015	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-11				
	Description	SEDIMENT				
	Sampled Date	09-AUG-20				
	Sampled Time					
	Client ID	DUPB				
Grouping	**Analyte**					
SOIL						
Metals	Strontium (Sr) (mg/kg)	39.5				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.085				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	238				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	0.943				
	Vanadium (V) (mg/kg)	17.3				
	Zinc (Zn) (mg/kg)	14.8				
	Zirconium (Zr) (mg/kg)	5.5				
Hydrocarbons	EPH10-19 (mg/kg)	<200				
	EPH19-32 (mg/kg)	<200				
	LEPH (mg/kg)	<200				
	HEPH (mg/kg)	<200				
	F2 (C10-C16) (mg/kg)	<30				
	F2-Naphth (mg/kg)	<30				
	F3 (C16-C34) (mg/kg)	<50				
	F3-PAH (mg/kg)	<50				
	F4 (C34-C50) (mg/kg)	<50				
	Chrom. to baseline at nC50	YES				
	Surrogate: 2-Bromobenzotrifluoride (%)	89.1				
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	73.0				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Anthracene (mg/kg)	<0.0040				
	Benz(a)anthracene (mg/kg)	<0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	<0.010				
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	<0.010				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	<0.010				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-1	L2487428-2	L2487428-3	L2487428-4	L2487428-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	05-AUG-20	05-AUG-20	05-AUG-20	06-AUG-20	06-AUG-20
	Sampled Time					
	Client ID	SW-1	SW-2	SW-3	SW-4	SW-5
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Surrogate: Chrysene d12 (%)	115.9	114.1	110.2	112.3	113.3
	Surrogate: Naphthalene d8 (%)	95.3	94.8	89.8	94.7	93.8
	Surrogate: Phenanthrene d10 (%)	98.7	96.7	93.4	95.4	95.5
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME)	<0.15	<0.15	<0.15	<0.15	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-6	L2487428-7	L2487428-8	L2487428-9	L2487428-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	06-AUG-20	09-AUG-20	09-AUG-20	09-AUG-20	06-AUG-20
	Sampled Time					
	Client ID	SNW-1	SE-1	SE-2	SE-3	DUPA
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Surrogate: Chrysene d12 (%)	119.4	116.9	106.1	118.2	111.2
	Surrogate: Naphthalene d8 (%)	98.3	95.5	87.9	98.0	89.7
	Surrogate: Phenanthrene d10 (%)	101.6	97.7	89.5	99.8	95.4
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME)	<0.15	<0.15	<0.15	<0.15	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2487428-11
	Description	SEDIMENT
	Sampled Date	09-AUG-20
	Sampled Time	
	Client ID	DUPB
Grouping	**Analyte**	
SOIL		
Polycyclic Aromatic Hydrocarbons	1-Methylnaphthalene (mg/kg)	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010
	Naphthalene (mg/kg)	<0.010
	Phenanthrene (mg/kg)	<0.010
	Pyrene (mg/kg)	<0.010
	Quinoline (mg/kg)	<0.050
	Surrogate: Chrysene d12 (%)	113.2
	Surrogate: Naphthalene d8 (%)	93.6
	Surrogate: Phenanthrene d10 (%)	94.9
	B(a)P Total Potency Equivalent (mg/kg)	<0.020
	IACR (CCME)	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	F4 (C34-C50)	LCS-ND	L2487428-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

EPH-TUMB-FID-VA	Soil	EPH in Solids by Tumbler and GCFID	BC MOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Solids by GC/FID", v2.1, July 1999. Soil samples are extracted with a 1:1 mixture of hexane and acetone using a rotary extraction technique modified from EPA 3570 prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

F2F3-PAH-CALC-VA	Soil	F2&F3 minus PAHs [Calculation]	CCME CWS PHC TIER 1 (2001)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F2 (C10-C16) and F3 (C16-C34), a subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extractor. The extract undergoes a silica-gel clean-up to remove polar compounds prior to analysis by on-column GC/FID. The F2-Napth and F3-PAH results are then calculated as follows:

1. F2-Napth: F2 (C10-C16) minus naphthalene.
2. F3-PAH: F3 (C16-C34) minus selected PAHs (phenanthrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene and pyrene).

F2F4-TUMB-H/A-FID-VA	Soil	CWS F2-F4 Hydrocarbons by Tumbler GCFID	CCME PETROLEUM HYDROCARBONS

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For C10 to C50 hydrocarbons (F2, F3, F4) and gravimetric heavy hydrocarbons (F4G-sg), a subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extractor. The extract undergoes a silica-gel clean-up to remove polar compounds. F2, F3 & F4 are analyzed by on-column GC/FID, and F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where F4 (C34-C50) and F4G-sg results are reported for a sample, the larger of the reported values is used for comparison against the relevant CCME standard for F4.
7. The gravimetric heavy hydrocarbon results (F4G-sg), cannot be added to the C6 to C50 hydrocarbon results.
8. This method is validated for use.
9. Data from analysis of quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram.

HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
LEPH/HEPH-CALC-VA	Soil	LEPHs and HEPHs	BC MOE LEPH/HEPH

LEPHs and HEPHs are measures of Light and Heavy Extractable Petroleum Hydrocarbons in soil. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.

LEPHs = EPH10-19 minus Naphthalene and Phenanthrene.

HEPHs = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and Pyrene.

MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Reference Information

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

MOISTURE-VA	Soil	Moisture content	CCME PHC in Soil - Tier 1 (mod)

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of two hours.

PAH-TMB-H/A-MS-VA	Soil	PAH - Rotary Extraction (Hexane/Acetone)	EPA 3570/8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

Benzo(a)pyrene Total Potency Equivalents [B(a)P TPE] represents the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAHs, and is calculated as per the CCME PAH Soil Quality Guidelines reference document (2010).

PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in "pH, Electrometric in Soil and Sediment - Prescriptive Method", Rev. 2005, Section B Physical, Inorganic and Misc. Constituents, BC Environmental Laboratory Manual. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PSA-PIPET+GRAVEL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-766320

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: GOLDER ASSOCIATES LTD.
200-2920 Virtual Way
Vancouver BC V5M 0C4
Contact: Brett Lucas

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R5195860								
WG3387097-1 DUP		**L2487428-7**						
Inorganic Carbon		2.26	2.22		%	1.8	20	21-AUG-20
WG3387097-4 IRM		**08-109_SOIL**						
Inorganic Carbon			98.2		%		80-120	21-AUG-20
WG3387097-2 LCS		**0.5**						
Inorganic Carbon			106.4		%		80-120	21-AUG-20
WG3387097-3 MB								
Inorganic Carbon			<0.050		%		0.05	21-AUG-20
C-TOT-LECO-SK	**Soil**							
Batch R5193636								
WG3386018-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			98.9		%		80-120	19-AUG-20
WG3386018-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			99.5		%		90-110	19-AUG-20
WG3386018-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	19-AUG-20
Batch R5195103								
WG3386022-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			97.3		%		80-120	19-AUG-20
WG3386022-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			98.3		%		90-110	19-AUG-20
WG3386022-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	19-AUG-20
EPH-TUMB-FID-VA	**Soil**							
Batch R5191651								
WG3385662-3 DUP		**L2487428-1**						
EPH10-19		<200	<200	RPD-NA	mg/kg	N/A	40	20-AUG-20
EPH19-32		<200	<200	RPD-NA	mg/kg	N/A	40	20-AUG-20
WG3385662-4 IRM		**ALS PHC RM3**						
EPH10-19			109.9		%		70-130	20-AUG-20
EPH19-32			107.6		%		70-130	20-AUG-20
WG3385662-2 LCS								
EPH10-19			106.1		%		70-130	20-AUG-20
EPH19-32			95.5		%		70-130	20-AUG-20
WG3385662-1 MB								
EPH10-19			<200		mg/kg		200	20-AUG-20
EPH19-32			<200		mg/kg		200	20-AUG-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EPH-TUMB-FID-VA	**Soil**							
Batch	**R5191651**							
WG3385662-1	**MB**							
Surrogate: 2-Bromobenzotrifluoride			97.9		%		60-140	20-AUG-20
F2F4-TUMB-H/A-FID-VA	**Soil**							
Batch	**R5195524**							
WG3385662-3	**DUP**	**L2487428-1**						
F2 (C10-C16)		<30	<30	RPD-NA	mg/kg	N/A	40	21-AUG-20
F3 (C16-C34)		<50	<50	RPD-NA	mg/kg	N/A	40	21-AUG-20
F4 (C34-C50)		<50	<50	RPD-NA	mg/kg	N/A	40	21-AUG-20
WG3385662-4	**IRM**	**ALS PHC RM3**						
F2 (C10-C16)			82.4		%		70-130	21-AUG-20
F3 (C16-C34)			78.0		%		70-130	21-AUG-20
F4 (C34-C50)			82.5		%		70-130	21-AUG-20
WG3385662-2	**LCS**							
F2 (C10-C16)			94.4		%		70-130	21-AUG-20
F3 (C16-C34)			85.0		%		70-130	21-AUG-20
F4 (C34-C50)			58.9	LCS-ND	%		70-130	21-AUG-20
WG3385662-1	**MB**							
F2 (C10-C16)			<30		mg/kg		30	21-AUG-20
F3 (C16-C34)			<50		mg/kg		50	21-AUG-20
F4 (C34-C50)			<50		mg/kg		50	21-AUG-20
Surrogate: 2-Bromobenzotrifluoride, F2-F4			71.8		%		60-140	21-AUG-20
HG-200.2-CVAF-VA	**Soil**							
Batch	**R5191337**							
WG3385664-4	**CRM**	**SCP SS-2**						
Mercury (Hg)			100.1		%		70-130	19-AUG-20
WG3385664-2	**DUP**	**L2487428-1**						
Mercury (Hg)		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	19-AUG-20
WG3385664-3	**LCS**							
Mercury (Hg)			98.4		%		80-120	19-AUG-20
WG3385664-1	**MB**							
Mercury (Hg)			<0.0050		mg/kg		0.005	19-AUG-20
MET-200.2-CCMS-VA	**Soil**							
Batch	**R5192045**							
WG3385664-4	**CRM**	**SCP SS-2**						
Aluminum (Al)			117.7		%		70-130	19-AUG-20
Antimony (Sb)			108.2		%		70-130	19-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R5192045								
WG3385664-4 CRM		**SCP SS-2**						
Arsenic (As)			104.5		%		70-130	19-AUG-20
Barium (Ba)			105.4		%		70-130	19-AUG-20
Beryllium (Be)			112.1		%		70-130	19-AUG-20
Bismuth (Bi)			0.14		mg/kg		0-0.34	19-AUG-20
Boron (B)			10.5		mg/kg		3.5-13.5	19-AUG-20
Cadmium (Cd)			104.5		%		70-130	19-AUG-20
Calcium (Ca)			115.6		%		70-130	19-AUG-20
Chromium (Cr)			112.5		%		70-130	19-AUG-20
Cobalt (Co)			111.5		%		70-130	19-AUG-20
Copper (Cu)			109.0		%		70-130	19-AUG-20
Iron (Fe)			108.5		%		70-130	19-AUG-20
Lead (Pb)			116.4		%		70-130	19-AUG-20
Lithium (Li)			99.7		%		70-130	19-AUG-20
Magnesium (Mg)			110.9		%		70-130	19-AUG-20
Manganese (Mn)			114.0		%		70-130	19-AUG-20
Molybdenum (Mo)			106.5		%		70-130	19-AUG-20
Nickel (Ni)			109.4		%		70-130	19-AUG-20
Phosphorus (P)			108.3		%		70-130	19-AUG-20
Potassium (K)			111.6		%		70-130	19-AUG-20
Selenium (Se)			0.20		mg/kg		0-0.34	19-AUG-20
Sodium (Na)			109.3		%		70-130	19-AUG-20
Strontium (Sr)			115.0		%		70-130	19-AUG-20
Thallium (Tl)			0.081		mg/kg		0.029-0.129	19-AUG-20
Tin (Sn)			111.7		%		70-130	19-AUG-20
Titanium (Ti)			118.0		%		70-130	19-AUG-20
Uranium (U)			110.7		%		70-130	19-AUG-20
Vanadium (V)			113.2		%		70-130	19-AUG-20
Zinc (Zn)			108.8		%		70-130	19-AUG-20
Zirconium (Zr)			102.8		%		70-130	19-AUG-20
WG3385664-2 DUP		**L2487428-1**						
Aluminum (Al)		2250	2180		mg/kg	3.3	40	19-AUG-20
Antimony (Sb)		<0.10	<0.10	RPD-NA	mg/kg	N/A	30	19-AUG-20
Arsenic (As)		2.56	3.04		mg/kg	17	30	19-AUG-20
Barium (Ba)		8.76	7.42		mg/kg	17	40	19-AUG-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R5192045								
WG3385664-2 DUP		**L2487428-1**						
Beryllium (Be)		0.15	0.14		mg/kg	6.9	30	19-AUG-20
Bismuth (Bi)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	19-AUG-20
Boron (B)		15.6	15.4		mg/kg	1.0	30	19-AUG-20
Cadmium (Cd)		<0.020	<0.020	RPD-NA	mg/kg	N/A	30	19-AUG-20
Calcium (Ca)		32600	31300		mg/kg	4.1	30	19-AUG-20
Chromium (Cr)		8.55	8.04		mg/kg	6.1	30	19-AUG-20
Cobalt (Co)		1.60	1.76		mg/kg	9.6	30	19-AUG-20
Copper (Cu)		2.78	2.67		mg/kg	3.8	30	19-AUG-20
Iron (Fe)		8360	7930		mg/kg	5.3	30	19-AUG-20
Lead (Pb)		2.10	1.92		mg/kg	8.8	40	19-AUG-20
Lithium (Li)		9.2	8.9		mg/kg	3.1	30	19-AUG-20
Magnesium (Mg)		16100	16000		mg/kg	0.9	30	19-AUG-20
Manganese (Mn)		70.6	83.9		mg/kg	17	30	19-AUG-20
Molybdenum (Mo)		0.18	0.23		mg/kg	26	40	19-AUG-20
Nickel (Ni)		4.81	4.29		mg/kg	11	30	19-AUG-20
Phosphorus (P)		265	269		mg/kg	1.7	30	19-AUG-20
Potassium (K)		1040	1020		mg/kg	2.1	40	19-AUG-20
Selenium (Se)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	19-AUG-20
Silver (Ag)		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	19-AUG-20
Sodium (Na)		3130	2640		mg/kg	17	40	19-AUG-20
Strontium (Sr)		19.7	21.0		mg/kg	6.6	40	19-AUG-20
Sulfur (S)		<1000	<1000	RPD-NA	mg/kg	N/A	30	19-AUG-20
Thallium (Tl)		0.050	<0.050	RPD-NA	mg/kg	N/A	30	19-AUG-20
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	19-AUG-20
Titanium (Ti)		150	139		mg/kg	7.8	40	19-AUG-20
Tungsten (W)		<0.50	<0.50	RPD-NA	mg/kg	N/A	30	19-AUG-20
Uranium (U)		0.413	0.360		mg/kg	14	30	19-AUG-20
Vanadium (V)		9.14	9.02		mg/kg	1.3	30	19-AUG-20
Zinc (Zn)		11.7	8.2	J	mg/kg	3.5	4	19-AUG-20
Zirconium (Zr)		2.3	1.8		mg/kg	24	30	19-AUG-20
WG3385664-3 LCS								
Aluminum (Al)			103.5		%		80-120	19-AUG-20
Antimony (Sb)			117.1		%		80-120	19-AUG-20
Arsenic (As)			100.6		%		80-120	19-AUG-20

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R5192045								
WG3385664-3 LCS								
Barium (Ba)			100.7		%		80-120	19-AUG-20
Beryllium (Be)			97.9		%		80-120	19-AUG-20
Bismuth (Bi)			113.4		%		80-120	19-AUG-20
Boron (B)			100.3		%		80-120	19-AUG-20
Cadmium (Cd)			102.9		%		80-120	19-AUG-20
Calcium (Ca)			102.3		%		80-120	19-AUG-20
Chromium (Cr)			103.4		%		80-120	19-AUG-20
Cobalt (Co)			103.3		%		80-120	19-AUG-20
Copper (Cu)			100.4		%		80-120	19-AUG-20
Iron (Fe)			101.6		%		80-120	19-AUG-20
Lead (Pb)			108.3		%		80-120	19-AUG-20
Lithium (Li)			90.0		%		80-120	19-AUG-20
Magnesium (Mg)			111.5		%		80-120	19-AUG-20
Manganese (Mn)			105.0		%		80-120	19-AUG-20
Molybdenum (Mo)			99.8		%		80-120	19-AUG-20
Nickel (Ni)			101.2		%		80-120	19-AUG-20
Phosphorus (P)			105.3		%		80-120	19-AUG-20
Potassium (K)			107.9		%		80-120	19-AUG-20
Selenium (Se)			103.7		%		80-120	19-AUG-20
Silver (Ag)			100.9		%		80-120	19-AUG-20
Sodium (Na)			111.3		%		80-120	19-AUG-20
Strontium (Sr)			99.9		%		80-120	19-AUG-20
Sulfur (S)			93.6		%		80-120	19-AUG-20
Thallium (Tl)			114.4		%		80-120	19-AUG-20
Tin (Sn)			100.8		%		80-120	19-AUG-20
Titanium (Ti)			98.1		%		80-120	19-AUG-20
Tungsten (W)			102.3		%		80-120	19-AUG-20
Uranium (U)			101.6		%		80-120	19-AUG-20
Vanadium (V)			105.0		%		80-120	19-AUG-20
Zinc (Zn)			104.1		%		80-120	19-AUG-20
Zirconium (Zr)			100.0		%		70-130	19-AUG-20
WG3385664-1 MB								
Aluminum (Al)			<50		mg/kg		50	19-AUG-20
Antimony (Sb)			<0.10		mg/kg		0.1	19-AUG-20

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R5192045								
WG3385664-1 MB								
Arsenic (As)			<0.10		mg/kg		0.1	19-AUG-20
Barium (Ba)			<0.50		mg/kg		0.5	19-AUG-20
Beryllium (Be)			<0.10		mg/kg		0.1	19-AUG-20
Bismuth (Bi)			<0.20		mg/kg		0.2	19-AUG-20
Boron (B)			<5.0		mg/kg		5	19-AUG-20
Cadmium (Cd)			<0.020		mg/kg		0.02	19-AUG-20
Calcium (Ca)			<50		mg/kg		50	19-AUG-20
Chromium (Cr)			<0.50		mg/kg		0.5	19-AUG-20
Cobalt (Co)			<0.10		mg/kg		0.1	19-AUG-20
Copper (Cu)			<0.50		mg/kg		0.5	19-AUG-20
Iron (Fe)			<50		mg/kg		50	19-AUG-20
Lead (Pb)			<0.50		mg/kg		0.5	19-AUG-20
Lithium (Li)			<2.0		mg/kg		2	19-AUG-20
Magnesium (Mg)			<20		mg/kg		20	19-AUG-20
Manganese (Mn)			<1.0		mg/kg		1	19-AUG-20
Molybdenum (Mo)			<0.10		mg/kg		0.1	19-AUG-20
Nickel (Ni)			<0.50		mg/kg		0.5	19-AUG-20
Phosphorus (P)			<50		mg/kg		50	19-AUG-20
Potassium (K)			<100		mg/kg		100	19-AUG-20
Selenium (Se)			<0.20		mg/kg		0.2	19-AUG-20
Silver (Ag)			<0.10		mg/kg		0.1	19-AUG-20
Sodium (Na)			<50		mg/kg		50	19-AUG-20
Strontium (Sr)			<0.50		mg/kg		0.5	19-AUG-20
Sulfur (S)			<1000		mg/kg		1000	19-AUG-20
Thallium (Tl)			<0.050		mg/kg		0.05	19-AUG-20
Tin (Sn)			<2.0		mg/kg		2	19-AUG-20
Titanium (Ti)			<1.0		mg/kg		1	19-AUG-20
Tungsten (W)			<0.50		mg/kg		0.5	19-AUG-20
Uranium (U)			<0.050		mg/kg		0.05	19-AUG-20
Vanadium (V)			<0.20		mg/kg		0.2	19-AUG-20
Zinc (Zn)			<2.0		mg/kg		2	19-AUG-20
Zirconium (Zr)			<1.0		mg/kg		1	19-AUG-20
MOISTURE-VA	**Soil**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-VA	**Soil**							
Batch R5191143								
WG3385666-3 DUP		**L2487428-1**						
Moisture		17.2	19.1		%	10	20	18-AUG-20
WG3385666-2 LCS								
Moisture			100.4		%		90-110	18-AUG-20
WG3385666-1 MB								
Moisture			<0.25		%		0.25	18-AUG-20
PAH-TMB-H/A-MS-VA	**Soil**							
Batch R5191501								
WG3385662-3 DUP		**L2487428-1**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	20-AUG-20
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	20-AUG-20
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	20-AUG-20
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Benzo(b&j)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	20-AUG-20
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
1-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	20-AUG-20
Quinoline		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	20-AUG-20
WG3385662-5 IRM		**ALS PAH RM2**						
Acenaphthene			91.7		%		60-130	20-AUG-20
Acenaphthylene			81.2		%		60-130	20-AUG-20
Anthracene			86.9		%		60-130	20-AUG-20
Benz(a)anthracene			97.9		%		60-130	20-AUG-20
Benzo(a)pyrene			99.5		%		60-130	20-AUG-20
Benzo(b&j)fluoranthene			97.8		%		60-130	20-AUG-20
Benzo(g,h,i)perylene			100.1		%		60-130	20-AUG-20

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-H/A-MS-VA	**Soil**							
Batch R5191501								
WG3385662-5 IRM		**ALS PAH RM2**						
Benzo(k)fluoranthene			96.7		%		60-130	20-AUG-20
Chrysene			95.9		%		60-130	20-AUG-20
Dibenz(a,h)anthracene			100.2		%		60-130	20-AUG-20
Fluoranthene			96.2		%		60-130	20-AUG-20
Fluorene			92.2		%		60-130	20-AUG-20
Indeno(1,2,3-c,d)pyrene			100.1		%		60-130	20-AUG-20
1-Methylnaphthalene			89.7		%		60-130	20-AUG-20
2-Methylnaphthalene			90.8		%		60-130	20-AUG-20
Naphthalene			88.5		%		50-130	20-AUG-20
Phenanthrene			95.2		%		60-130	20-AUG-20
Pyrene			96.0		%		60-130	20-AUG-20
WG3385662-2 LCS								
Acenaphthene			91.9		%		60-130	20-AUG-20
Acenaphthylene			88.4		%		60-130	20-AUG-20
Anthracene			92.9		%		60-130	20-AUG-20
Benz(a)anthracene			100.3		%		60-130	20-AUG-20
Benzo(a)pyrene			92.5		%		60-130	20-AUG-20
Benzo(b&j)fluoranthene			95.7		%		60-130	20-AUG-20
Benzo(g,h,i)perylene			93.1		%		60-130	20-AUG-20
Benzo(k)fluoranthene			94.4		%		60-130	20-AUG-20
Chrysene			92.0		%		60-130	20-AUG-20
Dibenz(a,h)anthracene			96.8		%		60-130	20-AUG-20
Fluoranthene			95.6		%		60-130	20-AUG-20
Fluorene			92.4		%		60-130	20-AUG-20
Indeno(1,2,3-c,d)pyrene			95.8		%		60-130	20-AUG-20
1-Methylnaphthalene			84.3		%		60-130	20-AUG-20
2-Methylnaphthalene			83.1		%		60-130	20-AUG-20
Naphthalene			81.5		%		50-130	20-AUG-20
Phenanthrene			94.7		%		60-130	20-AUG-20
Pyrene			97.8		%		60-130	20-AUG-20
Quinoline			84.0		%		60-130	20-AUG-20
WG3385662-1 MB								
Acenaphthene			<0.0050		mg/kg		0.005	20-AUG-20
Acenaphthylene			<0.0050		mg/kg		0.005	20-AUG-20
Anthracene			<0.0040		mg/kg		0.004	20-AUG-20

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-H/A-MS-VA	**Soil**							
Batch R5191501								
WG3385662-1 MB								
Benz(a)anthracene			<0.010		mg/kg		0.01	20-AUG-20
Benzo(a)pyrene			<0.010		mg/kg		0.01	20-AUG-20
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	20-AUG-20
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	20-AUG-20
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	20-AUG-20
Chrysene			<0.010		mg/kg		0.01	20-AUG-20
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	20-AUG-20
Fluoranthene			<0.010		mg/kg		0.01	20-AUG-20
Fluorene			<0.010		mg/kg		0.01	20-AUG-20
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	20-AUG-20
1-Methylnaphthalene			<0.010		mg/kg		0.01	20-AUG-20
2-Methylnaphthalene			<0.010		mg/kg		0.01	20-AUG-20
Naphthalene			<0.010		mg/kg		0.01	20-AUG-20
Phenanthrene			<0.010		mg/kg		0.01	20-AUG-20
Pyrene			<0.010		mg/kg		0.01	20-AUG-20
Quinoline			<0.050		mg/kg		0.05	20-AUG-20
Surrogate: Naphthalene d8			91.5		%		50-130	20-AUG-20
Surrogate: Phenanthrene d10			92.3		%		60-130	20-AUG-20
Surrogate: Chrysene d12			108.1		%		60-130	20-AUG-20
PH-1:2-VA	**Soil**							
Batch R5191276								
WG3385664-2 DUP		**L2487428-1**						
pH (1:2 soil:water)		8.37	8.53	J	pH	0.16	0.2	18-AUG-20
PSA-PIPET+GRAVEL-SK	**Soil**							
Batch R5196416								
WG3386604-1 DUP		**L2487428-5**						
% Gravel (>2mm)		6.3	6.3	J	%	0.0	5	21-AUG-20
% Sand (2.0mm - 0.063mm)		55.6	56.5	J	%	0.9	5	21-AUG-20
% Silt (0.063mm - 4um)		31.1	30.8	J	%	0.3	5	21-AUG-20
% Clay (<4um)		7.0	6.4	J	%	0.6	5	21-AUG-20
WG3386604-2 IRM		**2017-PSA**						
% Sand (2.0mm - 0.063mm)			45.4		%		39.1-49.1	21-AUG-20
% Silt (0.063mm - 4um)			36.6		%		32.5-42.5	21-AUG-20
% Clay (<4um)			18.0		%		13.4-23.4	21-AUG-20

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

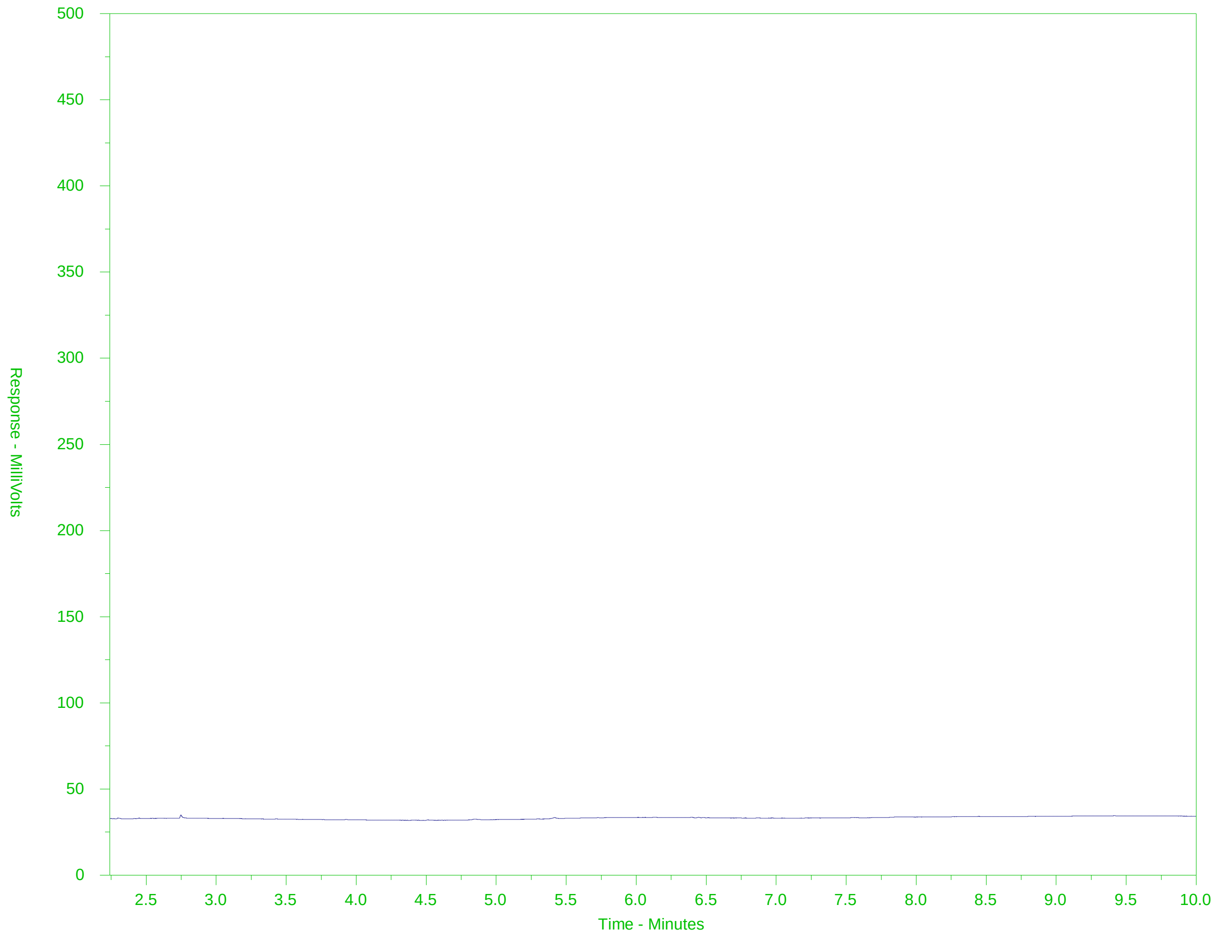
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-1
Client Sample ID: SW-1



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

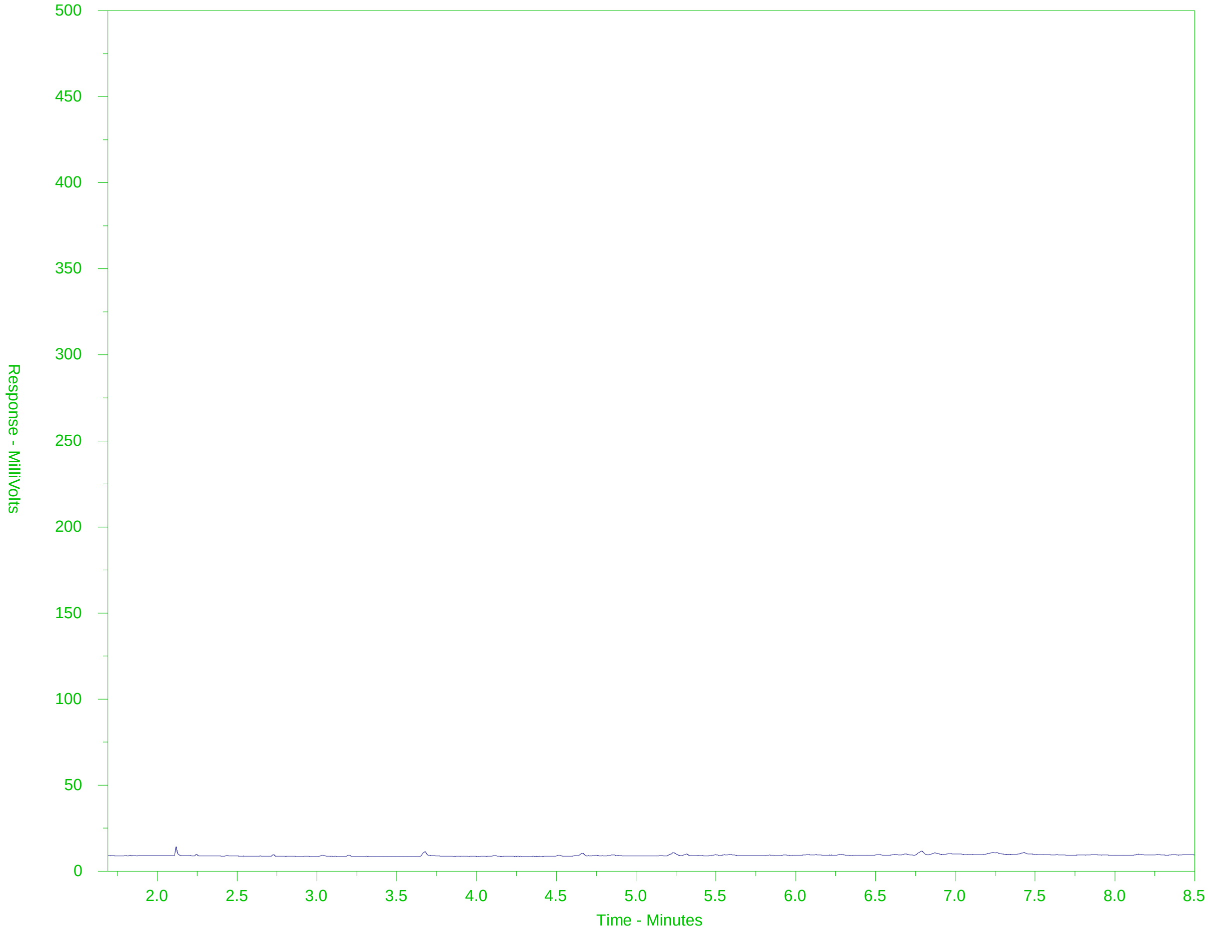
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-1
Client Sample ID: SW-1



← F2 →←	F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

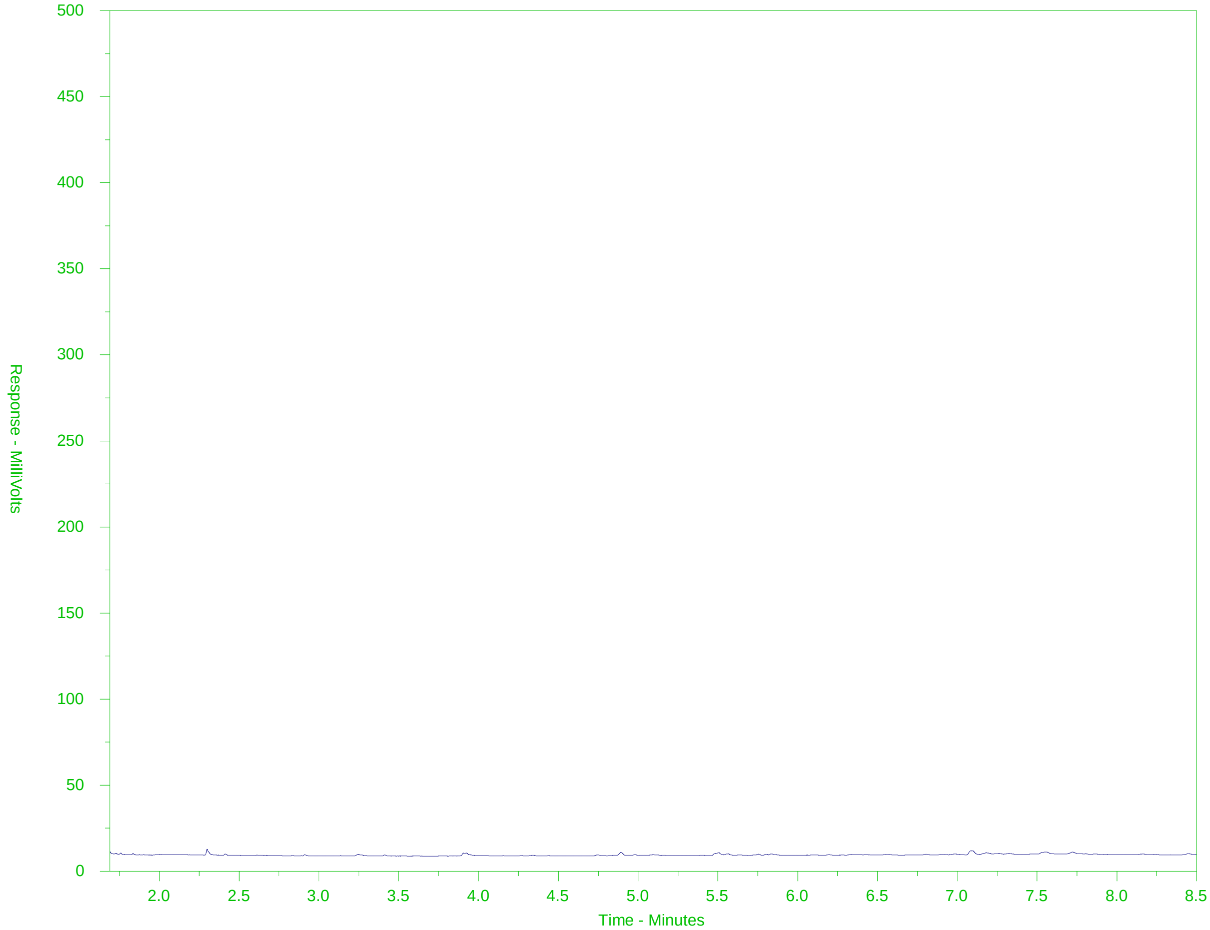
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: WG3385662-C-3#L2487428-C-1
Client Sample ID: SW-1



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F

← Gasoline → ← Motor Oils/ Lube Oils/ Grease →
← Diesel/ Jet Fuels →

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

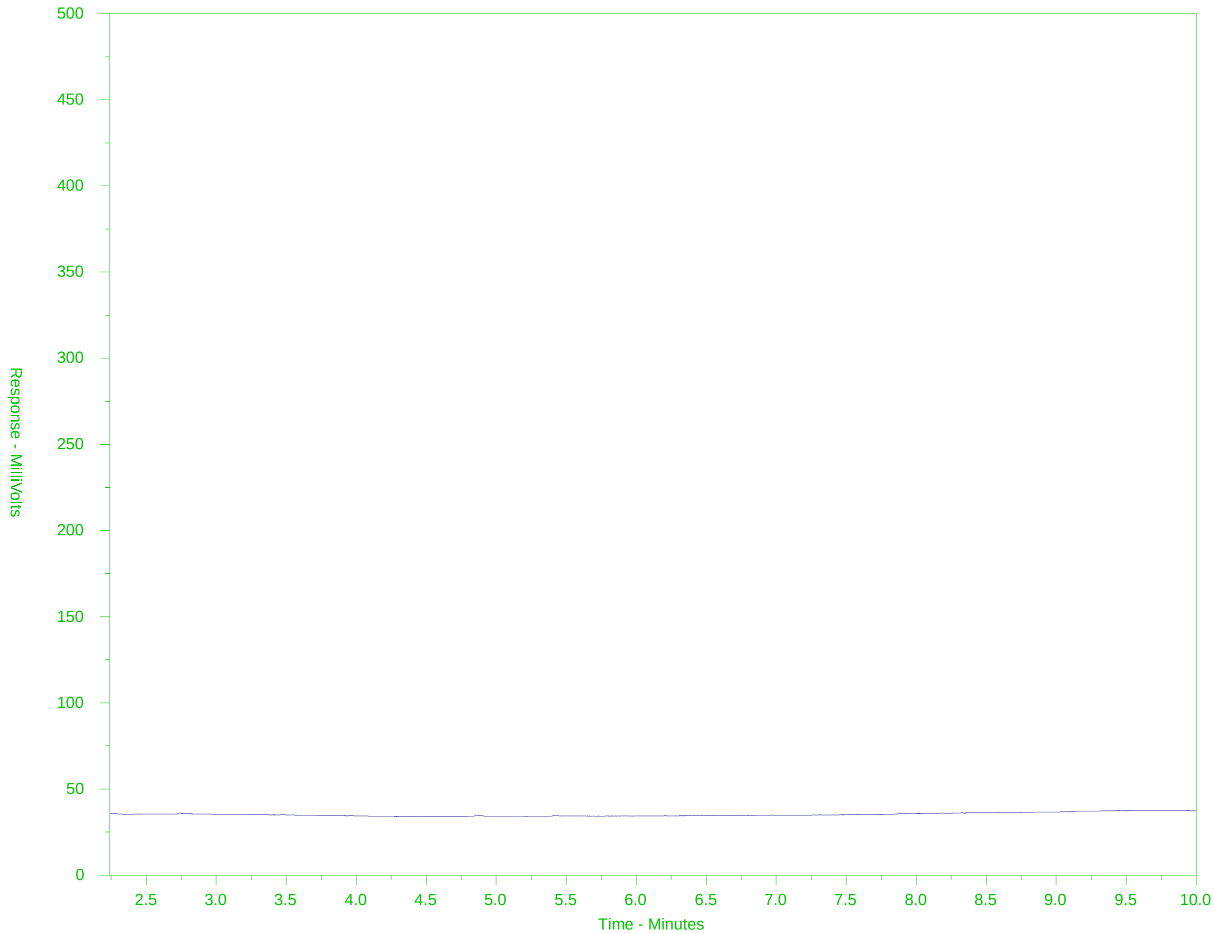
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: WG3385662-3#L2487428-1
Client Sample ID: SW-1



←EPH10-19→	←EPH19-32→	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	←Motor Oils/ Lube Oils/ Grease→	
←Diesel/ Jet Fuels→		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

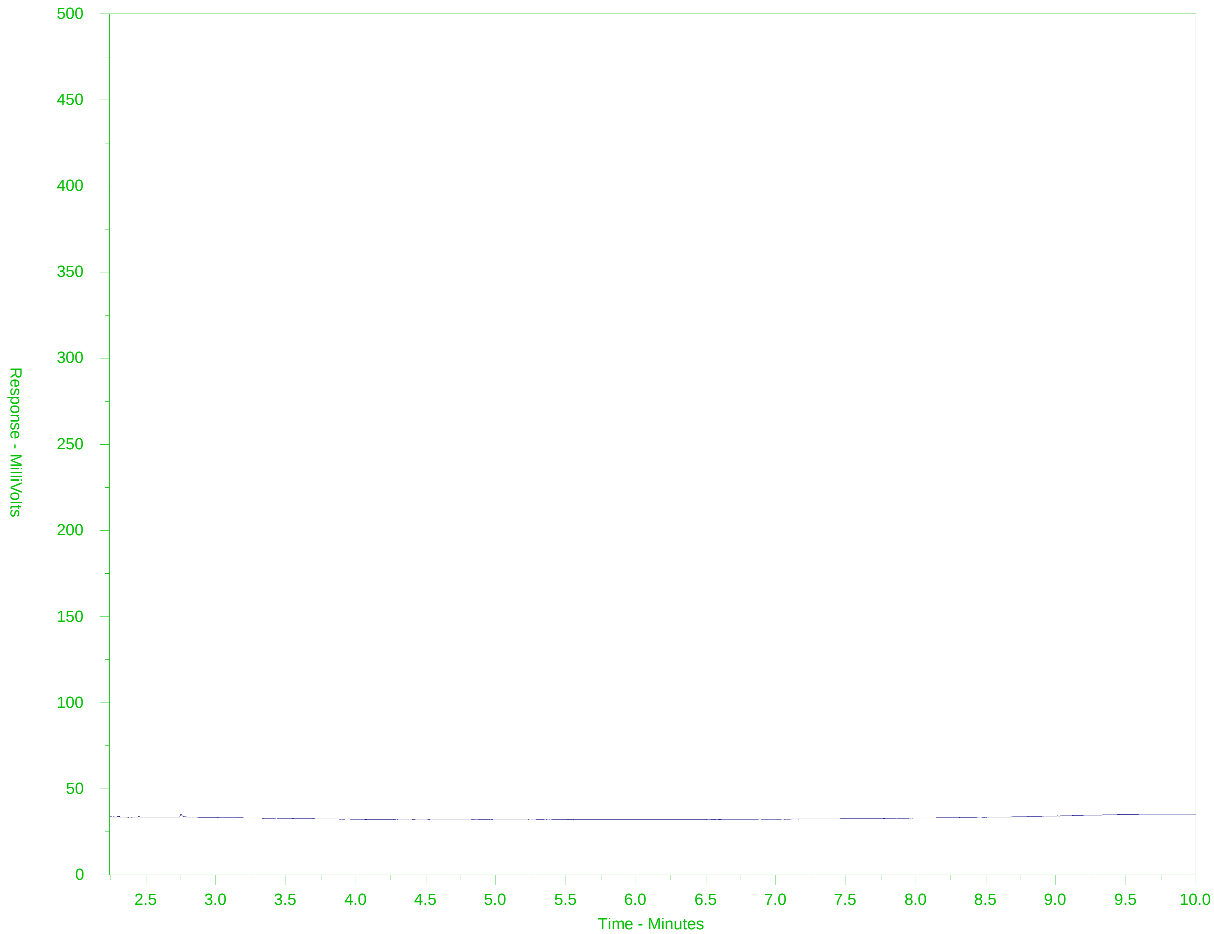
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-2
Client Sample ID: SW-2



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

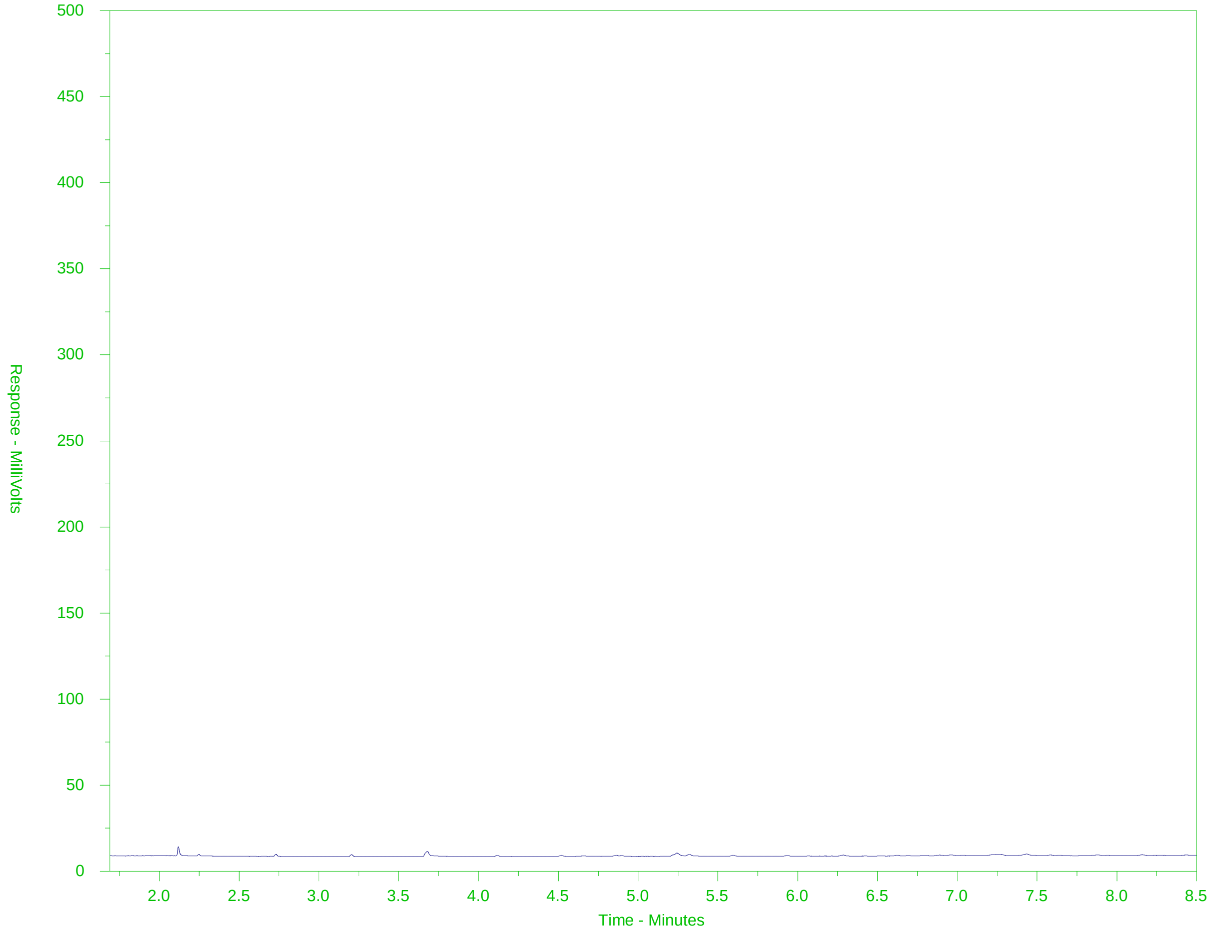
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-2
Client Sample ID: SW-2



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F

← Gasoline → ← Motor Oils/ Lube Oils/ Grease →

← Diesel/ Jet Fuels →

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

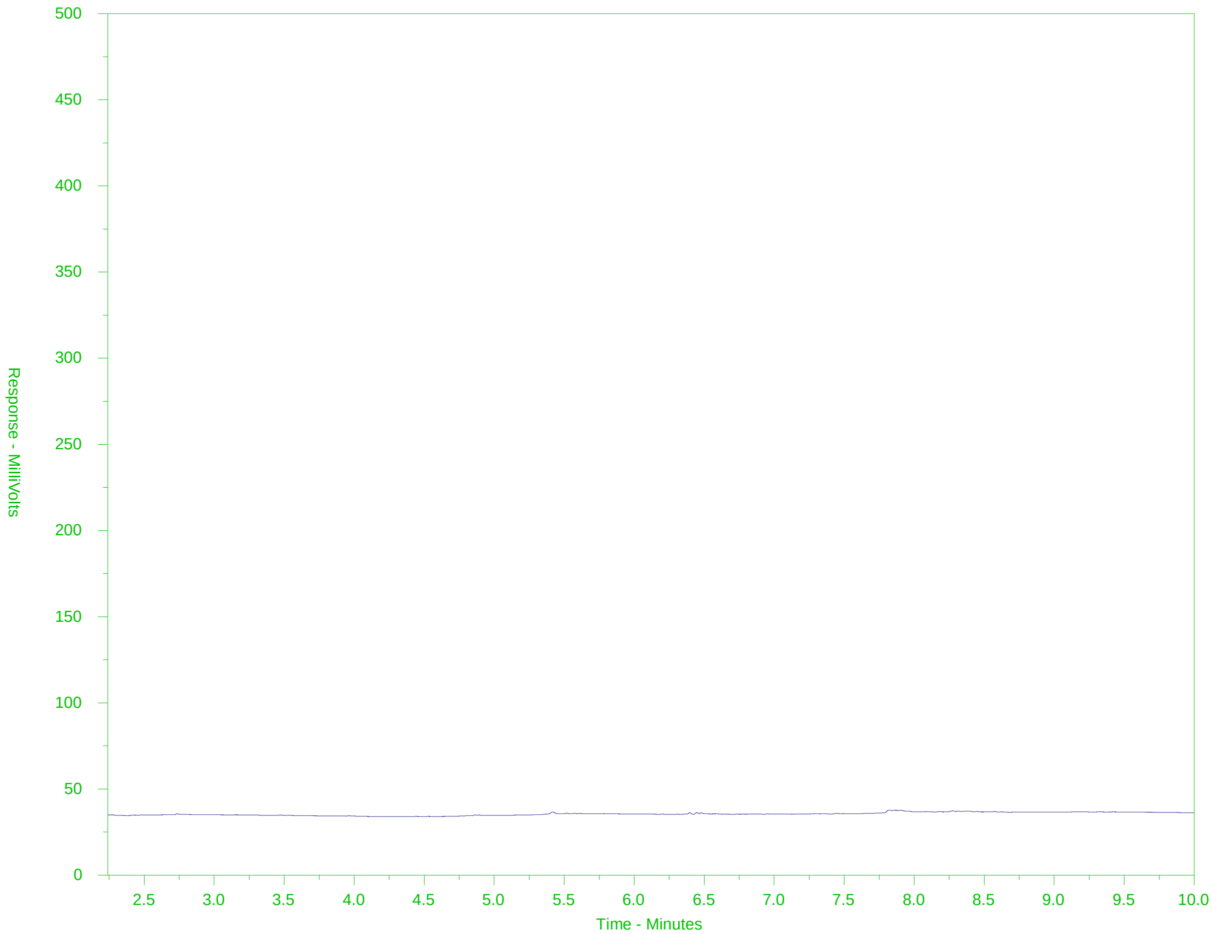
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-3
Client Sample ID: SW-3



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

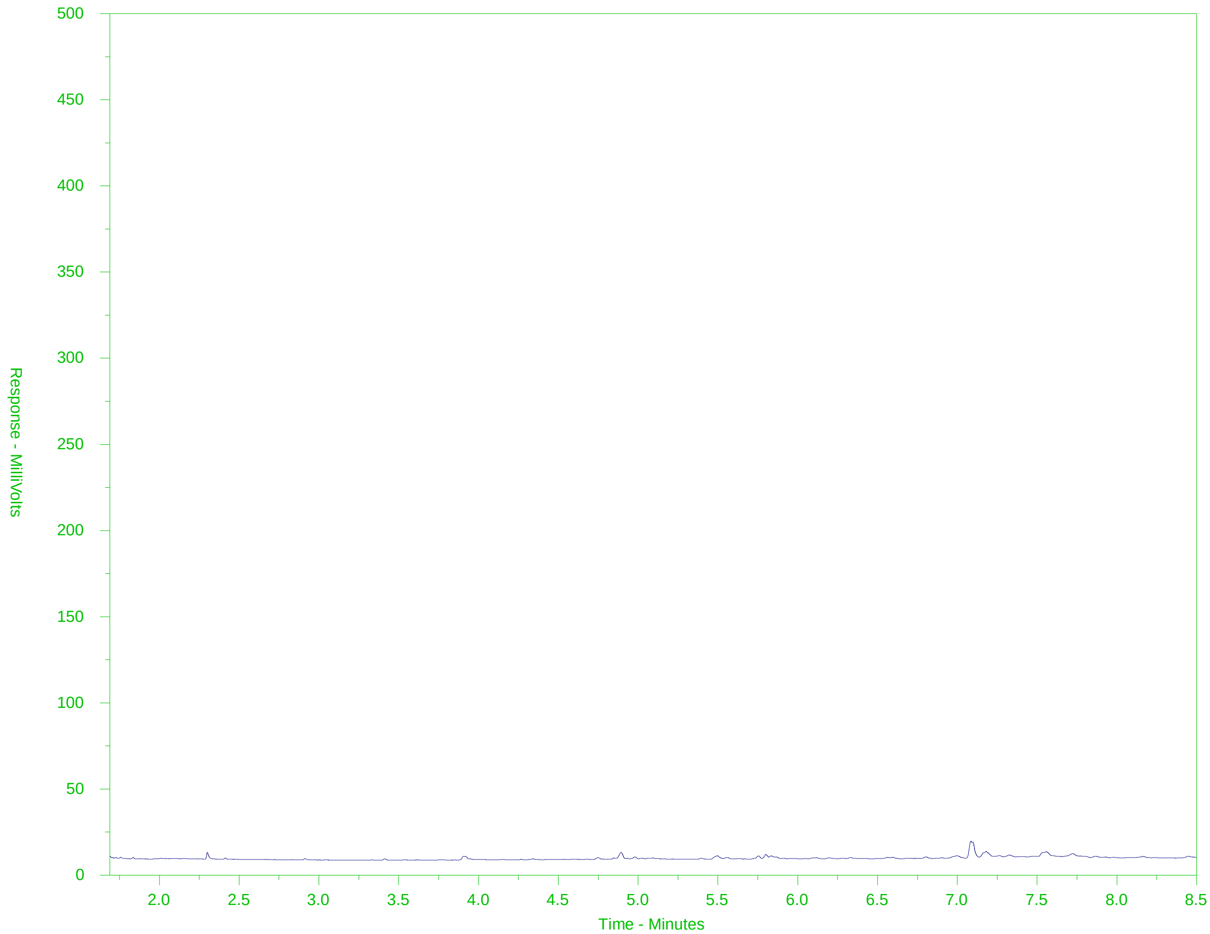
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-3
Client Sample ID: SW-3



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

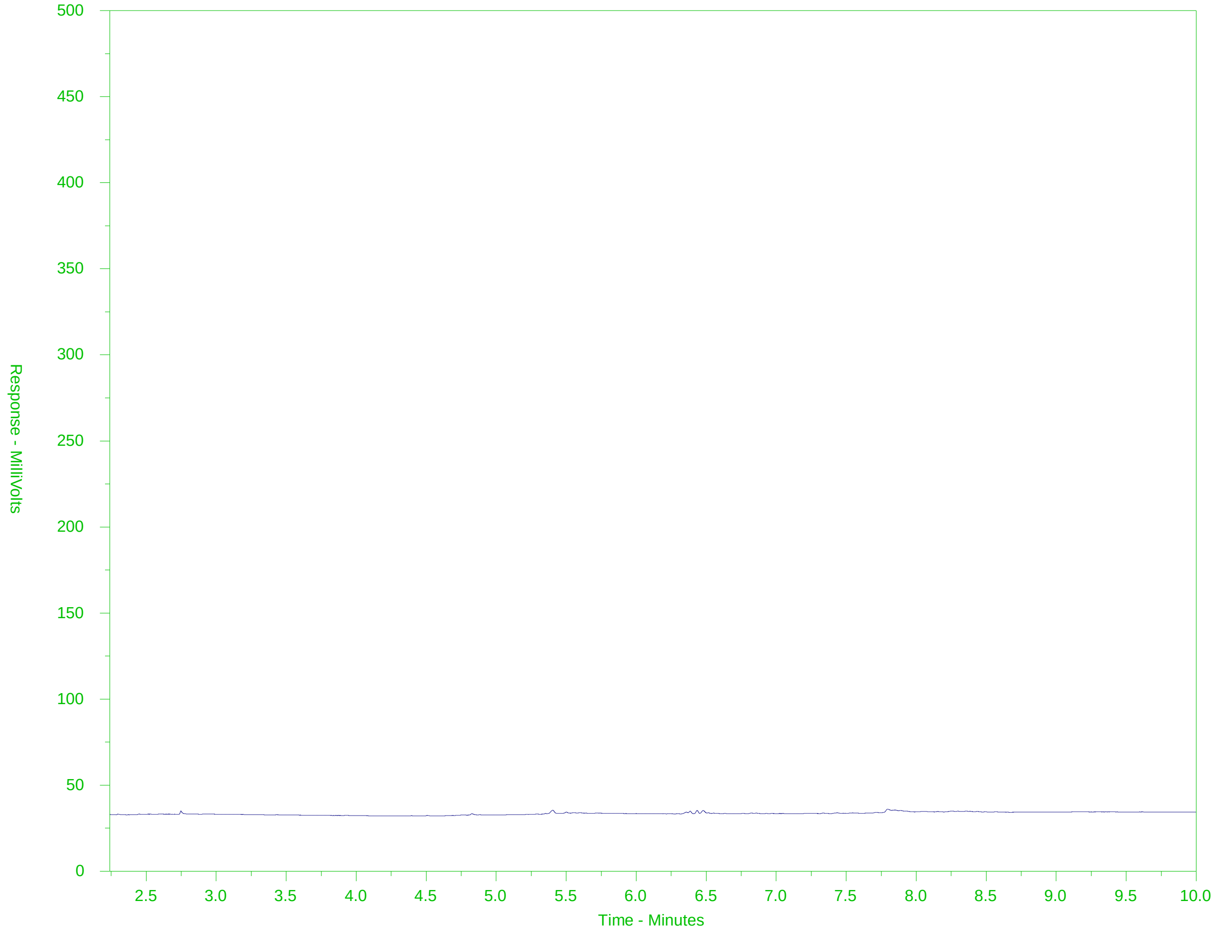
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-4
Client Sample ID: SW-4



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

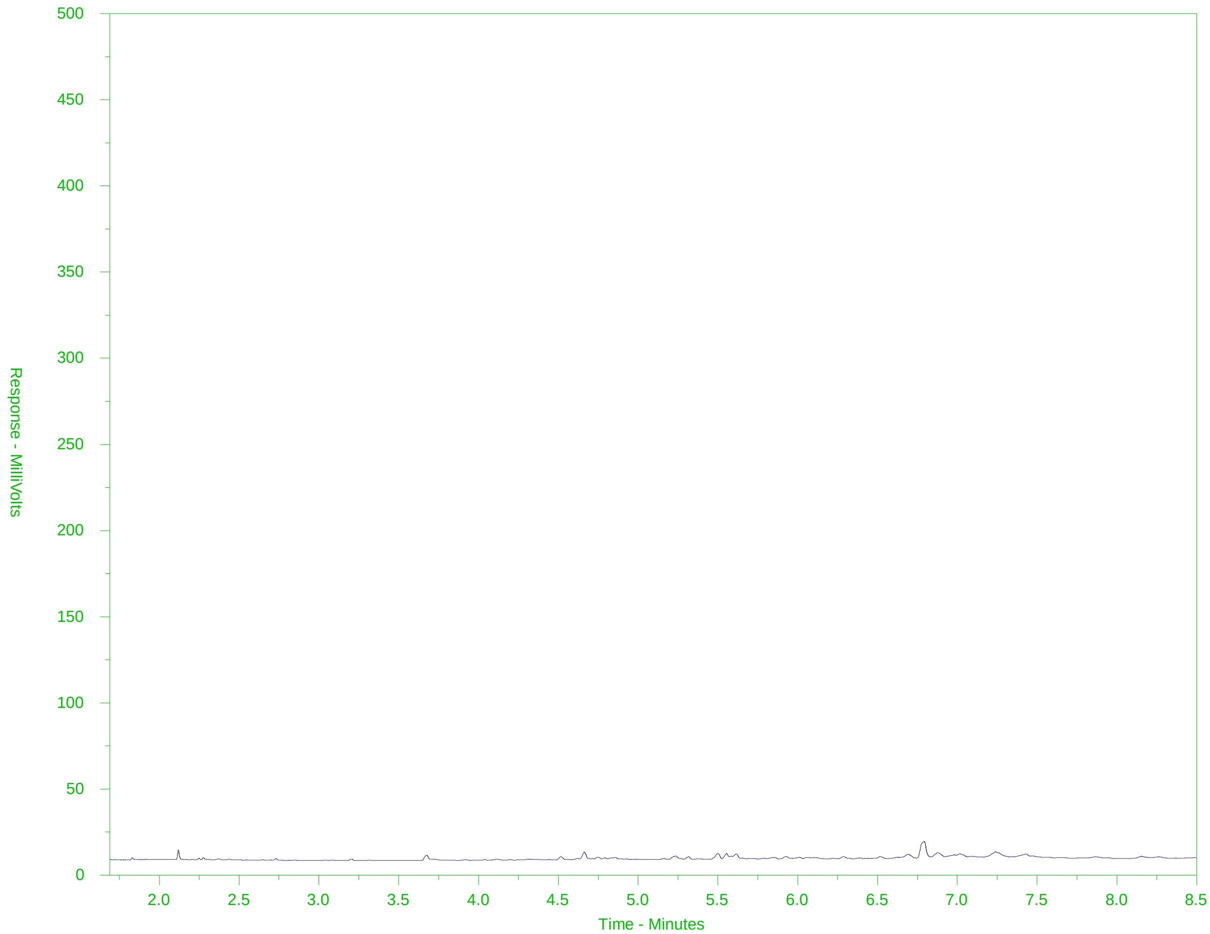
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-4
Client Sample ID: SW-4



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

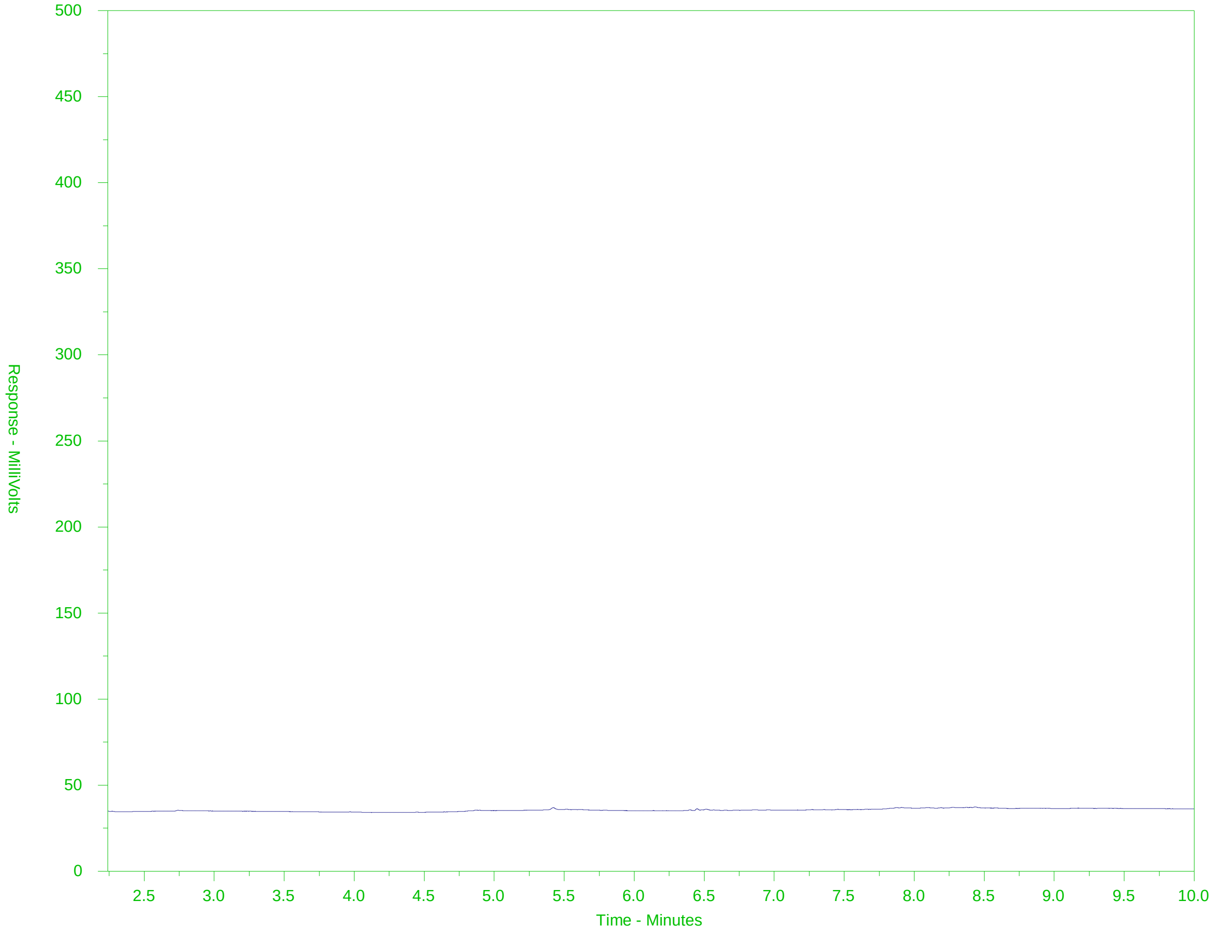
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-5
Client Sample ID: SW-5



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

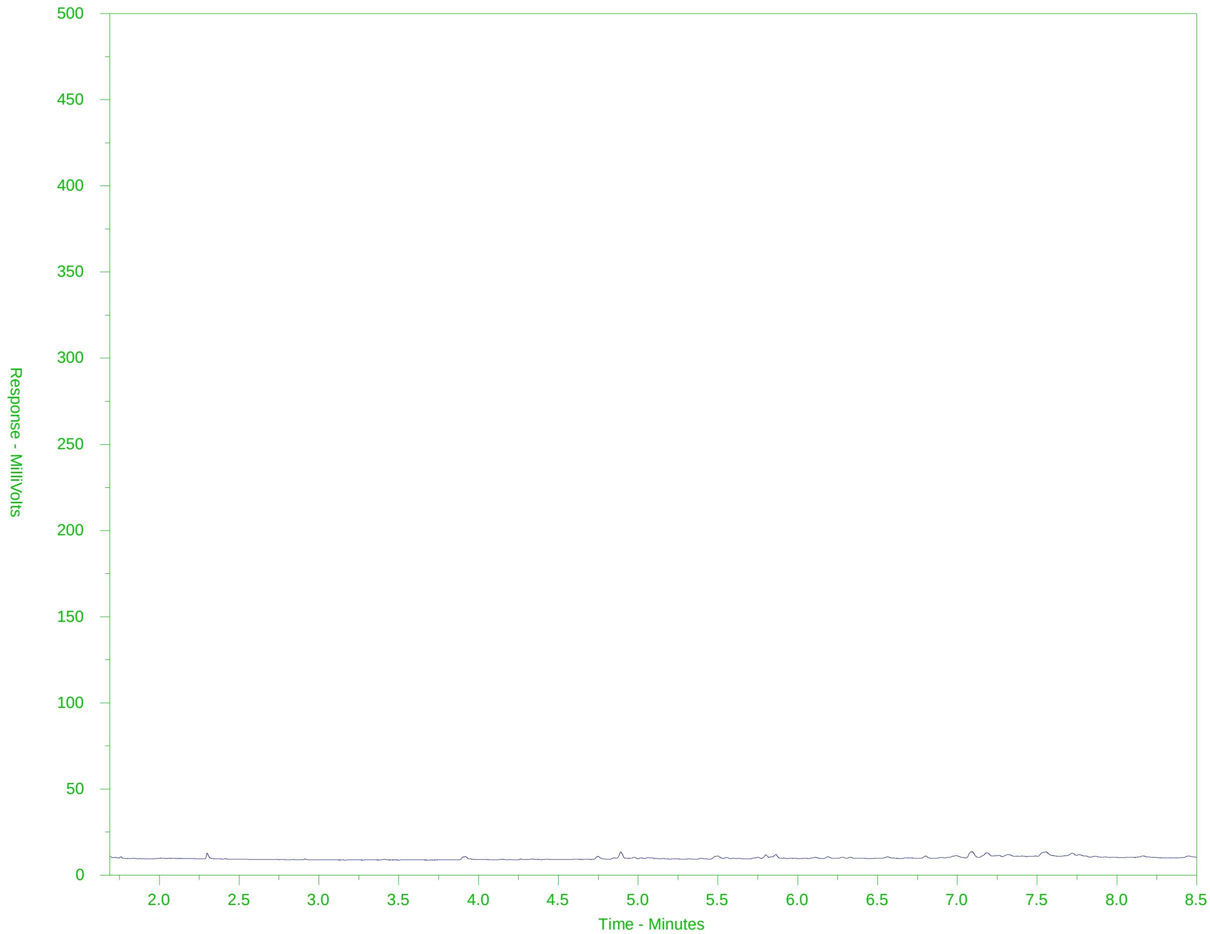
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-5
Client Sample ID: SW-5



← F2 →←	F3 →←	F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

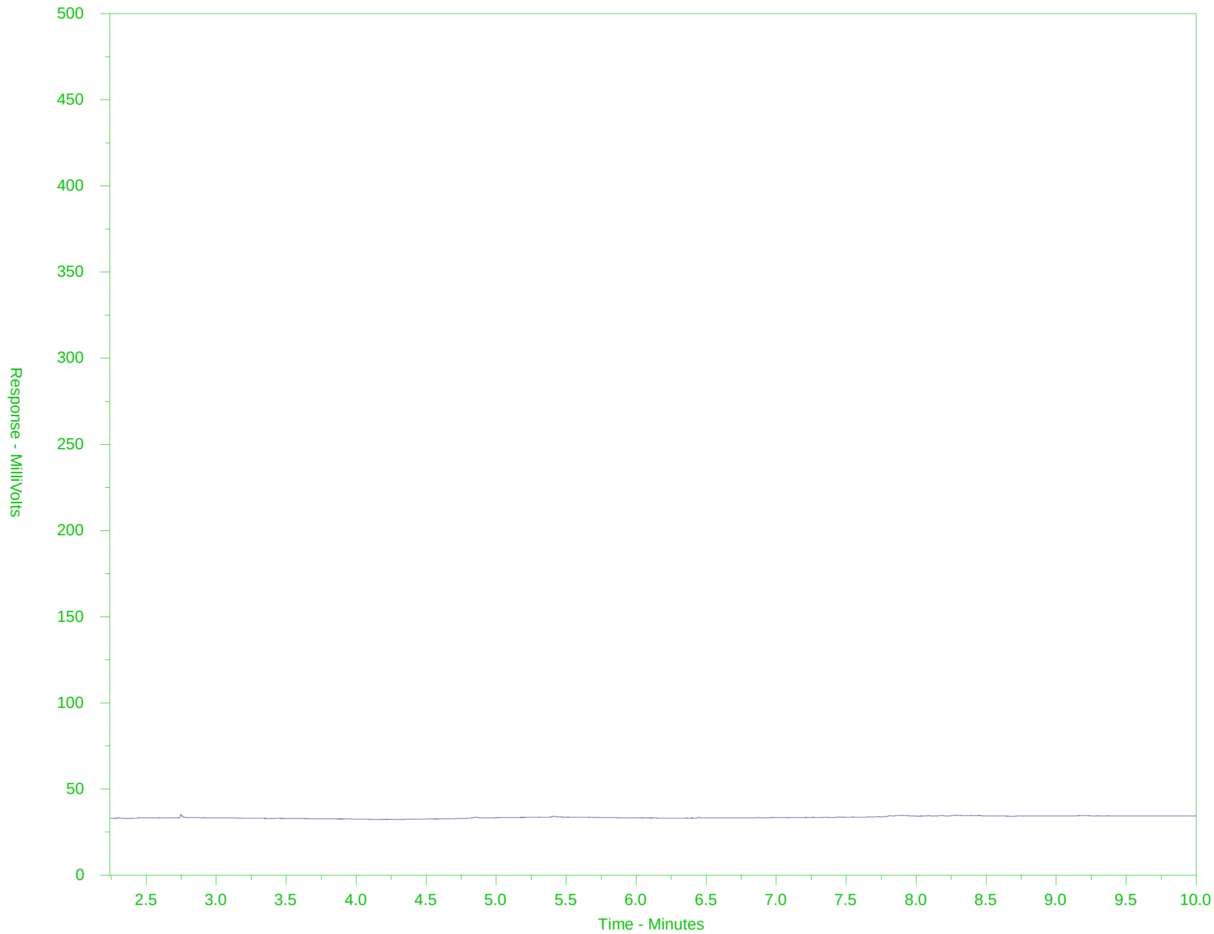
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-6
Client Sample ID: SNW-1



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

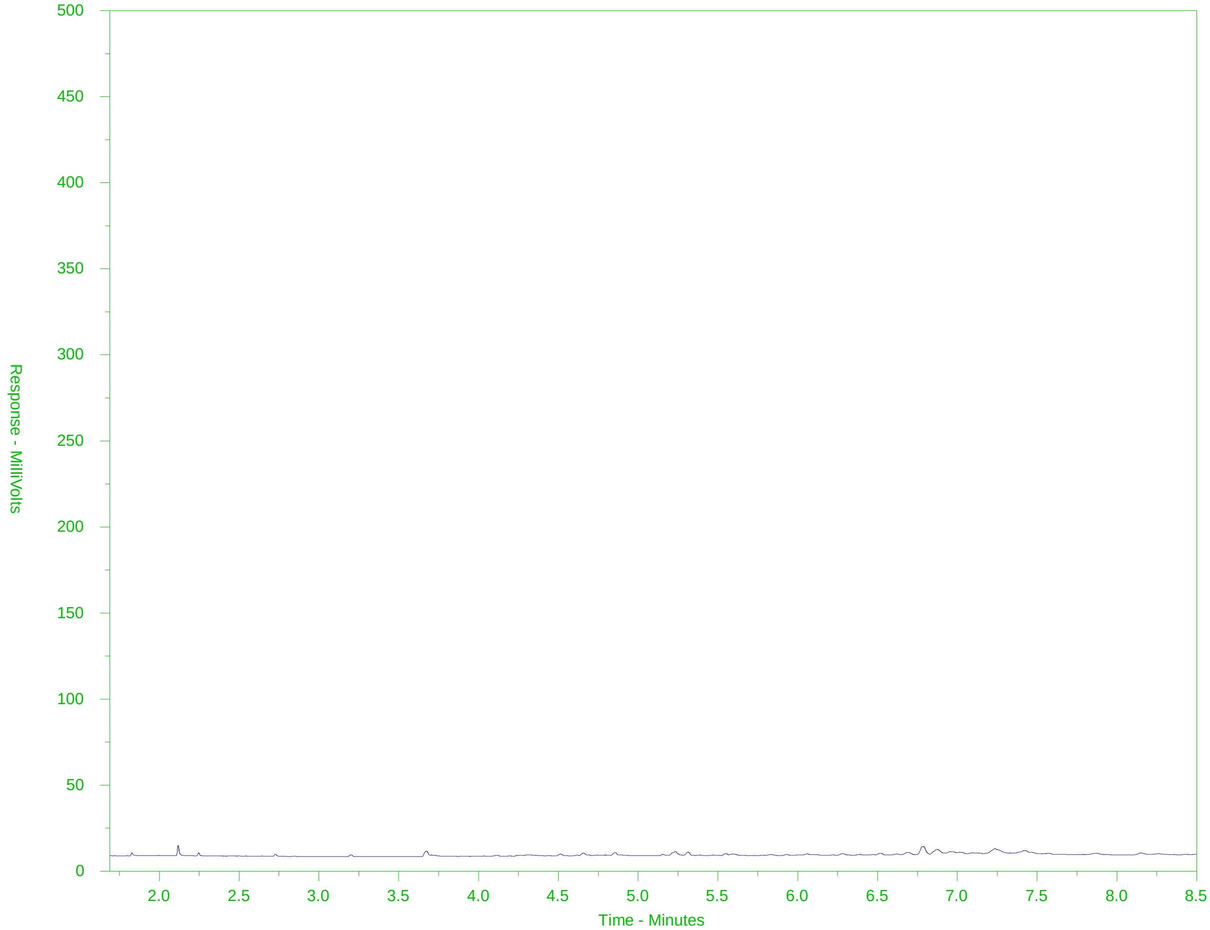
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-6
Client Sample ID: SNW-1



← F2 →←	F3 →	← F4 →	
nC10	nC16	nC34	nC50
174'C 346'F	287'C 549'F	481'C 898'F	575'C 1067'F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

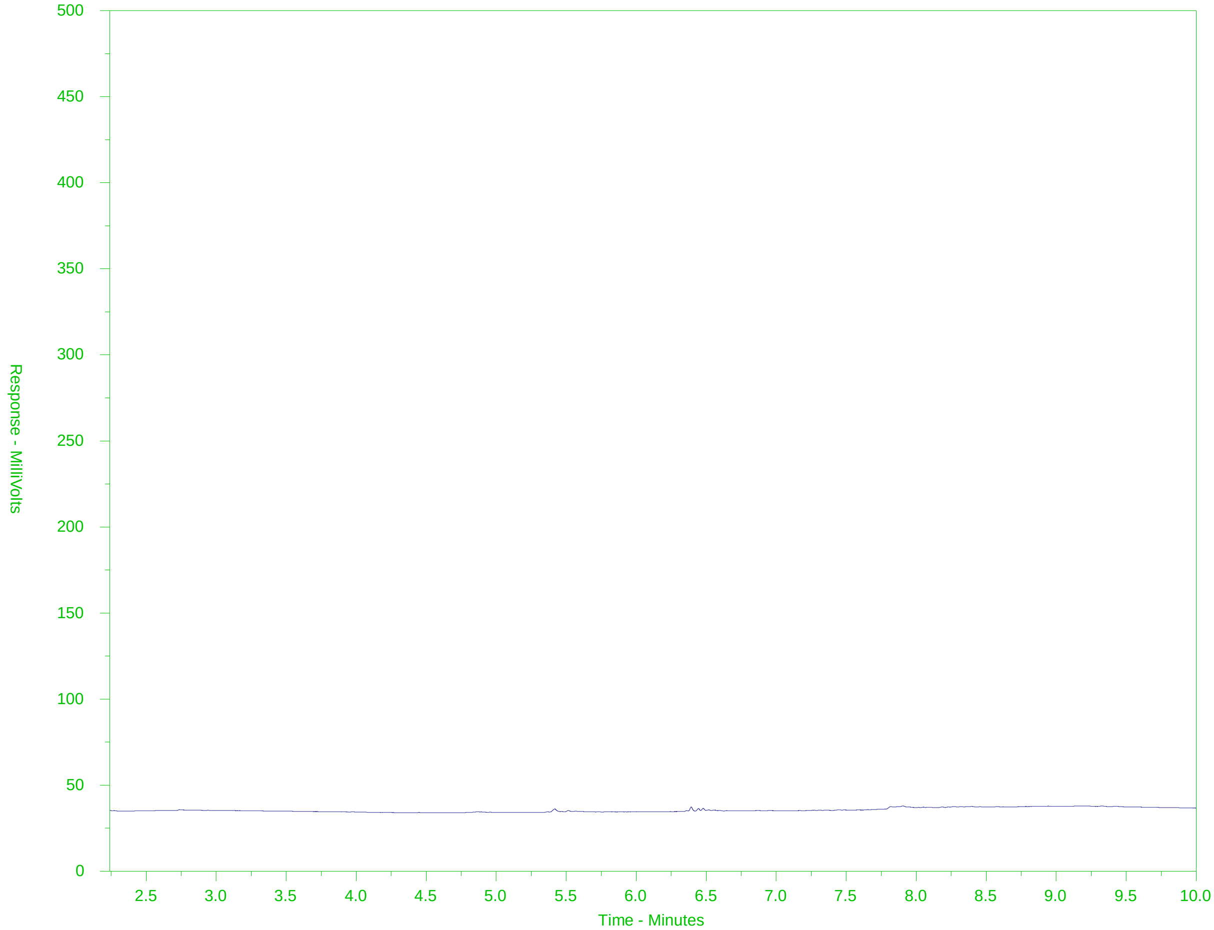
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-7
Client Sample ID: SE-1



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

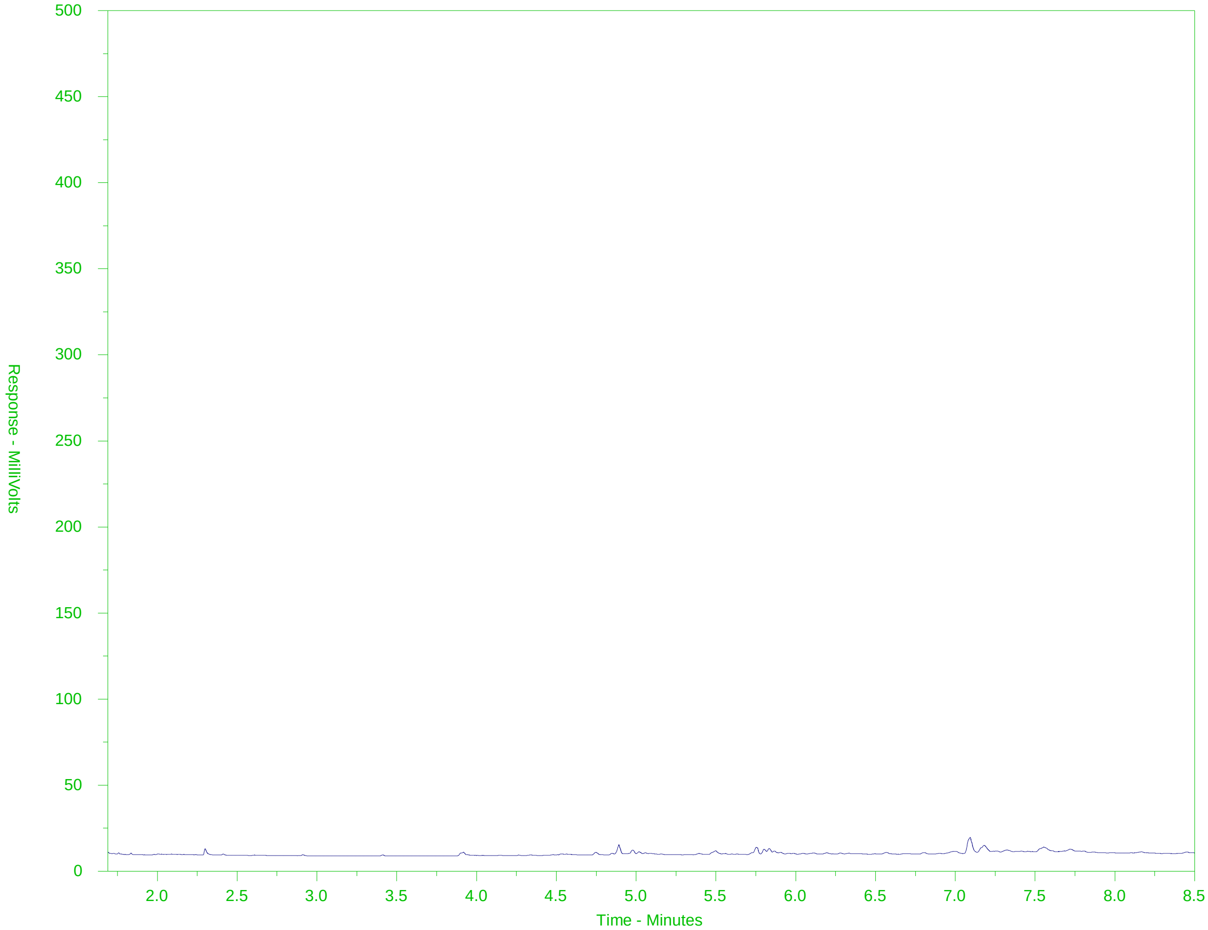
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-7
Client Sample ID: SE-1



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

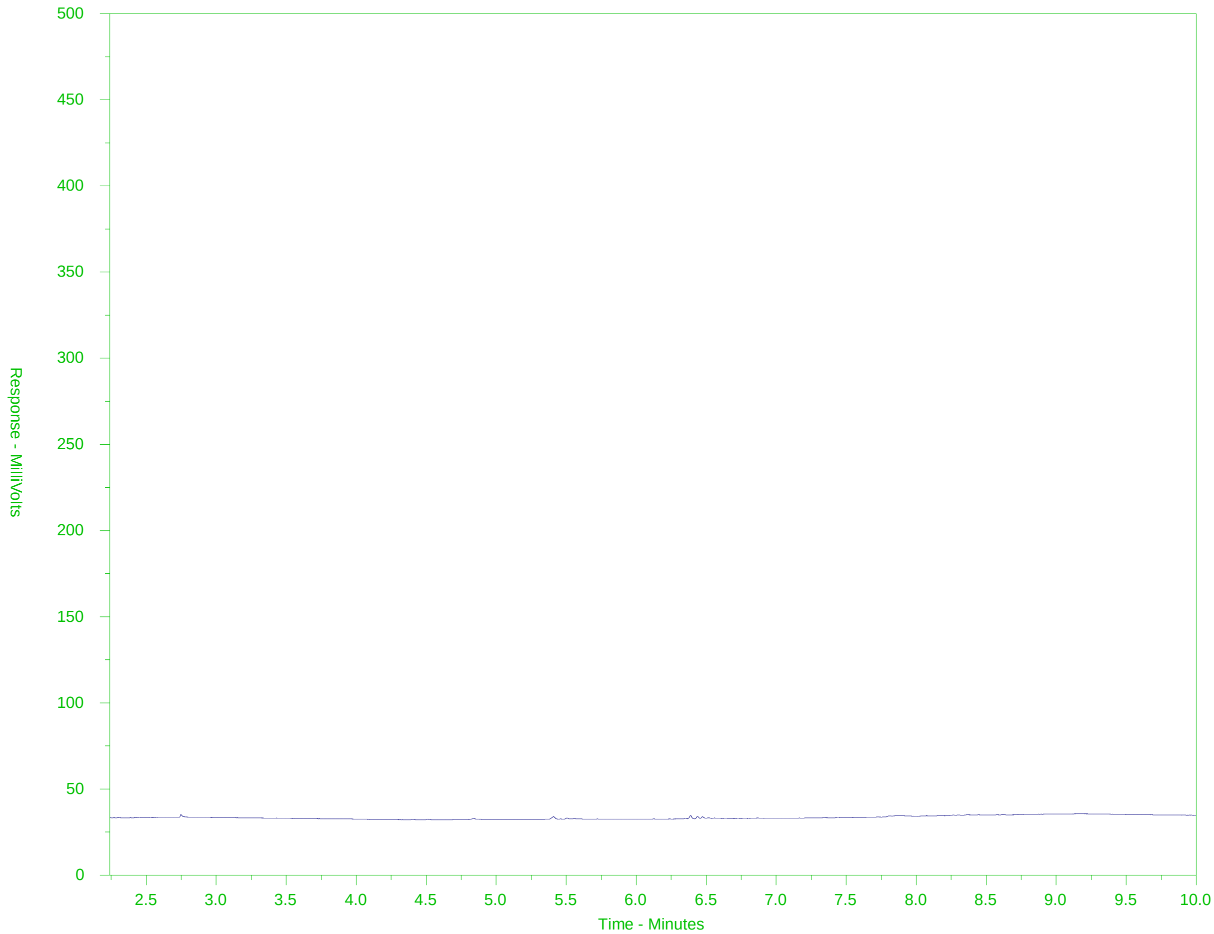
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-8
Client Sample ID: SE-2



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

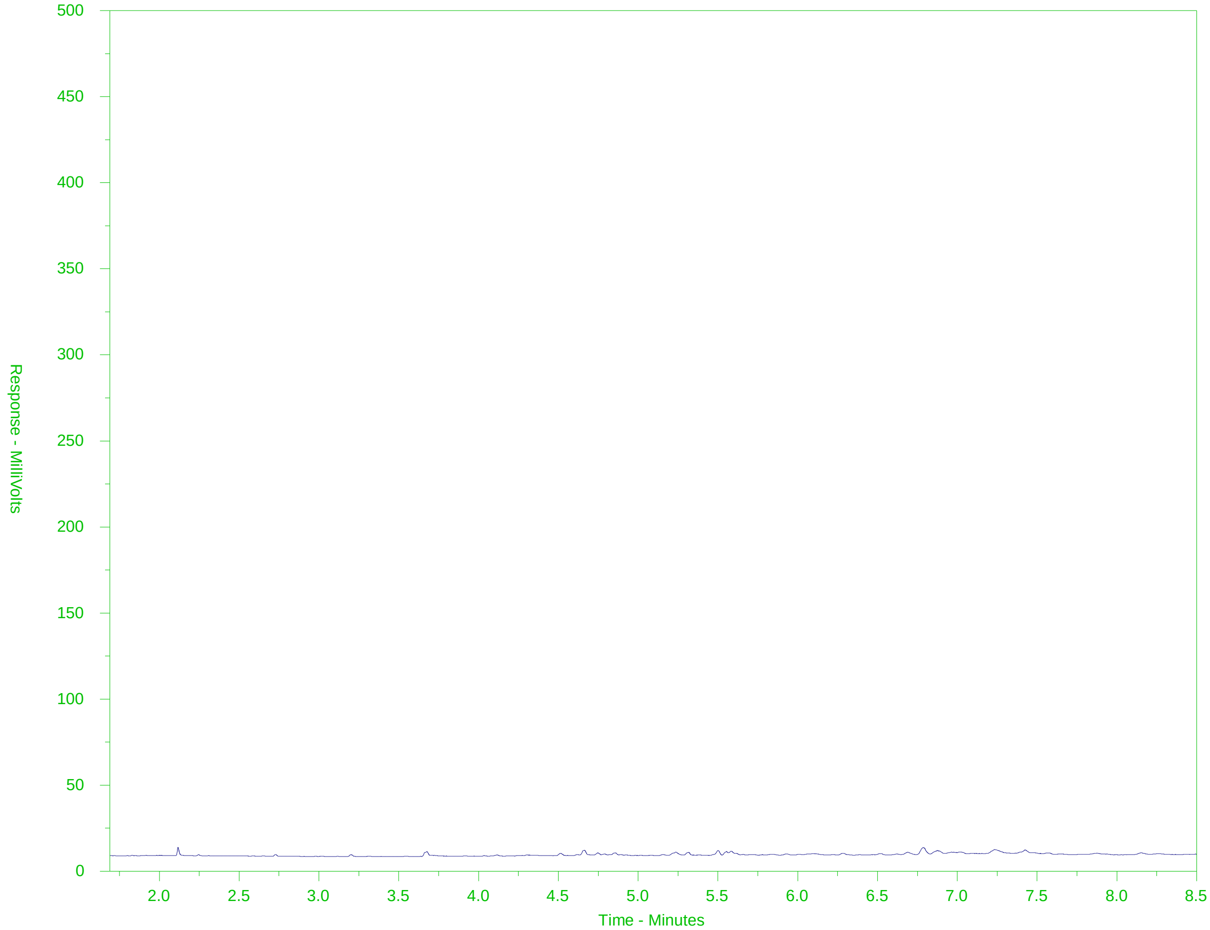
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-8
Client Sample ID: SE-2



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

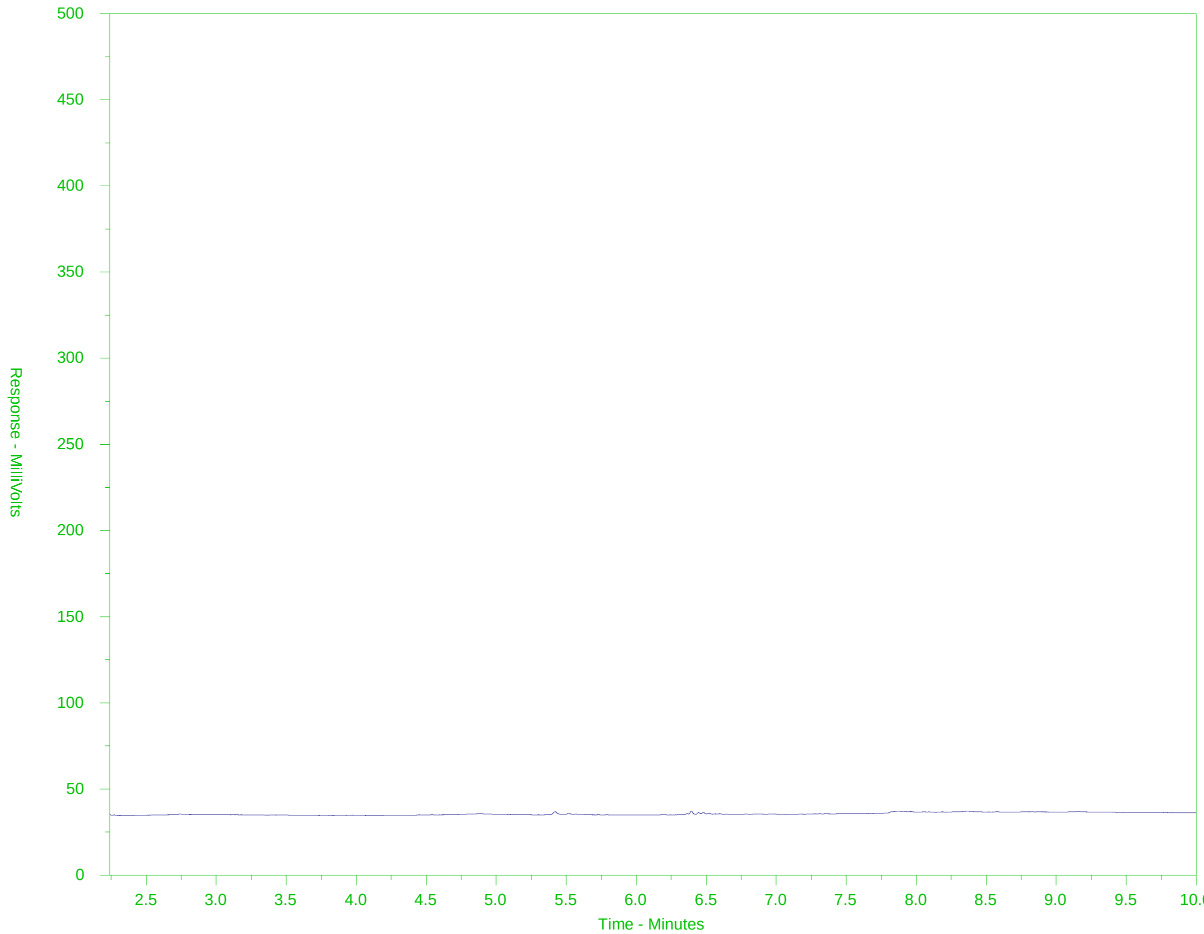
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-9
Client Sample ID: SE-3



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

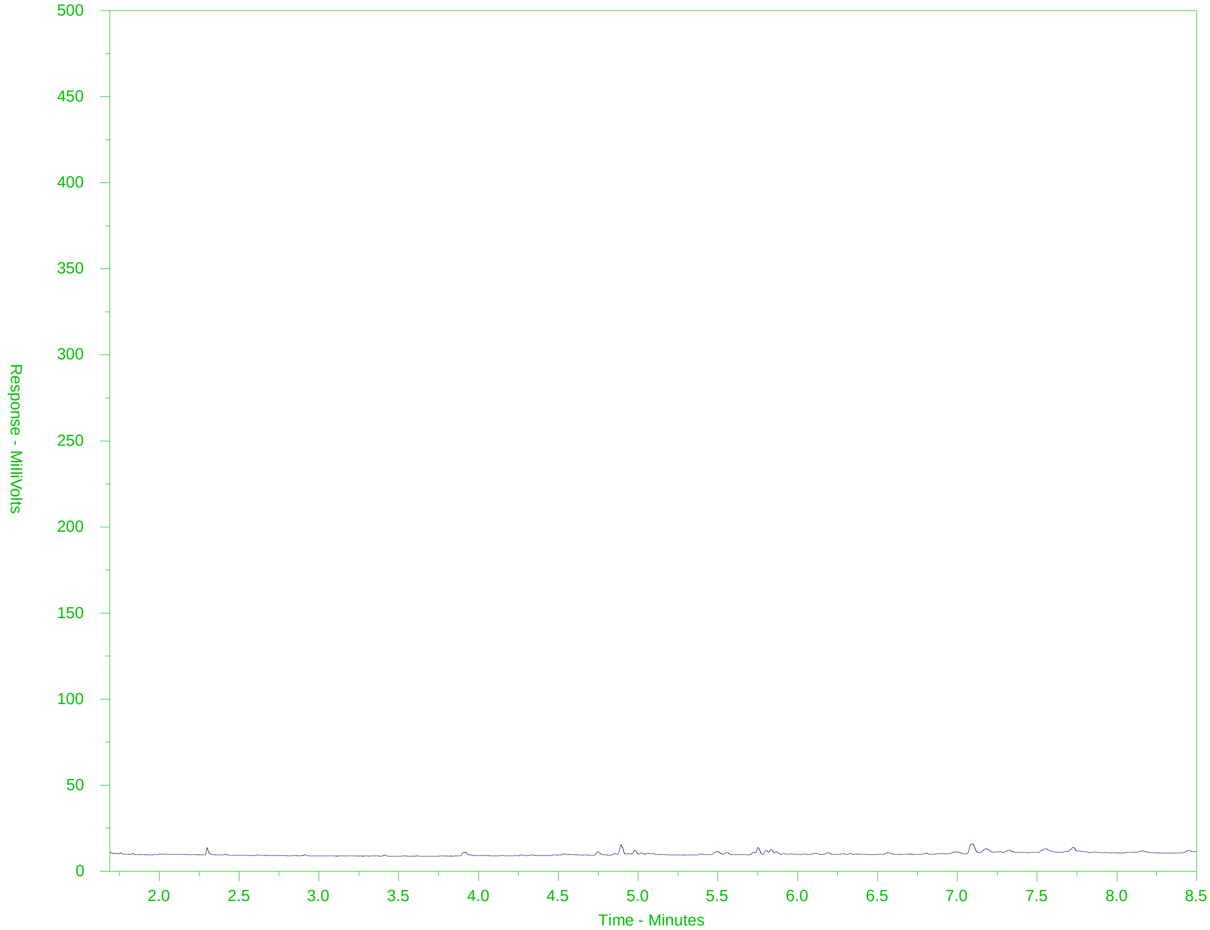
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-9
Client Sample ID: SE-3



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

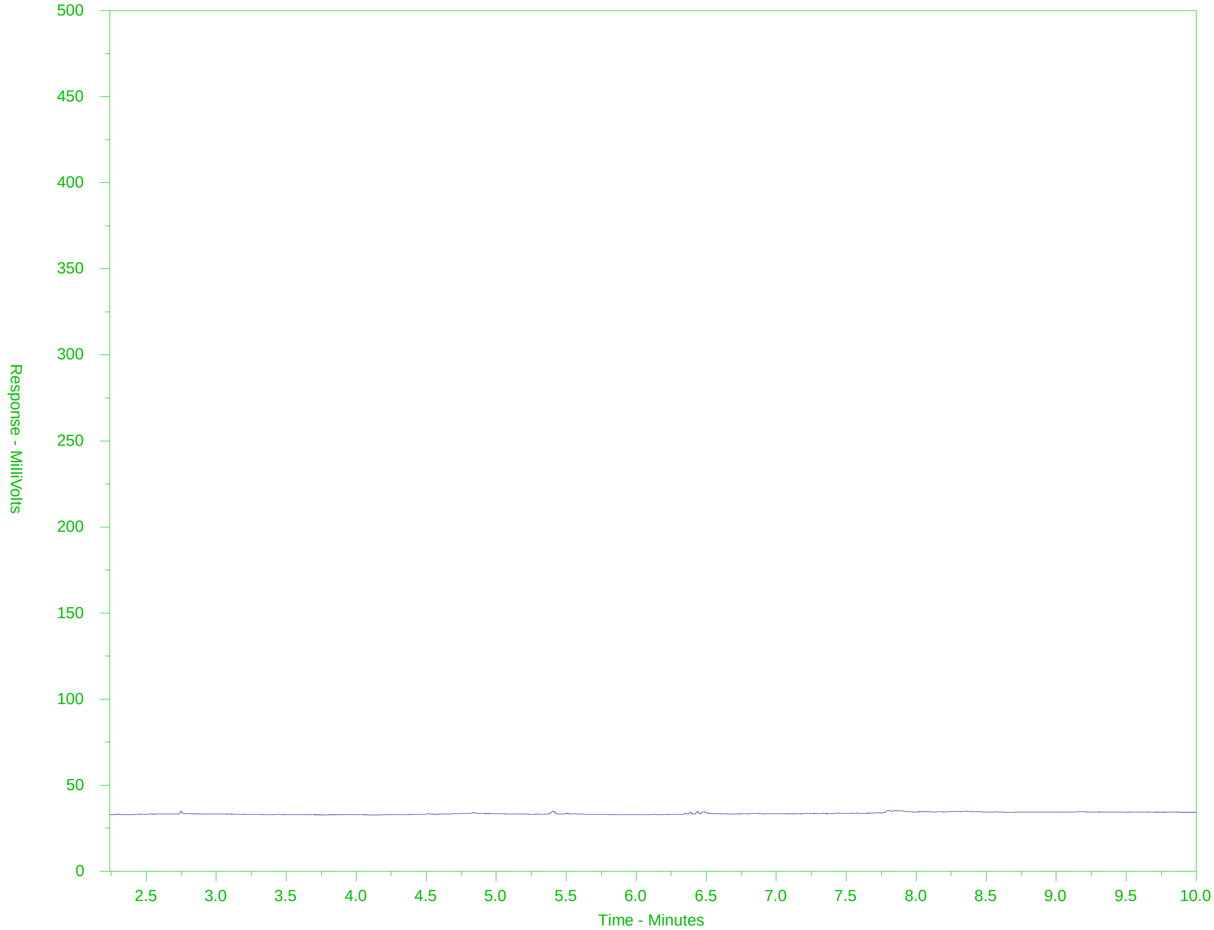
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-10
Client Sample ID: DUPA



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

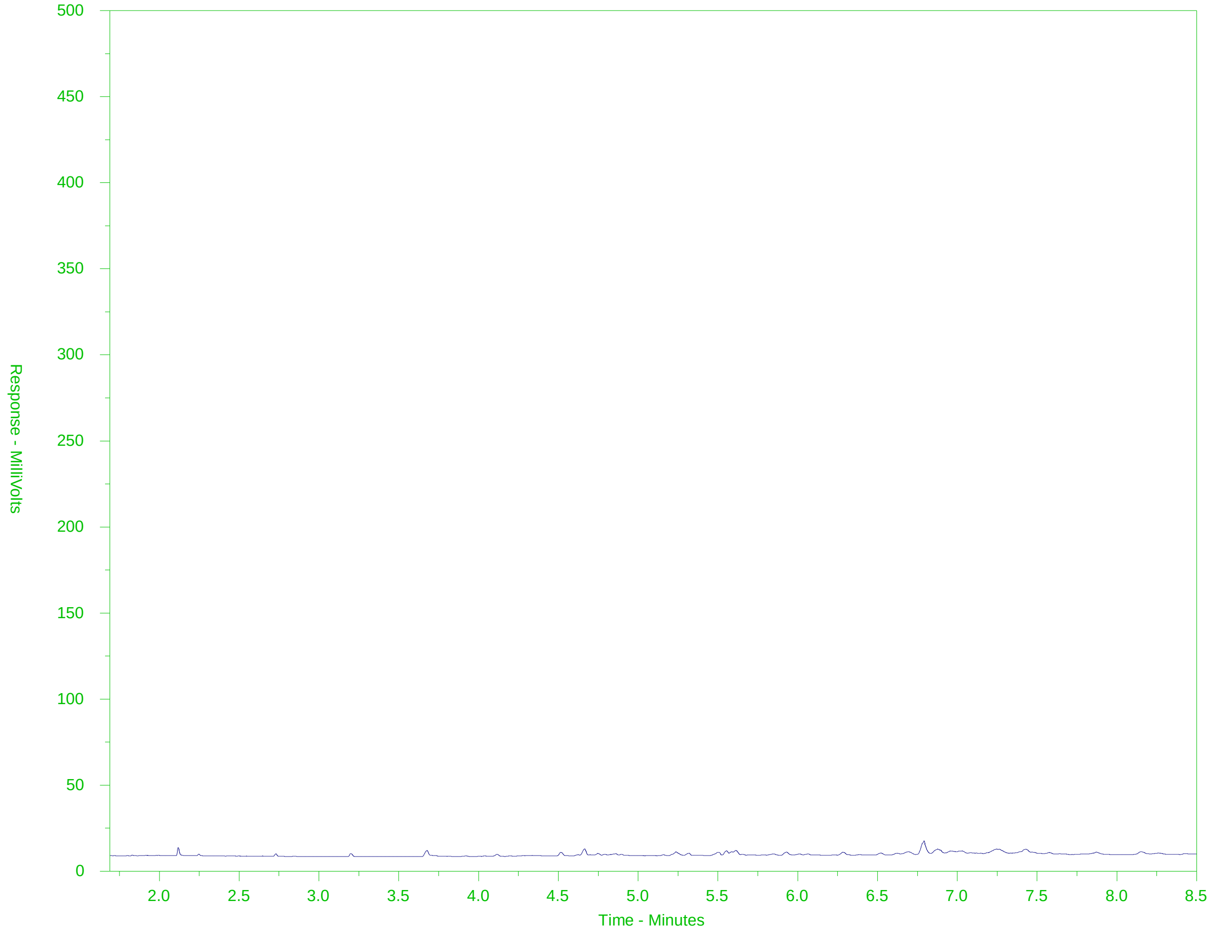
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-10
Client Sample ID: DUPA



← F2 →	← F3 →		← F4 →
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
←Gasoline→	← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

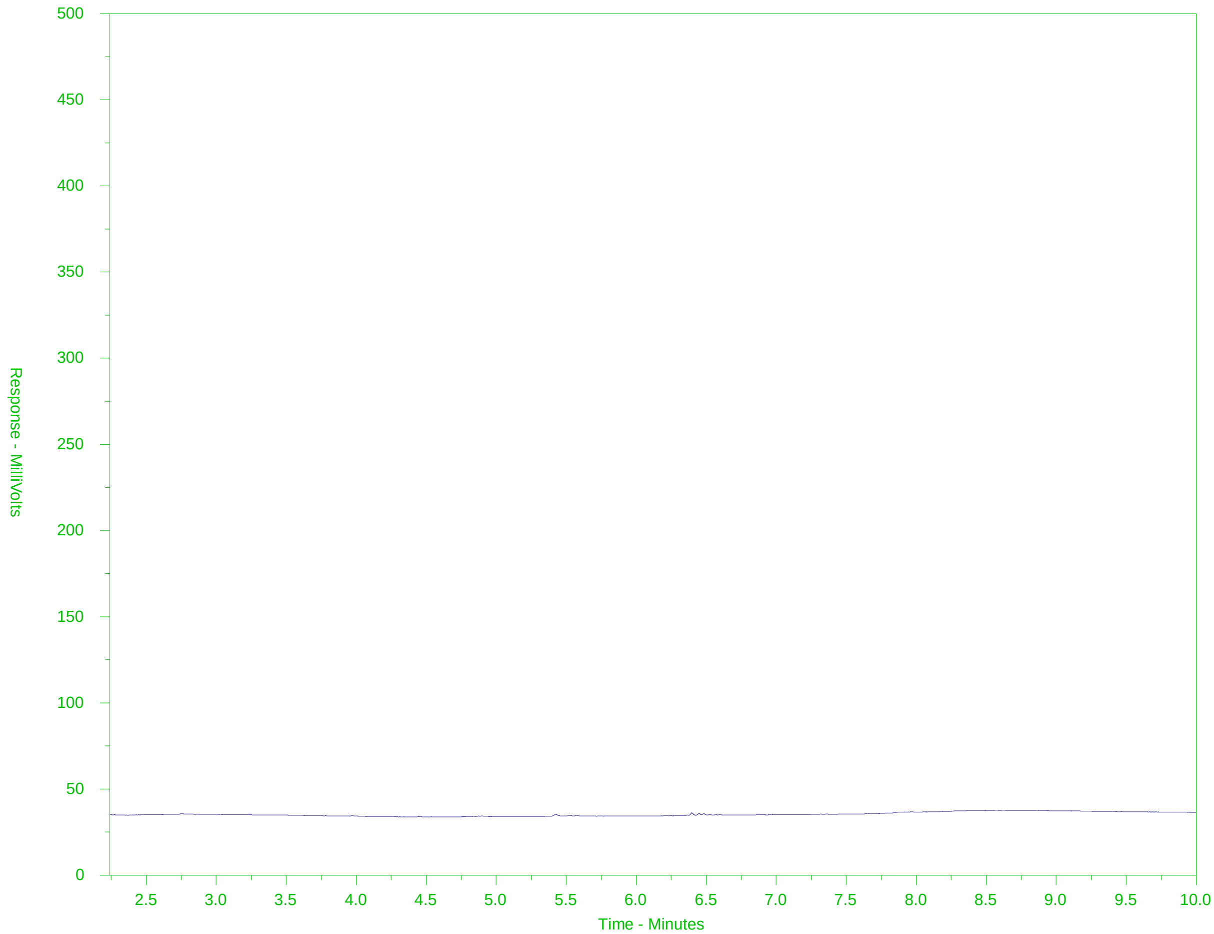
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

BC EPH HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-11
Client Sample ID: DUPB



← EPH10-19 →	← EPH19-32 →	
nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →		

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

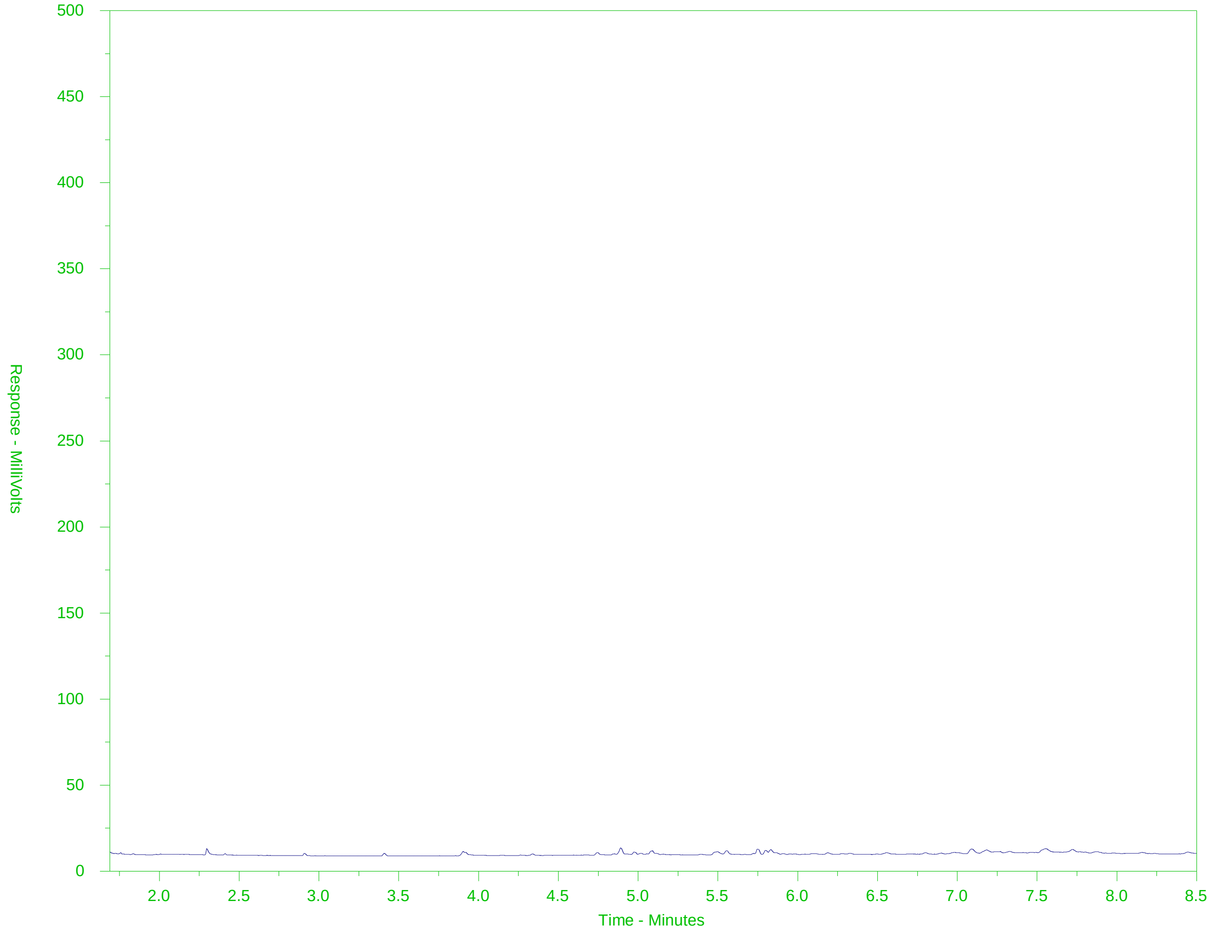
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2487428-C-11
Client Sample ID: DUPB



← F2 →←	F3 →←	F4 →
nC10 / 174°C / 346°F	nC16 / 287°C / 549°F	nC34 / 481°C / 898°F

nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F

←Gasoline→ ← Motor Oils/ Lube Oils/ Grease →

← Diesel/ Jet Fuels →

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2487428-COFC

COC Number: 17 - 766320

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder
Contact:	Christine Bylenga/Brett Lucas
Phone:	1(604) 296 4200
	Company address below will appear on the final report
Street:	Suite 200 - 2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: cbylenga@golder.com

Email 2: blucas@golder.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ 3 day [P3-25%] ☐ 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/03

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only): L2487428

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	TOC, TIC	Particle Size	F2-F4 PAH	LEPH, HEPH, EPH, PAH	Metals (including Hg)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	SW-1	05 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SW-2	05 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SW-3	05 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SW-4	06 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SW-5	06 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SNW-1	06 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SE-1	09 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SE-2	09 Aug 20		SEDIMENT	4	X	X	X	X	X		
	SE-3	09 Aug 20		SEDIMENT	4	X	X	X	X	X		
	DUPA	06 Aug 20		SEDIMENT	4	X	X	X	X	X		
	DUPB	09 Aug 20		SEDIMENT	4	X	X	X	X	X		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C: 2.4

FINAL COOLER TEMPERATURES °C: 7 (aug12)

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date: 12-Aug	Time: 9:50	Received by: JL	Date: AUG 13 2020	Time: 1:35p

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B3177**	Page	: 1 of 12
Amendment	: **1**		
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 20-Aug-2020 09:00
PO	: ----	Date Analysis Commenced	: 22-Aug-2020
C-O-C number	: 15-560020	Issue Date	: 24-Sep-2020 14:12
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Muneeb Alam	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Workorder Comments

Amended File (1): VOC/F1 data is included for all samples.

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-2	SW-14	SE-4	DUP-C	SE-5
				Client sampling date / time	15-Aug-2020	12-Aug-2020	13-Aug-2020	13-Aug-2020	13-Aug-2020
					VA20B3177-001	VA20B3177-002	VA20B3177-003	VA20B3177-004	VA20B3177-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	25.7	26.9	25.8	33.0	22.0
pH (1:2 soil:water)	----	E108	0.10	pH units	8.24	8.24	8.29	8.22	8.39
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	11.4	6.6	6.6	13.2	10.2
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	38.8	41.0	27.8	42.7	32.8
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	47.1	52.1	52.2	42.1	55.7
gravel (>2mm)	----	EC184E	1.0	%	2.7	<1.0	13.4	2.0	1.3
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.26	5.92	4.88	5.31	5.07
carbon, inorganic [IC]	----	E354	0.050	%	2.17	1.75	1.95	2.14	1.91
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	18.1	14.6	16.2	17.8	15.9
carbon, total organic [TOC]	----	EC356	0.050	%	3.09	4.17	2.93	3.17	3.16
organic matter	----	EC356	0.10	%	5.33	7.19	5.05	5.46	5.45
Metals									
aluminum	7429-90-5	E440	50	mg/kg	6520	4720	4980	7600	5640
antimony	7440-36-0	E440	0.10	mg/kg	0.14	<0.10	0.11	0.15	<0.10
arsenic	7440-38-2	E440	0.10	mg/kg	5.27	3.39	4.00	4.59	3.08
barium	7440-39-3	E440	0.50	mg/kg	18.0	16.0	15.1	17.6	14.4
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.31	0.32	0.47	0.34
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	45.7	36.8	35.2	52.1	38.4
cadmium	7440-43-9	E440	0.020	mg/kg	0.080	0.025	0.044	0.055	0.038
calcium	7440-70-2	E440	50	mg/kg	85700	104000	65000	71600	65400
chromium	7440-47-3	E440	0.50	mg/kg	20.4	18.1	16.8	24.2	17.6
cobalt	7440-48-4	E440	0.10	mg/kg	3.67	3.63	2.83	3.88	2.98
copper	7440-50-8	E440	0.50	mg/kg	7.46	7.03	5.49	7.96	5.88
iron	7439-89-6	E440	50	mg/kg	13100	13800	11400	12800	10700
lead	7439-92-1	E440	0.50	mg/kg	6.13	4.34	5.30	7.48	5.37
lithium	7439-93-2	E440	2.0	mg/kg	28.1	28.3	21.5	33.2	23.3
magnesium	7439-95-4	E440	20	mg/kg	42400	52200	32500	42100	34400

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SNW-2	SW-14	SE-4	DUP-C	SE-5
				Client sampling date / time	15-Aug-2020	12-Aug-2020	13-Aug-2020	13-Aug-2020	13-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B3177-001	VA20B3177-002	VA20B3177-003	VA20B3177-004	VA20B3177-005
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	140	185	115	129	111
mercury	7439-97-6	E510	0.0050	mg/kg	0.0110	0.0087	0.0127	0.0128	0.0097
molybdenum	7439-98-7	E440	0.10	mg/kg	0.43	0.56	0.41	0.61	0.44
nickel	7440-02-0	E440	0.50	mg/kg	11.2	10.3	9.15	12.9	9.47
phosphorus	7723-14-0	E440	50	mg/kg	448	479	419	556	435
potassium	7440-09-7	E440	100	mg/kg	2740	2170	2080	3210	2370
selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	<0.20	0.24	<0.20
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	4470	4980	4420	5150	3560
strontium	7440-24-6	E440	0.50	mg/kg	83.8	54.3	45.0	49.6	42.4
sulfur	7704-34-9	E440	1000	mg/kg	<1000	1100	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.118	0.095	0.087	0.130	0.097
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	264	282	223	295	240
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	0.989	0.779	0.797	1.12	0.831
vanadium	7440-62-2	E440	0.20	mg/kg	26.1	17.6	19.8	28.1	20.1
zinc	7440-66-6	E440	2.0	mg/kg	18.4	16.0	15.8	20.6	16.2
zirconium	7440-67-7	E440	1.0	mg/kg	7.1	6.0	5.2	8.6	6.6
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-2	SW-14	SE-4	DUP-C	SE-5
				Client sampling date / time	15-Aug-2020	12-Aug-2020	13-Aug-2020	13-Aug-2020	13-Aug-2020
					VA20B3177-001	VA20B3177-002	VA20B3177-003	VA20B3177-004	VA20B3177-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.118 DLCI	<0.161 DLCI	<0.199 DLCI	<0.198 DLCI
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	87.5	93.7	88.6	86.7	90.9
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	76.5	90.2	82.8	82.5	85.2
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	<25	<25	<25	<25

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-2	SW-14	SE-4	DUP-C	SE-5
				Client sampling date / time	15-Aug-2020	12-Aug-2020	13-Aug-2020	13-Aug-2020	13-Aug-2020
					VA20B3177-001	VA20B3177-002	VA20B3177-003	VA20B3177-004	VA20B3177-005
					Result	Result	Result	Result	Result
Hydrocarbons									
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	82.9	85.8	84.5	85.7	89.1
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	76.0	79.2	77.5	77.4	78.8
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	106	90.2	89.8	104	99.4
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-2	SW-14	SE-4	DUP-C	SE-5
				Client sampling date / time	15-Aug-2020	12-Aug-2020	13-Aug-2020	13-Aug-2020	13-Aug-2020
					VA20B3177-001	VA20B3177-002	VA20B3177-003	VA20B3177-004	VA20B3177-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	86.8	93.5	91.7	92.4	96.8
chrysene-d12	1719-03-5	E641A-L	0.010	%	95.9	102	102	102	106
naphthalene-d8	1146-65-2	E641A-L	0.010	%	91.2	96.7	94.4	95.9	100.0
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	79.1	84.4	83.0	83.6	87.7
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-14	SW-6	DUP-D	SNW-3	----
				Client sampling date / time	13-Aug-2020	14-Aug-2020	15-Aug-2020	15-Aug-2020	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	VA20B3177-006	VA20B3177-007	VA20B3177-008	VA20B3177-009	--------
					Result	Result	Result	Result	----
Physical Tests									
moisture	----	E144	0.25	%	30.9	26.3	26.0	28.0	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.24	8.24	8.34	8.34	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	16.6	8.1	13.0	15.4	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	47.0	33.4	44.0	40.6	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	33.6	57.9	42.8	40.9	----
gravel (>2mm)	----	EC184E	1.0	%	2.8	<1.0	<1.0	3.1	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.48	4.92	5.99	5.96	----
carbon, inorganic [IC]	----	E354	0.050	%	2.12	1.68	2.04	2.41	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	17.7	14.0	17.0	20.1	----
carbon, total organic [TOC]	----	EC356	0.050	%	3.36	3.24	3.95	3.55	----
organic matter	----	EC356	0.10	%	5.79	5.58	6.81	6.12	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	8110	5150	6390	7070	----
antimony	7440-36-0	E440	0.10	mg/kg	0.15	<0.10	0.14	0.14	----
arsenic	7440-38-2	E440	0.10	mg/kg	5.28	6.04	5.48	4.83	----
barium	7440-39-3	E440	0.50	mg/kg	19.5	17.6	18.0	19.5	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.51	0.33	0.41	0.45	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	----
boron	7440-42-8	E440	5.0	mg/kg	55.3	39.0	45.4	49.0	----
cadmium	7440-43-9	E440	0.020	mg/kg	0.056	0.032	0.083	0.068	----
calcium	7440-70-2	E440	50	mg/kg	77600	78700	87500	90100	----
chromium	7440-47-3	E440	0.50	mg/kg	25.7	18.4	20.4	22.4	----
cobalt	7440-48-4	E440	0.10	mg/kg	4.07	3.22	3.73	4.10	----
copper	7440-50-8	E440	0.50	mg/kg	8.60	5.56	7.70	8.56	----
iron	7439-89-6	E440	50	mg/kg	13500	14100	13100	13600	----
lead	7439-92-1	E440	0.50	mg/kg	7.52	4.52	6.11	6.84	----
lithium	7439-93-2	E440	2.0	mg/kg	36.0	23.9	28.6	32.8	----
magnesium	7439-95-4	E440	20	mg/kg	43600	38100	41100	43000	----
manganese	7439-96-5	E440	1.0	mg/kg	134	135	143	148	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-14	SW-6	DUP-D	SNW-3	----
				Client sampling date / time	13-Aug-2020	14-Aug-2020	15-Aug-2020	15-Aug-2020	----
					VA20B3177-006	VA20B3177-007	VA20B3177-008	VA20B3177-009	--------
					Result	Result	Result	Result	----
Metals									
mercury	7439-97-6	E510	0.0050	mg/kg	0.0133	0.0091	0.0112	0.0123	----
molybdenum	7439-98-7	E440	0.10	mg/kg	0.62	0.40	0.43	0.40	----
nickel	7440-02-0	E440	0.50	mg/kg	13.8	9.82	11.4	12.6	----
phosphorus	7723-14-0	E440	50	mg/kg	563	604	451	437	----
potassium	7440-09-7	E440	100	mg/kg	3460	2320	2690	2960	----
selenium	7782-49-2	E440	0.20	mg/kg	0.26	<0.20	0.21	<0.20	----
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	5050	4060	4010	4680	----
strontium	7440-24-6	E440	0.50	mg/kg	53.6	48.4	54.0	56.2	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	----
thallium	7440-28-0	E440	0.050	mg/kg	0.126	0.099	0.107	0.121	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	----
titanium	7440-32-6	E440	1.0	mg/kg	318	275	262	272	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	----
uranium	7440-61-1	E440	0.050	mg/kg	1.09	0.748	0.975	1.02	----
vanadium	7440-62-2	E440	0.20	mg/kg	29.6	20.4	25.9	27.0	----
zinc	7440-66-6	E440	2.0	mg/kg	21.4	15.9	18.8	19.8	----
zirconium	7440-67-7	E440	1.0	mg/kg	9.2	5.6	7.5	7.3	----
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Volatile Organic Compounds [BTEXS+MTBE]									

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-14	SW-6	DUP-D	SNW-3	----
				Client sampling date / time	13-Aug-2020	14-Aug-2020	15-Aug-2020	15-Aug-2020	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3177-006	VA20B3177-007	VA20B3177-008	VA20B3177-009	--------
					Result	Result	Result	Result	----
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.187 DLCI	<0.213 DLCI	<0.050	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	94.5	98.8	91.2	91.1	----
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	90.8	98.0	89.8	87.7	----
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	----
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	----
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	----
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	----
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	<25	<25	<25	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-14	SW-6	DUP-D	SNW-3	----
				Client sampling date / time	13-Aug-2020	14-Aug-2020	15-Aug-2020	15-Aug-2020	----
					VA20B3177-006	VA20B3177-007	VA20B3177-008	VA20B3177-009	--------
					Result	Result	Result	Result	----
Hydrocarbons									
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	----
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	----
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	82.8	82.0	86.9	84.4	----
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	77.0	75.3	80.5	79.3	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	95.0	57.1 SUR-ND	87.1	87.4	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	----
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	----
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	----

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

					Client sample ID	SE-14	SW-6	DUP-D	SNW-3	----
					Client sampling date / time	13-Aug-2020	14-Aug-2020	15-Aug-2020	15-Aug-2020	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA20B3177-006**	**VA20B3177-007**	**VA20B3177-008**	**VA20B3177-009**	**--------**
						Result	Result	Result	Result	----
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.010	%		94.8	87.1	96.9	92.2	----
chrysene-d12	1719-03-5	E641A-L	0.010	%		105	96.4	107	101	----
naphthalene-d8	1146-65-2	E641A-L	0.010	%		98.0	90.3	101	96.7	----
phenanthrene-d10	1517-22-2	E641A-L	0.010	%		85.5	79.1	88.6	83.4	----
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611C	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
bromoform	75-25-2	E611C	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
chloroform	67-66-3	E611C	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
dibromochloromethane	124-48-1	E611C	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	**: VA20B3177**	Page	
Amendment	: **1**		
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 20-Aug-2020 09:00
PO	: ----	Issue Date	: 24-Sep-2020 14:14
C-O-C number	: 15-560020		
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA20B3177-001	SNW-2	strontium	7440-24-6	E440	48.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Volatile Organic Compounds	QC-87186-002	----	bromoform	75-25-2	E611C	131 % LCS-ND	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.

Regular Sample Surrogates

Sub-Matrix: **Sediment**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	VA20B3177-007	SW-6	dichlorotoluene, 3,4-	97-75-0	57.1 %	70.0-130 %	Recovery less than lower data quality objective

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap DUP-D	E601A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-2	E601A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-3	E601A	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SW-6	E601A	14-Aug-2020	27-Aug-2020	14 days	12 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap DUP-C	E601A	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE-14	E601A	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE-4	E601A	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	28-Aug-2020	40 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE-5	E601A	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SW-14	E601A	12-Aug-2020	27-Aug-2020	14 days	14 days	✓	28-Aug-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP-D	E601.SG	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-2	E601.SG	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-3	E601.SG	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-6	E601.SG	14-Aug-2020	27-Aug-2020	14 days	12 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP-C	E601.SG	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-14	E601.SG	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-4	E601.SG	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	31-Aug-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-5	E601.SG	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-14	E601.SG	12-Aug-2020	27-Aug-2020	14 days	14 days	✓	31-Aug-2020	40 days	4 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP-D	E581.VH+F1	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-2	E581.VH+F1	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-3	E581.VH+F1	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-6	E581.VH+F1	14-Aug-2020	17-Sep-2020	40 days	33 days	✓	17-Sep-2020	6 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP-C	E581.VH+F1	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-14	E581.VH+F1	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-4	E581.VH+F1	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-5	E581.VH+F1	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-14	E581.VH+F1	12-Aug-2020	17-Sep-2020	40 days	35 days	✓	17-Sep-2020	4 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP-D	E510	15-Aug-2020	28-Aug-2020	28 days	12 days	✓	28-Aug-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-2	E510	15-Aug-2020	28-Aug-2020	28 days	12 days	✓	28-Aug-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-3	E510	15-Aug-2020	28-Aug-2020	28 days	12 days	✓	28-Aug-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-6	E510	14-Aug-2020	28-Aug-2020	28 days	13 days	✓	28-Aug-2020	14 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP-C	E510	13-Aug-2020	28-Aug-2020	28 days	14 days	✓	28-Aug-2020	13 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-14	E510	13-Aug-2020	28-Aug-2020	28 days	14 days	✓	28-Aug-2020	13 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-4	E510	13-Aug-2020	28-Aug-2020	28 days	14 days	✓	28-Aug-2020	13 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-5	E510	13-Aug-2020	28-Aug-2020	28 days	14 days	✓	28-Aug-2020	13 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-14	E510	12-Aug-2020	28-Aug-2020	28 days	15 days	✓	28-Aug-2020	12 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP-D	E440	15-Aug-2020	28-Aug-2020	180 days	12 days	✓	28-Aug-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-2	E440	15-Aug-2020	28-Aug-2020	180 days	12 days	✓	28-Aug-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-3	E440	15-Aug-2020	28-Aug-2020	180 days	12 days	✓	28-Aug-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-6	E440	14-Aug-2020	28-Aug-2020	180 days	13 days	✓	28-Aug-2020	166 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP-C	E440	13-Aug-2020	28-Aug-2020	180 days	14 days	✓	28-Aug-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-14	E440	13-Aug-2020	28-Aug-2020	180 days	14 days	✓	28-Aug-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-4	E440	13-Aug-2020	28-Aug-2020	180 days	14 days	✓	28-Aug-2020	165 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-5	E440	13-Aug-2020	28-Aug-2020	180 days	14 days	✓	28-Aug-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-14	E440	12-Aug-2020	28-Aug-2020	180 days	15 days	✓	28-Aug-2020	164 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP-C	E351	13-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP-D	E351	15-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-14	E351	13-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-4	E351	13-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-5	E351	13-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-2	E351	15-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-3	E351	15-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-14	E351	12-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-6	E351	14-Aug-2020	----	----	----		22-Aug-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP-C	E354	13-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP-D	E354	15-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-14	E354	13-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-4	E354	13-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-5	E354	13-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-2	E354	15-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-3	E354	15-Aug-2020	----	----	----		24-Aug-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-14	E354	12-Aug-2020	----	----	----		24-Aug-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-6	E354	14-Aug-2020	----	----	----		24-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP-C	E144	13-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP-D	E144	15-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-14	E144	13-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-4	E144	13-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-5	E144	13-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-2	E144	15-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-3	E144	15-Aug-2020	----	----	----		27-Aug-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-14	E144	12-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-6	E144	14-Aug-2020	----	----	----		27-Aug-2020	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP-D	E108	15-Aug-2020	28-Aug-2020	30 days	12 days	✓	28-Aug-2020	17 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-2	E108	15-Aug-2020	28-Aug-2020	30 days	12 days	✓	28-Aug-2020	17 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-3	E108	15-Aug-2020	28-Aug-2020	30 days	12 days	✓	28-Aug-2020	17 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-6	E108	14-Aug-2020	28-Aug-2020	30 days	13 days	✓	28-Aug-2020	16 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP-C	E108	13-Aug-2020	28-Aug-2020	30 days	14 days	✓	28-Aug-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-14	E108	13-Aug-2020	28-Aug-2020	30 days	14 days	✓	28-Aug-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-4	E108	13-Aug-2020	28-Aug-2020	30 days	14 days	✓	28-Aug-2020	15 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-5	E108	13-Aug-2020	28-Aug-2020	30 days	14 days	✓	28-Aug-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-14	E108	12-Aug-2020	28-Aug-2020	30 days	15 days	✓	28-Aug-2020	14 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP-D	E641A-L	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-2	E641A-L	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-3	E641A-L	15-Aug-2020	27-Aug-2020	14 days	11 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-6	E641A-L	14-Aug-2020	27-Aug-2020	14 days	12 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP-C	E641A-L	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-14	E641A-L	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-4	E641A-L	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	27-Aug-2020	40 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-5	E641A-L	13-Aug-2020	27-Aug-2020	14 days	13 days	✓	27-Aug-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-14	E641A-L	12-Aug-2020	27-Aug-2020	14 days	14 days	✓	27-Aug-2020	40 days	0 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-C	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-D	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-14	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-4	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-5	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-2	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-3	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-14	E611C	12-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-6	E611C	14-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-D	E611C	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-2	E611C	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-3	E611C	15-Aug-2020	17-Sep-2020	40 days	32 days	✓	17-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-6	E611C	14-Aug-2020	17-Sep-2020	40 days	33 days	✓	17-Sep-2020	6 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-C	E611C	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-14	E611C	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-4	E611C	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-5	E611C	13-Aug-2020	17-Sep-2020	40 days	34 days	✓	17-Sep-2020	5 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-14	E611C	12-Aug-2020	17-Sep-2020	40 days	35 days	✓	17-Sep-2020	4 days	0 days	✓
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-C	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-D	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-14	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-4	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-5	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-2	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-3	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-14	E611C	12-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-6	E611C	14-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-C	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-D	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-14	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-4	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-5	E611C	13-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-2	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-3	E611C	15-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-14	E611C	12-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-6	E611C	14-Aug-2020	17-Sep-2020	----	----		17-Sep-2020	----	----	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHC - EPH by GC-FID	E601A	77830	1	20	5.0	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	77831	1	9	11.1	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	77826	1	11	9.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	77827	1	11	9.0	5.0	✓
Moisture Content by Gravimetry	E144	77835	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	77829	1	11	9.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	77828	1	11	9.0	5.0	✓
Total Carbon by Combustion	E351	75774	1	11	9.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	75991	1	11	9.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	87187	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	87186	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	77830	2	20	10.0	10.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	77831	2	9	22.2	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	77826	2	11	18.1	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	77827	2	11	18.1	10.0	✓
Moisture Content by Gravimetry	E144	77835	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	77829	2	11	18.1	10.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	77828	1	11	9.0	5.0	✓
Total Carbon by Combustion	E351	75774	2	11	18.1	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	75991	2	11	18.1	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	87187	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	87186	1	9	11.1	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	77830	1	20	5.0	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	77831	1	9	11.1	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	77826	1	11	9.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	77827	1	11	9.0	5.0	✓
Moisture Content by Gravimetry	E144	77835	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	77829	1	11	9.0	5.0	✓
Total Carbon by Combustion	E351	75774	1	11	9.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	75991	1	11	9.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	87187	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	87186	1	9	11.1	5.0	✓
Matrix Spikes (MS)							
VH and F1 by Headspace GC-FID	E581.VH+F1	87187	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	87186	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601.SG Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME Fractions 2-4 (F2-F4).
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
F1-BTEX	EC580 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

Preparation Methods	*Method / Lab*	*Matrix*	*Method Reference*	*Method Descriptions*
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA20B3177**		Page	: 1 of 18
Amendment	: **1**			
Client	: Golder Associates Ltd.		Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas		Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4		Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----		Telephone	: +1 604 253 4188
Project	: 1663724/34000/03		Date Samples Received	: 20-Aug-2020 09:00
PO	: ----		Date Analysis Commenced	: 22-Aug-2020
C-O-C number	: 15-560020		Issue Date	: 24-Sep-2020 14:12
Sampler	: ----			
Site	: ----			
Quote number	: Q79542			
No. of samples received	: 9			
No. of samples analysed	: 9			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Muneeb Alam	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 77828)											
VA20B3177-001	SNW-2	pH (1:2 soil:water)	----	E108	0.10	pH units	8.24	8.29	0.605%	5%	----
Physical Tests (QC Lot: 77835)											
VA20B3177-001	SNW-2	moisture	----	E144	0.25	%	25.7	24.2	5.82%	20%	----
Organic / Inorganic Carbon (QC Lot: 75774)											
VA20B3177-001	SNW-2	carbon, total [TC]	----	E351	0.050	%	5.26	5.32	1.05%	20%	----
Organic / Inorganic Carbon (QC Lot: 75991)											
VA20B3177-001	SNW-2	carbon, inorganic [IC]	----	E354	0.050	%	2.17	2.16	0.515%	20%	----
Metals (QC Lot: 77826)											
VA20B3177-001	SNW-2	mercury	7439-97-6	E510	0.0050	mg/kg	0.0110	0.0113	0.0002	Diff <2x LOR	----
Metals (QC Lot: 77827)											
VA20B3177-001	SNW-2	aluminum	7429-90-5	E440	50	mg/kg	6520	5970	8.89%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.14	0.13	0.007	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.27	5.24	0.572%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	18.0	16.9	6.30%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.37	0.03	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	45.7	44.5	2.74%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.080	0.080	0.00005	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	85700	84300	1.64%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	20.4	20.1	1.72%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	3.67	3.64	1.07%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	7.46	7.43	0.444%	30%	----
		iron	7439-89-6	E440	50	mg/kg	13100	12800	2.41%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	6.13	6.01	1.96%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	28.1	28.2	0.339%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	42400	40900	3.75%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	140	136	2.90%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.43	0.41	0.02	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	11.2	10.9	2.46%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	448	477	6.42%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	2740	2510	8.77%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 77827) - continued											
VA20B3177-001	SNW-2	silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	4470	3980	11.7%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	83.8	51.4	48.0%	40%	DUP-H
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.118	0.108	0.010	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	264	257	2.67%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.989	0.938	5.24%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	26.1	25.3	3.11%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	18.4	17.7	3.51%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	7.1	7.0	2.08%	30%	----
Volatile Organic Compounds (QC Lot: 87186)											
VA20B3177-001	SNW-2	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 87186) - continued											
VA20B3177-001	SNW-2	styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 77830)											
VA20B3177-001	SNW-2	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 77831)											
VA20B3177-001	SNW-2	F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	<25	0	Diff <2x LOR	----
		F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 87187)											
VA20B3177-001	SNW-2	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 77829)											
VA20B3177-001	SNW-2	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Polycyclic Aromatic Hydrocarbons (QC Lot: 77829) - continued											
VA20B3177-001	SNW-2	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 77835)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 75774)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 75991)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Metals (QCLot: 77826)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 77827)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 77827) - continued						
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Volatile Organic Compounds (QCLot: 87186)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 87186) - continued						
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 77830)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
					<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
					<200	----
Hydrocarbons (QCLot: 77831)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
Hydrocarbons (QCLot: 87187)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77829)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
					<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 77829) - continued						
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 77828)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 77835)									
moisture	----	E144	0.25	%	50 %	100.0	90.0	110	----
Organic / Inorganic Carbon (QCLot: 75774)									
carbon, total [TC]	----	E351	0.05	%	48 %	98.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 75991)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	98.1	80.0	120	----
Metals (QCLot: 77826)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	99.7	80.0	120	----
Metals (QCLot: 77827)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.6	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	105	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.0	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	110	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	110	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	106	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	109	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 77827) - continued									
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	113	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	107	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	110	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	107	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	107	80.0	120	----
Volatile Organic Compounds (QCLot: 87186)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	105	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	110	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	# 131	70.0	130	LCS-ND
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	91.4	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	98.8	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	122	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	119	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	117	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	122	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	96.8	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	99.2	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	98.2	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	108	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	102	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	119	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	113	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	112	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Volatile Organic Compounds (QCLot: 87186) - continued									
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	119	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	118	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	116	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	122	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	98.6	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	114	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
Hydrocarbons (QCLot: 77830)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	106	70.0	130	----
					7113 mg/kg	103	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	106	70.0	130	----
					10183 mg/kg	101	70.0	130	----
Hydrocarbons (QCLot: 77831)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	115	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	109	70.0	130	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	107	70.0	130	----
Hydrocarbons (QCLot: 87187)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	130	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77829)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	94.7	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	94.7	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	89.5	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	95.8	60.0	130	----
					0.32 mg/kg	106	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	97.0	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
					0.135 mg/kg	103	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	95.0	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.2	60.0	130	----
					0.34 mg/kg	99.4	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	91.1	60.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 77829) - continued									
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	92.0	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
					1.757 mg/kg	99.4	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	95.7	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	94.4	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91.2	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	90.9	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	93.8	60.0	130	----
					1.13 mg/kg	96.4	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.0	60.0	130	----
					1.325 mg/kg	98.9	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	92.3	60.0	130	----

Qualifiers

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 87186)										
VA20B3177-002	SW-14	benzene	71-43-2	E611C	1.89 mg/kg	3.125 mg/kg	88.1	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.98 mg/kg	3.125 mg/kg	92.4	60.0	140	----
		bromoform	75-25-2	E611C	2.37 mg/kg	3.125 mg/kg	111	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.04 mg/kg	3.125 mg/kg	95.2	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.98 mg/kg	3.125 mg/kg	92.6	60.0	140	----
		chloroethane	75-00-3	E611C	1.60 mg/kg	3.125 mg/kg	74.7	60.0	140	----
		chloroform	67-66-3	E611C	1.85 mg/kg	3.125 mg/kg	86.4	60.0	140	----
		chloromethane	74-87-3	E611C	1.71 mg/kg	3.125 mg/kg	79.9	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.18 mg/kg	3.125 mg/kg	102	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.06 mg/kg	3.125 mg/kg	96.4	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.97 mg/kg	3.125 mg/kg	92.1	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.05 mg/kg	3.125 mg/kg	95.9	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.88 mg/kg	3.125 mg/kg	87.9	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	1.94 mg/kg	3.125 mg/kg	90.5	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.71 mg/kg	3.125 mg/kg	79.8	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.78 mg/kg	3.125 mg/kg	83.0	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.75 mg/kg	3.125 mg/kg	81.8	60.0	140	----
		dichloromethane	75-09-2	E611C	1.95 mg/kg	3.125 mg/kg	91.2	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.85 mg/kg	3.125 mg/kg	86.5	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.00 mg/kg	3.125 mg/kg	93.5	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	1.87 mg/kg	3.125 mg/kg	87.2	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.93 mg/kg	3.125 mg/kg	90.1	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	1.97 mg/kg	3.125 mg/kg	92.1	60.0	140	----
		styrene	100-42-5	E611C	1.98 mg/kg	3.125 mg/kg	92.6	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.08 mg/kg	3.125 mg/kg	97.1	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.11 mg/kg	3.125 mg/kg	98.5	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.02 mg/kg	3.125 mg/kg	94.4	60.0	140	----
		toluene	108-88-3	E611C	1.94 mg/kg	3.125 mg/kg	90.8	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	1.97 mg/kg	3.125 mg/kg	91.9	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.97 mg/kg	3.125 mg/kg	92.2	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.05 mg/kg	3.125 mg/kg	95.9	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.58 mg/kg	3.125 mg/kg	120	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 87186) - continued										
VA20B3177-002	SW-14	vinyl chloride	75-01-4	E611C	1.74 mg/kg	3.125 mg/kg	81.1	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	3.89 mg/kg	6.25 mg/kg	90.8	60.0	140	----
		xylene, o-	95-47-6	E611C	1.94 mg/kg	3.125 mg/kg	90.4	60.0	140	----
Hydrocarbons (QCLot: 87187)										
VA20B3177-003	SE-4	F1 (C6-C10)	----	E581.VH+F1	121 mg/kg	187.5 mg/kg	92.0	60.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Organic / Inorganic Carbon (QCLot: 75774)									
QC-75774-003	RM	carbon, total [TC]	----	E351	1.4 %	102	80.0	120	----
Organic / Inorganic Carbon (QCLot: 75991)									
QC-75991-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	92.5	80.0	120	----
Metals (QCLot: 77826)									
QC-77826-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	97.6	70.0	130	----
Metals (QCLot: 77827)									
QC-77827-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
QC-77827-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	113	70.0	130	----
QC-77827-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
QC-77827-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-77827-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	111	70.0	130	----
QC-77827-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	126	40.0	160	----
QC-77827-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	105	70.0	130	----
QC-77827-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	113	70.0	130	----
QC-77827-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	114	70.0	130	----
QC-77827-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-77827-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	106	70.0	130	----
QC-77827-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	105	70.0	130	----
QC-77827-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
QC-77827-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	101	70.0	130	----
QC-77827-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	112	70.0	130	----
QC-77827-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
QC-77827-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	111	70.0	130	----
QC-77827-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	107	70.0	130	----
QC-77827-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
QC-77827-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
QC-77827-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	103	70.0	130	----
QC-77827-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	109	70.0	130	----
QC-77827-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	103	40.0	160	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Metals (QCLot: 77827) - continued									
QC-77827-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	108	70.0	130	----
QC-77827-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	123	70.0	130	----
QC-77827-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	114	70.0	130	----
QC-77827-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	111	70.0	130	----
QC-77827-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	108	70.0	130	----
QC-77827-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	104	70.0	130	----
Hydrocarbons (QCLot: 77831)									
QC-77831-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	103	70.0	130	----
QC-77831-003	Petroleum Hydrocarbon IRM	F3 (C16-C34)	----	E601.SG	14124 mg/kg	98.4	70.0	130	----
QC-77831-003	Petroleum Hydrocarbon IRM	F4 (C34-C50)	----	E601.SG	1238 mg/kg	103	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 77829)									
QC-77829-003	RM	acenaphthene	83-32-9	E641A-L	0.638 mg/kg	96.8	60.0	130	----
QC-77829-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	112	60.0	130	----
QC-77829-003	RM	benz(a)anthracene	56-55-3	E641A-L	0.545 mg/kg	98.1	60.0	130	----
QC-77829-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	103	60.0	130	----
QC-77829-003	RM	benzo(g,h,i)perylene	191-24-2	E641A-L	0.377 mg/kg	103	60.0	130	----
QC-77829-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	99.7	60.0	130	----
QC-77829-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	98.2	60.0	130	----
QC-77829-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.8	60.0	130	----
QC-77829-003	RM	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.445 mg/kg	99.1	60.0	130	----
QC-77829-003	RM	methylnaphthalene, 1-	90-12-0	E641A-L	1.256 mg/kg	95.8	60.0	130	----
QC-77829-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	92.0	60.0	130	----
QC-77829-003	RM	naphthalene	91-20-3	E641A-L	1.03 mg/kg	99.7	50.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 560020

Page of

Report To	Contact and company name below will appear on the final report
Company:	Golder
Contact:	Christine Bylenga/Brett Lucas
Phone:	1 604-296-4200
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	cbylenga@golder.com
Email 2	blucas@golder.com
Email 3	
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑	Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:	dd-mmm-yy hh:mm		

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
~~ALS Account # / Quote #:~~	Q79542
Job #:	1663724/34000/03
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	B3177

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Environmental Division
Vancouver
Work Order Reference
VA20B3177
Telephone : +1 604 253 4188

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, TIC	Particle Size	F2-F4 PAH	LEPH, HEPH, EPH, PAH	Metals (incl. Hg)	Number of Containers
	SNW-2	15-AUG-20		SEDIMENT	X	X	X	X	X	4
	SW-14	12-AUG-20		SEDIMENT	X	X	X	X	X	4
	SE-4	13-AUG-20		SEDIMENT	X	X	X	X	X	4
	DUP-C	13-AUG-20	—	SEDIMENT	X	X	X	X	X	4
	SE-5	13-AUG-20		SEDIMENT	X	X	X	X	X	4
	SE-14	13-AUG-20		SEDIMENT	X	X	X	X	X	4
	SW-6	14-AUG-20		SEDIMENT	X	X	X	X	X	4
	DUP-D	15-AUG-20	—	SEDIMENT	X	X	X	X	X	4
	SNW-3	15-AUG-20		SEDIMENT	X	X	X	X	X	4

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C: 10°C

FINAL COOLER TEMPERATURES °C:

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: RCS	Date: 20 Aug 2020	Time: 9:02

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B5306**	Page	: 1 of 33
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 15-Sep-2020 12:45
PO	: ----	Date Analysis Commenced	: 17-Sep-2020
C-O-C number	: 17-766308, 15-560013,15-560021	Issue Date	: 01-Oct-2020 17:42
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 28		
No. of samples analysed	: 28		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Workorder Comments

For sample SNE-5 (#18), received Methanol vials leaked during transport. One vial is empty and the other contains only 1-2 ml of liquid. For sample SNE-1, 1 vial received empty, but second one is intact, so analysis still can be conducted. Please contact AM regarding sample SNE-5.

Sample Comments

Sample	Client Id	*Comment*
VA20B5306-001	SW-7	Sample(018) : Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

Qualifiers

Qualifier	*Description*
DLIS	*Detection Limit Adjusted due to insufficient sample.*
DLQ	*Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.*

RRV	*Reported result verified by repeat analysis.*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SW-7	SW-8	SNW-4	SNW-5	SNW-6
Client sampling date / time					18-Aug-2020 11:36	18-Aug-2020 13:36	25-Aug-2020 09:35	25-Aug-2020 12:05	25-Aug-2020 14:15
					VA20B5306-001	VA20B5306-002	VA20B5306-003	VA20B5306-004	VA20B5306-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	23.2	31.0	29.3	29.2	23.5
pH (1:2 soil:water)	----	E108	0.10	pH units	8.34	8.21	8.33	8.36	8.48
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	6.5	9.2	12.6	15.5	14.6
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	38.3	51.8	43.0	47.0	39.2
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	50.8	37.0	30.5	29.7	41.1
gravel (>2mm)	----	EC184E	1.0	%	4.4	2.0	13.9	7.8	5.1
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.81	6.39	6.55	6.55	6.50
carbon, inorganic [IC]	----	E354	0.050	%	2.02	2.29	3.13	3.16	3.24
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	16.8	19.1	26.1	26.3	27.0
carbon, total organic [TOC]	----	EC356	0.050	%	3.79	4.10	3.42	3.39	3.26
organic matter	----	EC356	0.10	%	6.53	7.07	5.90	5.84	5.62
Metals									
aluminum	7429-90-5	E440	50	mg/kg	5490	6860	8200	7700	6660
antimony	7440-36-0	E440	0.10	mg/kg	<0.10	<0.10	0.16	0.14	0.14
arsenic	7440-38-2	E440	0.10	mg/kg	5.20	5.20	5.83	5.82	4.79
barium	7440-39-3	E440	0.50	mg/kg	18.0	20.4	21.5	20.7	18.5
beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.39	0.51	0.51	0.43
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	33.7	41.2	53.2	54.2	45.4
cadmium	7440-43-9	E440	0.020	mg/kg	0.043	0.034	0.092	0.110	0.104
calcium	7440-70-2	E440	50	mg/kg	80400	98000	87300	85000	75600
chromium	7440-47-3	E440	0.50	mg/kg	21.1	25.5	24.4	22.4	19.8
cobalt	7440-48-4	E440	0.10	mg/kg	3.52	4.17	4.32	4.16	3.61
copper	7440-50-8	E440	0.50	mg/kg	6.84	8.51	9.84	8.96	8.16
iron	7439-89-6	E440	50	mg/kg	14100	16400	14500	13800	12000
lead	7439-92-1	E440	0.50	mg/kg	4.57	5.99	7.91	7.79	7.20
lithium	7439-93-2	E440	2.0	mg/kg	21.5	27.6	36.5	37.2	31.6

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

				Client sample ID	SW-7	SW-8	SNW-4	SNW-5	SNW-6
				Client sampling date / time	18-Aug-2020 11:36	18-Aug-2020 13:36	25-Aug-2020 09:35	25-Aug-2020 12:05	25-Aug-2020 14:15
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-001	VA20B5306-002	VA20B5306-003	VA20B5306-004	VA20B5306-005
					Result	Result	Result	Result	Result
Metals									
magnesium	7439-95-4	E440	20	mg/kg	44800	53100	42900	37600	34400
manganese	7439-96-5	E440	1.0	mg/kg	142	175	156	153	136
mercury	7439-97-6	E510	0.0050	mg/kg	0.0089	0.0123	0.0154	0.0153	0.0143
molybdenum	7439-98-7	E440	0.10	mg/kg	0.30	0.56	0.37	0.40	0.38
nickel	7440-02-0	E440	0.50	mg/kg	11.0	13.3	13.2	12.5	11.0
phosphorus	7723-14-0	E440	50	mg/kg	572	551	434	464	366
potassium	7440-09-7	E440	100	mg/kg	2500	3030	3300	3170	2680
selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0.26	0.23	0.24
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	3830	5210	4740	4880	3550
strontium	7440-24-6	E440	0.50	mg/kg	47.4	56.7	56.0	53.7	48.7
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.105	0.118	0.144	0.133	0.122
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	297	340	290	263	235
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	0.748	0.950	1.12	1.04	1.02
vanadium	7440-62-2	E440	0.20	mg/kg	20.6	25.7	31.1	29.6	26.9
zinc	7440-66-6	E440	2.0	mg/kg	15.3	18.8	22.2	21.9	20.3
zirconium	7440-67-7	E440	1.0	mg/kg	5.6	6.4	6.7	6.0	6.3
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid)**

Analyte	CAS Number	Method	LOR	Unit	SW-7	SW-8	SNW-4	SNW-5	SNW-6
Client sampling date / time					18-Aug-2020 11:36	18-Aug-2020 13:36	25-Aug-2020 09:35	25-Aug-2020 12:05	25-Aug-2020 14:15
					VA20B5306-001	VA20B5306-002	VA20B5306-003	VA20B5306-004	VA20B5306-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	0.056	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.200 DLQ	<0.350 DLQ	<0.075 DLQ	<0.075 DLQ	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.011 DLIS	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	91.9	94.8	87.2	88.6	91.6
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	91.6	95.7	89.1	92.8	97.7
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Analytical Results

Sub-Matrix: Sediment

(Matrix: Soil/Solid)

				Client sample ID	SW-7	SW-8	SNW-4	SNW-5	SNW-6
				Client sampling date / time	18-Aug-2020 11:36	18-Aug-2020 13:36	25-Aug-2020 09:35	25-Aug-2020 12:05	25-Aug-2020 14:15
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B5306-001**	**VA20B5306-002**	**VA20B5306-003**	**VA20B5306-004**	**VA20B5306-005**
					Result	Result	Result	Result	Result
Hydrocarbons									
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	84.8	82.0	82.6	80.6	87.4
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	74.3	74.0	67.6	68.4	75.2
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	93.1	79.9	83.8	93.7	126
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SW-7	SW-8	SNW-4	SNW-5	SNW-6
				Client sampling date / time	18-Aug-2020 11:36	18-Aug-2020 13:36	25-Aug-2020 09:35	25-Aug-2020 12:05	25-Aug-2020 14:15
					VA20B5306-001	VA20B5306-002	VA20B5306-003	VA20B5306-004	VA20B5306-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	94.5	90.0	88.3	93.7	90.5
chrysene-d12	1719-03-5	E641A-L	0.010	%	101	101	100	104	102
naphthalene-d8	1146-65-2	E641A-L	0.010	%	96.1	95.4	94.8	102	97.6
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	98.3	98.4	93.3	99.0	95.8
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-6	SE-7	SE-8	SE-9	SE-10
				Client sampling date / time	27-Aug-2020 09:07	27-Aug-2020 10:35	27-Aug-2020 12:20	27-Aug-2020 14:30	27-Aug-2020 15:30
					VA20B5306-006	VA20B5306-007	VA20B5306-008	VA20B5306-009	VA20B5306-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	27.5	21.0	21.9	25.0	25.8
pH (1:2 soil:water)	----	E108	0.10	pH units	8.31	8.10	8.39	8.33	8.30
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	9.3	4.5	3.8	4.9	4.0
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	31.5	16.0	12.6	21.1	15.8
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	48.4	37.2	60.4	71.0	45.9
gravel (>2mm)	----	EC184E	1.0	%	10.8	42.3	23.2	3.0	34.3
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.84	5.43	4.47	3.42	4.67
carbon, inorganic [IC]	----	E354	0.050	%	2.59	2.58	2.14	1.57	2.04
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	21.6	21.5	17.8	13.1	17.0
carbon, total organic [TOC]	----	EC356	0.050	%	3.25	2.85	2.33	1.85	2.63
organic matter	----	EC356	0.10	%	5.60	4.91	4.02	3.19	4.53
Metals									
aluminum	7429-90-5	E440	50	mg/kg	5420	4780	3130	3770	4530
antimony	7440-36-0	E440	0.10	mg/kg	0.12	<0.10	<0.10	<0.10	<0.10
arsenic	7440-38-2	E440	0.10	mg/kg	4.75	5.69	2.89	3.34	4.69
barium	7440-39-3	E440	0.50	mg/kg	15.1	13.4	7.97	9.54	11.2
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.31	0.23	0.23	0.29
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	38.8	34.8	21.1	23.2	31.2
cadmium	7440-43-9	E440	0.020	mg/kg	0.044	0.046	0.025	0.029	0.037
calcium	7440-70-2	E440	50	mg/kg	68500	60400	34800	31800	43900
chromium	7440-47-3	E440	0.50	mg/kg	17.1	14.8	9.14	12.2	16.5
cobalt	7440-48-4	E440	0.10	mg/kg	3.11	2.67	1.82	2.22	2.61
copper	7440-50-8	E440	0.50	mg/kg	6.21	5.42	4.12	4.15	4.74
iron	7439-89-6	E440	50	mg/kg	11500	10800	7090	8610	9690
lead	7439-92-1	E440	0.50	mg/kg	6.42	5.16	3.23	3.82	4.42
lithium	7439-93-2	E440	2.0	mg/kg	26.2	21.6	13.4	14.4	18.8
magnesium	7439-95-4	E440	20	mg/kg	30900	28400	15200	17600	21100

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-6	SE-7	SE-8	SE-9	SE-10
				Client sampling date / time	27-Aug-2020 09:07	27-Aug-2020 10:35	27-Aug-2020 12:20	27-Aug-2020 14:30	27-Aug-2020 15:30
					VA20B5306-006	VA20B5306-007	VA20B5306-008	VA20B5306-009	VA20B5306-010
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	114	116	75.7	92.5	116
mercury	7439-97-6	E510	0.0050	mg/kg	0.0128	0.0110	0.0071	0.0077	0.0092
molybdenum	7439-98-7	E440	0.10	mg/kg	0.45	0.35	0.21	0.28	0.32
nickel	7440-02-0	E440	0.50	mg/kg	9.63	8.40	5.23	6.65	7.92
phosphorus	7723-14-0	E440	50	mg/kg	403	436	258	337	438
potassium	7440-09-7	E440	100	mg/kg	2090	2000	1230	1490	1780
selenium	7782-49-2	E440	0.20	mg/kg	0.21	0.23	<0.20	<0.20	<0.20
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	4070	4120	3220	3310	4250
strontium	7440-24-6	E440	0.50	mg/kg	45.2	46.8	28.5	25.9	44.8
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.101	0.082	0.052	0.069	0.082
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	222	212	145	217	221
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.07	0.737	0.524	0.676	0.686
vanadium	7440-62-2	E440	0.20	mg/kg	23.2	19.4	11.4	13.9	16.0
zinc	7440-66-6	E440	2.0	mg/kg	16.8	14.8	10.3	11.6	13.9
zirconium	7440-67-7	E440	1.0	mg/kg	4.7	3.4	2.7	4.0	4.4
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-6	SE-7	SE-8	SE-9	SE-10
				Client sampling date / time	27-Aug-2020 09:07	27-Aug-2020 10:35	27-Aug-2020 12:20	27-Aug-2020 14:30	27-Aug-2020 15:30
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-006	VA20B5306-007	VA20B5306-008	VA20B5306-009	VA20B5306-010
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.200 DLQ	<0.250 DLQ	<0.250 DLQ	<0.200 DLQ	<0.200 DLQ
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	0.059 RRV	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	83.4	84.8	74.8	79.7	78.0
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	101	97.4	93.6	97.2	101
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	SE-6	SE-7	SE-8	SE-9	SE-10
				Client sampling date / time	27-Aug-2020 09:07	27-Aug-2020 10:35	27-Aug-2020 12:20	27-Aug-2020 14:30	27-Aug-2020 15:30
					VA20B5306-006	**VA20B5306-007**	**VA20B5306-008**	**VA20B5306-009**	**VA20B5306-010**
					Result	Result	Result	Result	Result
Hydrocarbons									
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	80.7	80.3	81.4	80.2	78.2
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	67.4	66.0	69.4	67.5	70.1
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	96.3	93.2	65.6 SUR-ND	77.0	114
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid)**

				Client sample ID	SE-6	SE-7	SE-8	SE-9	SE-10
				Client sampling date / time	27-Aug-2020 09:07	27-Aug-2020 10:35	27-Aug-2020 12:20	27-Aug-2020 14:30	27-Aug-2020 15:30
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B5306-006**	**VA20B5306-007**	**VA20B5306-008**	**VA20B5306-009**	**VA20B5306-010**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	87.2	84.9	83.4	82.7	87.3
chrysene-d12	1719-03-5	E641A-L	0.010	%	97.2	93.4	92.4	93.5	98.1
naphthalene-d8	1146-65-2	E641A-L	0.010	%	94.5	91.5	91.6	91.0	89.7
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	91.4	87.9	87.6	88.3	90.4
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-11	DUP E	SNE-1	SNE-2	SNE-3
				Client sampling date / time	27-Aug-2020 17:01	27-Aug-2020	28-Aug-2020 13:10	28-Aug-2020 14:20	28-Aug-2020 16:50
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	VA20B5306-011	VA20B5306-012	VA20B5306-013	VA20B5306-014	VA20B5306-015
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	33.5	25.2	19.4	25.9	20.5
pH (1:2 soil:water)	----	E108	0.10	pH units	8.30	8.34	8.49	8.39	8.50
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	11.4	11.2	6.0	10.9	9.0
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	38.3	36.3	22.2	34.1	32.4
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	41.3	46.4	61.8	51.8	50.9
gravel (>2mm)	----	EC184E	1.0	%	9.0	6.1	10.0	3.2	7.7
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.30	5.78	5.77	6.22	6.52
carbon, inorganic [IC]	----	E354	0.050	%	2.58	2.61	2.63	2.93	3.18
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	21.5	21.8	21.9	24.4	26.5
carbon, total organic [TOC]	----	EC356	0.050	%	2.72	3.17	3.14	3.29	3.34
organic matter	----	EC356	0.10	%	4.69	5.46	5.41	5.67	5.76
Metals									
aluminum	7429-90-5	E440	50	mg/kg	7320	6340	4080	5740	5010
antimony	7440-36-0	E440	0.10	mg/kg	0.13	0.13	<0.10	0.13	<0.10
arsenic	7440-38-2	E440	0.10	mg/kg	4.52	5.26	2.15	5.24	2.93
barium	7440-39-3	E440	0.50	mg/kg	19.5	17.7	11.8	16.6	15.9
beryllium	7440-41-7	E440	0.10	mg/kg	0.46	0.38	0.24	0.39	0.31
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	48.9	42.5	27.4	41.0	34.5
cadmium	7440-43-9	E440	0.020	mg/kg	0.060	0.053	0.063	0.082	0.061
calcium	7440-70-2	E440	50	mg/kg	66200	67100	48800	69700	74100
chromium	7440-47-3	E440	0.50	mg/kg	21.5	19.6	13.2	18.3	15.6
cobalt	7440-48-4	E440	0.10	mg/kg	3.56	3.26	2.30	3.40	2.77
copper	7440-50-8	E440	0.50	mg/kg	7.36	6.44	4.58	7.16	5.92
iron	7439-89-6	E440	50	mg/kg	12100	11700	8060	11200	9000
lead	7439-92-1	E440	0.50	mg/kg	7.07	6.28	4.46	6.59	5.26
lithium	7439-93-2	E440	2.0	mg/kg	30.7	26.4	18.1	27.3	23.4
magnesium	7439-95-4	E440	20	mg/kg	35300	33200	25800	34600	34300

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid)**

Analyte	CAS Number	Method	LOR	Unit	SE-11	DUP E	SNE-1	SNE-2	SNE-3
				Client sampling date / time	27-Aug-2020 17:01	27-Aug-2020	28-Aug-2020 13:10	28-Aug-2020 14:20	28-Aug-2020 16:50
					VA20B5306-011	VA20B5306-012	VA20B5306-013	VA20B5306-014	VA20B5306-015
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	133	123	88.0	124	119
mercury	7439-97-6	E510	0.0050	mg/kg	0.0159	0.0134	0.0086	0.0132	0.0100
molybdenum	7439-98-7	E440	0.10	mg/kg	0.66	0.45	0.29	0.32	0.25
nickel	7440-02-0	E440	0.50	mg/kg	11.5	10.4	7.15	10.4	8.61
phosphorus	7723-14-0	E440	50	mg/kg	477	440	250	506	289
potassium	7440-09-7	E440	100	mg/kg	3000	2590	1720	2330	2050
selenium	7782-49-2	E440	0.20	mg/kg	0.31	0.20	<0.20	<0.20	<0.20
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	5510	4190	3110	4080	3200
strontium	7440-24-6	E440	0.50	mg/kg	47.4	52.0	34.2	44.5	45.3
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.115	0.106	0.075	0.105	0.089
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	299	257	182	244	198
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.03	0.928	0.666	0.926	0.786
vanadium	7440-62-2	E440	0.20	mg/kg	25.9	24.6	15.5	24.0	18.6
zinc	7440-66-6	E440	2.0	mg/kg	20.0	17.6	11.6	17.2	14.3
zirconium	7440-67-7	E440	1.0	mg/kg	6.6	5.8	4.5	5.7	4.8
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-11	DUP E	SNE-1	SNE-2	SNE-3
				Client sampling date / time	27-Aug-2020 17:01	27-Aug-2020	28-Aug-2020 13:10	28-Aug-2020 14:20	28-Aug-2020 16:50
					VA20B5306-011	**VA20B5306-012**	**VA20B5306-013**	**VA20B5306-014**	**VA20B5306-015**
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	----	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	----	----	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.200 DLQ	<0.150 DLQ	<0.082 DLQ	<0.050	<0.069 DLQ
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	----	----	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	----	----	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	----	----	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	----	----	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	----	----	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	----	----	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

				Client sample ID	SE-11	DUP E	SNE-1	SNE-2	SNE-3
				Client sampling date / time	27-Aug-2020 17:01	27-Aug-2020	28-Aug-2020 13:10	28-Aug-2020 14:20	28-Aug-2020 16:50
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-011	VA20B5306-012	VA20B5306-013	VA20B5306-014	VA20B5306-015
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
xylene, o-	95-47-6	E611C	0.050	mg/kg	----	----	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	----	----	<0.075	<0.075	<0.075
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	78.9	79.2	85.7	80.1	103
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	113	108	95.2	87.8	118
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	78.4	85.7	82.8	87.6	81.1
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	67.2	71.8	72.7	74.4	67.0
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	106	122	103	98.0	122
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-11	DUP E	SNE-1	SNE-2	SNE-3
				Client sampling date / time	27-Aug-2020 17:01	27-Aug-2020	28-Aug-2020 13:10	28-Aug-2020 14:20	28-Aug-2020 16:50
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-011	VA20B5306-012	VA20B5306-013	VA20B5306-014	VA20B5306-015
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	83.2	83.3	86.5	92.1	83.8
chrysene-d12	1719-03-5	E641A-L	0.010	%	96.0	95.4	99.0	105	95.4
naphthalene-d8	1146-65-2	E641A-L	0.010	%	89.0	88.6	92.5	99.3	92.1
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	89.6	88.6	92.2	98.0	90.1
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Sediment
(Matrix: Soil/Solid)

Analyte	CAS Number	Method	LOR	Unit	DUP F	SNE-4	SNE-5	SW-9	DUP G
				Client sampling date / time	28-Aug-2020	29-Aug-2020 10:20	29-Aug-2020 13:20	29-Aug-2020 16:50	29-Aug-2020
					VA20B5306-016	VA20B5306-017	VA20B5306-018	VA20B5306-019	VA20B5306-020
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	18.3	32.0	34.3	26.3	30.0
pH (1:2 soil:water)	----	E108	0.10	pH units	8.52	8.27	8.35	8.37	8.40
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	6.6	18.4	19.8	6.8	13.6
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	22.9	50.2	48.8	39.1	41.0
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	64.9	29.6	22.9	53.1	21.6
gravel (>2mm)	----	EC184E	1.0	%	5.6	1.8	8.5	1.0	23.8
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.87	6.36	6.29	5.68	6.39
carbon, inorganic [IC]	----	E354	0.050	%	2.70	3.08	3.01	1.91	2.92
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	22.5	25.7	25.1	16.0	24.4
carbon, total organic [TOC]	----	EC356	0.050	%	3.17	3.28	3.28	3.77	3.47
organic matter	----	EC356	0.10	%	5.46	5.65	5.65	6.50	5.98
Metals									
aluminum	7429-90-5	E440	50	mg/kg	4090	9390	10700	5590	9140
antimony	7440-36-0	E440	0.10	mg/kg	<0.10	0.17	0.21	<0.10	0.17
arsenic	7440-38-2	E440	0.10	mg/kg	2.08	4.79	6.87	4.43	5.08
barium	7440-39-3	E440	0.50	mg/kg	11.2	24.6	26.9	17.4	23.1
beryllium	7440-41-7	E440	0.10	mg/kg	0.27	0.59	0.68	0.37	0.54
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	27.1	63.0	68.7	37.7	57.0
cadmium	7440-43-9	E440	0.020	mg/kg	0.057	0.103	0.111	0.028	0.088
calcium	7440-70-2	E440	50	mg/kg	54400	94200	90800	84600	84500
chromium	7440-47-3	E440	0.50	mg/kg	12.6	26.6	29.8	20.4	25.9
cobalt	7440-48-4	E440	0.10	mg/kg	2.24	4.84	5.26	3.41	4.63
copper	7440-50-8	E440	0.50	mg/kg	4.59	10.6	11.7	6.76	10.2
iron	7439-89-6	E440	50	mg/kg	8050	15200	17000	13400	14400
lead	7439-92-1	E440	0.50	mg/kg	4.27	9.34	9.74	4.75	8.98
lithium	7439-93-2	E440	2.0	mg/kg	18.3	42.0	46.5	27.7	38.3
magnesium	7439-95-4	E440	20	mg/kg	25300	42500	44800	44000	41600

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	DUP F	SNE-4	SNE-5	SW-9	DUP G
				Client sampling date / time	28-Aug-2020	29-Aug-2020 10:20	29-Aug-2020 13:20	29-Aug-2020 16:50	29-Aug-2020
					VA20B5306-016	VA20B5306-017	VA20B5306-018	VA20B5306-019	VA20B5306-020
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	89.4	166	177	144	165
mercury	7439-97-6	E510	0.0050	mg/kg	0.0080	0.0162	0.0184	0.0095	0.0157
molybdenum	7439-98-7	E440	0.10	mg/kg	0.25	0.46	0.50	0.38	0.41
nickel	7440-02-0	E440	0.50	mg/kg	6.92	14.9	16.3	10.7	14.4
phosphorus	7723-14-0	E440	50	mg/kg	259	449	522	509	429
potassium	7440-09-7	E440	100	mg/kg	1660	3860	4390	2470	3620
selenium	7782-49-2	E440	0.20	mg/kg	<0.20	0.27	0.33	<0.20	0.25
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	2450	5650	6160	3620	4850
strontium	7440-24-6	E440	0.50	mg/kg	33.4	60.6	60.0	45.3	59.0
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.075	0.166	0.170	0.108	0.155
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	174	326	351	307	309
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	0.692	1.35	1.39	0.833	1.26
vanadium	7440-62-2	E440	0.20	mg/kg	15.5	34.4	39.0	20.9	33.1
zinc	7440-66-6	E440	2.0	mg/kg	11.2	25.9	28.3	15.4	24.0
zirconium	7440-67-7	E440	1.0	mg/kg	4.5	8.8	8.5	5.7	8.2
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	DUP F	SNE-4	SNE-5	SW-9	DUP G
				Client sampling date / time	28-Aug-2020	29-Aug-2020 10:20	29-Aug-2020 13:20	29-Aug-2020 16:50	29-Aug-2020
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B5306-016**	**VA20B5306-017**	**VA20B5306-018**	**VA20B5306-019**	**VA20B5306-020**
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	----	----	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----	----	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	----	----	<0.075	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.150 DLQ	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	0.072 RRV	0.086	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	----	<0.0050	<0.0050	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	----	<0.015	<0.015	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
styrene	100-42-5	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
toluene	108-88-3	E611C	0.050	mg/kg	----	0.061	<0.050	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

				Client sample ID	DUP F	SNE-4	SNE-5	SW-9	DUP G
				Client sampling date / time	28-Aug-2020	29-Aug-2020 10:20	29-Aug-2020 13:20	29-Aug-2020 16:50	29-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-016	VA20B5306-017	VA20B5306-018	VA20B5306-019	VA20B5306-020
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
xylene, o-	95-47-6	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	----	<0.075	<0.075	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	88.2	103	84.3	81.8	74.8
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	121	116	92.0	104	96.8
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	81.1	83.5	102	77.9	84.0
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	69.6	69.8	73.6	67.4	72.8
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	69.6 SUR-ND	131 SUR-ND	107	118	120
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	DUP F	SNE-4	SNE-5	SW-9	DUP G
				Client sampling date / time	28-Aug-2020	29-Aug-2020 10:20	29-Aug-2020 13:20	29-Aug-2020 16:50	29-Aug-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-016	VA20B5306-017	VA20B5306-018	VA20B5306-019	VA20B5306-020
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	82.6	118	89.0	78.5	78.6
chrysene-d12	1719-03-5	E641A-L	0.010	%	95.6	127	96.4	89.0	91.7
naphthalene-d8	1146-65-2	E641A-L	0.010	%	91.0	127	86.7	87.0	89.2
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	89.6	125	90.3	84.4	86.5
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-6	SE-12	SNW-10	SW-11	SW-12
				Client sampling date / time	30-Aug-2020 09:15	30-Aug-2020 16:20	30-Aug-2020 12:14	30-Aug-2020 13:25	30-Aug-2020 15:00
					VA20B5306-021	VA20B5306-022	VA20B5306-023	VA20B5306-024	VA20B5306-025
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	34.1	26.1	23.7	28.4	24.4
pH (1:2 soil:water)	----	E108	0.10	pH units	8.28	8.43	8.33	8.37	8.75
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	23.5	7.1	4.2	4.1	1.9
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	58.7	21.5	25.8	19.4	7.0
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	16.2	60.7	69.6	74.1	91.1
gravel (>2mm)	----	EC184E	1.0	%	1.6	10.7	<1.0	2.4	<1.0
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	6.23	5.29	5.20	5.13	4.49
carbon, inorganic [IC]	----	E354	0.050	%	3.03	2.22	1.79	1.73	1.62
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	25.2	18.5	14.9	14.4	13.5
carbon, total organic [TOC]	----	EC356	0.050	%	3.20	3.07	3.41	3.40	2.87
organic matter	----	EC356	0.10	%	5.52	5.29	5.88	5.86	4.95
Metals									
aluminum	7429-90-5	E440	50	mg/kg	11100	3480	3790	3320	2290
antimony	7440-36-0	E440	0.10	mg/kg	0.21	0.12	<0.10	<0.10	<0.10
arsenic	7440-38-2	E440	0.10	mg/kg	6.89	2.70	3.43	2.20	0.92
barium	7440-39-3	E440	0.50	mg/kg	28.3	9.48	11.8	10.6	7.01
beryllium	7440-41-7	E440	0.10	mg/kg	0.70	0.24	0.24	0.22	0.13
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	69.2	24.2	25.7	23.0	14.8
cadmium	7440-43-9	E440	0.020	mg/kg	0.127	0.039	<0.020	0.024	<0.020
calcium	7440-70-2	E440	50	mg/kg	96900	42100	66200	56800	41000
chromium	7440-47-3	E440	0.50	mg/kg	30.1	11.9	14.8	12.1	9.15
cobalt	7440-48-4	E440	0.10	mg/kg	5.62	2.07	2.67	2.50	1.68
copper	7440-50-8	E440	0.50	mg/kg	12.4	4.32	4.86	4.35	2.71
iron	7439-89-6	E440	50	mg/kg	17600	6920	11800	10400	5460
lead	7439-92-1	E440	0.50	mg/kg	10.3	4.41	3.25	2.97	2.01
lithium	7439-93-2	E440	2.0	mg/kg	49.9	16.7	19.7	17.8	12.2
magnesium	7439-95-4	E440	20	mg/kg	45800	20400	35800	30000	20800

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-6	SE-12	SNW-10	SW-11	SW-12
Client sampling date / time					30-Aug-2020 09:15	30-Aug-2020 16:20	30-Aug-2020 12:14	30-Aug-2020 13:25	30-Aug-2020 15:00
					VA20B5306-021	VA20B5306-022	VA20B5306-023	VA20B5306-024	VA20B5306-025
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	192	76.7	118	120	74.2
mercury	7439-97-6	E510	0.0050	mg/kg	0.0190	0.0084	0.0056	0.0062	<0.0050
molybdenum	7439-98-7	E440	0.10	mg/kg	0.53	0.31	0.30	0.42	0.17
nickel	7440-02-0	E440	0.50	mg/kg	17.0	6.66	7.64	6.98	4.89
phosphorus	7723-14-0	E440	50	mg/kg	527	281	409	282	177
potassium	7440-09-7	E440	100	mg/kg	4300	1460	1640	1480	1050
selenium	7782-49-2	E440	0.20	mg/kg	0.32	<0.20	<0.20	<0.20	<0.20
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	6410	3380	3470	3680	2270
strontium	7440-24-6	E440	0.50	mg/kg	65.5	38.4	40.6	33.1	24.4
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.184	0.067	0.072	0.066	<0.050
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	360	168	220	197	159
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.56	0.574	0.596	0.544	0.358
vanadium	7440-62-2	E440	0.20	mg/kg	40.7	14.4	14.3	12.7	7.96
zinc	7440-66-6	E440	2.0	mg/kg	29.9	10.8	10.9	10.2	6.8
zirconium	7440-67-7	E440	1.0	mg/kg	9.6	3.7	3.9	3.6	2.9
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid)**

				Client sample ID	SNE-6	SE-12	SNW-10	SW-11	SW-12
				Client sampling date / time	30-Aug-2020 09:15	30-Aug-2020 16:20	30-Aug-2020 12:14	30-Aug-2020 13:25	30-Aug-2020 15:00
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B5306-021**	**VA20B5306-022**	**VA20B5306-023**	**VA20B5306-024**	**VA20B5306-025**
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.200 DLQ	<0.050	<0.250 DLQ	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	90.2	84.7	86.1	86.5	87.2
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	110	108	105	117	125
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SNE-6	SE-12	SNW-10	SW-11	SW-12
				Client sampling date / time	30-Aug-2020 09:15	30-Aug-2020 16:20	30-Aug-2020 12:14	30-Aug-2020 13:25	30-Aug-2020 15:00
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B5306-021**	**VA20B5306-022**	**VA20B5306-023**	**VA20B5306-024**	**VA20B5306-025**
					Result	Result	Result	Result	Result
Hydrocarbons									
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	83.3	86.1	95.4	94.8	94.8
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	73.3	73.1	93.4	85.3	90.3
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	128	120	119	121	117
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid)**

				Client sample ID	SNE-6	SE-12	SNW-10	SW-11	SW-12
				Client sampling date / time	30-Aug-2020 09:15	30-Aug-2020 16:20	30-Aug-2020 12:14	30-Aug-2020 13:25	30-Aug-2020 15:00
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-021	VA20B5306-022	VA20B5306-023	VA20B5306-024	VA20B5306-025
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	85.3	85.0	103	99.8	108
chrysene-d12	1719-03-5	E641A-L	0.010	%	99.0	98.1	115	113	122
naphthalene-d8	1146-65-2	E641A-L	0.010	%	95.9	94.6	109	105	116
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	93.6	91.9	108	105	113
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SW-13	SNE-14	SNW-7	----	----
				Client sample ID	SW-13	SNE-14	SNW-7	----	----
				Client sampling date / time	31-Aug-2020 13:58	31-Aug-2020 11:00	31-Aug-2020 12:40	----	----
					VA20B5306-026	VA20B5306-027	VA20B5306-028	--------	--------
					Result	Result	Result	----	----
Physical Tests									
moisture	----	E144	0.25	%	25.6	34.9	27.8	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.51	8.30	8.36	----	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	3.8	25.1	16.3	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	24.9	56.2	39.5	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	70.7	14.2	37.2	----	----
gravel (>2mm)	----	EC184E	1.0	%	<1.0	4.5	7.0	----	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.85	6.04	6.26	----	----
carbon, inorganic [IC]	----	E354	0.050	%	1.81	3.03	3.08	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	15.1	25.3	25.7	----	----
carbon, total organic [TOC]	----	EC356	0.050	%	4.04	3.01	3.18	----	----
organic matter	----	EC356	0.10	%	6.96	5.19	5.48	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	4240	13200	7950	----	----
antimony	7440-36-0	E440	0.10	mg/kg	<0.10	0.26	0.16	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	2.08	6.41	6.42	----	----
barium	7440-39-3	E440	0.50	mg/kg	11.8	34.4	21.4	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.27	0.74	0.47	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	----	----
boron	7440-42-8	E440	5.0	mg/kg	29.8	76.0	52.9	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	<0.020	0.119	0.094	----	----
calcium	7440-70-2	E440	50	mg/kg	80000	90200	85200	----	----
chromium	7440-47-3	E440	0.50	mg/kg	15.1	33.8	22.4	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	2.92	6.22	4.26	----	----
copper	7440-50-8	E440	0.50	mg/kg	5.17	13.9	9.10	----	----
iron	7439-89-6	E440	50	mg/kg	11100	19400	13400	----	----
lead	7439-92-1	E440	0.50	mg/kg	3.39	11.0	7.37	----	----
lithium	7439-93-2	E440	2.0	mg/kg	24.4	53.9	35.4	----	----
magnesium	7439-95-4	E440	20	mg/kg	42600	48000	37700	----	----

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SW-13	SNE-14	SNW-7	----	----
				Client sampling date / time	31-Aug-2020 13:58	31-Aug-2020 11:00	31-Aug-2020 12:40	----	----
					VA20B5306-026	VA20B5306-027	VA20B5306-028	--------	--------
					Result	Result	Result	----	----
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	133	211	156	----	----
mercury	7439-97-6	E510	0.0050	mg/kg	0.0067	0.0206	0.0162	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	0.36	0.58	0.40	----	----
nickel	7440-02-0	E440	0.50	mg/kg	8.09	18.9	12.9	----	----
phosphorus	7723-14-0	E440	50	mg/kg	356	507	441	----	----
potassium	7440-09-7	E440	100	mg/kg	1860	5180	3160	----	----
selenium	7782-49-2	E440	0.20	mg/kg	<0.20	0.36	0.24	----	----
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	----	----
sodium	7440-23-5	E440	50	mg/kg	4070	6880	4390	----	----
strontium	7440-24-6	E440	0.50	mg/kg	42.0	64.1	61.1	----	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.078	0.192	0.121	----	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	----	----
titanium	7440-32-6	E440	1.0	mg/kg	244	389	257	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
uranium	7440-61-1	E440	0.050	mg/kg	0.710	1.56	1.00	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	14.6	46.4	31.5	----	----
zinc	7440-66-6	E440	2.0	mg/kg	11.6	32.5	20.8	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	5.1	10.5	7.2	----	----
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

				Client sample ID	SW-13	SNE-14	SNW-7	----	----
				Client sampling date / time	31-Aug-2020 13:58	31-Aug-2020 11:00	31-Aug-2020 12:40	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	VA20B5306-026	VA20B5306-027	VA20B5306-028	--------	--------
					Result	Result	Result	----	----
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	----	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.100 DLQ	<0.050	<0.050	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	94.6	84.4	86.6	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	117	119	115	----	----
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	----	----
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	----	----
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	----	----

Analytical Results

Sub-Matrix: Sediment (Matrix: Soil/Solid)				Client sample ID	SW-13	SNE-14	SNW-7	----	----
				Client sampling date / time	31-Aug-2020 13:58	31-Aug-2020 11:00	31-Aug-2020 12:40	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B5306-026	VA20B5306-027	VA20B5306-028	--------	--------
					Result	Result	Result	----	----
Hydrocarbons									
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	----	----
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	----	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	----	----
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	----	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	----	----
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	95.8	92.7	90.4	----	----
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	94.0	86.6	85.8	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	130	114	114	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----

Analytical Results

Sub-Matrix: **Sediment**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SW-13	SNE-14	SNW-7	----	----
				Client sampling date / time	31-Aug-2020 13:58	31-Aug-2020 11:00	31-Aug-2020 12:40	----	----
					VA20B5306-026	VA20B5306-027	VA20B5306-028	--------	--------
					Result	Result	Result	----	----
Polycyclic Aromatic Hydrocarbons									
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	----	----
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	103	106	101	----	----
chrysene-d12	1719-03-5	E641A-L	0.010	%	117	119	115	----	----
naphthalene-d8	1146-65-2	E641A-L	0.010	%	112	114	106	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	109	111	106	----	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B5306**	Page	: 1 of 48
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 15-Sep-2020 12:45
PO	: ----	Issue Date	: 01-Oct-2020 17:43
C-O-C number	: 17-766308, 15-560013,15-560021		
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 28		
No. of samples analysed	: 28		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Volatile Organic Compounds	QC-89521-002	----	trichlorofluoromethane	75-69-4	E611C	155 % LCS-ND	60.0-140%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Reference Material (RM) Sample								
Metals	QC-MRG2-87890003	----	antimony	7440-36-0	E440	195 % RM-H	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	*Description*
RM-H	*Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

Regular Sample Surrogates

Sub-Matrix: **Sediment**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	VA20B5306-008	SE-8	dichlorotoluene, 3,4-	97-75-0	65.6 %	70.0-130 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B5306-016	DUP F	dichlorotoluene, 3,4-	97-75-0	69.6 %	70.0-130 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B5306-017	SNE-4	dichlorotoluene, 3,4-	97-75-0	131 %	70.0-130 %	Recovery greater than upper data quality objective

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-13	E601.SG	31-Aug-2020	18-Sep-2020	13 days	17 days	✖ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-7	E601.SG	31-Aug-2020	18-Sep-2020	13 days	18 days	✖ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-12	E601.SG	30-Aug-2020	18-Sep-2020	14 days	18 days	✖ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-14	E601.SG	31-Aug-2020	18-Sep-2020	14 days	18 days	✖ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-12	E601.SG	30-Aug-2020	18-Sep-2020	14 days	18 days	✖ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP G	E601.SG	29-Aug-2020	18-Sep-2020	14 days	19 days	✖ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-5	E601.SG	29-Aug-2020	18-Sep-2020	14 days	19 days	✖ EHTR	22-Sep-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-6	E601.SG	30-Aug-2020	18-Sep-2020	14 days	19 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-10	E601.SG	30-Aug-2020	18-Sep-2020	14 days	19 days	✘ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-11	E601.SG	30-Aug-2020	18-Sep-2020	14 days	19 days	✘ EHTR	23-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-9	E601.SG	29-Aug-2020	18-Sep-2020	14 days	19 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP F	E601.SG	28-Aug-2020	18-Sep-2020	14 days	20 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-1	E601.SG	28-Aug-2020	18-Sep-2020	14 days	20 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-2	E601.SG	28-Aug-2020	18-Sep-2020	14 days	20 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-3	E601.SG	28-Aug-2020	18-Sep-2020	14 days	20 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-4	E601.SG	29-Aug-2020	18-Sep-2020	14 days	20 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP E	E601.SG	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-10	E601.SG	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-11	E601.SG	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-8	E601.SG	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-9	E601.SG	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-6	E601.SG	27-Aug-2020	18-Sep-2020	14 days	22 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-7	E601.SG	27-Aug-2020	18-Sep-2020	14 days	22 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-5	E601.SG	25-Aug-2020	18-Sep-2020	14 days	23 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-6	E601.SG	25-Aug-2020	18-Sep-2020	14 days	23 days	× EHTR	22-Sep-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-4	E601.SG	25-Aug-2020	18-Sep-2020	14 days	24 days	✘ EHTR	22-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-7	E601.SG	18-Aug-2020	17-Sep-2020	14 days	30 days	✘ EHTR	18-Sep-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-8	E601.SG	18-Aug-2020	17-Sep-2020	14 days	30 days	✘ EHTR	18-Sep-2020	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-7	E581.VH+F1	31-Aug-2020	29-Sep-2020	39 days	28 days	✓	30-Sep-2020	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-13	E581.VH+F1	31-Aug-2020	29-Sep-2020	39 days	28 days	✓	30-Sep-2020	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-4	E581.VH+F1	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-5	E581.VH+F1	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-6	E581.VH+F1	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-14	E581.VH+F1	31-Aug-2020	29-Sep-2020	40 days	28 days	✓	30-Sep-2020	11 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-12	E581.VH+F1	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-10	E581.VH+F1	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-11	E581.VH+F1	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-12	E581.VH+F1	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP G	E581.VH+F1	29-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-6	E581.VH+F1	30-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-9	E581.VH+F1	29-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP F	E581.VH+F1	28-Aug-2020	29-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-6	E581.VH+F1	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-7	E581.VH+F1	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-8	E581.VH+F1	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-9	E581.VH+F1	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-4	E581.VH+F1	29-Aug-2020	30-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-5	E581.VH+F1	29-Aug-2020	30-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP E	E581.VH+F1	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-10	E581.VH+F1	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-11	E581.VH+F1	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-1	E581.VH+F1	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-2	E581.VH+F1	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-3	E581.VH+F1	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-7	E581.VH+F1	18-Aug-2020	22-Sep-2020	40 days	34 days	✓	24-Sep-2020	5 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-8	E581.VH+F1	18-Aug-2020	22-Sep-2020	40 days	34 days	✓	24-Sep-2020	5 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-7	E510	31-Aug-2020	19-Sep-2020	27 days	18 days	✓	22-Sep-2020	9 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-13	E510	31-Aug-2020	19-Sep-2020	27 days	18 days	✓	22-Sep-2020	9 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-14	E510	31-Aug-2020	19-Sep-2020	28 days	18 days	✓	22-Sep-2020	9 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-10	E510	30-Aug-2020	19-Sep-2020	28 days	19 days	✓	22-Sep-2020	8 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-11	E510	30-Aug-2020	19-Sep-2020	28 days	19 days	✓	22-Sep-2020	8 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-12	E510	30-Aug-2020	19-Sep-2020	28 days	19 days	✓	22-Sep-2020	8 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-12	E510	30-Aug-2020	21-Sep-2020	28 days	21 days	✓	22-Sep-2020	6 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-6	E510	30-Aug-2020	21-Sep-2020	28 days	22 days	✓	22-Sep-2020	5 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-9	E510	29-Aug-2020	21-Sep-2020	28 days	22 days	✓	22-Sep-2020	5 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP G	E510	29-Aug-2020	21-Sep-2020	28 days	23 days	✓	22-Sep-2020	4 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-3	E510	28-Aug-2020	21-Sep-2020	28 days	23 days	✓	22-Sep-2020	4 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-4	E510	29-Aug-2020	21-Sep-2020	28 days	23 days	✓	22-Sep-2020	4 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-5	E510	29-Aug-2020	21-Sep-2020	28 days	23 days	✓	22-Sep-2020	4 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP F	E510	28-Aug-2020	21-Sep-2020	28 days	24 days	✓	22-Sep-2020	3 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
Container / Client Sample ID(s)			*Preparation Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*	*Analysis Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-10	E510	27-Aug-2020	21-Sep-2020	28 days	24 days	✓	22-Sep-2020	3 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-11	E510	27-Aug-2020	21-Sep-2020	28 days	24 days	✓	22-Sep-2020	3 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-1	E510	28-Aug-2020	21-Sep-2020	28 days	24 days	✓	22-Sep-2020	3 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-2	E510	28-Aug-2020	21-Sep-2020	28 days	24 days	✓	22-Sep-2020	3 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP E	E510	27-Aug-2020	21-Sep-2020	28 days	25 days	✓	22-Sep-2020	2 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-6	E510	27-Aug-2020	21-Sep-2020	28 days	25 days	✓	22-Sep-2020	2 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-7	E510	27-Aug-2020	21-Sep-2020	28 days	25 days	✓	22-Sep-2020	2 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-8	E510	27-Aug-2020	21-Sep-2020	28 days	25 days	✓	22-Sep-2020	2 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-9	E510	27-Aug-2020	21-Sep-2020	28 days	25 days	✓	22-Sep-2020	2 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-4	E510	25-Aug-2020	21-Sep-2020	28 days	27 days	✓	22-Sep-2020	0 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-5	E510	25-Aug-2020	21-Sep-2020	28 days	27 days	✓	22-Sep-2020	0 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-6	E510	25-Aug-2020	21-Sep-2020	28 days	27 days	✓	22-Sep-2020	0 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-8	E510	18-Aug-2020	18-Sep-2020	28 days	30 days	× EHTL	18-Sep-2020	-3 days	0 days	×
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-7	E510	18-Aug-2020	18-Sep-2020	28 days	30 days	× EHTR	18-Sep-2020	-3 days	0 days	× EHTR-FM
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-7	E440	31-Aug-2020	19-Sep-2020	179 days	18 days	✓	21-Sep-2020	161 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-13	E440	31-Aug-2020	19-Sep-2020	179 days	18 days	✓	21-Sep-2020	161 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-14	E440	31-Aug-2020	19-Sep-2020	180 days	18 days	✓	21-Sep-2020	161 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-10	E440	30-Aug-2020	19-Sep-2020	180 days	19 days	✓	21-Sep-2020	160 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-11	E440	30-Aug-2020	19-Sep-2020	180 days	19 days	✓	21-Sep-2020	160 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-12	E440	30-Aug-2020	19-Sep-2020	180 days	19 days	✓	21-Sep-2020	160 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-12	E440	30-Aug-2020	21-Sep-2020	180 days	21 days	✓	21-Sep-2020	158 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-6	E440	30-Aug-2020	21-Sep-2020	180 days	22 days	✓	21-Sep-2020	157 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-9	E440	29-Aug-2020	21-Sep-2020	180 days	22 days	✓	21-Sep-2020	157 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP G	E440	29-Aug-2020	21-Sep-2020	180 days	23 days	✓	21-Sep-2020	156 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-3	E440	28-Aug-2020	21-Sep-2020	180 days	23 days	✓	21-Sep-2020	156 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-4	E440	29-Aug-2020	21-Sep-2020	180 days	23 days	✓	21-Sep-2020	156 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-5	E440	29-Aug-2020	21-Sep-2020	180 days	23 days	✓	21-Sep-2020	156 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP F	E440	28-Aug-2020	21-Sep-2020	180 days	24 days	✓	21-Sep-2020	155 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-10	E440	27-Aug-2020	21-Sep-2020	180 days	24 days	✓	21-Sep-2020	155 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-11	E440	27-Aug-2020	21-Sep-2020	180 days	24 days	✓	21-Sep-2020	155 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-1	E440	28-Aug-2020	21-Sep-2020	180 days	24 days	✓	21-Sep-2020	155 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-2	E440	28-Aug-2020	21-Sep-2020	180 days	24 days	✓	21-Sep-2020	155 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP E	E440	27-Aug-2020	21-Sep-2020	180 days	25 days	✓	21-Sep-2020	154 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-6	E440	27-Aug-2020	21-Sep-2020	180 days	25 days	✓	21-Sep-2020	154 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-7	E440	27-Aug-2020	21-Sep-2020	180 days	25 days	✓	21-Sep-2020	154 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-8	E440	27-Aug-2020	21-Sep-2020	180 days	25 days	✓	21-Sep-2020	154 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-9	E440	27-Aug-2020	21-Sep-2020	180 days	25 days	✓	21-Sep-2020	154 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-4	E440	25-Aug-2020	21-Sep-2020	180 days	27 days	✓	21-Sep-2020	152 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-5	E440	25-Aug-2020	21-Sep-2020	180 days	27 days	✓	21-Sep-2020	152 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-6	E440	25-Aug-2020	21-Sep-2020	180 days	27 days	✓	21-Sep-2020	152 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-7	E440	18-Aug-2020	18-Sep-2020	180 days	30 days	✓	18-Sep-2020	149 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-8	E440	18-Aug-2020	18-Sep-2020	180 days	30 days	✓	18-Sep-2020	149 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP E	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP F	E351	28-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP G	E351	29-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-10	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-11	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-12	E351	30-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-6	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-7	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-8	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-9	E351	27-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-1	E351	28-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-14	E351	31-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-2	E351	28-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-3	E351	28-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-4	E351	29-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-5	E351	29-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-6	E351	30-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-10	E351	30-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-4	E351	25-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-5	E351	25-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-6	E351	25-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-7	E351	31-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-11	E351	30-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-12	E351	30-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-13	E351	31-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-7	E351	18-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-8	E351	18-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-9	E351	29-Aug-2020	----	----	----		19-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP E	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP F	E354	28-Aug-2020	----	----	----		21-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP G	E354	29-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-10	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-11	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-12	E354	30-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-6	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-7	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-8	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-9	E354	27-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-1	E354	28-Aug-2020	----	----	----		21-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-14	E354	31-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-2	E354	28-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-3	E354	28-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-4	E354	29-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-5	E354	29-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-6	E354	30-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-10	E354	30-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-4	E354	25-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-5	E354	25-Aug-2020	----	----	----		21-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-6	E354	25-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-7	E354	31-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-11	E354	30-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-12	E354	30-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-13	E354	31-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-7	E354	18-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-8	E354	18-Aug-2020	----	----	----		21-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-9	E354	29-Aug-2020	----	----	----		21-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP E	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP F	E144	28-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP G	E144	29-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-10	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-11	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-12	E144	30-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-6	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-7	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-8	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-9	E144	27-Aug-2020	----	----	----		18-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-1	E144	28-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-14	E144	31-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-2	E144	28-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-3	E144	28-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-4	E144	29-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-5	E144	29-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-6	E144	30-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-10	E144	30-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-4	E144	25-Aug-2020	----	----	----		18-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-5	E144	25-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-6	E144	25-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-7	E144	31-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-11	E144	30-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-12	E144	30-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-13	E144	31-Aug-2020	----	----	----		18-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-7	E144	18-Aug-2020	----	----	----		17-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-8	E144	18-Aug-2020	----	----	----		17-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-9	E144	29-Aug-2020	----	----	----		18-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-7	E108	31-Aug-2020	19-Sep-2020	29 days	18 days	✓	21-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-13	E108	31-Aug-2020	19-Sep-2020	29 days	18 days	✓	21-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-14	E108	31-Aug-2020	19-Sep-2020	30 days	18 days	✓	21-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-12	E108	30-Aug-2020	19-Sep-2020	30 days	19 days	✓	21-Sep-2020	10 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-6	E108	30-Aug-2020	19-Sep-2020	30 days	19 days	✓	21-Sep-2020	10 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-10	E108	30-Aug-2020	19-Sep-2020	30 days	19 days	✓	21-Sep-2020	10 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-11	E108	30-Aug-2020	19-Sep-2020	30 days	19 days	✓	21-Sep-2020	10 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-12	E108	30-Aug-2020	19-Sep-2020	30 days	19 days	✓	21-Sep-2020	10 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP G	E108	29-Aug-2020	19-Sep-2020	30 days	20 days	✓	21-Sep-2020	9 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-4	E108	29-Aug-2020	19-Sep-2020	30 days	20 days	✓	21-Sep-2020	9 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-5	E108	29-Aug-2020	19-Sep-2020	30 days	20 days	✓	21-Sep-2020	9 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-9	E108	29-Aug-2020	19-Sep-2020	30 days	20 days	✓	21-Sep-2020	9 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP F	E108	28-Aug-2020	19-Sep-2020	30 days	21 days	✓	21-Sep-2020	8 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-1	E108	28-Aug-2020	19-Sep-2020	30 days	21 days	✓	21-Sep-2020	8 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-2	E108	28-Aug-2020	19-Sep-2020	30 days	21 days	✓	21-Sep-2020	8 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-3	E108	28-Aug-2020	19-Sep-2020	30 days	21 days	✓	21-Sep-2020	8 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP E	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-10	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-11	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-6	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-7	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-8	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-9	E108	27-Aug-2020	19-Sep-2020	30 days	22 days	✓	21-Sep-2020	7 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-4	E108	25-Aug-2020	19-Sep-2020	30 days	24 days	✓	21-Sep-2020	5 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-5	E108	25-Aug-2020	19-Sep-2020	30 days	24 days	✓	21-Sep-2020	5 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-6	E108	25-Aug-2020	19-Sep-2020	30 days	24 days	✓	21-Sep-2020	5 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-7	E108	18-Aug-2020	18-Sep-2020	30 days	30 days	✓	18-Sep-2020	-1 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-8	E108	18-Aug-2020	18-Sep-2020	30 days	30 days	✓	18-Sep-2020	-1 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-13	E641A-L	31-Aug-2020	18-Sep-2020	13 days	17 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-7	E641A-L	31-Aug-2020	18-Sep-2020	13 days	18 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-12	E641A-L	30-Aug-2020	18-Sep-2020	14 days	18 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-14	E641A-L	31-Aug-2020	18-Sep-2020	14 days	18 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-12	E641A-L	30-Aug-2020	18-Sep-2020	14 days	18 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP G	E641A-L	29-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-5	E641A-L	29-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-6	E641A-L	30-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-9	E641A-L	29-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-10	E641A-L	30-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-11	E641A-L	30-Aug-2020	18-Sep-2020	14 days	19 days	× EHTR	22-Sep-2020	40 days	4 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP F	E641A-L	28-Aug-2020	18-Sep-2020	14 days	20 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-1	E641A-L	28-Aug-2020	18-Sep-2020	14 days	20 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-2	E641A-L	28-Aug-2020	18-Sep-2020	14 days	20 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-3	E641A-L	28-Aug-2020	18-Sep-2020	14 days	20 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-4	E641A-L	29-Aug-2020	18-Sep-2020	14 days	20 days	× EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP E	E641A-L	27-Aug-2020	18-Sep-2020	14 days	21 days	× EHTR	22-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-10	E641A-L	27-Aug-2020	18-Sep-2020	14 days	21 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-11	E641A-L	27-Aug-2020	18-Sep-2020	14 days	21 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-8	E641A-L	27-Aug-2020	18-Sep-2020	14 days	21 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-9	E641A-L	27-Aug-2020	18-Sep-2020	14 days	21 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-6	E641A-L	27-Aug-2020	18-Sep-2020	14 days	22 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-7	E641A-L	27-Aug-2020	18-Sep-2020	14 days	22 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-5	E641A-L	25-Aug-2020	18-Sep-2020	14 days	23 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-6	E641A-L	25-Aug-2020	18-Sep-2020	14 days	23 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-4	E641A-L	25-Aug-2020	18-Sep-2020	14 days	24 days	✘ EHTR	22-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-7	E641A-L	18-Aug-2020	17-Sep-2020	14 days	30 days	× EHTR	18-Sep-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-8	E641A-L	18-Aug-2020	17-Sep-2020	14 days	30 days	× EHTR	18-Sep-2020	40 days	0 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP E	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP F	E611C	28-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP G	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-10	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-11	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-6	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-7	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-8	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-9	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-1	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-14	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-2	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-3	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-4	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-5	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-6	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-10	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-4	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-5	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-6	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-7	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-11	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-13	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-7	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-8	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-9	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-7	E611C	31-Aug-2020	29-Sep-2020	39 days	28 days	✓	30-Sep-2020	11 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-13	E611C	31-Aug-2020	29-Sep-2020	39 days	28 days	✓	30-Sep-2020	11 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-4	E611C	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-5	E611C	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-6	E611C	25-Aug-2020	22-Sep-2020	40 days	27 days	✓	24-Sep-2020	12 days	2 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-14	E611C	31-Aug-2020	29-Sep-2020	40 days	28 days	✓	30-Sep-2020	11 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-12	E611C	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-10	E611C	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-11	E611C	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-12	E611C	30-Aug-2020	29-Sep-2020	40 days	29 days	✓	30-Sep-2020	10 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP G	E611C	29-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-6	E611C	30-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-9	E611C	29-Aug-2020	29-Sep-2020	40 days	30 days	✓	30-Sep-2020	9 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP F	E611C	28-Aug-2020	29-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-6	E611C	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-7	E611C	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-8	E611C	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-9	E611C	27-Aug-2020	28-Sep-2020	40 days	31 days	✓	29-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP E	E611C	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-10	E611C	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-11	E611C	27-Aug-2020	29-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-7	E611C	18-Aug-2020	22-Sep-2020	40 days	34 days	✓	24-Sep-2020	5 days	2 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-8	E611C	18-Aug-2020	22-Sep-2020	40 days	34 days	✓	24-Sep-2020	5 days	2 days	✓
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP E	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP F	E611C	28-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP G	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-10	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-11	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-6	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-7	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-8	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-9	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-1	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-14	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-2	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-3	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-4	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-5	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-6	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-10	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-4	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-5	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-6	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-7	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-11	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-13	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-7	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-8	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-9	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-4	E611C	29-Aug-2020	30-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-5	E611C	29-Aug-2020	30-Sep-2020	40 days	31 days	✓	30-Sep-2020	8 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-1	E611C	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-2	E611C	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-3	E611C	28-Aug-2020	30-Sep-2020	40 days	32 days	✓	30-Sep-2020	7 days	0 days	✓
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP E	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP F	E611C	28-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP G	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-10	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-11	E611C	27-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-6	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-7	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-8	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-9	E611C	27-Aug-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-1	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-14	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-2	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-3	E611C	28-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-4	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-5	E611C	29-Aug-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-6	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-10	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-4	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-5	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-6	E611C	25-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-7	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-11	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-12	E611C	30-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-13	E611C	31-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-7	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-8	E611C	18-Aug-2020	22-Sep-2020	----	----		24-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-9	E611C	29-Aug-2020	29-Sep-2020	----	----		30-Sep-2020	----	----	

Legend & Qualifier Definitions

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHC - EPH by GC-FID	E601A	87614	3	34	8.8	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	87615	3	28	10.7	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	87610	3	35	8.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	87609	3	36	8.3	5.0	✓
Moisture Content by Gravimetry	E144	87149	4	33	12.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	87613	3	35	8.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	87611	3	36	8.3	5.0	✓
Total Carbon by Combustion	E351	88752	2	36	5.5	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	89335	2	33	6.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	89522	5	78	6.4	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	89521	5	70	7.1	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	87614	6	34	17.6	10.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	87615	6	28	21.4	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	87610	6	35	17.1	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	87609	6	36	16.6	10.0	✓
Moisture Content by Gravimetry	E144	87149	4	33	12.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	87613	6	35	17.1	10.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	87611	3	36	8.3	5.0	✓
Total Carbon by Combustion	E351	88752	4	36	11.1	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	89335	4	33	12.1	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	89522	5	78	6.4	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	89521	5	70	7.1	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	87614	3	34	8.8	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	87615	3	28	10.7	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	87610	3	35	8.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	87609	3	36	8.3	5.0	✓
Moisture Content by Gravimetry	E144	87149	4	33	12.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	87613	3	35	8.5	5.0	✓
Total Carbon by Combustion	E351	88752	2	36	5.5	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	89335	2	33	6.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	89522	5	78	6.4	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	89521	5	70	7.1	5.0	✓
Matrix Spikes (MS)							
VH and F1 by Headspace GC-FID	E581.VH+F1	89522	5	78	6.4	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	89521	5	70	7.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry’s law.
CCME PHC - F2-F4 by GC-FID	E601.SG Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME Fractions 2-4 (F2-F4).
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
F1-BTEX	EC580 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
F2 to F3 minus PAH	EC600 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F2-PAH = CCME Fraction 2 (C10-C16) minus Naphthalene F3-PAH = CCME Fraction 3 (C16-C34) minus select Polycyclic Aromatic Hydrocarbons (PAH) as per CCME Soil Tier 1
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA20B5306**	Page	: 1 of 49
Client	: Golder Associates Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Christine Bylenga	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 15-Sep-2020 12:45
PO	: ----	Date Analysis Commenced	: 17-Sep-2020
C-O-C number	: 17-766308, 15-560013,15-560021	Issue Date	: 01-Oct-2020 17:42
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 28		
No. of samples analysed	: 28		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 87149)											
VA20B5306-001	SW-7	moisture	----	E144	0.25	%	23.2	23.5	1.13%	20%	----
Physical Tests (QC Lot: 87611)											
VA20B5306-001	SW-7	pH (1:2 soil:water)	----	E108	0.10	pH units	8.34	8.35	0.120%	5%	----
Physical Tests (QC Lot: 87881)											
VA20B5306-003	SNW-4	pH (1:2 soil:water)	----	E108	0.10	pH units	8.33	8.34	0.120%	5%	----
Physical Tests (QC Lot: 87885)											
VA20B5306-021	SNE-6	moisture	----	E144	0.25	%	34.1	33.3	2.32%	20%	----
Physical Tests (QC Lot: 87892)											
VA20B5306-023	SNW-10	pH (1:2 soil:water)	----	E108	0.10	pH units	8.33	8.30	0.361%	5%	----
Physical Tests (QC Lot: 87898)											
VA20B4674-084	Anonymous	moisture	----	E144	0.25	%	17.3	16.5	4.32%	20%	----
Physical Tests (QC Lot: 88142)											
VA20B5306-003	SNW-4	moisture	----	E144	0.25	%	29.3	29.4	0.396%	20%	----
Organic / Inorganic Carbon (QC Lot: 88752)											
VA20B5306-001	SW-7	carbon, total [TC]	----	E351	0.050	%	5.81	5.75	1.00%	20%	----
Organic / Inorganic Carbon (QC Lot: 88764)											
VA20B5165-005	Anonymous	carbon, total [TC]	----	E351	0.050	%	1.76	1.78	1.38%	20%	----
Organic / Inorganic Carbon (QC Lot: 89335)											
VA20B5306-001	SW-7	carbon, inorganic [IC]	----	E354	0.050	%	2.02	2.06	1.63%	20%	----
Organic / Inorganic Carbon (QC Lot: 89343)											
VA20B5306-021	SNE-6	carbon, inorganic [IC]	----	E354	0.050	%	3.03	3.04	0.197%	20%	----
Metals (QC Lot: 87609)											
VA20B2613-013	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	26500	26800	0.953%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.56	0.56	0.008	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	8.02	7.96	0.631%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	178	190	6.84%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.49	0.51	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.147	0.158	7.24%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	4250	4490	5.49%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 87609) - continued											
VA20B2613-013	Anonymous	chromium	7440-47-3	E440	0.50	mg/kg	62.3	64.2	2.89%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	18.5	19.0	2.34%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	34.1	34.5	1.32%	30%	----
		iron	7439-89-6	E440	50	mg/kg	42200	44300	5.02%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	11.3	11.2	1.42%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	17.5	18.9	7.84%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	8720	9030	3.57%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	610	671	9.61%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.05	1.05	0.112%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	43.9	45.4	3.44%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	560	589	5.12%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1010	1050	4.11%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	0.22	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	44.9	47.4	5.42%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.122	0.126	0.004	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1180	1240	4.42%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.01	1.04	3.61%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	78.2	77.6	0.835%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	76.4	79.1	3.40%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	5.2	5.8	0.6	Diff <2x LOR	----
Metals (QC Lot: 87610)											
VA20B5306-001	SW-7	mercury	7439-97-6	E510	0.0050	mg/kg	0.0089	0.0090	0.0002	Diff <2x LOR	----
Metals (QC Lot: 87879)											
VA20B5306-003	SNW-4	aluminum	7429-90-5	E440	50	mg/kg	8200	7910	3.58%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.16	0.15	0.005	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.83	5.41	7.46%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	21.5	20.9	2.82%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.51	0.48	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	53.2	52.8	0.735%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.092	0.097	0.005	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	87300	87100	0.179%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 87879) - continued											
VA20B5306-003	SNW-4	chromium	7440-47-3	E440	0.50	mg/kg	24.4	23.1	5.63%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	4.32	4.25	1.67%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	9.84	9.45	4.08%	30%	----
		iron	7439-89-6	E440	50	mg/kg	14500	14100	2.73%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	7.91	7.97	0.859%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	36.5	36.2	1.00%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	42900	40300	6.29%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	156	151	2.62%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.37	0.37	0.002	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	13.2	12.9	2.36%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	434	405	6.77%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	3300	3220	2.23%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.26	0.23	0.03	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	4740	4530	4.50%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	56.0	54.7	2.44%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.144	0.139	0.006	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	290	282	2.64%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.12	1.15	2.89%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	31.1	29.9	3.73%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	22.2	22.3	0.678%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	6.7	7.0	4.68%	30%	----
Metals (QC Lot: 87880)											
VA20B5306-003	SNW-4	mercury	7439-97-6	E510	0.0050	mg/kg	0.0154	0.0153	0.00009	Diff <2x LOR	----
Metals (QC Lot: 87890)											
VA20B5306-023	SNW-10	aluminum	7429-90-5	E440	50	mg/kg	3790	3900	2.88%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	3.43	3.44	0.170%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	11.8	12.1	2.62%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.24	0.25	0.01	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	25.7	26.8	1.2	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 87890) - continued											
VA20B5306-023	SNW-10	calcium	7440-70-2	E440	50	mg/kg	66200	62800	5.32%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	14.8	14.3	2.84%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	2.67	2.56	3.99%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	4.86	4.81	1.01%	30%	----
		iron	7439-89-6	E440	50	mg/kg	11800	11600	2.17%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	3.25	3.29	1.28%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	19.7	20.2	2.39%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	35800	33600	6.22%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	118	113	4.35%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.30	0.30	0.005	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	7.64	7.61	0.347%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	409	408	0.0864%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1640	1710	3.96%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	3470	3160	9.47%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	40.6	36.0	12.0%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.072	0.072	0.0005	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	220	224	2.10%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.596	0.582	2.39%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	14.3	13.7	4.77%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	10.9	10.6	0.3	Diff <2x LOR	----
		zirconium	7440-67-7	E440	1.0	mg/kg	3.9	3.8	0.1	Diff <2x LOR	----
Metals (QC Lot: 87891)											
VA20B5306-023	SNW-10	mercury	7439-97-6	E510	0.0050	mg/kg	0.0056	0.0070	0.0013	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 89521)											
VA20B5306-001	SW-7	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 89521) - continued											
VA20B5306-001	SW-7	chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 93112)											
VA20B5306-006	SE-6	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 93112) - continued											
VA20B5306-006	SE-6	chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	0.059	0.061	0.002	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 93776)											
VA20B5306-010	SE-10	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 93776) - continued											
VA20B5306-010	SE-10	chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 94359)											
KS2001808-003	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 94359) - continued											
KS2001808-003	Anonymous	chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 94493)											
VA20B5306-018	SNE-5	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 94493) - continued											
VA20B5306-018	SNE-5	chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 87615)											
VA20B5306-001	SW-7	F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	0	Diff <2x LOR	----
		F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 87883)											
VA20B5306-003	SNW-4	F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	0	Diff <2x LOR	----
		F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Hydrocarbons (QC Lot: 87895)											
VA20B5306-023	SNW-10	F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	0	Diff <2x LOR	----
		F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 89522)											
VA20B5306-001	SW-7	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 93113)											
VA20B5306-006	SE-6	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 93775)											
VA20B5072-007	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	14.0	10.6	3.4	Diff <2x LOR	----
Hydrocarbons (QC Lot: 94358)											
KS2001808-003	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 94494)											
VA20B5306-018	SNE-5	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 87613)											
VA20B5306-001	SW-7	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 87882)											

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Polycyclic Aromatic Hydrocarbons (QC Lot: 87882) - continued											
VA20B5306-003	SNW-4	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 87894)											
VA20B4674-084	Anonymous	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 87894) - continued											
VA20B4674-084	Anonymous	methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	0.012	0.012	0.00007	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	0.021	0.022	0.00007	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 87149)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 87885)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 87898)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 88142)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 88752)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 88764)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 89335)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 89343)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Metals (QCLot: 87609)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 87609) - continued						
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 87610)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 87879)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 87879) - continued						
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 87880)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 87890)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 87890) - continued						
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 87891)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Volatile Organic Compounds (QCLot: 89521)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 89521) - continued						
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 93112)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued						
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 93776)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 93776) - continued						
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 94359)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 94359) - continued						
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 94493)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 94493) - continued						
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 87615)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
					<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
					<50	----
Hydrocarbons (QCLot: 87883)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
					<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
Hydrocarbons (QCLot: 87895)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
					<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
					<50	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 89522)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 93113)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 93775)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 94358)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 94494)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87613)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0075	----
					<0.0075	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0075	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0075	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0075	----
					<0.0075	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 87882)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87894)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
					<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 87894) - continued						
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 87149)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Physical Tests (QCLot: 87611)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 87881)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 87885)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 87892)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 87898)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Physical Tests (QCLot: 88142)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Organic / Inorganic Carbon (QCLot: 88752)									
carbon, total [TC]	----	E351	0.05	%	48 %	99.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 88764)									
carbon, total [TC]	----	E351	0.05	%	48 %	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 89335)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	96.0	90.0	110	----
Organic / Inorganic Carbon (QCLot: 89343)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	96.8	90.0	110	----
Metals (QCLot: 87609)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	111	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	94.6	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	95.5	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 87609) - continued									
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	107	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	116	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	86.7	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	107	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	114	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	113	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	111	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	113	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	105	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	109	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	108	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	107	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	105	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	109	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	109	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	100	80.0	120	----
Metals (QCLot: 87610)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 87879)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	99.2	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	96.4	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
					Laboratory Control Sample (LCS) Report				
Metals (QCLot: 87879) - continued									
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.5	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	112	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	97.0	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.7	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	93.3	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.1	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	108	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	98.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	91.9	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.0	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	108	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	102	80.0	120	----
Metals (QCLot: 87880)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	105	80.0	120	----
Metals (QCLot: 87890)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	105	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	94.3	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100.0	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	95.1	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 87890) - continued									
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	99.7	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	110	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	94.9	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	100	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	97.1	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.0	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.3	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	105	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	109	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	107	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.7	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	94.7	80.0	120	----
Metals (QCLot: 87891)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	106	80.0	120	----
Volatile Organic Compounds (QCLot: 89521)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	92.0	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	128	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	99.6	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	87.2	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	80.7	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 89521) - continued									
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	85.2	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	99.6	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	122	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	93.0	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	75.2	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	77.8	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	113	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	91.8	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	121	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	96.0	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	93.6	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	98.0	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	# 155	60.0	140	LCS-ND
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	81.8	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	106	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
Volatile Organic Compounds (QCLot: 93112)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	97.0	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	93.4	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	102	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	78.5	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	101	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	89.7	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	86.5	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	97.2	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued									
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	80.5	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	92.7	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	94.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	96.3	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	89.9	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	92.2	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	95.9	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	95.6	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	87.4	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	85.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	112	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	81.6	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	76.3	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	84.1	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	93.6	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	85.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	91.3	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	89.1	70.0	130	----
Volatile Organic Compounds (QCLot: 93776)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	86.5	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	87.0	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	97.8	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	83.0	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	89.2	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	87.2	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	92.6	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	87.4	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	96.1	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	91.6	70.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93776) - continued									
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	94.5	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	88.5	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	86.7	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	83.4	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	89.9	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	90.5	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	88.6	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	96.0	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	95.1	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	90.0	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	99.0	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	94.6	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	96.5	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	86.9	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	91.5	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	93.5	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	84.8	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	84.6	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	87.5	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	85.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	105	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	90.2	70.0	130	----
Volatile Organic Compounds (QCLot: 94359)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	93.8	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	91.3	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	99.8	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	94.1	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	91.5	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	92.3	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	79.8	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	92.9	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	98.4	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	87.3	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	99.9	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 94359) - continued									
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	95.4	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	87.6	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	96.8	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	87.6	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	96.9	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	91.2	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	90.2	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	99.7	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	90.4	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	86.1	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	84.3	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	90.5	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	91.4	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	97.3	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	100	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	124	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	75.9	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	96.8	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	99.0	70.0	130	----
Volatile Organic Compounds (QCLot: 94493)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	85.1	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	83.6	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	88.0	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	84.6	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	86.1	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	94.5	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	91.7	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	94.7	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	86.1	70.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Volatile Organic Compounds (QCLot: 94493) - continued									
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	80.4	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	84.8	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	85.7	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	83.9	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	85.7	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	90.8	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	86.0	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	89.0	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	99.1	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	93.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	90.5	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	87.9	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	87.9	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	92.6	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	76.3	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	84.1	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	97.9	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	82.5	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	106	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	89.2	70.0	130	----
Hydrocarbons (QCLot: 87615)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	101	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	95.8	70.0	130	----
					14124 mg/kg	93.2	70.0	130	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	89.8	70.0	130	----
					1238 mg/kg	109	70.0	130	----
Hydrocarbons (QCLot: 87883)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	106	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	98.3	70.0	130	----
					14124 mg/kg	87.0	70.0	130	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	97.4	70.0	130	----
Hydrocarbons (QCLot: 87895)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	123	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	114	70.0	130	----
					14124 mg/kg	97.8	70.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Hydrocarbons (QCLot: 87895) - continued									
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	108	70.0	130	----
					1238 mg/kg	109	70.0	130	----
Hydrocarbons (QCLot: 89522)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	100	70.0	130	----
Hydrocarbons (QCLot: 93113)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	114	70.0	130	----
Hydrocarbons (QCLot: 93775)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	90.3	70.0	130	----
Hydrocarbons (QCLot: 94358)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	115	70.0	130	----
Hydrocarbons (QCLot: 94494)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	108	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87613)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	96.8	60.0	130	----
					0.638 mg/kg	98.1	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	95.0	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	99.6	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	91.4	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	96.1	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	93.8	60.0	130	----
					0.135 mg/kg	104	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	96.2	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	93.6	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96.9	60.0	130	----
					0.34 mg/kg	96.2	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	98.8	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	94.8	60.0	130	----
					1.196 mg/kg	95.4	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					1.757 mg/kg	100	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	98.3	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	89.6	60.0	130	----
					0.445 mg/kg	92.8	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	90.0	60.0	130	----
					1.256 mg/kg	95.8	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	87.1	60.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 87613) - continued									
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	86.6	50.0	130	----
					1.03 mg/kg	98.8	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	98.3	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					1.325 mg/kg	101	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	93.1	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87882)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	99.8	60.0	130	----
					0.638 mg/kg	96.1	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	98.8	60.0	130	----
					0.2 mg/kg	108	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	95.8	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	97.2	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	97.1	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	98.1	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	98.6	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	97.0	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	99.5	60.0	130	----
					0.34 mg/kg	80.5	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.0	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	100	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	98.0	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.6	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	94.1	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
					1.325 mg/kg	97.7	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	98.7	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87894)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	102	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	99.9	60.0	130	----
					0.2 mg/kg	106	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	95.6	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	99.6	60.0	130	----
					0.32 mg/kg	102	60.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 87894) - continued									
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
					0.545 mg/kg	93.1	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	98.9	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	95.6	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
					0.34 mg/kg	96.9	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
					0.666 mg/kg	99.4	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	104	60.0	130	----
					1.196 mg/kg	98.9	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	107	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	98.8	60.0	130	----
					0.445 mg/kg	90.0	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	95.8	60.0	130	----
					1.256 mg/kg	98.8	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.3	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	93.4	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	109	60.0	130	----
					1.325 mg/kg	99.2	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	95.5	60.0	130	----

Qualifiers

Qualifier	*Description*
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 89521)										
VA20B5306-001	SW-7	benzene	71-43-2	E611C	1.73 mg/kg	3.125 mg/kg	84.8	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.94 mg/kg	3.125 mg/kg	94.6	60.0	140	----
		bromoform	75-25-2	E611C	2.38 mg/kg	3.125 mg/kg	116	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	1.80 mg/kg	3.125 mg/kg	88.1	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.84 mg/kg	3.125 mg/kg	89.8	60.0	140	----
		chloroethane	75-00-3	E611C	1.72 mg/kg	3.125 mg/kg	84.0	60.0	140	----
		chloroform	67-66-3	E611C	1.80 mg/kg	3.125 mg/kg	87.8	60.0	140	----
		chloromethane	74-87-3	E611C	1.80 mg/kg	3.125 mg/kg	87.9	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.17 mg/kg	3.125 mg/kg	106	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	1.85 mg/kg	3.125 mg/kg	90.6	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.70 mg/kg	3.125 mg/kg	83.3	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	1.73 mg/kg	3.125 mg/kg	84.7	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.74 mg/kg	3.125 mg/kg	85.4	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	1.90 mg/kg	3.125 mg/kg	93.0	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.68 mg/kg	3.125 mg/kg	82.3	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.76 mg/kg	3.125 mg/kg	86.0	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.67 mg/kg	3.125 mg/kg	81.6	60.0	140	----
		dichloromethane	75-09-2	E611C	1.80 mg/kg	3.125 mg/kg	88.3	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.85 mg/kg	3.125 mg/kg	90.6	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	1.82 mg/kg	3.125 mg/kg	89.1	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.00 mg/kg	3.125 mg/kg	97.8	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.85 mg/kg	3.125 mg/kg	90.4	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	1.98 mg/kg	3.125 mg/kg	97.0	60.0	140	----
		styrene	100-42-5	E611C	1.86 mg/kg	3.125 mg/kg	91.1	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.10 mg/kg	3.125 mg/kg	103	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.18 mg/kg	3.125 mg/kg	107	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	1.57 mg/kg	3.125 mg/kg	76.8	60.0	140	----
		toluene	108-88-3	E611C	1.63 mg/kg	3.125 mg/kg	79.6	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	1.69 mg/kg	3.125 mg/kg	82.8	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.98 mg/kg	3.125 mg/kg	96.9	60.0	140	----
		trichloroethylene	79-01-6	E611C	1.64 mg/kg	3.125 mg/kg	80.4	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	1.86 mg/kg	3.125 mg/kg	91.2	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
Volatile Organic Compounds (QCLot: 89521) - continued										
VA20B5306-001	SW-7	vinyl chloride	75-01-4	E611C	1.69 mg/kg	3.125 mg/kg	82.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	3.46 mg/kg	6.25 mg/kg	84.7	60.0	140	----
		xylene, o-	95-47-6	E611C	1.76 mg/kg	3.125 mg/kg	86.3	60.0	140	----
Volatile Organic Compounds (QCLot: 93112)										
VA20B5306-007	SE-7	benzene	71-43-2	E611C	1.90 mg/kg	3.125 mg/kg	68.9	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.96 mg/kg	3.125 mg/kg	71.3	60.0	140	----
		bromoform	75-25-2	E611C	2.36 mg/kg	3.125 mg/kg	85.9	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.29 mg/kg	3.125 mg/kg	83.2	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.92 mg/kg	3.125 mg/kg	69.9	60.0	140	----
		chloroethane	75-00-3	E611C	1.81 mg/kg	3.125 mg/kg	65.7	60.0	140	----
		chloroform	67-66-3	E611C	1.79 mg/kg	3.125 mg/kg	65.1	60.0	140	----
		chloromethane	74-87-3	E611C	2.78 mg/kg	3.125 mg/kg	101	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.06 mg/kg	3.125 mg/kg	74.7	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.08 mg/kg	3.125 mg/kg	75.6	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.69 mg/kg	3.125 mg/kg	61.4	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	1.96 mg/kg	3.125 mg/kg	71.2	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.83 mg/kg	3.125 mg/kg	66.4	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.05 mg/kg	3.125 mg/kg	74.4	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.76 mg/kg	3.125 mg/kg	63.8	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.78 mg/kg	3.125 mg/kg	64.6	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.73 mg/kg	3.125 mg/kg	62.7	60.0	140	----
		dichloromethane	75-09-2	E611C	1.94 mg/kg	3.125 mg/kg	70.4	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.97 mg/kg	3.125 mg/kg	71.6	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.50 mg/kg	3.125 mg/kg	91.0	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.49 mg/kg	3.125 mg/kg	90.6	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.72 mg/kg	3.125 mg/kg	62.5	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.32 mg/kg	3.125 mg/kg	84.1	60.0	140	----
		styrene	100-42-5	E611C	1.79 mg/kg	3.125 mg/kg	65.2	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	1.74 mg/kg	3.125 mg/kg	63.2	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.62 mg/kg	3.125 mg/kg	95.2	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.36 mg/kg	3.125 mg/kg	85.7	60.0	140	----
		toluene	108-88-3	E611C	1.78 mg/kg	3.125 mg/kg	64.8	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.55 mg/kg	3.125 mg/kg	92.5	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.87 mg/kg	3.125 mg/kg	67.9	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.30 mg/kg	3.125 mg/kg	83.5	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	1.72 mg/kg	3.125 mg/kg	62.6	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued										
VA20B5306-007	SE-7	vinyl chloride	75-01-4	E611C	2.57 mg/kg	3.125 mg/kg	93.5	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	3.62 mg/kg	6.25 mg/kg	65.8	60.0	140	----
		xylene, o-	95-47-6	E611C	1.80 mg/kg	3.125 mg/kg	65.3	60.0	140	----
Volatile Organic Compounds (QCLot: 93776)										
VA20B5306-011	SE-11	benzene	71-43-2	E611C	2.07 mg/kg	3.125 mg/kg	81.7	60.0	140	----
		bromodichloromethane	75-27-4	E611C	2.06 mg/kg	3.125 mg/kg	81.0	60.0	140	----
		bromoform	75-25-2	E611C	2.36 mg/kg	3.125 mg/kg	92.7	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.05 mg/kg	3.125 mg/kg	80.6	60.0	140	----
		chlorobenzene	108-90-7	E611C	2.10 mg/kg	3.125 mg/kg	82.6	60.0	140	----
		chloroethane	75-00-3	E611C	2.16 mg/kg	3.125 mg/kg	85.2	60.0	140	----
		chloroform	67-66-3	E611C	2.60 mg/kg	3.125 mg/kg	102	60.0	140	----
		chloromethane	74-87-3	E611C	2.35 mg/kg	3.125 mg/kg	92.6	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.08 mg/kg	3.125 mg/kg	81.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.18 mg/kg	3.125 mg/kg	86.0	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	2.09 mg/kg	3.125 mg/kg	82.2	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.14 mg/kg	3.125 mg/kg	84.5	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	2.15 mg/kg	3.125 mg/kg	84.6	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.05 mg/kg	3.125 mg/kg	80.6	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.10 mg/kg	3.125 mg/kg	82.6	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.13 mg/kg	3.125 mg/kg	83.9	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.01 mg/kg	3.125 mg/kg	79.0	60.0	140	----
		dichloromethane	75-09-2	E611C	2.12 mg/kg	3.125 mg/kg	83.3	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.09 mg/kg	3.125 mg/kg	82.5	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.19 mg/kg	3.125 mg/kg	86.1	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.13 mg/kg	3.125 mg/kg	83.9	60.0	140	----
		ethylbenzene	100-41-4	E611C	2.03 mg/kg	3.125 mg/kg	79.9	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.37 mg/kg	3.125 mg/kg	93.4	60.0	140	----
		styrene	100-42-5	E611C	2.15 mg/kg	3.125 mg/kg	84.7	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.50 mg/kg	3.125 mg/kg	98.6	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.19 mg/kg	3.125 mg/kg	86.4	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.02 mg/kg	3.125 mg/kg	79.5	60.0	140	----
		toluene	108-88-3	E611C	2.10 mg/kg	3.125 mg/kg	82.6	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.27 mg/kg	3.125 mg/kg	89.5	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.92 mg/kg	3.125 mg/kg	75.6	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.01 mg/kg	3.125 mg/kg	79.0	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.64 mg/kg	3.125 mg/kg	104	60.0	140	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Volatile Organic Compounds (QCLot: 93776) - continued										
VA20B5306-011	SE-11	vinyl chloride	75-01-4	E611C	2.16 mg/kg	3.125 mg/kg	85.1	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.74 mg/kg	6.25 mg/kg	93.4	60.0	140	----
		xylene, o-	95-47-6	E611C	2.04 mg/kg	3.125 mg/kg	80.2	60.0	140	----
Volatile Organic Compounds (QCLot: 94359)										
KS2001808-003	Anonymous	benzene	71-43-2	E611C	2.86 mg/kg	3.125 mg/kg	95.4	60.0	140	----
		bromodichloromethane	75-27-4	E611C	2.82 mg/kg	3.125 mg/kg	94.1	60.0	140	----
		bromoform	75-25-2	E611C	3.24 mg/kg	3.125 mg/kg	108	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.81 mg/kg	3.125 mg/kg	93.7	60.0	140	----
		chlorobenzene	108-90-7	E611C	2.74 mg/kg	3.125 mg/kg	91.6	60.0	140	----
		chloroethane	75-00-3	E611C	2.88 mg/kg	3.125 mg/kg	96.2	60.0	140	----
		chloroform	67-66-3	E611C	2.78 mg/kg	3.125 mg/kg	92.7	60.0	140	----
		chloromethane	74-87-3	E611C	2.84 mg/kg	3.125 mg/kg	94.7	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.86 mg/kg	3.125 mg/kg	95.6	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.84 mg/kg	3.125 mg/kg	94.7	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	2.47 mg/kg	3.125 mg/kg	82.3	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.84 mg/kg	3.125 mg/kg	94.8	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	2.86 mg/kg	3.125 mg/kg	95.6	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.85 mg/kg	3.125 mg/kg	95.1	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.92 mg/kg	3.125 mg/kg	97.4	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.68 mg/kg	3.125 mg/kg	89.4	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.93 mg/kg	3.125 mg/kg	97.9	60.0	140	----
		dichloromethane	75-09-2	E611C	2.89 mg/kg	3.125 mg/kg	96.4	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.82 mg/kg	3.125 mg/kg	94.1	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	3.22 mg/kg	3.125 mg/kg	108	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	3.18 mg/kg	3.125 mg/kg	106	60.0	140	----
		ethylbenzene	100-41-4	E611C	2.54 mg/kg	3.125 mg/kg	84.8	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	3.05 mg/kg	3.125 mg/kg	102	60.0	140	----
		styrene	100-42-5	E611C	2.56 mg/kg	3.125 mg/kg	85.3	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.49 mg/kg	3.125 mg/kg	83.2	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	3.30 mg/kg	3.125 mg/kg	110	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.45 mg/kg	3.125 mg/kg	81.9	60.0	140	----
		toluene	108-88-3	E611C	2.62 mg/kg	3.125 mg/kg	87.6	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.79 mg/kg	3.125 mg/kg	93.2	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.65 mg/kg	3.125 mg/kg	88.5	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.92 mg/kg	3.125 mg/kg	97.4	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	3.00 mg/kg	3.125 mg/kg	100	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 94359) - continued										
KS2001808-003	Anonymous	vinyl chloride	75-01-4	E611C	2.55 mg/kg	3.125 mg/kg	85.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	5.36 mg/kg	6.25 mg/kg	89.4	60.0	140	----
		xylene, o-	95-47-6	E611C	2.57 mg/kg	3.125 mg/kg	85.8	60.0	140	----
Volatile Organic Compounds (QCLot: 94493)										
VA20B5306-018	SNE-5	benzene	71-43-2	E611C	1.83 mg/kg	3.125 mg/kg	82.0	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.86 mg/kg	3.125 mg/kg	82.8	60.0	140	----
		bromoform	75-25-2	E611C	2.19 mg/kg	3.125 mg/kg	97.9	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	1.81 mg/kg	3.125 mg/kg	80.9	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.88 mg/kg	3.125 mg/kg	83.9	60.0	140	----
		chloroethane	75-00-3	E611C	1.85 mg/kg	3.125 mg/kg	82.7	60.0	140	----
		chloroform	67-66-3	E611C	1.83 mg/kg	3.125 mg/kg	81.9	60.0	140	----
		chloromethane	74-87-3	E611C	1.92 mg/kg	3.125 mg/kg	85.8	60.0	140	----
		dibromochloromethane	124-48-1	E611C	1.85 mg/kg	3.125 mg/kg	82.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.00 mg/kg	3.125 mg/kg	89.2	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.90 mg/kg	3.125 mg/kg	85.0	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	1.95 mg/kg	3.125 mg/kg	87.0	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.90 mg/kg	3.125 mg/kg	84.7	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	1.83 mg/kg	3.125 mg/kg	81.9	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.84 mg/kg	3.125 mg/kg	82.2	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.88 mg/kg	3.125 mg/kg	84.0	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.76 mg/kg	3.125 mg/kg	78.5	60.0	140	----
		dichloromethane	75-09-2	E611C	1.85 mg/kg	3.125 mg/kg	82.5	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.87 mg/kg	3.125 mg/kg	83.6	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	1.87 mg/kg	3.125 mg/kg	83.4	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	1.78 mg/kg	3.125 mg/kg	79.5	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.78 mg/kg	3.125 mg/kg	79.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.16 mg/kg	3.125 mg/kg	96.7	60.0	140	----
		styrene	100-42-5	E611C	1.90 mg/kg	3.125 mg/kg	85.0	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.25 mg/kg	3.125 mg/kg	101	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.00 mg/kg	3.125 mg/kg	89.2	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	1.78 mg/kg	3.125 mg/kg	79.4	60.0	140	----
		toluene	108-88-3	E611C	1.84 mg/kg	3.125 mg/kg	82.3	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.00 mg/kg	3.125 mg/kg	89.5	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.74 mg/kg	3.125 mg/kg	77.6	60.0	140	----
		trichloroethylene	79-01-6	E611C	1.76 mg/kg	3.125 mg/kg	78.5	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.45 mg/kg	3.125 mg/kg	109	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
Volatile Organic Compounds (QCLot: 94493) - continued										
VA20B5306-018	SNE-5	vinyl chloride	75-01-4	E611C	1.81 mg/kg	3.125 mg/kg	81.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.18 mg/kg	6.25 mg/kg	93.4	60.0	140	----
		xylene, o-	95-47-6	E611C	1.80 mg/kg	3.125 mg/kg	80.3	60.0	140	----
Hydrocarbons (QCLot: 89522)										
VA20B5306-001	SW-7	F1 (C6-C10)	----	E581.VH+F1	97.1 mg/kg	187.5 mg/kg	74.2	60.0	140	----
Hydrocarbons (QCLot: 93113)										
VA20B5306-008	SE-8	F1 (C6-C10)	----	E581.VH+F1	74.5 mg/kg	187.5 mg/kg	64.5	60.0	140	----
Hydrocarbons (QCLot: 93775)										
VA20B5072-041	Anonymous	F1 (C6-C10)	----	E581.VH+F1	140 mg/kg	187.5 mg/kg	104	60.0	140	----
Hydrocarbons (QCLot: 94358)										
KS2001808-003	Anonymous	F1 (C6-C10)	----	E581.VH+F1	166 mg/kg	187.5 mg/kg	92.3	60.0	140	----
Hydrocarbons (QCLot: 94494)										
VA20B5306-018	SNE-5	F1 (C6-C10)	----	E581.VH+F1	150 mg/kg	187.5 mg/kg	112	60.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 88752)									
QC-88752-003	RM	carbon, total [TC]	----	E351	1.4 %	97.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 88764)									
QC-88764-003	RM	carbon, total [TC]	----	E351	1.4 %	96.5	80.0	120	----
Organic / Inorganic Carbon (QCLot: 89335)									
QC-89335-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	100	80.0	120	----
Organic / Inorganic Carbon (QCLot: 89343)									
QC-89343-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	98.5	80.0	120	----
Metals (QCLot: 87609)									
QC-87609-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	109	70.0	130	----
QC-87609-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	96.7	70.0	130	----
QC-87609-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	98.0	70.0	130	----
QC-87609-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-87609-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	94.3	70.0	130	----
QC-87609-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	100	40.0	160	----
QC-87609-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
QC-87609-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	100	70.0	130	----
QC-87609-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	111	70.0	130	----
QC-87609-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-87609-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	99.8	70.0	130	----
QC-87609-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
QC-87609-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	108	70.0	130	----
QC-87609-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	85.9	70.0	130	----
QC-87609-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	105	70.0	130	----
QC-87609-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
QC-87609-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	93.7	70.0	130	----
QC-87609-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-87609-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	103	70.0	130	----
QC-87609-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
QC-87609-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	106	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 87609) - continued									
QC-87609-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	100	70.0	130	----
QC-87609-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.4	40.0	160	----
QC-87609-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	101	70.0	130	----
QC-87609-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	114	70.0	130	----
QC-87609-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	103	70.0	130	----
QC-87609-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----
QC-87609-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-87609-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	90.8	70.0	130	----
Metals (QCLot: 87610)									
QC-87610-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Metals (QCLot: 87879)									
QC-87879-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	101	70.0	130	----
QC-87879-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	95.5	70.0	130	----
QC-87879-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	99.1	70.0	130	----
QC-87879-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-87879-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-87879-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	100	40.0	160	----
QC-87879-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	122	70.0	130	----
QC-87879-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	107	70.0	130	----
QC-87879-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	101	70.0	130	----
QC-87879-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	102	70.0	130	----
QC-87879-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	99.4	70.0	130	----
QC-87879-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
QC-87879-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	101	70.0	130	----
QC-87879-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	105	70.0	130	----
QC-87879-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	94.2	70.0	130	----
QC-87879-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-87879-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	106	70.0	130	----
QC-87879-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	----
QC-87879-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	90.9	70.0	130	----
QC-87879-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	100	70.0	130	----
QC-87879-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	97.6	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 87879) - continued									
QC-87879-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	98.4	70.0	130	----
QC-87879-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	103	40.0	160	----
QC-87879-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	92.7	70.0	130	----
QC-87879-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	98.2	70.0	130	----
QC-87879-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	104	70.0	130	----
QC-87879-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	99.1	70.0	130	----
QC-87879-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
QC-87879-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	85.1	70.0	130	----
Metals (QCLot: 87880)									
QC-87880-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	106	70.0	130	----
Metals (QCLot: 87890)									
QC-87890-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	107	70.0	130	----
QC-87890-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	# 195	70.0	130	RM-H
QC-87890-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	102	70.0	130	----
QC-87890-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	105	70.0	130	----
QC-87890-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	108	70.0	130	----
QC-87890-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	117	40.0	160	----
QC-87890-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	106	70.0	130	----
QC-87890-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
QC-87890-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	111	70.0	130	----
QC-87890-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
QC-87890-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	100	70.0	130	----
QC-87890-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
QC-87890-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	111	70.0	130	----
QC-87890-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
QC-87890-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	99.7	70.0	130	----
QC-87890-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
QC-87890-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	114	70.0	130	----
QC-87890-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-87890-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	92.9	70.0	130	----
QC-87890-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	111	70.0	130	----
QC-87890-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Metals (QCLot: 87890) - continued									
QC-87890-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	103	70.0	130	----
QC-87890-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	106	40.0	160	----
QC-87890-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	107	70.0	130	----
QC-87890-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	119	70.0	130	----
QC-87890-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	114	70.0	130	----
QC-87890-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	109	70.0	130	----
QC-87890-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	97.8	70.0	130	----
QC-87890-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	101	70.0	130	----
Metals (QCLot: 87891)									
QC-87891-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	107	70.0	130	----
Hydrocarbons (QCLot: 87615)									
QC-87615-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	96.4	70.0	130	----
Hydrocarbons (QCLot: 87883)									
QC-87883-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	90.6	70.0	130	----
QC-87883-003	Petroleum Hydrocarbon IRM	F4 (C34-C50)	----	E601.SG	1238 mg/kg	105	70.0	130	----
Hydrocarbons (QCLot: 87895)									
QC-87895-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	102	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87613)									
QC-87613-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	96.3	60.0	130	----
QC-87613-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	99.0	60.0	130	----
QC-87613-003	RM	benz(a)anthracene	56-55-3	E641A-L	0.545 mg/kg	97.4	60.0	130	----
QC-87613-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	97.2	60.0	130	----
QC-87613-003	RM	benzo(g,h,i)perylene	191-24-2	E641A-L	0.377 mg/kg	99.6	60.0	130	----
QC-87613-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	106	60.0	130	----
QC-87613-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.1	60.0	130	----
QC-87613-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	94.0	60.0	130	----
QC-87613-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	98.5	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87882)									
QC-87882-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	104	60.0	130	----
QC-87882-003	RM	benz(a)anthracene	56-55-3	E641A-L	0.545 mg/kg	92.0	60.0	130	----
QC-87882-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	96.3	60.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 87882) - continued									
QC-87882-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	91.5	60.0	130	----
QC-87882-003	RM	benzo(g,h,i)perylene	191-24-2	E641A-L	0.377 mg/kg	95.7	60.0	130	----
QC-87882-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	96.4	60.0	130	----
QC-87882-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	93.8	60.0	130	----
QC-87882-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	96.5	60.0	130	----
QC-87882-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.5	60.0	130	----
QC-87882-003	RM	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.445 mg/kg	91.6	60.0	130	----
QC-87882-003	RM	methylnaphthalene, 1-	90-12-0	E641A-L	1.256 mg/kg	96.6	60.0	130	----
QC-87882-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	95.2	60.0	130	----
QC-87882-003	RM	naphthalene	91-20-3	E641A-L	1.03 mg/kg	100	50.0	130	----
QC-87882-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	96.5	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 87894)									
QC-87894-003	RM	acenaphthene	83-32-9	E641A-L	0.638 mg/kg	96.9	60.0	130	----
QC-87894-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	92.5	60.0	130	----
QC-87894-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	89.0	60.0	130	----
QC-87894-003	RM	benzo(g,h,i)perylene	191-24-2	E641A-L	0.377 mg/kg	97.2	60.0	130	----
QC-87894-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	98.0	60.0	130	----
QC-87894-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.3	60.0	130	----
QC-87894-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	97.7	60.0	130	----
QC-87894-003	RM	naphthalene	91-20-3	E641A-L	1.03 mg/kg	103	50.0	130	----
QC-87894-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	98.5	60.0	130	----

Qualifiers

Qualifier	*Description*
RM-H	*Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 766308

Page 1 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	
Company:	Golder Associates Ltd.	Select Report Format:	[✓] PDF [✓] EXCEL [ ] EDD (DIGITAL)
Contact:	Christine Bylenga / Brett Lucas	Quality Control (QC) Report with Report	[✓] YES [ ] NO
Phone:	1 604 296 4200	[ ] Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution:	[✓] EMAIL [ ] MAIL [ ] FAX
Street:	200 - 2920 Virtual Way	Email 1 or Fax	Cbylenga@Golder.com
City/Province:	Vancouver BC	Email 2	BLucas@Golder.com
Postal Code:	V5M 0C4	Email 3	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

- Regular [R] [✓] Standard TAT if received by 3 pm - business days - no surcharges apply
- PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]
- EMERGENCY: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]
- Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
- For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To		Invoice Distribution	
Same as Report To	[✓] YES [ ] NO	Select Invoice Distribution:	[✓] EMAIL [ ] MAIL [ ] FAX
Copy of Invoice with Report	[ ] YES [✓] NO	Email 1 or Fax	
Company:	~~Q79542~~	Email 2	
Contact:	~~1663724/34000/04~~		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q79542	AFE/Cost Center:	PO#
Job #:	1663724 / 34000 / 03	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	B5306	ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Number of Containers	TOC TIC	Particle Size	F2-F4 PAH	LEPH, HEPH, EPH PAH	Metals (Incl. Hg)	Samples on Hold	Suspected Hazard (see Special Instructions)
1	SW-7	18 Aug 20	1136	SEDIMENT	4	X	X	X	X	X		
2	SW-8	18 Aug 20	1336	SEDIMENT	4	X	X	X	X	X		
3	SNW-4	25 Aug 20	0935	SEDIMENT	4	X	X	X	X	X		
4	SNW-5	25 Aug 20	1205	SEDIMENT	4	X	X	X	X	X		
5	~~SNW-6~~	~~25 Aug 20~~	~~1415~~	~~SEDIMENT~~	~~4~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
6	SE-6	27 Aug 20	0907	Sediment	4	X	X	X	X	X		
7	SE-7	27 Aug 20	1035	Sediment	4	X	X	X	X	X		
8	SE-8	27 Aug 20	1220	Sediment	4	X	X	X	X	X		
9	SE-9	27 Aug 20	1430	Sediment	4	X	X	X	X	X		
10	SE-10	27 Aug 20	1530	Sediment	4	X	X	X	X	X		
11	SE-11	27 Aug 20	1701	Sediment	4	X	X	X	X	X		
12	DUPE	27 Aug 20	—	Sediment	4	X	X	X	X	X		

Environmental Division
Vancouver
Work Order Reference
VA20B5306
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [✓] NO

Are samples for human consumption/ use? [ ] YES [✓] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

- Frozen [ ] — SIF Observations: Yes [ ] No [ ]
- Ice Packs [✓] Ice Cubes [ ] — Custody seal intact: Yes [ ] No [ ]
- Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	9 avg 9 cooler

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: B Lucas	Date: 12 SEP 2020	Time: 0800	Received by:	Date:	Time:	Received by: cm	Date: 15 Sept. 2020	Time: 12:45pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 - 560013

Page 2 of 3

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd.
Contact:	Christine Bylenga / Brett Lucas
Phone:	1604 296 4200
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: Cbylenga@golder.com

Email 2: blucas@golder.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/03

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only)

ALS Contact:

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, TIC	Particle size	F2-F4, PAH	LEPH, HEPH, EPH, PAH	Metals (Includ. Hg)	Number of Containers
13	SNE-1	28 Aug 20	13:10	Sediment	X	X	X	X	X	4
14	SNE-2	28 Aug 20	14:20	Sediment	X	X	X	X	X	4
15	SNE-3	28 Aug 20	16:50	Sediment	X	X	X	X	X	4
16	DUP F	28 Aug 20	—	Sediment	X	X	X	X	X	4
17	SNE-4	29 Aug 20	10:20	Sediment	X	X	X	X	X	4
18	SNE-5	29 Aug 20	13:20	Sediment	X	X	X	X	X	4
19	SW-9	29 Aug 20	16:50	Sediment	X	X	X	X	X	4
20	DUP G	29 Aug 20	—	Sediment	X	X	X	X	X	4
21	SNE-6	30 Aug 20	09:15	Sediment	X	X	X	X	X	4
22	SE-12	30 Aug 20	16:20	Sediment	X	X	X	X	X	4
23	SNW-10	30 Aug 20	12:14	Sediment	X	X	X	X	X	4
24	SW-11	30 Aug 20	13:25	Sediment	X	X	X	X	X	4

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 9 avg 9 cooler

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 12 SEP 2020	Time:	Received by:	Date:	Time:	Received by: em	Date: 15 Sept. 2020	Time: 12:45pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 560021

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd
Contact:	Christine Bylenga/Brett Lucas
Phone:	1604 296 4200
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: cbylenga@golder.com
Email 2: blucas@golder.com
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542
Job #: 1663724/34000/03
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only) | ALS Contact: | Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC TIC	Particle Size	F2-F4, PAH	LEPH, HEPH, EPH PAH	Metals (Incl. Hg)	Number of Containers
25	SW-12	30 Aug 20	15:00	Sediment	X	X	X	X	X	4
26	SW-13	31 Aug 20	13:58	Sediment	X	X	X	X	X	4
27	SNE-14	31 Aug 20	11:00	Sediment	X	X	X	X	X	4
28	SNW-7	4 Sep 20	12:40	Sediment	X	X	X	X	X	4

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 9 avg of 9 [illegible]

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 12 SEP 2020	Time: 8:00	Received by:	Date:	Time:	Received by: cm	Date: 15 Sept. 2020	Time: 12:45 pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

OCTOBER 2015 FRONT

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20B6111**	Page	: 1 of 27
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 21-Sep-2020 12:00
PO	: ----	Date Analysis Commenced	: 24-Sep-2020
C-O-C number	: 15-560017,15-56008	Issue Date	: 09-Oct-2020 11:37
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

Qualifier	*Description*
DLQ	*Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	SNE-7	SNW-8	SW-15	SNE-9	SNE-10
				Client sampling date / time	07-Sep-2020 09:45	08-Sep-2020 11:30	06-Sep-2020 13:00	07-Sep-2020 15:00	07-Sep-2020 17:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-001	VA20B6111-002	VA20B6111-003	VA20B6111-004	VA20B6111-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	34.7	29.5	30.2	35.6	35.8
pH (1:2 soil:water)	----	E108	0.10	pH units	8.21	8.30	8.27	8.28	8.26
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	22.7	15.3	5.6	27.0	23.4
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	52.1	45.6	42.0	57.2	55.6
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	22.4	38.3	52.3	15.6	18.6
gravel (>2mm)	----	EC184E	1.0	%	2.8	<1.0	<1.0	<1.0	2.4
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.75	6.68	6.49	5.89	6.02
carbon, inorganic [IC]	----	E354	0.050	%	3.41	3.61	2.16	3.32	3.44
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	28.4	30.1	18.0	27.7	28.7
carbon, total organic [TOC]	----	EC356	0.050	%	2.34	3.07	4.33	2.57	2.58
organic matter	----	EC356	0.10	%	4.03	5.29	7.46	4.43	4.45
Metals									
aluminum	7429-90-5	E440	50	mg/kg	10400	7240	4900	11100	10600
antimony	7440-36-0	E440	0.10	mg/kg	0.20	0.14	<0.10	0.20	0.20
arsenic	7440-38-2	E440	0.10	mg/kg	5.79	6.81	2.84	4.98	8.87
barium	7440-39-3	E440	0.50	mg/kg	26.7	20.0	14.4	29.1	29.8
beryllium	7440-41-7	E440	0.10	mg/kg	0.56	0.49	0.30	0.63	0.64
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	60.1	48.4	36.0	67.7	67.1
cadmium	7440-43-9	E440	0.020	mg/kg	0.110	0.080	0.022	0.124	0.111
calcium	7440-70-2	E440	50	mg/kg	85200	89400	94500	92100	88900
chromium	7440-47-3	E440	0.50	mg/kg	28.4	25.3	18.1	31.8	30.3
cobalt	7440-48-4	E440	0.10	mg/kg	5.13	4.08	3.44	5.72	5.58
copper	7440-50-8	E440	0.50	mg/kg	11.6	8.95	6.86	13.1	12.6
iron	7439-89-6	E440	50	mg/kg	16200	14000	13200	17300	18200
lead	7439-92-1	E440	0.50	mg/kg	8.90	6.88	4.05	9.86	9.43
lithium	7439-93-2	E440	2.0	mg/kg	41.9	33.4	27.8	46.1	44.1

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-7	SNW-8	SW-15	SNE-9	SNE-10
				Client sampling date / time	07-Sep-2020 09:45	08-Sep-2020 11:30	06-Sep-2020 13:00	07-Sep-2020 15:00	07-Sep-2020 17:00
					VA20B6111-001	VA20B6111-002	VA20B6111-003	VA20B6111-004	VA20B6111-005
					Result	Result	Result	Result	Result
Metals									
magnesium	7439-95-4	E440	20	mg/kg	43800	40000	49600	46000	45200
manganese	7439-96-5	E440	1.0	mg/kg	171	165	181	180	204
mercury	7439-97-6	E510	0.0050	mg/kg	0.0170	0.0146	0.0090	0.0171	0.0190
molybdenum	7439-98-7	E440	0.10	mg/kg	0.42	0.37	0.57	0.51	0.49
nickel	7440-02-0	E440	0.50	mg/kg	16.5	13.4	9.76	18.3	17.5
phosphorus	7723-14-0	E440	50	mg/kg	543	477	434	546	611
potassium	7440-09-7	E440	100	mg/kg	4140	2800	2210	4560	4270
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.24	<0.20	0.33	0.29
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	6200	5090	4740	6820	6510
strontium	7440-24-6	E440	0.50	mg/kg	57.0	61.1	51.6	60.4	67.5
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.160	0.110	0.084	0.174	0.160
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	319	238	276	348	327
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.27	0.884	0.727	1.52	1.30
vanadium	7440-62-2	E440	0.20	mg/kg	37.8	30.3	17.5	41.7	42.0
zinc	7440-66-6	E440	2.0	mg/kg	28.2	20.8	14.0	31.3	29.4
zirconium	7440-67-7	E440	1.0	mg/kg	8.5	6.8	5.7	10.5	9.4
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-7	SNW-8	SW-15	SNE-9	SNE-10
Client sampling date / time					07-Sep-2020 09:45	08-Sep-2020 11:30	06-Sep-2020 13:00	07-Sep-2020 15:00	07-Sep-2020 17:00
					VA20B6111-001	VA20B6111-002	VA20B6111-003	VA20B6111-004	VA20B6111-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	----	<0.0050	<0.0050	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	----	<0.015	<0.015	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
styrene	100-42-5	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
toluene	108-88-3	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	----	<0.050	<0.050	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	----	<0.075	<0.075	----	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.250 DLQ	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	----	----	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----	----	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-7	SNW-8	SW-15	SNE-9	SNE-10
Client sampling date / time					07-Sep-2020 09:45	08-Sep-2020 11:30	06-Sep-2020 13:00	07-Sep-2020 15:00	07-Sep-2020 17:00
					VA20B6111-001	VA20B6111-002	VA20B6111-003	VA20B6111-004	VA20B6111-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	----	----	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	----	----	<0.075	<0.075
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	78.7	94.2	89.0	91.1	79.2
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	89.7	106	91.8	78.9	95.1
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	94.7	62.6	61.8	62.4	64.6
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	65.9	65.6	63.2	70.0	64.3
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	112	85.8	81.4	121	106
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-7	SNW-8	SW-15	SNE-9	SNE-10
Client sampling date / time					07-Sep-2020 09:45	08-Sep-2020 11:30	06-Sep-2020 13:00	07-Sep-2020 15:00	07-Sep-2020 17:00
					VA20B6111-001	**VA20B6111-002**	**VA20B6111-003**	**VA20B6111-004**	**VA20B6111-005**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	92.0	94.9	94.0	83.1	91.4
chrysene-d12	1719-03-5	E641A-L	0.010	%	105	102	102	92.5	99.7
naphthalene-d8	1146-65-2	E641A-L	0.010	%	97.5	100	97.1	90.8	97.8
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	103	105	99.2	93.3	98.6
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	SNE-8	SNW-9	SNW-10	SNW-11	SNW-12
				Client sampling date / time	07-Sep-2020 12:00	08-Sep-2020 14:00	08-Sep-2020 16:00	09-Sep-2020 09:35	09-Sep-2020 12:10
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	VA20B6111-006	VA20B6111-007	VA20B6111-008	VA20B6111-009	VA20B6111-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	35.9	31.9	30.5	31.9	30.1
pH (1:2 soil:water)	----	E108	0.10	pH units	8.17	8.35	8.32	8.19	8.29
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	21.7	24.8	19.1	22.7	25.8
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	51.0	53.3	43.3	48.8	50.4
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	19.0	18.7	33.0	26.2	21.2
gravel (>2mm)	----	EC184E	1.0	%	8.3	3.2	4.6	2.3	2.6
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.84	6.50	6.45	6.45	6.50
carbon, inorganic [IC]	----	E354	0.050	%	3.41	3.55	3.70	3.55	3.63
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	28.4	29.6	30.9	29.6	30.3
carbon, total organic [TOC]	----	EC356	0.050	%	2.43	2.95	2.75	2.90	2.87
organic matter	----	EC356	0.10	%	4.19	5.08	4.74	5.00	4.95
Metals									
aluminum	7429-90-5	E440	50	mg/kg	11200	9340	8120	10200	10800
antimony	7440-36-0	E440	0.10	mg/kg	0.19	0.18	0.15	0.16	0.19
arsenic	7440-38-2	E440	0.10	mg/kg	8.99	4.56	7.60	5.07	4.36
barium	7440-39-3	E440	0.50	mg/kg	28.1	25.1	22.8	27.6	27.8
beryllium	7440-41-7	E440	0.10	mg/kg	0.64	0.56	0.48	0.59	0.61
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	66.5	59.4	53.6	61.3	67.3
cadmium	7440-43-9	E440	0.020	mg/kg	0.090	0.124	0.092	0.100	0.150
calcium	7440-70-2	E440	50	mg/kg	85500	94900	84300	102000	107000
chromium	7440-47-3	E440	0.50	mg/kg	30.3	26.7	23.2	28.6	30.5
cobalt	7440-48-4	E440	0.10	mg/kg	5.48	4.80	4.31	5.00	5.20
copper	7440-50-8	E440	0.50	mg/kg	12.4	11.4	9.96	11.4	12.2
iron	7439-89-6	E440	50	mg/kg	18200	14700	14700	16100	16500
lead	7439-92-1	E440	0.50	mg/kg	9.38	8.58	7.54	8.49	9.28
lithium	7439-93-2	E440	2.0	mg/kg	44.2	41.5	35.6	40.5	45.6
magnesium	7439-95-4	E440	20	mg/kg	45000	43100	40100	45900	47100

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	SNE-8	SNW-9	SNW-10	SNW-11	SNW-12
				Client sampling date / time	07-Sep-2020 12:00	08-Sep-2020 14:00	08-Sep-2020 16:00	09-Sep-2020 09:35	09-Sep-2020 12:10
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-006	VA20B6111-007	VA20B6111-008	VA20B6111-009	VA20B6111-010
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	212	161	168	166	170
mercury	7439-97-6	E510	0.0050	mg/kg	0.0191	0.0158	0.0164	0.0166	0.0157
molybdenum	7439-98-7	E440	0.10	mg/kg	0.45	0.43	0.40	0.35	0.53
nickel	7440-02-0	E440	0.50	mg/kg	17.4	15.3	13.7	15.6	16.9
phosphorus	7723-14-0	E440	50	mg/kg	680	461	523	432	409
potassium	7440-09-7	E440	100	mg/kg	4460	3810	3420	4050	4370
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.26	0.24	0.27	0.24
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	6630	5350	5200	6200	5800
strontium	7440-24-6	E440	0.50	mg/kg	63.4	59.9	62.9	67.5	69.0
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.158	0.148	0.125	0.156	0.170
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	334	299	259	339	348
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.15	1.29	0.936	1.23	1.60
vanadium	7440-62-2	E440	0.20	mg/kg	41.1	36.1	32.9	36.4	38.6
zinc	7440-66-6	E440	2.0	mg/kg	30.0	25.7	22.3	26.9	28.9
zirconium	7440-67-7	E440	1.0	mg/kg	9.1	8.9	7.6	8.2	10.2
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	----	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNE-8	SNW-9	SNW-10	SNW-11	SNW-12
Client sampling date / time					07-Sep-2020 12:00	08-Sep-2020 14:00	08-Sep-2020 16:00	09-Sep-2020 09:35	09-Sep-2020 12:10
					VA20B6111-006	VA20B6111-007	VA20B6111-008	VA20B6111-009	VA20B6111-010
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	----	<0.0050	----	----	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	----	<0.015	----	----	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	----	<0.050	----	----	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	----	<0.050	----	----	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	----	<0.050	----	----	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	----	<0.050	----	----	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	----	<0.050	----	----	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	----	<0.075	----	----	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	----	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	----	----	<0.0050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----	----	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	----	----	<0.050	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	----	----	<0.050	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	----	----	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	----	----	<0.050	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

				Client sample ID	SNE-8	SNW-9	SNW-10	SNW-11	SNW-12
				Client sampling date / time	07-Sep-2020 12:00	08-Sep-2020 14:00	08-Sep-2020 16:00	09-Sep-2020 09:35	09-Sep-2020 12:10
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-006	VA20B6111-007	VA20B6111-008	VA20B6111-009	VA20B6111-010
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	----	----	<0.050	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	----	----	<0.075	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	75.6	93.3	----	80.4	89.9
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	95.2	96.6	----	73.0	93.6
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	----	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	----	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	63.6	90.0	65.1	98.0	65.1
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	64.3	61.1	69.0	74.0	79.4
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	106	97.0	----	108	79.4
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	SNE-8	SNW-9	SNW-10	SNW-11	SNW-12
				Client sampling date / time	07-Sep-2020 12:00	08-Sep-2020 14:00	08-Sep-2020 16:00	09-Sep-2020 09:35	09-Sep-2020 12:10
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-006	VA20B6111-007	VA20B6111-008	VA20B6111-009	VA20B6111-010
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	88.6	88.5	91.7	95.5	95.1
chrysene-d12	1719-03-5	E641A-L	0.010	%	99.6	100	100	106	105
naphthalene-d8	1146-65-2	E641A-L	0.010	%	94.6	97.2	97.0	97.1	97.3
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	100.0	99.0	95.2	94.4	92.8
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	----	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-13	SNW-14	SNE-11	SNE-12	SE18-1
				Client sampling date / time	09-Sep-2020 15:20	09-Sep-2020 16:45	10-Sep-2020 13:50	10-Sep-2020 15:50	10-Sep-2020 17:30
					VA20B6111-011	VA20B6111-012	VA20B6111-013	VA20B6111-014	VA20B6111-015
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	30.0	30.3	38.2	36.6	20.0
pH (1:2 soil:water)	----	E108	0.10	pH units	8.26	8.27	8.12	8.19	8.31
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	21.2	16.8	25.4	26.8	1.6
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	44.5	47.8	49.7	53.5	4.4
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	30.2	32.1	21.3	16.5	92.0
gravel (>2mm)	----	EC184E	1.0	%	4.1	3.3	3.6	3.2	2.0
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	6.50	6.60	6.06	6.09	3.00
carbon, inorganic [IC]	----	E354	0.050	%	3.69	3.62	3.49	3.45	1.71
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	30.8	30.2	29.1	28.7	14.3
carbon, total organic [TOC]	----	EC356	0.050	%	2.81	2.98	2.57	2.64	1.29
organic matter	----	EC356	0.10	%	4.84	5.14	4.43	4.55	2.22
Metals									
aluminum	7429-90-5	E440	50	mg/kg	9190	8330	11200	10800	1620
antimony	7440-36-0	E440	0.10	mg/kg	0.17	0.16	0.22	0.21	<0.10
arsenic	7440-38-2	E440	0.10	mg/kg	4.97	6.62	10.2	7.54	1.30
barium	7440-39-3	E440	0.50	mg/kg	24.2	22.9	32.7	30.7	4.83
beryllium	7440-41-7	E440	0.10	mg/kg	0.57	0.49	0.71	0.59	0.11
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	58.9	54.0	69.3	67.8	11.6
cadmium	7440-43-9	E440	0.020	mg/kg	0.126	0.083	0.116	0.101	<0.020
calcium	7440-70-2	E440	50	mg/kg	97400	99100	93300	87700	21300
chromium	7440-47-3	E440	0.50	mg/kg	26.1	25.5	31.0	30.4	6.07
cobalt	7440-48-4	E440	0.10	mg/kg	4.68	4.72	5.81	5.39	1.12
copper	7440-50-8	E440	0.50	mg/kg	10.7	10.7	13.4	12.6	1.99
iron	7439-89-6	E440	50	mg/kg	14800	15500	20100	17900	6990
lead	7439-92-1	E440	0.50	mg/kg	8.04	7.99	10.3	9.49	1.47
lithium	7439-93-2	E440	2.0	mg/kg	39.2	37.5	45.6	43.3	6.9
magnesium	7439-95-4	E440	20	mg/kg	40600	42500	44300	43100	10900

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-13	SNW-14	SNE-11	SNE-12	SE18-1
				Client sampling date / time	09-Sep-2020 15:20	09-Sep-2020 16:45	10-Sep-2020 13:50	10-Sep-2020 15:50	10-Sep-2020 17:30
					VA20B6111-011	VA20B6111-012	VA20B6111-013	VA20B6111-014	VA20B6111-015
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	152	174	209	194	48.2
mercury	7439-97-6	E510	0.0050	mg/kg	0.0144	0.0156	0.0190	0.0187	<0.0050
molybdenum	7439-98-7	E440	0.10	mg/kg	0.50	0.42	0.54	0.51	0.21
nickel	7440-02-0	E440	0.50	mg/kg	14.5	14.6	18.0	17.2	3.19
phosphorus	7723-14-0	E440	50	mg/kg	427	483	650	542	164
potassium	7440-09-7	E440	100	mg/kg	3750	3350	4560	4470	780
selenium	7782-49-2	E440	0.20	mg/kg	0.24	0.28	0.34	0.32	<0.20
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	5350	5480	7590	7090	2440
strontium	7440-24-6	E440	0.50	mg/kg	76.6	66.9	69.9	66.4	15.4
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.150	0.133	0.177	0.174	<0.050
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	309	284	357	342	95.0
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.26	1.05	1.32	1.27	0.288
vanadium	7440-62-2	E440	0.20	mg/kg	34.2	33.8	45.3	41.6	6.36
zinc	7440-66-6	E440	2.0	mg/kg	24.8	25.0	32.6	31.0	5.8
zirconium	7440-67-7	E440	1.0	mg/kg	8.6	7.6	9.1	9.3	2.2
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SNW-13	SNW-14	SNE-11	SNE-12	SE18-1
				Client sampling date / time	09-Sep-2020 15:20	09-Sep-2020 16:45	10-Sep-2020 13:50	10-Sep-2020 15:50	10-Sep-2020 17:30
					VA20B6111-011	VA20B6111-012	VA20B6111-013	VA20B6111-014	VA20B6111-015
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	----	----	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	----	----	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	----	----	<0.075
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	----	----	<0.0050	<0.0050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	----	----	<0.015	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	----	----	<0.050	<0.050	----
styrene	100-42-5	E611C	0.050	mg/kg	----	----	<0.050	<0.050	----
toluene	108-88-3	E611C	0.050	mg/kg	----	----	<0.050	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	----	----	<0.050	<0.050	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

				Client sample ID	SNW-13	SNW-14	SNE-11	SNE-12	SE18-1
				Client sampling date / time	09-Sep-2020 15:20	09-Sep-2020 16:45	10-Sep-2020 13:50	10-Sep-2020 15:50	10-Sep-2020 17:30
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-011	VA20B6111-012	VA20B6111-013	VA20B6111-014	VA20B6111-015
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
xylene, o-	95-47-6	E611C	0.050	mg/kg	----	----	<0.050	<0.050	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	----	----	<0.075	<0.075	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	84.0	99.4	79.0	80.7	87.1
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	87.0	101	108	101	97.1
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	65.6	68.6	68.5	64.7	65.6
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	71.7	79.6	81.0	70.3	71.6
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	93.7	81.0	111	108	66.0 SUR-ND
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	SNW-13	SNW-14	SNE-11	SNE-12	SE18-1
				Client sampling date / time	09-Sep-2020 15:20	09-Sep-2020 16:45	10-Sep-2020 13:50	10-Sep-2020 15:50	10-Sep-2020 17:30
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B6111-011**	**VA20B6111-012**	**VA20B6111-013**	**VA20B6111-014**	**VA20B6111-015**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	103	102	97.9	101	98.6
chrysene-d12	1719-03-5	E641A-L	0.010	%	110	112	108	111	108
naphthalene-d8	1146-65-2	E641A-L	0.010	%	101	103	101	104	98.9
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	98.8	98.7	95.9	99.6	95.1
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

				Client sample ID	DUP-H	SNW-15	SE-13	SNE-13	SNE-15
				Client sampling date / time	11-Sep-2020	11-Sep-2020 11:40	11-Sep-2020 15:35	12-Sep-2020 11:15	12-Sep-2020 14:55
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B6111-016**	**VA20B6111-017**	**VA20B6111-018**	**VA20B6111-019**	**VA20B6111-020**
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	29.2	29.7	31.0	36.1	38.3
pH (1:2 soil:water)	----	E108	0.10	pH units	8.25	8.26	8.03	8.19	8.07
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	18.0	17.1	13.2	27.2	29.1
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	43.0	39.9	38.4	53.9	57.1
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	33.4	37.0	45.5	16.8	12.2
gravel (>2mm)	----	EC184E	1.0	%	5.6	6.0	2.9	2.1	1.6
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	6.56	6.62	5.93	5.99	6.07
carbon, inorganic [IC]	----	E354	0.050	%	3.39	3.50	2.99	3.58	3.50
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	28.2	29.2	24.9	29.8	29.1
carbon, total organic [TOC]	----	EC356	0.050	%	3.17	3.12	2.94	2.41	2.57
organic matter	----	EC356	0.10	%	5.46	5.38	5.07	4.15	4.43
Metals									
aluminum	7429-90-5	E440	50	mg/kg	8940	8800	6860	12100	11300
antimony	7440-36-0	E440	0.10	mg/kg	0.16	0.16	0.10	0.24	0.25
arsenic	7440-38-2	E440	0.10	mg/kg	6.37	6.63	4.01	8.58	7.86
barium	7440-39-3	E440	0.50	mg/kg	23.5	22.9	16.2	35.1	34.5
beryllium	7440-41-7	E440	0.10	mg/kg	0.55	0.56	0.43	0.72	0.72
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	mg/kg	58.3	58.9	45.2	72.1	68.5
cadmium	7440-43-9	E440	0.020	mg/kg	0.090	0.129	0.045	0.110	0.129
calcium	7440-70-2	E440	50	mg/kg	90600	102000	71900	95000	104000
chromium	7440-47-3	E440	0.50	mg/kg	24.0	24.6	21.4	34.1	33.1
cobalt	7440-48-4	E440	0.10	mg/kg	4.44	4.42	3.41	6.19	6.25
copper	7440-50-8	E440	0.50	mg/kg	9.58	9.88	7.20	14.1	14.9
iron	7439-89-6	E440	50	mg/kg	14700	15000	11400	20400	20200
lead	7439-92-1	E440	0.50	mg/kg	7.74	7.89	6.09	10.7	11.3
lithium	7439-93-2	E440	2.0	mg/kg	36.5	36.6	29.6	47.8	48.6
magnesium	7439-95-4	E440	20	mg/kg	37600	39500	37500	46900	49500

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	DUP-H	SNW-15	SE-13	SNE-13	SNE-15
				Client sampling date / time	11-Sep-2020	11-Sep-2020 11:40	11-Sep-2020 15:35	12-Sep-2020 11:15	12-Sep-2020 14:55
					VA20B6111-016	VA20B6111-017	VA20B6111-018	VA20B6111-019	VA20B6111-020
					Result	Result	Result	Result	Result
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	157	161	121	218	229
mercury	7439-97-6	E510	0.0050	mg/kg	0.0152	0.0155	0.0123	0.0210	0.0223
molybdenum	7439-98-7	E440	0.10	mg/kg	0.38	0.40	0.47	0.55	0.61
nickel	7440-02-0	E440	0.50	mg/kg	13.6	13.4	11.0	19.1	19.5
phosphorus	7723-14-0	E440	50	mg/kg	469	439	472	633	624
potassium	7440-09-7	E440	100	mg/kg	3670	3630	2920	4920	4510
selenium	7782-49-2	E440	0.20	mg/kg	0.25	0.31	0.21	0.39	0.32
silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
sodium	7440-23-5	E440	50	mg/kg	5190	5180	5210	7210	7830
strontium	7440-24-6	E440	0.50	mg/kg	67.4	71.9	67.1	71.9	72.5
sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	mg/kg	0.137	0.137	0.104	0.188	0.194
tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	mg/kg	289	286	278	384	347
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	mg/kg	1.06	1.06	0.825	1.68	1.55
vanadium	7440-62-2	E440	0.20	mg/kg	33.2	33.0	24.4	47.0	45.2
zinc	7440-66-6	E440	2.0	mg/kg	23.3	23.4	19.2	34.9	36.5
zirconium	7440-67-7	E440	1.0	mg/kg	8.0	8.0	6.6	9.5	8.7
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	DUP-H	SNW-15	SE-13	SNE-13	SNE-15
Client sampling date / time					11-Sep-2020	11-Sep-2020 11:40	11-Sep-2020 15:35	12-Sep-2020 11:15	12-Sep-2020 14:55
					VA20B6111-016	VA20B6111-017	VA20B6111-018	VA20B6111-019	VA20B6111-020
					Result	Result	Result	Result	Result
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.260 DLQ	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	97.1	77.4	85.8	78.2	73.8
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	106	81.0	119	101	78.7
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	YES	YES	YES	YES
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	<200

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	DUP-H	SNW-15	SE-13	SNE-13	SNE-15
				Client sampling date / time	11-Sep-2020	11-Sep-2020 11:40	11-Sep-2020 15:35	12-Sep-2020 11:15	12-Sep-2020 14:55
					VA20B6111-016	VA20B6111-017	VA20B6111-018	VA20B6111-019	VA20B6111-020
					Result	Result	Result	Result	Result
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	<30	<30	<30
F2-naphthalene	----	EC600	30	mg/kg	<30	<30	<30	<30	<30
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
F3-PAH	----	EC600	50	mg/kg	<50	<50	<50	<50	<50
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	<50	<50	<50
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	<200
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	69.2	65.1	63.2	67.6	65.5
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	71.7	71.8	69.3	69.9	69.0
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	124	103	77.8	107	69.7 SUR-ND
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	DUP-H	SNW-15	SE-13	SNE-13	SNE-15
				Client sampling date / time	11-Sep-2020	11-Sep-2020 11:40	11-Sep-2020 15:35	12-Sep-2020 11:15	12-Sep-2020 14:55
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA20B6111-016**	**VA20B6111-017**	**VA20B6111-018**	**VA20B6111-019**	**VA20B6111-020**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	104	96.9	93.6	103	101
chrysene-d12	1719-03-5	E641A-L	0.010	%	114	108	100	113	112
naphthalene-d8	1146-65-2	E641A-L	0.010	%	106	98.1	94.6	104	99.6
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	101	93.7	90.0	100	98.6
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	SE-15	----	----	----	----
				Client sampling date / time	12-Sep-2020 16:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-021	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
moisture	----	E144	0.25	%	34.6	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	8.08	----	----	----	----
Particle Size									
clay (<0.004mm)	----	EC184E	1.0	%	15.0	----	----	----	----
silt (0.063mm - 0.004mm)	----	EC184E	1.0	%	47.6	----	----	----	----
sand (2.0mm - 0.063mm)	----	EC184E	1.0	%	34.7	----	----	----	----
gravel (>2mm)	----	EC184E	1.0	%	2.7	----	----	----	----
Organic / Inorganic Carbon									
carbon, total [TC]	----	E351	0.050	%	5.47	----	----	----	----
carbon, inorganic [IC]	----	E354	0.050	%	3.26	----	----	----	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	27.2	----	----	----	----
carbon, total organic [TOC]	----	EC356	0.050	%	2.21	----	----	----	----
organic matter	----	EC356	0.10	%	3.81	----	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	7640	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	0.12	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	4.22	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	18.9	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.49	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	49.5	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	0.070	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg	79400	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	24.0	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	3.88	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	8.51	----	----	----	----
iron	7439-89-6	E440	50	mg/kg	12600	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	7.41	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	34.2	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	41300	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-15	----	----	----	----
				Client sampling date / time	12-Sep-2020 16:20	----	----	----	----
					VA20B6111-021	--------	--------	--------	--------
					Result	----	----	----	----
Metals									
manganese	7439-96-5	E440	1.0	mg/kg	139	----	----	----	----
mercury	7439-97-6	E510	0.0050	mg/kg	0.0147	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	0.51	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	13.1	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	488	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg	3180	----	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.28	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	<0.10	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg	5570	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	55.1	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.128	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg	<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	308	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	1.06	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	26.6	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	20.3	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	7.1	----	----	----	----
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	----	----	----	----
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	----	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	----	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-15	----	----	----	----
				Client sampling date / time	12-Sep-2020 16:20	----	----	----	----
					VA20B6111-021	--------	--------	--------	--------
					Result	----	----	----	----
Volatile Organic Compounds									
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.250 DLQ	----	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	----	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	----	----	----	----
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	----	----	----	----
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	----	----	----	----
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	----	----	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	----	----	----	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	----	----	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	----	----	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	----	----	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	84.6	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	98.0	----	----	----	----
Hydrocarbons									
chromatogram to baseline at nC50	----	E601.SG	-	mg/kg	YES	----	----	----	----
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	SE-15	----	----	----	----
Client sampling date / time					12-Sep-2020 16:20	----	----	----	----
					VA20B6111-021	--------	--------	--------	--------
					Result	----	----	----	----
Hydrocarbons									
F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	----	----	----	----
F1-BTEX	----	EC580	5.0	mg/kg	<5.0	----	----	----	----
F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	----	----	----	----
F2-naphthalene	----	EC600	30	mg/kg	<30	----	----	----	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----	----	----	----
F3-PAH	----	EC600	50	mg/kg	<50	----	----	----	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----	----	----	----
HEPHs	----	EC600A	200	mg/kg	<200	----	----	----	----
LEPHs	----	EC600A	200	mg/kg	<200	----	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	62.3	----	----	----	----
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	70.6	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	91.5	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

				Client sample ID	SE-15	----	----	----	----
				Client sampling date / time	12-Sep-2020 16:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B6111-021	--------	--------	--------	--------
					Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	----	----	----	----
quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	----	----	----	----
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A-L	0.010	%	95.2	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.010	%	102	----	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.010	%	94.0	----	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	91.8	----	----	----	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	----	----	----	----
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	----	----	----	----
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	----	----	----	----
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20B6111**	Page	: 1 of 40
Client	: **Golder Associates Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 21-Sep-2020 12:00
PO	: ----	Issue Date	: 09-Oct-2020 11:37
C-O-C number	: 15-560017,15-56008		
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Regular Sample Surrogates

Sub-Matrix: **Soil**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	VA20B6111-020	SNE-15	dichlorotoluene, 3,4-	97-75-0	69.7 %	70.0-130 %	Recovery less than lower data quality objective
Hydrocarbons Surrogates	VA20B6111-015	SE18-1	dichlorotoluene, 3,4-	97-75-0	66.0 %	70.0-130 %	Recovery less than lower data quality objective

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE-15	E601A	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-13	E601A	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-15	E601A	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap DUP-H	E601A	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE-13	E601A	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-15	E601A	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SE18-1	E601A	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-11	E601A	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-12	E601A	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-11	E601A	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-12	E601A	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-13	E601A	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-14	E601A	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-8	E601A	08-Sep-2020	25-Sep-2020	14 days	16 days	× EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-10	E601A	08-Sep-2020	25-Sep-2020	14 days	16 days	× EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNW-9	E601A	08-Sep-2020	25-Sep-2020	14 days	16 days	× EHT	28-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-10	E601A	07-Sep-2020	25-Sep-2020	14 days	17 days	× EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-8	E601A	07-Sep-2020	25-Sep-2020	14 days	17 days	× EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-9	E601A	07-Sep-2020	25-Sep-2020	14 days	17 days	× EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SNE-7	E601A	07-Sep-2020	25-Sep-2020	14 days	18 days	× EHTR	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap SW-15	E601A	06-Sep-2020	25-Sep-2020	14 days	18 days	× EHTR	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-15	E601.SG	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-13	E601.SG	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-15	E601.SG	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap DUP-H	E601.SG	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	29-Sep-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE-13	E601.SG	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-15	E601.SG	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SE18-1	E601.SG	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-11	E601.SG	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-12	E601.SG	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-11	E601.SG	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-12	E601.SG	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-13	E601.SG	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	29-Sep-2020	40 days	4 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-14	E601.SG	09-Sep-2020	24-Sep-2020	14 days	15 days	× EHT	29-Sep-2020	40 days	4 days	✓

Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-8	E601.SG	08-Sep-2020	25-Sep-2020	14 days	16 days	✖ EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-10	E601.SG	08-Sep-2020	25-Sep-2020	14 days	16 days	✖ EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNW-9	E601.SG	08-Sep-2020	25-Sep-2020	14 days	16 days	✖ EHT	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-10	E601.SG	07-Sep-2020	25-Sep-2020	14 days	17 days	✖ EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-8	E601.SG	07-Sep-2020	25-Sep-2020	14 days	17 days	✖ EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-9	E601.SG	07-Sep-2020	25-Sep-2020	14 days	17 days	✖ EHTL	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SNE-7	E601.SG	07-Sep-2020	25-Sep-2020	14 days	18 days	✖ EHTR	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap SW-15	E601.SG	06-Sep-2020	25-Sep-2020	14 days	18 days	✖ EHTR	28-Sep-2020	40 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-15	E581.VH+F1	12-Sep-2020	30-Sep-2020	40 days	17 days	✓	01-Oct-2020	22 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE18-1	E581.VH+F1	10-Sep-2020	28-Sep-2020	40 days	17 days	✓	29-Sep-2020	22 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-13	E581.VH+F1	12-Sep-2020	30-Sep-2020	40 days	17 days	✓	30-Sep-2020	22 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial DUP-H	E581.VH+F1	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SE-13	E581.VH+F1	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-15	E581.VH+F1	12-Sep-2020	30-Sep-2020	40 days	18 days	✓	01-Oct-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-12	E581.VH+F1	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-13	E581.VH+F1	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-14	E581.VH+F1	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-15	E581.VH+F1	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-11	E581.VH+F1	10-Sep-2020	30-Sep-2020	40 days	19 days	✓	30-Sep-2020	20 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-12	E581.VH+F1	10-Sep-2020	30-Sep-2020	40 days	19 days	✓	30-Sep-2020	20 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-8	E581.VH+F1	08-Sep-2020	28-Sep-2020	40 days	19 days	✓	29-Sep-2020	20 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-9	E581.VH+F1	08-Sep-2020	28-Sep-2020	40 days	19 days	✓	29-Sep-2020	20 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNW-11	E581.VH+F1	09-Sep-2020	30-Sep-2020	40 days	20 days	✓	30-Sep-2020	19 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SW-15	E581.VH+F1	06-Sep-2020	28-Sep-2020	40 days	21 days	✓	29-Sep-2020	18 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-10	E581.VH+F1	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-7	E581.VH+F1	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-8	E581.VH+F1	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial SNE-9	E581.VH+F1	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-15	E510	12-Sep-2020	25-Sep-2020	28 days	12 days	✓	25-Sep-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-13	E510	12-Sep-2020	25-Sep-2020	28 days	12 days	✓	25-Sep-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-15	E510	12-Sep-2020	25-Sep-2020	28 days	12 days	✓	25-Sep-2020	15 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap DUP-H	E510	11-Sep-2020	25-Sep-2020	28 days	13 days	✓	25-Sep-2020	14 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE-13	E510	11-Sep-2020	25-Sep-2020	28 days	13 days	✓	25-Sep-2020	14 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-15	E510	11-Sep-2020	25-Sep-2020	28 days	13 days	✓	25-Sep-2020	14 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SE18-1	E510	10-Sep-2020	25-Sep-2020	28 days	14 days	✓	25-Sep-2020	13 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-11	E510	10-Sep-2020	25-Sep-2020	28 days	14 days	✓	25-Sep-2020	13 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-12	E510	10-Sep-2020	25-Sep-2020	28 days	14 days	✓	25-Sep-2020	13 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-11	E510	09-Sep-2020	25-Sep-2020	28 days	15 days	✓	25-Sep-2020	12 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-12	E510	09-Sep-2020	25-Sep-2020	28 days	15 days	✓	25-Sep-2020	12 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-13	E510	09-Sep-2020	25-Sep-2020	28 days	15 days	✓	25-Sep-2020	12 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-14	E510	09-Sep-2020	25-Sep-2020	28 days	15 days	✓	25-Sep-2020	12 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-10	E510	08-Sep-2020	26-Sep-2020	28 days	17 days	✓	26-Sep-2020	10 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-8	E510	08-Sep-2020	26-Sep-2020	28 days	17 days	✓	26-Sep-2020	10 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNW-9	E510	08-Sep-2020	26-Sep-2020	28 days	17 days	✓	26-Sep-2020	10 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-10	E510	07-Sep-2020	26-Sep-2020	28 days	18 days	✓	26-Sep-2020	9 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-7	E510	07-Sep-2020	26-Sep-2020	28 days	18 days	✓	26-Sep-2020	9 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-8	E510	07-Sep-2020	26-Sep-2020	28 days	18 days	✓	26-Sep-2020	9 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SNE-9	E510	07-Sep-2020	26-Sep-2020	28 days	18 days	✓	26-Sep-2020	9 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap SW-15	E510	06-Sep-2020	26-Sep-2020	28 days	19 days	✓	26-Sep-2020	8 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-15	E440	12-Sep-2020	25-Sep-2020	180 days	12 days	✓	25-Sep-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-13	E440	12-Sep-2020	25-Sep-2020	180 days	12 days	✓	25-Sep-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-15	E440	12-Sep-2020	25-Sep-2020	180 days	12 days	✓	25-Sep-2020	167 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap DUP-H	E440	11-Sep-2020	25-Sep-2020	180 days	13 days	✓	25-Sep-2020	166 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE-13	E440	11-Sep-2020	25-Sep-2020	180 days	13 days	✓	25-Sep-2020	166 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-15	E440	11-Sep-2020	25-Sep-2020	180 days	13 days	✓	25-Sep-2020	166 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SE18-1	E440	10-Sep-2020	25-Sep-2020	180 days	14 days	✓	25-Sep-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-11	E440	10-Sep-2020	25-Sep-2020	180 days	14 days	✓	25-Sep-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-12	E440	10-Sep-2020	25-Sep-2020	180 days	14 days	✓	25-Sep-2020	165 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-11	E440	09-Sep-2020	25-Sep-2020	180 days	15 days	✓	25-Sep-2020	164 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-12	E440	09-Sep-2020	25-Sep-2020	180 days	15 days	✓	25-Sep-2020	164 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-13	E440	09-Sep-2020	25-Sep-2020	180 days	15 days	✓	25-Sep-2020	164 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-14	E440	09-Sep-2020	25-Sep-2020	180 days	15 days	✓	25-Sep-2020	164 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-10	E440	08-Sep-2020	26-Sep-2020	180 days	17 days	✓	26-Sep-2020	162 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-8	E440	08-Sep-2020	26-Sep-2020	180 days	17 days	✓	26-Sep-2020	162 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNW-9	E440	08-Sep-2020	26-Sep-2020	180 days	17 days	✓	26-Sep-2020	162 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-10	E440	07-Sep-2020	26-Sep-2020	180 days	18 days	✓	26-Sep-2020	161 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-7	E440	07-Sep-2020	26-Sep-2020	180 days	18 days	✓	26-Sep-2020	161 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-8	E440	07-Sep-2020	26-Sep-2020	180 days	18 days	✓	26-Sep-2020	161 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SNE-9	E440	07-Sep-2020	26-Sep-2020	180 days	18 days	✓	26-Sep-2020	161 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap SW-15	E440	06-Sep-2020	26-Sep-2020	180 days	19 days	✓	26-Sep-2020	160 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag DUP-H	E351	11-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-13	E351	11-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE18-1	E351	10-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-10	E351	07-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-11	E351	10-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-12	E351	10-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-13	E351	12-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-15	E351	12-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-7	E351	07-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-8	E351	07-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNE-9	E351	07-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-10	E351	08-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-11	E351	09-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-12	E351	09-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-13	E351	09-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-14	E351	09-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-15	E351	11-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-8	E351	08-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SNW-9	E351	08-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SW-15	E351	06-Sep-2020	----	----	----		30-Sep-2020	0 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Carbon by Combustion										
LDPE bag SE-15	E351	12-Sep-2020	----	----	----		06-Oct-2020	5 days	5 days	✓
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag DUP-H	E354	11-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-13	E354	11-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE-15	E354	12-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SE18-1	E354	10-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-10	E354	07-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-11	E354	10-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-12	E354	10-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-13	E354	12-Sep-2020	----	----	----		28-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-15	E354	12-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-7	E354	07-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-8	E354	07-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNE-9	E354	07-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-10	E354	08-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-11	E354	09-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-12	E354	09-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-13	E354	09-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-14	E354	09-Sep-2020	----	----	----		28-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-15	E354	11-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-8	E354	08-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SNW-9	E354	08-Sep-2020	----	----	----		28-Sep-2020	----	----	
Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve										
LDPE bag SW-15	E354	06-Sep-2020	----	----	----		28-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap DUP-H	E144	11-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-13	E144	11-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE-15	E144	12-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SE18-1	E144	10-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-10	E144	07-Sep-2020	----	----	----		25-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-11	E144	10-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-12	E144	10-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-13	E144	12-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-15	E144	12-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-7	E144	07-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-8	E144	07-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNE-9	E144	07-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-10	E144	08-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-11	E144	09-Sep-2020	----	----	----		24-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-12	E144	09-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-13	E144	09-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-14	E144	09-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-15	E144	11-Sep-2020	----	----	----		24-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-8	E144	08-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SNW-9	E144	08-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap SW-15	E144	06-Sep-2020	----	----	----		25-Sep-2020	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-15	E108	12-Sep-2020	25-Sep-2020	30 days	12 days	✓	25-Sep-2020	17 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-13	E108	12-Sep-2020	25-Sep-2020	30 days	12 days	✓	25-Sep-2020	17 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-15	E108	12-Sep-2020	25-Sep-2020	30 days	12 days	✓	25-Sep-2020	17 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap DUP-H	E108	11-Sep-2020	25-Sep-2020	30 days	13 days	✓	25-Sep-2020	16 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE-13	E108	11-Sep-2020	25-Sep-2020	30 days	13 days	✓	25-Sep-2020	16 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-15	E108	11-Sep-2020	25-Sep-2020	30 days	13 days	✓	25-Sep-2020	16 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SE18-1	E108	10-Sep-2020	25-Sep-2020	30 days	14 days	✓	25-Sep-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-11	E108	10-Sep-2020	25-Sep-2020	30 days	14 days	✓	25-Sep-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-12	E108	10-Sep-2020	25-Sep-2020	30 days	14 days	✓	25-Sep-2020	15 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-11	E108	09-Sep-2020	25-Sep-2020	30 days	15 days	✓	25-Sep-2020	14 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-12	E108	09-Sep-2020	25-Sep-2020	30 days	15 days	✓	25-Sep-2020	14 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-13	E108	09-Sep-2020	25-Sep-2020	30 days	15 days	✓	25-Sep-2020	14 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-14	E108	09-Sep-2020	25-Sep-2020	30 days	15 days	✓	25-Sep-2020	14 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-10	E108	08-Sep-2020	26-Sep-2020	30 days	17 days	✓	28-Sep-2020	12 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-8	E108	08-Sep-2020	26-Sep-2020	30 days	17 days	✓	28-Sep-2020	12 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNW-9	E108	08-Sep-2020	26-Sep-2020	30 days	17 days	✓	28-Sep-2020	12 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-10	E108	07-Sep-2020	26-Sep-2020	30 days	18 days	✓	28-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-7	E108	07-Sep-2020	26-Sep-2020	30 days	18 days	✓	28-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-8	E108	07-Sep-2020	26-Sep-2020	30 days	18 days	✓	28-Sep-2020	11 days	2 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SNE-9	E108	07-Sep-2020	26-Sep-2020	30 days	18 days	✓	28-Sep-2020	11 days	2 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap SW-15	E108	06-Sep-2020	26-Sep-2020	30 days	19 days	✓	28-Sep-2020	10 days	2 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-15	E641A-L	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-13	E641A-L	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-15	E641A-L	12-Sep-2020	24-Sep-2020	14 days	12 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap DUP-H	E641A-L	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE-13	E641A-L	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-15	E641A-L	11-Sep-2020	24-Sep-2020	14 days	13 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SE18-1	E641A-L	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-11	E641A-L	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓

Matrix: **Soil/Solid**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
Container / Client Sample ID(s)			*Preparation Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*	*Analysis Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-12	E641A-L	10-Sep-2020	24-Sep-2020	14 days	14 days	✓	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-11	E641A-L	09-Sep-2020	24-Sep-2020	14 days	15 days	✘ EHT	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-12	E641A-L	09-Sep-2020	24-Sep-2020	14 days	15 days	✘ EHT	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-13	E641A-L	09-Sep-2020	24-Sep-2020	14 days	15 days	✘ EHT	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-14	E641A-L	09-Sep-2020	24-Sep-2020	14 days	15 days	✘ EHT	28-Sep-2020	40 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-8	E641A-L	08-Sep-2020	25-Sep-2020	14 days	16 days	✘ EHTL	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-10	E641A-L	08-Sep-2020	25-Sep-2020	14 days	16 days	✘ EHT	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNW-9	E641A-L	08-Sep-2020	25-Sep-2020	14 days	16 days	✘ EHT	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-10	E641A-L	07-Sep-2020	25-Sep-2020	14 days	17 days	✘ EHTL	26-Sep-2020	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-8	E641A-L	07-Sep-2020	25-Sep-2020	14 days	17 days	× EHTL	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-9	E641A-L	07-Sep-2020	25-Sep-2020	14 days	17 days	× EHTL	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SNE-7	E641A-L	07-Sep-2020	25-Sep-2020	14 days	18 days	× EHTR	26-Sep-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap SW-15	E641A-L	06-Sep-2020	25-Sep-2020	14 days	18 days	× EHTR	26-Sep-2020	40 days	1 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-H	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-13	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE18-1	E611C	10-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-10	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-11	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-12	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-13	E611C	12-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-7	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-8	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-9	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-11	E611C	09-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-12	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-13	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-14	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-15	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-8	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-9	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-15	E611C	06-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE18-1	E611C	10-Sep-2020	28-Sep-2020	40 days	17 days	✓	29-Sep-2020	22 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-12	E611C	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-13	E611C	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-14	E611C	09-Sep-2020	28-Sep-2020	40 days	18 days	✓	29-Sep-2020	21 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-8	E611C	08-Sep-2020	28-Sep-2020	40 days	19 days	✓	29-Sep-2020	20 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-9	E611C	08-Sep-2020	28-Sep-2020	40 days	19 days	✓	29-Sep-2020	20 days	0 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-15	E611C	06-Sep-2020	28-Sep-2020	40 days	21 days	✓	29-Sep-2020	18 days	0 days	✓
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-H	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-13	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE18-1	E611C	10-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-10	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-11	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-12	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-13	E611C	12-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-7	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-8	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-9	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-11	E611C	09-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-12	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-13	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-14	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-15	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-8	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-9	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-15	E611C	06-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-15	E611C	12-Sep-2020	30-Sep-2020	40 days	17 days	✓	01-Oct-2020	22 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-13	E611C	12-Sep-2020	30-Sep-2020	40 days	17 days	✓	30-Sep-2020	22 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-H	E611C	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-13	E611C	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-15	E611C	12-Sep-2020	30-Sep-2020	40 days	18 days	✓	01-Oct-2020	21 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-15	E611C	11-Sep-2020	30-Sep-2020	40 days	18 days	✓	30-Sep-2020	21 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-11	E611C	10-Sep-2020	30-Sep-2020	40 days	19 days	✓	30-Sep-2020	20 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-12	E611C	10-Sep-2020	30-Sep-2020	40 days	19 days	✓	30-Sep-2020	20 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-11	E611C	09-Sep-2020	30-Sep-2020	40 days	20 days	✓	30-Sep-2020	19 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-10	E611C	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-7	E611C	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-8	E611C	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-9	E611C	07-Sep-2020	30-Sep-2020	40 days	22 days	✓	30-Sep-2020	17 days	0 days	✓
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial DUP-H	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-13	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SE18-1	E611C	10-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-10	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-11	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-12	E611C	10-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-13	E611C	12-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-15	E611C	12-Sep-2020	30-Sep-2020	----	----		01-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-7	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-8	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNE-9	E611C	07-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-11	E611C	09-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-12	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-13	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-14	E611C	09-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-15	E611C	11-Sep-2020	30-Sep-2020	----	----		30-Sep-2020	----	----	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-8	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SNW-9	E611C	08-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial SW-15	E611C	06-Sep-2020	28-Sep-2020	----	----		29-Sep-2020	----	----	

Legend & Qualifier Definitions

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHC - EPH by GC-FID	E601A	91640	2	21	9.5	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	91639	2	21	9.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	91636	2	21	9.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	91635	2	21	9.5	5.0	✓
Moisture Content by Gravimetry	E144	91641	2	21	9.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	91638	2	21	9.5	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	91637	2	21	9.5	5.0	✓
Total Carbon by Combustion	E351	94843	2	40	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	93460	2	21	9.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	93113	3	56	5.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	93112	3	31	9.6	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	91640	4	21	19.0	10.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	91639	4	21	19.0	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	91636	4	21	19.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	91635	4	21	19.0	10.0	✓
Moisture Content by Gravimetry	E144	91641	2	21	9.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	91638	4	21	19.0	10.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	91637	2	21	9.5	5.0	✓
Total Carbon by Combustion	E351	94843	4	40	10.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	93460	4	21	19.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	93113	3	56	5.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	93112	3	31	9.6	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	91640	2	21	9.5	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	91639	2	21	9.5	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	91636	2	21	9.5	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	91635	2	21	9.5	5.0	✓
Moisture Content by Gravimetry	E144	91641	2	21	9.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	91638	2	21	9.5	5.0	✓
Total Carbon by Combustion	E351	94843	2	40	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	93460	2	21	9.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	93113	3	56	5.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	93112	3	31	9.6	5.0	✓
Matrix Spikes (MS)							
VH and F1 by Headspace GC-FID	E581.VH+F1	93113	3	56	5.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	93112	3	31	9.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601.SG Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME Fractions 2-4 (F2-F4).
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.
Particle Size Analysis (Pipette) - MMER Classification	EC184E Saskatoon - Environmental	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil	EC356 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
F1-BTEX	EC580 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
F2 to F3 minus PAH	EC600 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F2-PAH = CCME Fraction 2 (C10-C16) minus Naphthalene F3-PAH = CCME Fraction 3 (C16-C34) minus select Polycyclic Aromatic Hydrocarbons (PAH) as per CCME Soil Tier 1
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA20B6111**	Page	: 1 of 34
Client	: Golder Associates Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Brett Lucas	Account Manager	: Amber Springer
Address	: 200-2920 Virtual Way Vancouver BC Canada V5M 0C4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 1663724/34000/03	Date Samples Received	: 21-Sep-2020 12:00
PO	: ----	Date Analysis Commenced	: 24-Sep-2020
C-O-C number	: 15-560017,15-56008	Issue Date	: 09-Oct-2020 11:37
Sampler	: ----		
Site	: ----		
Quote number	: Q79542		
No. of samples received	: 21		
No. of samples analysed	: 21		

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percentage Difference
# = Indicates a QC result that did not meet the ALS DQO.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Physical Tests (QC Lot: 91637)											
VA20B6111-009	SNW-11	pH (1:2 soil:water)	----	E108	0.10	pH units	8.19	8.24	0.609%	5%	----
Physical Tests (QC Lot: 91641)											
VA20B6111-009	SNW-11	moisture	----	E144	0.25	%	31.9	31.8	0.129%	20%	----
Physical Tests (QC Lot: 91983)											
VA20B6111-001	SNE-7	pH (1:2 soil:water)	----	E108	0.10	pH units	8.21	8.23	0.243%	5%	----
Physical Tests (QC Lot: 91987)											
VA20B6111-001	SNE-7	moisture	----	E144	0.25	%	34.7	34.6	0.323%	20%	----
Organic / Inorganic Carbon (QC Lot: 93460)											
VA20B6111-001	SNE-7	carbon, inorganic [IC]	----	E354	0.050	%	3.41	3.43	0.572%	20%	----
Organic / Inorganic Carbon (QC Lot: 93464)											
VA20B6111-021	SE-15	carbon, inorganic [IC]	----	E354	0.050	%	3.26	3.24	0.740%	20%	----
Organic / Inorganic Carbon (QC Lot: 94843)											
VA20B4607-001	Anonymous	carbon, total [TC]	----	E351	0.050	%	0.372	0.374	0.002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 94845)											
VA20B6111-001	SNE-7	carbon, total [TC]	----	E351	0.050	%	5.75	5.80	0.847%	20%	----
Metals (QC Lot: 91635)											
VA20B6111-009	SNW-11	aluminum	7429-90-5	E440	50	mg/kg	10200	9550	6.25%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.16	0.16	0.005	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.07	4.62	9.28%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	27.6	24.4	12.1%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.59	0.51	0.08	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	61.3	59.7	2.61%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.100	0.099	0.0004	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	102000	96600	5.40%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	28.6	27.8	2.86%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	5.00	4.65	7.33%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	11.4	10.8	5.67%	30%	----
		iron	7439-89-6	E440	50	mg/kg	16100	15300	4.82%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	8.49	8.07	5.12%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	40.5	39.7	1.95%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 91635) - continued											
VA20B6111-009	SNW-11	magnesium	7439-95-4	E440	20	mg/kg	45900	43000	6.38%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	166	156	6.04%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.35	0.37	0.02	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	15.6	15.0	3.64%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	432	424	1.76%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4050	3840	5.33%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.27	0.25	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	6200	5740	7.74%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	67.5	67.9	0.539%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.156	0.153	0.003	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	339	316	7.17%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.23	1.23	0.213%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	36.4	34.3	5.97%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	26.9	25.4	5.62%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	8.2	8.6	4.31%	30%	----
Metals (QC Lot: 91636)											
VA20B6111-009	SNW-11	mercury	7439-97-6	E510	0.0050	mg/kg	0.0166	0.0152	0.0014	Diff <2x LOR	----
Metals (QC Lot: 91981)											
VA20B6111-001	SNE-7	mercury	7439-97-6	E510	0.0050	mg/kg	0.0170	0.0177	0.0007	Diff <2x LOR	----
Metals (QC Lot: 91982)											
VA20B6111-001	SNE-7	aluminum	7429-90-5	E440	50	mg/kg	10400	10500	1.57%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.20	0.20	0.009	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.79	5.89	1.58%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	26.7	26.0	2.47%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.56	0.58	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	60.1	62.6	4.03%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.110	0.113	0.003	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	85200	86300	1.36%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	28.4	29.2	2.86%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	5.13	5.23	1.81%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 91982) - continued											
VA20B6111-001	SNE-7	copper	7440-50-8	E440	0.50	mg/kg	11.6	12.2	4.92%	30%	----
		iron	7439-89-6	E440	50	mg/kg	16200	16400	0.740%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	8.90	9.18	3.12%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	41.9	42.7	1.76%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	43800	45000	2.76%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	171	172	0.432%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.42	0.40	0.02	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	16.5	16.7	1.43%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	543	519	4.50%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4140	4280	3.36%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.34	0.05	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	6200	6160	0.668%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	57.0	58.7	2.90%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.160	0.160	0.0006	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	319	333	4.25%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.27	1.30	2.10%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	37.8	38.9	2.94%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	28.2	28.7	1.77%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	8.5	9.4	10.9%	30%	----
Volatile Organic Compounds (QC Lot: 93112)											
VA20B5306-006	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 93112) - continued											
VA20B5306-006	Anonymous	dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	0.059	0.061	0.002	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 94493)											
VA20B5306-018	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 94493) - continued											
VA20B5306-018	Anonymous	dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 94744)											
VA20B5824-004	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 94744) - continued											
VA20B5824-004	Anonymous	dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	0.114	0.101	0.014	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 91639)											
VA20B6111-009	SNW-11	F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	0	Diff <2x LOR	----
		F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 91640)											
VA20B6111-009	SNW-11	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 91985)											
VA20B6111-001	SNE-7	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 91986)											
VA20B6111-001	SNE-7	F2 (C10-C16)	----	E601.SG	30	mg/kg	<30	<30	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Hydrocarbons (QC Lot: 91986) - continued											
VA20B6111-001	SNE-7	F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	<50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 93113)											
VA20B5306-006	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 94494)											
VA20B5306-018	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 94743)											
VA20B5824-004	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 91638)											
VA20B6111-009	SNW-11	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 91984)											
VA20B6111-001	SNE-7	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 91984) - continued											
VA20B6111-001	SNE-7	benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 91641)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 91987)						
moisture	----	E144	0.25	%	<0.25	----
Organic / Inorganic Carbon (QCLot: 93460)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 93464)						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 94843)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Organic / Inorganic Carbon (QCLot: 94845)						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
Metals (QCLot: 91635)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 91635) - continued						
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 91636)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 91981)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 91982)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 91982) - continued						
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Volatile Organic Compounds (QCLot: 93112)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued						
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 94493)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 94493) - continued						
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Volatile Organic Compounds (QCLot: 94744)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 94744) - continued						
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 91639)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
Hydrocarbons (QCLot: 91640)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 91985)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 91986)						
F2 (C10-C16)	----	E601.SG	25	mg/kg	<25	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	<50	----
					<50	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	<50	----
Hydrocarbons (QCLot: 93113)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 94494)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----
Hydrocarbons (QCLot: 94743)						
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	<5.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 91638)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----
Polycyclic Aromatic Hydrocarbons (QCLot: 91984)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
					<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 91984) - continued						
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 91637)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	101	95.0	105	----
Physical Tests (QCLot: 91641)									
moisture	----	E144	0.25	%	50 %	99.6	90.0	110	----
Physical Tests (QCLot: 91983)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 91987)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Organic / Inorganic Carbon (QCLot: 93460)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	97.3	90.0	110	----
Organic / Inorganic Carbon (QCLot: 93464)									
carbon, inorganic [IC]	----	E354	0.05	%	0.5 %	99.0	90.0	110	----
Organic / Inorganic Carbon (QCLot: 94843)									
carbon, total [TC]	----	E351	0.05	%	48 %	98.6	80.0	120	----
Organic / Inorganic Carbon (QCLot: 94845)									
carbon, total [TC]	----	E351	0.05	%	48 %	99.5	80.0	120	----
Metals (QCLot: 91635)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	108	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	100.0	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	110	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	93.2	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.7	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 91635) - continued									
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	96.8	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	97.9	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	112	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	99.1	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	110	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	108	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.0	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	105	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	106	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	107	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	93.4	80.0	120	----
Metals (QCLot: 91636)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 91981)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	98.8	80.0	120	----
Metals (QCLot: 91982)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	98.6	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	99.6	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.3	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.3	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	94.4	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.1	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.7	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	97.8	80.0	120	----

Sub-Matrix: **Soil/Solid**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 91982) - continued									
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.4	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	100	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.5	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	109	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	89.6	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.9	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	95.1	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	102	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	94.6	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	100	80.0	120	----
Volatile Organic Compounds (QCLot: 93112)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	97.0	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	93.4	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	102	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	78.5	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	101	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	89.7	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	86.5	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	97.2	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	80.5	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	92.7	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	94.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	96.3	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	89.9	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued									
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	92.2	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	95.9	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	95.6	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	87.4	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	85.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	112	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	81.6	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	76.3	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	84.1	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	93.6	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	85.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	91.3	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	89.1	70.0	130	----
Volatile Organic Compounds (QCLot: 94493)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	85.1	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	83.6	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	88.0	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	84.6	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	86.1	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	82.9	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	94.5	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	91.7	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	94.7	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	86.1	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	80.4	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	84.8	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	85.7	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	84.0	70.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Volatile Organic Compounds (QCLot: 94493) - continued									
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	83.9	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	85.7	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	90.8	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	86.0	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	89.0	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	99.1	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	93.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	90.5	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	87.9	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	87.9	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	92.6	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	76.3	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	84.1	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	97.9	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	82.5	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	106	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	89.2	70.0	130	----
Volatile Organic Compounds (QCLot: 94744)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	105	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	122	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	106	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	96.7	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	98.1	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	90.5	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	99.7	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	107	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 94744) - continued									
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	121	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	93.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	110	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	90.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	118	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	93.1	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	95.9	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	105	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	109	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	88.6	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	100	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	95.0	70.0	130	----
Hydrocarbons (QCLot: 91639)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	112	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	114	70.0	130	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	108	70.0	130	----
Hydrocarbons (QCLot: 91640)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	99.2	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	106	70.0	130	----
Hydrocarbons (QCLot: 91985)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	98.4	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	104	70.0	130	----
Hydrocarbons (QCLot: 91986)									
F2 (C10-C16)	----	E601.SG	25	mg/kg	618.75 mg/kg	101	70.0	130	----
F3 (C16-C34)	----	E601.SG	50	mg/kg	1242.49 mg/kg	101	70.0	130	----
					14124 mg/kg	89.4	70.0	130	----
F4 (C34-C50)	----	E601.SG	50	mg/kg	993.9 mg/kg	95.5	70.0	130	----
Hydrocarbons (QCLot: 93113)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	114	70.0	130	----
Hydrocarbons (QCLot: 94494)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	108	70.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	High	Qualifier
Hydrocarbons (QCLot: 94743)									
F1 (C6-C10)	----	E581.VH+F1	5	mg/kg	93.6 mg/kg	117	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 91638)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	97.0	60.0	130	----
					0.638 mg/kg	98.5	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	97.0	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	93.1	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	99.6	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	94.1	60.0	130	----
					0.545 mg/kg	93.7	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	96.6	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	95.0	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	98.4	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
					0.666 mg/kg	94.6	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	99.2	60.0	130	----
					1.196 mg/kg	96.1	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	98.4	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
					0.445 mg/kg	91.2	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
					1.256 mg/kg	95.2	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	89.6	60.0	130	----
					1.088 mg/kg	91.4	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	88.8	50.0	130	----
					1.03 mg/kg	96.9	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	99.0	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	92.2	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 91984)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	99.5	60.0	130	----
					0.638 mg/kg	93.4	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	98.9	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	96.2	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 91984) - continued									
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	113	60.0	130	----
					0.545 mg/kg	97.7	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	96.7	60.0	130	----
					0.135 mg/kg	92.7	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
					0.377 mg/kg	100	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	93.6	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	110	60.0	130	----
					0.666 mg/kg	103	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	99.1	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99.2	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					0.445 mg/kg	93.3	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	95.9	60.0	130	----
					1.256 mg/kg	90.3	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	95.9	60.0	130	----
					1.088 mg/kg	89.1	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	96.7	50.0	130	----
					1.03 mg/kg	92.0	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	88.8	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93112)										
VA20B5306-007	Anonymous	benzene	71-43-2	E611C	1.90 mg/kg	3.125 mg/kg	68.9	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.96 mg/kg	3.125 mg/kg	71.3	60.0	140	----
		bromoform	75-25-2	E611C	2.36 mg/kg	3.125 mg/kg	85.9	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.29 mg/kg	3.125 mg/kg	83.2	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.92 mg/kg	3.125 mg/kg	69.9	60.0	140	----
		chloroethane	75-00-3	E611C	1.81 mg/kg	3.125 mg/kg	65.7	60.0	140	----
		chloroform	67-66-3	E611C	1.79 mg/kg	3.125 mg/kg	65.1	60.0	140	----
		chloromethane	74-87-3	E611C	2.78 mg/kg	3.125 mg/kg	101	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.06 mg/kg	3.125 mg/kg	74.7	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.08 mg/kg	3.125 mg/kg	75.6	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.69 mg/kg	3.125 mg/kg	61.4	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	1.96 mg/kg	3.125 mg/kg	71.2	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.83 mg/kg	3.125 mg/kg	66.4	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.05 mg/kg	3.125 mg/kg	74.4	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.76 mg/kg	3.125 mg/kg	63.8	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.78 mg/kg	3.125 mg/kg	64.6	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.73 mg/kg	3.125 mg/kg	62.7	60.0	140	----
		dichloromethane	75-09-2	E611C	1.94 mg/kg	3.125 mg/kg	70.4	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.97 mg/kg	3.125 mg/kg	71.6	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.50 mg/kg	3.125 mg/kg	91.0	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.49 mg/kg	3.125 mg/kg	90.6	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.72 mg/kg	3.125 mg/kg	62.5	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.32 mg/kg	3.125 mg/kg	84.1	60.0	140	----
		styrene	100-42-5	E611C	1.79 mg/kg	3.125 mg/kg	65.2	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	1.74 mg/kg	3.125 mg/kg	63.2	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.62 mg/kg	3.125 mg/kg	95.2	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.36 mg/kg	3.125 mg/kg	85.7	60.0	140	----
		toluene	108-88-3	E611C	1.78 mg/kg	3.125 mg/kg	64.8	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.55 mg/kg	3.125 mg/kg	92.5	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.87 mg/kg	3.125 mg/kg	67.9	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.30 mg/kg	3.125 mg/kg	83.5	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	1.72 mg/kg	3.125 mg/kg	62.6	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 93112) - continued										
VA20B5306-007	Anonymous	vinyl chloride	75-01-4	E611C	2.57 mg/kg	3.125 mg/kg	93.5	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	3.62 mg/kg	6.25 mg/kg	65.8	60.0	140	----
		xylene, o-	95-47-6	E611C	1.80 mg/kg	3.125 mg/kg	65.3	60.0	140	----
Volatile Organic Compounds (QCLot: 94493)										
VA20B5306-018	Anonymous	benzene	71-43-2	E611C	1.83 mg/kg	3.125 mg/kg	82.0	60.0	140	----
		bromodichloromethane	75-27-4	E611C	1.86 mg/kg	3.125 mg/kg	82.8	60.0	140	----
		bromoform	75-25-2	E611C	2.19 mg/kg	3.125 mg/kg	97.9	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	1.81 mg/kg	3.125 mg/kg	80.9	60.0	140	----
		chlorobenzene	108-90-7	E611C	1.88 mg/kg	3.125 mg/kg	83.9	60.0	140	----
		chloroethane	75-00-3	E611C	1.85 mg/kg	3.125 mg/kg	82.7	60.0	140	----
		chloroform	67-66-3	E611C	1.83 mg/kg	3.125 mg/kg	81.9	60.0	140	----
		chloromethane	74-87-3	E611C	1.92 mg/kg	3.125 mg/kg	85.8	60.0	140	----
		dibromochloromethane	124-48-1	E611C	1.85 mg/kg	3.125 mg/kg	82.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.00 mg/kg	3.125 mg/kg	89.2	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.90 mg/kg	3.125 mg/kg	85.0	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	1.95 mg/kg	3.125 mg/kg	87.0	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.90 mg/kg	3.125 mg/kg	84.7	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	1.83 mg/kg	3.125 mg/kg	81.9	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	1.84 mg/kg	3.125 mg/kg	82.2	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	1.88 mg/kg	3.125 mg/kg	84.0	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	1.76 mg/kg	3.125 mg/kg	78.5	60.0	140	----
		dichloromethane	75-09-2	E611C	1.85 mg/kg	3.125 mg/kg	82.5	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	1.87 mg/kg	3.125 mg/kg	83.6	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	1.87 mg/kg	3.125 mg/kg	83.4	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	1.78 mg/kg	3.125 mg/kg	79.5	60.0	140	----
		ethylbenzene	100-41-4	E611C	1.78 mg/kg	3.125 mg/kg	79.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.16 mg/kg	3.125 mg/kg	96.7	60.0	140	----
		styrene	100-42-5	E611C	1.90 mg/kg	3.125 mg/kg	85.0	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.25 mg/kg	3.125 mg/kg	101	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.00 mg/kg	3.125 mg/kg	89.2	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	1.78 mg/kg	3.125 mg/kg	79.4	60.0	140	----
		toluene	108-88-3	E611C	1.84 mg/kg	3.125 mg/kg	82.3	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.00 mg/kg	3.125 mg/kg	89.5	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	1.74 mg/kg	3.125 mg/kg	77.6	60.0	140	----
		trichloroethylene	79-01-6	E611C	1.76 mg/kg	3.125 mg/kg	78.5	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.45 mg/kg	3.125 mg/kg	109	60.0	140	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 94493) - continued										
VA20B5306-018	Anonymous	vinyl chloride	75-01-4	E611C	1.81 mg/kg	3.125 mg/kg	81.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.18 mg/kg	6.25 mg/kg	93.4	60.0	140	----
		xylene, o-	95-47-6	E611C	1.80 mg/kg	3.125 mg/kg	80.3	60.0	140	----
Volatile Organic Compounds (QCLot: 94744)										
VA20B5824-004	Anonymous	benzene	71-43-2	E611C	2.39 mg/kg	3.125 mg/kg	86.3	60.0	140	----
		bromodichloromethane	75-27-4	E611C	2.43 mg/kg	3.125 mg/kg	87.8	60.0	140	----
		bromoform	75-25-2	E611C	3.16 mg/kg	3.125 mg/kg	114	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	2.40 mg/kg	3.125 mg/kg	86.4	60.0	140	----
		chlorobenzene	108-90-7	E611C	2.30 mg/kg	3.125 mg/kg	83.0	60.0	140	----
		chloroethane	75-00-3	E611C	2.55 mg/kg	3.125 mg/kg	91.9	60.0	140	----
		chloroform	67-66-3	E611C	2.24 mg/kg	3.125 mg/kg	80.9	60.0	140	----
		chloromethane	74-87-3	E611C	2.33 mg/kg	3.125 mg/kg	84.1	60.0	140	----
		dibromochloromethane	124-48-1	E611C	2.58 mg/kg	3.125 mg/kg	93.2	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.38 mg/kg	3.125 mg/kg	85.8	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	2.02 mg/kg	3.125 mg/kg	73.0	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.34 mg/kg	3.125 mg/kg	84.3	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	2.45 mg/kg	3.125 mg/kg	88.3	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.46 mg/kg	3.125 mg/kg	88.7	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.45 mg/kg	3.125 mg/kg	88.3	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.27 mg/kg	3.125 mg/kg	82.0	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.44 mg/kg	3.125 mg/kg	88.0	60.0	140	----
		dichloromethane	75-09-2	E611C	2.47 mg/kg	3.125 mg/kg	89.0	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.42 mg/kg	3.125 mg/kg	87.3	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	3.35 mg/kg	3.125 mg/kg	121	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.95 mg/kg	3.125 mg/kg	106	60.0	140	----
		ethylbenzene	100-41-4	E611C	2.11 mg/kg	3.125 mg/kg	76.2	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.71 mg/kg	3.125 mg/kg	97.9	60.0	140	----
		styrene	100-42-5	E611C	2.12 mg/kg	3.125 mg/kg	76.5	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.19 mg/kg	3.125 mg/kg	79.1	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	3.01 mg/kg	3.125 mg/kg	108	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	2.00 mg/kg	3.125 mg/kg	72.0	60.0	140	----
		toluene	108-88-3	E611C	2.55 mg/kg	3.125 mg/kg	91.9	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.40 mg/kg	3.125 mg/kg	86.6	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.35 mg/kg	3.125 mg/kg	84.6	60.0	140	----
		trichloroethylene	79-01-6	E611C	2.38 mg/kg	3.125 mg/kg	85.8	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.48 mg/kg	3.125 mg/kg	89.6	60.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*Concentration*	*Target*	*MS*	*Low*	*High*	*Qualifier*
Volatile Organic Compounds (QCLot: 94744) - continued										
VA20B5824-004	Anonymous	vinyl chloride	75-01-4	E611C	2.12 mg/kg	3.125 mg/kg	76.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.45 mg/kg	6.25 mg/kg	80.3	60.0	140	----
		xylene, o-	95-47-6	E611C	2.15 mg/kg	3.125 mg/kg	77.7	60.0	140	----
Hydrocarbons (QCLot: 93113)										
VA20B5306-008	Anonymous	F1 (C6-C10)	----	E581.VH+F1	74.5 mg/kg	187.5 mg/kg	64.5	60.0	140	----
Hydrocarbons (QCLot: 94494)										
VA20B5306-018	Anonymous	F1 (C6-C10)	----	E581.VH+F1	150 mg/kg	187.5 mg/kg	112	60.0	140	----
Hydrocarbons (QCLot: 94743)										
VA20B5824-004	Anonymous	F1 (C6-C10)	----	E581.VH+F1	150 mg/kg	187.5 mg/kg	90.0	60.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 93460)									
QC-93460-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	113	80.0	120	----
Organic / Inorganic Carbon (QCLot: 93464)									
QC-93464-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	111	80.0	120	----
Organic / Inorganic Carbon (QCLot: 94843)									
QC-94843-003	RM	carbon, total [TC]	----	E351	1.4 %	94.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 94845)									
QC-94845-003	RM	carbon, total [TC]	----	E351	1.4 %	97.7	80.0	120	----
Metals (QCLot: 91635)									
QC-91635-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	110	70.0	130	----
QC-91635-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	95.7	70.0	130	----
QC-91635-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	103	70.0	130	----
QC-91635-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	105	70.0	130	----
QC-91635-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-91635-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	106	40.0	160	----
QC-91635-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	100	70.0	130	----
QC-91635-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
QC-91635-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
QC-91635-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
QC-91635-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	105	70.0	130	----
QC-91635-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	105	70.0	130	----
QC-91635-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	112	70.0	130	----
QC-91635-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	104	70.0	130	----
QC-91635-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	108	70.0	130	----
QC-91635-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	107	70.0	130	----
QC-91635-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	101	70.0	130	----
QC-91635-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-91635-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	98.4	70.0	130	----
QC-91635-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	112	70.0	130	----
QC-91635-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	107	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 91635) - continued									
QC-91635-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	109	70.0	130	----
QC-91635-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	100	40.0	160	----
QC-91635-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	103	70.0	130	----
QC-91635-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	118	70.0	130	----
QC-91635-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	110	70.0	130	----
QC-91635-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	110	70.0	130	----
QC-91635-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	106	70.0	130	----
QC-91635-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	90.6	70.0	130	----
Metals (QCLot: 91636)									
QC-91636-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	100	70.0	130	----
Metals (QCLot: 91981)									
QC-91981-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	98.8	70.0	130	----
Metals (QCLot: 91982)									
QC-91982-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
QC-91982-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	99.7	70.0	130	----
QC-91982-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	90.7	70.0	130	----
QC-91982-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	104	70.0	130	----
QC-91982-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	104	70.0	130	----
QC-91982-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	107	40.0	160	----
QC-91982-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	130	70.0	130	----
QC-91982-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
QC-91982-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	104	70.0	130	----
QC-91982-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	99.4	70.0	130	----
QC-91982-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	98.1	70.0	130	----
QC-91982-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	96.0	70.0	130	----
QC-91982-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	97.3	70.0	130	----
QC-91982-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	100	70.0	130	----
QC-91982-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	102	70.0	130	----
QC-91982-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
QC-91982-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	97.3	70.0	130	----
QC-91982-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	----
QC-91982-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	99.8	70.0	130	----
QC-91982-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	103	70.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 91982) - continued									
QC-91982-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	101	70.0	130	----
QC-91982-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	102	70.0	130	----
QC-91982-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	86.5	40.0	160	----
QC-91982-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	96.7	70.0	130	----
QC-91982-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	104	70.0	130	----
QC-91982-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	97.4	70.0	130	----
QC-91982-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
QC-91982-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	97.4	70.0	130	----
QC-91982-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	95.0	70.0	130	----
Hydrocarbons (QCLot: 91639)									
QC-91639-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	83.3	70.0	130	----
QC-91639-003	Petroleum Hydrocarbon IRM	F3 (C16-C34)	----	E601.SG	14124 mg/kg	79.6	70.0	130	----
QC-91639-003	Petroleum Hydrocarbon IRM	F4 (C34-C50)	----	E601.SG	1238 mg/kg	90.8	70.0	130	----
Hydrocarbons (QCLot: 91640)									
QC-91640-003	Petroleum Hydrocarbon IRM	EPH (C10-C19)	----	E601A	7113 mg/kg	99.1	70.0	130	----
QC-91640-003	Petroleum Hydrocarbon IRM	EPH (C19-C32)	----	E601A	10183 mg/kg	100	70.0	130	----
Hydrocarbons (QCLot: 91985)									
QC-91985-003	Petroleum Hydrocarbon IRM	EPH (C10-C19)	----	E601A	7113 mg/kg	98.0	70.0	130	----
QC-91985-003	Petroleum Hydrocarbon IRM	EPH (C19-C32)	----	E601A	10183 mg/kg	99.3	70.0	130	----
Hydrocarbons (QCLot: 91986)									
QC-91986-003	Petroleum Hydrocarbon IRM	F2 (C10-C16)	----	E601.SG	4720 mg/kg	95.9	70.0	130	----
QC-91986-003	Petroleum Hydrocarbon IRM	F4 (C34-C50)	----	E601.SG	1238 mg/kg	96.4	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 91638)									
QC-91638-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	114	60.0	130	----
QC-91638-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	106	60.0	130	----
QC-91638-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	89.4	60.0	130	----
QC-91638-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	91.4	60.0	130	----
QC-91638-003	RM	benzo(g,h,i)perylene	191-24-2	E641A-L	0.377 mg/kg	96.7	60.0	130	----
QC-91638-003	RM	benzo(k)fluoranthene	207-08-9	E641A-L	0.34 mg/kg	96.2	60.0	130	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 91638) - continued									
QC-91638-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	96.0	60.0	130	----
QC-91638-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	95.3	60.0	130	----
QC-91638-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	96.2	60.0	130	----
QC-91638-003	RM	pyrene	129-00-0	E641A-L	1.325 mg/kg	97.4	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 91984)									
QC-91984-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	99.0	60.0	130	----
QC-91984-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	95.8	60.0	130	----
QC-91984-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	96.7	60.0	130	----
QC-91984-003	RM	benzo(k)fluoranthene	207-08-9	E641A-L	0.34 mg/kg	95.7	60.0	130	----
QC-91984-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	100	60.0	130	----
QC-91984-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	93.2	60.0	130	----
QC-91984-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	94.7	60.0	130	----
QC-91984-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	94.8	60.0	130	----
QC-91984-003	RM	pyrene	129-00-0	E641A-L	1.325 mg/kg	94.6	60.0	130	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 560017

Report To — Contact and company name below will appear on the final report

Company:	Golder Associates Ltd.
Contact:	Christine Bylenga/Brett Lucas
Phone:	1-604-296-4200

Company address below will appear on the final report

Street:	200-2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4

Invoice To
Same as Report To ☑ YES ☐ NO
Copy of Invoice with Report ☐ YES ☑ NO
Company:
Contact:

Report Format / Distribution
Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: cbylenga@golder.com
Email 2: blucas@golder.com
Email 3:

Invoice Distribution
Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Project Information
ALS Account # / Quote #: Q79542
Job #: 1663724/34000/03
PO / AFE:
LSD:
ALS Lab Work Order # (lab use only)

Oil and Gas Required Fields (client use)
AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:
ALS Contact: Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Environmental Division
Vancouver
Work Order Reference
VA20B6111
Telephone : +1 604 253 4188

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, TIC	Particle Size	F2-F4 PAH	LEPH/HEPH, EPH, PAH	metals (incl Hg)	Number of Containers
	SNE-7	07-Sep-20	09:45	SEDIMENT	X	X	X	X	X	4
	SNW-8	08-Sep-20	11:30	SEDIMENT	X	X	X	X	X	4
	SW-15	06-Sep-20	13:00		X	X	X	X	X	
	SNE-9	07-Sep-20	15:00		X	X	X	X	X	
	SNE-10	07-Sep-20	17:00		X	X	X	X	X	
	SNE-8	07-Sep-20	12:00		X	X	X	X	X	
	SNW-9	08-Sep-20	14:00		X	X	X	X	X	
	SNW-10	08-Sep-20	16:00		X	X	X	X	X	
	SNW-11	09-Sep-20	09:35		X	X	X	X	X	
	SNW-12	09-Sep-20	12:10		X	X	X	X	X	
	SNW-13	09-Sep-20	15:20		X	X	X	X	X	
	SNW-14	09-Sep-20	16:45		X	X	X	X	X	

Drinking Water (DW) Samples[1] (client use)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)
Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐
INITIAL COOLER TEMPERATURES °C: 2.6
FINAL COOLER TEMPERATURES °C: 10 C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 14 SEP 2020	Time: 1700	Received by: [signature]	Date: Sept 22, 2020	Time: 9:45	Received by: RK.	Date: Sept-21	Time: 12:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY — OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 560018

Report To	Contact and company name below will appear on the final report
Company:	Golder Associates Ltd.
Contact:	Christine Bylenga / Brett Lucas
Phone:	1-604-296-4200
	Company address below will appear on the final report
Street:	200-2920 Virtual Way
City/Province:	Vancouver, BC
Postal Code:	V5M 0C4
Invoice To	Same as Report To [✓] YES [ ] NO
	Copy of Invoice with Report [ ] YES [✓] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [✓] PDF [✓] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [✓] YES [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [✓] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: cbylenga@golder.com

Email 2: blucas@golder.com

Email 3:

Invoice Distribution

Select Invoice Distribution: [✓] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax:

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] [✓] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] [ ] 3 day [P3] [ ] 2 day [P2] [ ]

EMERGENCY: 1 Business day [E1] [ ] Same Day, Weekend or Statutory holiday [E0] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q79542

Job #: 1663724/34000/103

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only): 6111

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:
ALS Contact: | Sampler:

Environmental Division
Vancouver
Work Order Reference
VA20B6111

Telephone : +1 604 253 4188

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TOC, TIC	Particle Size	F2-F4 PAH	LEPH, HEPH, EPH, PAH	Metals (incl Hg)	Number of Containers
	SNE-11	10-Sep-20	13:50	SEDIMENT	X	X	X	X	X	4
	SNE-12	10-Sep-20	15:50	↓	X	X	X	X	X	↓
	SE18-1	10-Sep-20	17:30		X	X	X	X	X	
	DUP H	11-Sep-20	—		X	X	X	X	X	
	SNW-15	11-Sep-20	11:40		X	X	X	X	X	
	SE-13	11-Sep-20	15:35		X	X	X	X	X	
	SNE-13	12-Sep-20	11:15		X	X	X	X	X	
	SNE-15	12-Sep-20	14:55		X	X	X	X	X	
	SE-15	12-Sep-20	16:20	↓	X	X	X	X	X	↓

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO

Are samples for human drinking water use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] | SIF Observations Yes [ ] No [ ]

Ice Packs [✓] Ice Cubes [ ] | Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: 10°C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 14 SEP 2020	Time: 1700	Received by:	Date:	Time:	Received by: RK.	Date: Sep/21	Time: 12:40

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX 3D

Sediment Screening Table

Sample ID / Date Sampled / Laboratory Sample ID / Parameter	Lowest Detectio	Units	CCME		NOAA Sediment Benchmarks							Eco Tox EqP (@ 1%TOC)
			ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET	
Physical Properties												
Moisture	0.25	%	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-	-
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-	-
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-	-
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-	-
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-	-
Texture		-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)												
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	-
Metals												
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00	-
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30	-
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00	-
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00	-
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-	-
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00	-
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00	-
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00	-
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00	-
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00	-
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00	-
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00	-
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41	-
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00	-
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-	-
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00	-
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10	-
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	-
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40	-
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	-
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	-
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00	-
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00	-
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (Soil)												
VOC Sample Container		-	-	-	-	-	-	-	-	-	-	
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-	0.06
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.65
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-	1.20
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01	0.34
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-		1.70
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11	0.35
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00	3.60
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-	-
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06	0.53
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.67
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.17
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.03
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00	-
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)												
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-	-
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-	-
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	-
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)												
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130	-
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071	-
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280	-
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960	-
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100	-
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800	-
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800	-
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950	-
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230	-
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300	-
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120	0.540
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600	-
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-	-
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064	-
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230	0.480
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660	-
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400	-
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-	-
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-	-

Sample ID	SW-3-1	SW-2-2	SW-2-1	SC-4-1	SC-4-2	SC-5-1	SC-5-2	DUP-A	SW-5-1	SW-5-2	SN-4-1	SN-4-2	SN-3-2	SN-3-1	SN-2-2	SN-2-1	SN-1-2
Date Sampled	10-Aug-2017	10-Aug-2017	10-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017	11-Aug-2017
Laboratory Sample ID	L1977406-1	L1977406-2	L1977406-3	L1977406-4	L1977406-5	L1977406-6	L1977406-7	L1977406-8	L1977406-9	L1977406-10	L1977406-11	L1977406-12	L1977406-13	L1977406-14	L1977406-15	L1977406-16	L1977406-17
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																	
Moisture	28.5		27.5	39.5		34.1		35.7	32.7		24.8			29.9		28.8	
pH (1:2 soil:water)	8.14	8.12	8.02	8.08	7.92	8.11	8.02	8.19	8.25	8.21	8.29	8.33	8.27	8.22	8.19	8.24	8.31
% Gravel (>2mm)	7.7	<1.0	<1.0	3.0	4.5	15.4	6.8	31.2	<1.0	10.1	15.0	11.4	18.1	10.8	15.4	15.8	34.9
% Sand (2.0mm - 0.063mm)	56.8	68.7	72.1	20.2	25.6	36.8	43.9	28.1	42.0	32.4	43.6	38.9	25.6	30.2	30.3	35.6	36.8
% Silt (0.063mm - 4um)	30.0	25.2	22.4	33.3	46.5	37.5	37.0	31.5	34.8	38.9	29.2	35.3	41.4	44.0	42.2	39.4	23.2
% Clay (<4um)	5.6	5.3	4.8	43.5	23.5	10.3	12.3	9.1	23.2	18.8	12.2	14.4	14.8	15.0	12.1	9.2	5.1
Texture	Sandy loam	y loam / Loamy	Loamy sand	Clay loam	Silt loam	Loam	Loam	Loam	Loam	Loam	Loam	Loam	Silt loam	Silt loam	Silt loam	am / Sandy loa	Sandy loam
Organic / Inorganic Carbon (Soil)																	
Total Inorganic Carbon	1.99	1.43	1.42	1.88	2.67	2.12	1.74	1.79	2.46	2.29	2.13	2.23	2.42	2.15	1.98	2.15	1.85
Total Organic Carbon	2.36	2.01	1.83	1.71	2.6	2.21	1.89	2.03	2.07	2.7	2.06	2.51	3.2	3	3.1	2.59	2.32
Metals																	
Aluminum (Al)	4520	3770	3260	14700	8960	6520	6910	6640	6990	6850	5430	5940	6930	6920	6160	5490	3850
Antimony (Sb)	<0.10	<0.10	<0.10	0.13	0.16	0.13	0.15	0.13	0.15	0.15	0.12	0.14	0.14	0.13	0.12	0.11	<0.10
Arsenic (As)	3.71	4.38	3.30	5.29	4.65	2.42	3.95	2.62	6.52	7.07	5.83	5.80	6.66	7.72	8.32	6.77	3.32
Barium (Ba)	15.5	13.7	12.8	42.9	28.1	17.4	18.7	18.9	21.3	21.2	16.2	18.5	20.4	20.8	19.1	17.1	13.5
Beryllium (Be)	0.34	0.26	0.23	0.98	0.62	0.45	0.46	0.43	0.46	0.48	0.37	0.40	0.47	0.45	0.43	0.37	0.28
Bismuth (Bi)	<0.20	<0.20	<0.20	0.23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	33.4	25.7	22.9	61.2	60.5	41.7	46.9	41.5	48.5	49.0	38.3	42.5	49.1	47.4	44.1	39.5	29.7
Cadmium (Cd)	0.04	0.03	0.04	0.08	0.12	0.07	0.08	0.07	0.09	0.10	0.07	0.09	0.07	0.08	0.07	0.04	0.05
Calcium (Ca)	79400	51700	56000	44500	73800	57500	50000	55100	80700	85100	73900	78300	86400	85700	81900	77800	69200
Chromium (Cr)	17.7	14.8	13.0	63.1	29.7	23.5	24.2	23.6	22.8	22.4	17.7	19.9	22.8	23.1	21.1	19.5	14.2
Cobalt (Co)	3.04	2.69	2.27	10.10	5.11	3.64	3.79	3.73	4.34	4.27	3.37	3.84	4.28	4.35	4.05	3.52	2.56
Copper (Cu)	6.1	4.6	4.1	23.4	11.6	7.6	9.2	7.6	9.6	9.6	7.6	8.6	9.7	9.7	8.7	7.6	5.2
Iron (Fe)	10700	10100	8350	28900	14900	10700	11500	10800	13700	13900	11300	12400	13900	14300	13700	12300	9320
Lead (Pb)	4.77	3.68	3.48	15.10	10.50	6.70	7.46	6.95	7.49	7.65	6.05	6.90	7.20	7.18	6.36	5.85	4.31
Lithium (Li)	23.8	19.3	16.9	46.0	43.6	28.8	29.7	27.9	34.3	34.2	26.6	30.8	34.1	33.2	30.3	27.5	19.8
Magnesium (Mg)	40700	26900	25300	30600	37000	33900	28100	31000	35200	36900	31200	34800	41900	40500	40100	36800	30300
Manganese (Mn)	132	106	92	235	151	117	113	116	153	157	132	139	157	159	158	140	109
Mercury (Hg)	0.0097	0.0076	0.0063	0.0154	0.0237	0.0130	0.0177	0.0156	0.0163	0.0169	0.0127	0.0137	0.0147	0.0143	0.0138	0.0133	0.0088
Molybdenum (Mo)	0.36	0.30	0.27	0.95	1.09	0.74	1.04	0.61	0.34	0.35	0.29	0.33	0.37	0.36	0.34	0.34	0.27
Nickel (Ni)	9.55	8.34	7.08	34.60	17.20	14.10	14.90	14.10	13.00	12.90	10.20	11.80	13.30	13.10	12.20	10.80	7.86
Phosphorus (P)	443	442	403	623	629	494	528	478	457	499	422	436	517	569	589	518	354
Potassium (K)	2020	1850	1560	5880	3980	2670	2900	2730	3040	3010	2350	2610	3030	3060	2680	2430	1750
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	0.48	0.30	0.45	0.32	0.22	0.25	0.21	<0.20	0.22	<0.20	<0.20	<0.20	<0.20
Silver (Ag)	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	3970	4170	3690	6500	11200	5200	7150	5670	5100	5610	4210	4670	5560	4840	4460	3990	3170
Strontium (Sr)	46.5	35.8	60.5	44.5	62.1	41.3	52.5	42.0	55.8	61.3	51.0	52.4	56.6	56.0	52.1	55.6	50.6
Sulfur (S)	<1000	<1000	<1000	2000	2100	1000	1600	1100	<1000	<1000	<1000	<1000	1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.092	0.094	0.076	0.285	0.190	0.129	0.137	0.124	0.127	0.124	0.101	0.111	0.127	0.127	0.110	0.101	0.079
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	253	247	211	747	339	313	299	304	256	249	209	229	281	288	284	237	204
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.76	0.65	0.63	2.87	1.54	1.26	1.39	1.23	0.97	0.95	0.77	0.92	0.95	0.95	0.98	0.79	0.67
Vanadium (V)	18.6	15.9	13.8	47.2	32.6	21.9	25.2	22.0	29.4	29.8	24.2	26.6	29.2	29.7	26.6	23.2	16.3
Zinc (Zn)	14.0	13.3	12.1	42.6	27.9	21.1	22.2	21.0	21.9	21.9	16.8	19.2	20.4	20.5	18.3	16.5	12.1
Zirconium (Zr)	5.2	3.7	3.5	22.7	8.8	5.5	5.0	5.3	7.3	6.9	5.6	6.1	7.1	7.3	6.4	5.5	4.8
Volatile Organic Compounds (Soil)																	
VOC Sample Container	Field MeOH		Field MeOH	Field MeOH		Field MeOH		Field MeOH	Field MeOH		Field MeOH			Field MeOH		Field MeOH	
Benzene	<0.0050		<0.0050	<0.0050		<0.0050		<0.0050	<0.0050		<0.0050			<0.0050		<0.0050	
Bromodichloromethane (BDCM)	<0.015		<0.015	<0.015		<0.015		<0.015	<0.015		<0.015			<0.015		<0.015	
Bromoform (Tribromomethane)	<0.20		<0.20	<0.20		<0.20		<0.20	<0.20		<0.20			<0.20		<0.20	
Carbon Tetrachloride	<0.050		<0.050	<0.050		<0.050		<0.050	<0.050		<0.050			<0.050		<0.050	
Chlorobenzene	<0.050		<0.050	<0.050		<0.050		<0.050	<0.050		<0.050			<0.050		<0.050	
Dichloromethane (DCM) (Methylene Chloride)	<0.050		<0.050	<0.050		<0.050		<0.050	<0.050		<0.050			<0.050		<0.050	
Chloroethane	<0.050		<0.050	<0.050		<0.050		<0.050	<0.050		<0.050			<0.050		<0.050	
Chloroform	<0.075		<0.075	<0.075		<0.075		<0.075	<0.075		<0.075			<0.075		<0.075	
Chloromethane	93.1		93.5	99.2		89.6		97.2	92.7		98			88.9		86.8	
1,2-Dichlorobenzene	90.4		87.6	96.5		87		97.1	91.3		96.6			85.3		88.5	
1,3-Dichlorobenzene																	
1,4-Dichlorobenzene																	
1,1-Dichloroethane																	
1,2-Dichloroethane																	
1,1-Dichloroethylene																	
1,2-dichloroethylene (Cis) (1,2-dichloroethene)																	
1,2-dichloroethylene (Trans) (1,2-dichloroethene)																	
Dichloromethane (DCM) (Methylene Chloride)																	
1,2-dichloropropane (Propylene Dichloride)																	
cis-1,3-Dichloropropylene																	
trans-1,3-Dichloropropylene																	
1,3-Dichloropropene (cis & trans)																	
Ethylbenzene																	
Methyl tert-Butyl Ether																	
Styrene																	
1,1,1,2-Tetrachloroethane																	
1,1,2,2-Tetrachloroethane																	
Tetrachloroethylene (PCE/PERC)																	
Toluene																	
1,1,1-Trichloroethane																	
1,1,2-Trichloroethane																	
Trichloroethylene (TCE)																	
Trichlorofluoromethane (Freon 11)																	
Vinyl Chloride (Chloroethene)																	
o-Xylene																	
m,p-Xylenes																	
Xylenes, Total																	
4-Bromofluorobenzene (SS)																	
1,4-Difluorobenzene (SS)																	
Hydrocarbons (Soil)																	
EPH (C10-C19)																	
EPH (C19-C32)																	
LEPH (C10-C19) Less PAHs																	
HEPH (C19-C32) Less PAHs																	
2-Bromobenzotrifluoride	99.4		90.6	90.7		88.7		90.5	91.3		87.7			92.5		84.1	
Polycyclic Aromatic Hydrocarbons (Soil)																	
Acenaphthene	<0.0050		<0.0050	<0.0050		<0.0050		<0.0050	<0.0050		<0.0050			<0.0050		<0.0050	
Acenaphthylene	<0.0050		<0.0050	<0.0050		<0.0050		<0.0050	<0.0050		<0.0050			<0.0050		<0.0050	
Anthracene	<0.0040		<0.0040	<0.0040		<0.0040		<0.0040	<0.0040		<0.0040			<0.0040		<0.0040	
Benz(a)anthracene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Benzo(a)pyrene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Benzo(b,j) fluoranthene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Benzo(b,j,k)fluoranthene	<0.015		<0.015	<0.015		<0.015		<0.015	<0.015		<0.015			<0.015		<0.015	
Benzo(g,h,i)perylene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Benzo(k)fluoranthene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Chrysene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Dibenz(a,h)anthracene	<0.0050		<0.0050	<0.0050		<0.0050		<0.0050	<0.0050		<0.0050			<0.0050		<0.0050	
Fluoranthene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Fluorene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Indeno(1,2,3-c,d)pyrene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
1-Methylnaphthalene																	
2-Methylnaphthalene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Naphthalene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Phenanthrene	<0.010		<0.010	<0.010		<0.010		<0.010	<0.010		<0.010			<0.010		<0.010	
Pyrene																	
Quinoline																	
Acenaphthene d10	96.1		98.4	96.5		93.9		81.5	83.9		95			94.9		96.1	
Chrysene d12	102.1		104	108.4		97.4		80.1	94.8		105.9			107.6		104.9	
Naphthalene d8	94.9		100.7	93.7		80.5		78.6	74.4		83.6			86		95.3	
Phenanthrene d10	98.6		106	107.8		101.8		91.3	95.9		99.8			96.3		105.5	
Benzo(a)pyrene Total Potency Equivalence (TPE)	<0.020		<0.020	<0.020		<0.020		<0.020	<0.020		<0.020			<0.020		<0.020	
Index of Additive Cancer Risk	<0.15		<0.15	<0.15		<0.15		<0.15	<0.15		<0.15			<0.15		<0.15	

Sample ID	SN-1-1	SE-5-1	SE-5-2	SE-5-3	SE-4-1	SE-4-2	SE-4-3	SC-2-1	SC-2-2	SC-2-3	SC-3-1	SC-3-2	SC-3-3	SC-4-3	SC-5-3	SN-5-3	SN-4-3
Date Sampled	11-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017	12-Aug-2017
Laboratory Sample ID	L1977406-18	L1977406-19	L1977406-20	L1977406-21	L1977406-22	L1977406-23	L1977406-24	L1977406-25	L1977406-26	L1977406-27	L1977406-28	L1977406-29	L1977406-30	L1977406-31	L1977406-32	L1977406-33	L1977406-34
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																	
Moisture	27.8	30.4			30.5			46.2			33						
pH (1:2 soil:water)	8.25	8.18	8.12	8.04	8.18	8.23	8.19	8.01	8.09	8.00	8.24	8.17	7.85	8.08	8.16	8.26	8.32
% Gravel (>2mm)	44.1	6.0	1.5	17.2	37.0	1.4	18.7	5.7	3.9	6.5	11.7	13.1	2.5	15.6	11.7	14.4	12.0
% Sand (2.0mm - 0.063mm)	27.2	49.3	69.4	54.4	30.3	66.8	50.5	20.5	29.7	25.1	25.4	21.9	25.4	33.6	40.5	34.2	29.4
% Silt (0.063mm - 4um)	23.7	36.3	20.0	21.4	24.5	24.8	23.2	53.0	51.1	50.5	47.9	49.4	52.3	35.9	32.5	33.8	40.3
% Clay (<4um)	5.0	8.4	9.0	7.0	8.1	7.0	7.6	20.7	15.3	17.9	15.0	15.6	19.9	14.8	15.2	17.7	18.4
Texture	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Loam	Sandy loam	Sandy loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Loam	Loam	Loam	Silt loam
Organic / Inorganic Carbon (Soil)																	
Total Inorganic Carbon	1.86	1.72	1.42	1.53	1.92	1.52	1.66	2.40	2.40	2.07	2.26	2.18	2.44	2.17	1.79	2.41	2.55
Total Organic Carbon	2.01	2.1	1.07	1.57	2.38	1.38	1.61	3.4	2.9	3.2	2.4	3.3	3.3	2.48	1.75	2.54	3
Metals																	
Aluminum (Al)	5140	5510	3290	3610	5400	4200	4560	10700	7930	7610	7850	8720	10600	9910	8590	8630	8450
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	0.26	0.16	0.19	0.16	0.19	0.29	0.17	0.13	0.16	0.17
Arsenic (As)	4.81	5.57	5.24	4.14	5.17	2.08	3.12	6.63	4.42	4.07	3.69	3.97	5.91	4.05	3.85	6.67	7.16
Barium (Ba)	16.3	15.2	13.0	12.3	17.8	11.4	12.8	29.6	25.8	19.7	20.4	27.5	25.9	36.4	23.1	23.9	23.4
Beryllium (Be)	0.33	0.37	0.23	0.25	0.36	0.28	0.30	0.70	0.51	0.50	0.51	0.55	0.65	0.60	0.53	0.53	0.56
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	37.1	39.0	23.7	24.6	37.8	29.8	33.7	81.3	54.4	55.0	54.7	61.8	73.6	64.6	51.0	58.8	61.3
Cadmium (Cd)	0.05	0.04	0.03	0.03	0.05	0.04	0.04	0.11	0.07	0.18	0.09	0.09	0.17	0.12	0.08	0.10	0.11
Calcium (Ca)	78800	57200	38100	41100	65400	52400	48700	87500	80100	69400	73800	85100	72100	75600	53200	87700	98800
Chromium (Cr)	18.4	18.4	12.0	12.7	19.1	13.5	15.4	34.1	25.7	25.5	23.9	26.6	32.4	30.0	31.5	24.2	26.1
Cobalt (Co)	3.14	3.28	2.12	2.26	3.32	2.31	2.49	5.36	4.38	4.05	3.76	4.28	4.65	4.76	4.57	4.59	4.84
Copper (Cu)	6.5	6.8	4.2	4.6	6.9	4.8	5.7	13.1	9.3	9.6	8.1	9.3	13.0	10.0	9.9	10.3	10.7
Iron (Fe)	11200	11000	7850	8130	11300	7850	8500	17200	13300	12300	12000	13200	14000	13600	13600	14400	15600
Lead (Pb)	5.23	5.81	3.72	4.11	6.19	4.44	4.90	10.90	8.27	8.16	8.08	9.00	10.20	9.27	8.37	8.32	8.78
Lithium (Li)	25.7	26.9	16.3	17.7	25.1	19.1	21.2	50.6	35.4	35.9	35.6	39.6	46.2	40.6	31.3	37.0	40.5
Magnesium (Mg)	40500	31600	19700	20500	30500	25600	26700	50700	45700	41900	42000	46700	45800	38700	29400	39300	44500
Manganese (Mn)	130	117	82	89	122	90	94	172	154	132	135	147	146	146	133	176	173
Mercury (Hg)	0.0121	0.0121	0.0072	0.0086	0.0142	0.0075	0.0076	0.0201	0.0157	0.0148	0.0174	0.0185	0.0199	0.0243	0.0148	0.0180	0.0154
Molybdenum (Mo)	0.31	0.34	0.23	0.26	0.33	0.30	0.37	1.08	0.48	1.02	0.69	0.75	2.78	0.74	0.66	0.39	0.39
Nickel (Ni)	9.87	10.10	6.59	7.06	10.70	7.49	8.36	19.20	14.40	14.50	13.00	14.60	17.70	17.80	18.50	13.80	14.80
Phosphorus (P)	441	465	430	530	517	340	397	747	569	523	499	556	532	526	534	478	513
Potassium (K)	2220	2420	1550	1690	2360	1800	1970	4650	3390	3310	3300	3640	4480	4060	3520	3600	3590
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	0.24	<0.20	<0.20	0.63	0.29	0.37	0.34	0.36	0.63	0.59	0.28	0.25	0.24
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	3880	5580	4320	4270	5050	3400	4280	10500	6920	7040	5780	7680	10100	8670	8490	5440	5160
Strontium (Sr)	48.5	40.7	34.3	33.6	56.6	36.3	35.1	65.8	56.3	50.3	51.2	69.1	51.9	65.2	68.4	62.3	68.8
Sulfur (S)	<1000	<1000	<1000	<1000	1100	<1000	<1000	1900	1200	1400	<1000	1300	3100	1400	1300	<1000	<1000
Thallium (Tl)	0.100	0.103	0.066	0.077	0.107	0.115	0.096	0.207	0.142	0.146	0.138	0.155	0.206	0.172	0.149	0.145	0.151
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	236	243	171	178	257	196	198	385	321	283	277	299	341	336	381	283	298
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.80	0.78	0.50	0.57	0.90	0.71	0.73	1.66	1.16	1.38	1.25	1.39	1.96	1.45	1.55	1.10	1.18
Vanadium (V)	20.6	23.1	15.1	16.0	22.4	16.3	18.5	42.6	28.5	30.3	27.7	30.3	43.0	32.1	27.4	32.7	35.5
Zinc (Zn)	15.2	16.3	10.9	11.6	16.6	12.7	13.6	31.7	23.7	22.3	21.9	23.9	27.7	27.2	23.5	23.6	24.5
Zirconium (Zr)	5.9	5.8	3.3	3.7	5.2	4.7	4.9	9.1	7.3	7.0	6.7	7.3	9.0	8.1	8.9	7.8	8.8
Volatile Organic Compounds (Soil)																	
VOC Sample Container	Field MeOH	Field MeOH			Field MeOH			Field MeOH			Field MeOH						
Benzene	<0.0050	<0.0050			<0.0050			<0.0050			<0.0050						
Bromodichloromethane (BDCM)	<0.015	<0.015			<0.015			<0.015			<0.015						
Bromoform (Tribromomethane)	<0.20	<0.20			<0.20			<0.20			<0.20						
Carbon Tetrachloride	<0.050	<0.050			<0.050			<0.050			<0.050						
Chlorobenzene	<0.050	<0.050			<0.050			<0.050			<0.050						
Dichloromethane (DCM) (Methylene Chloride)	<0.050	<0.050			<0.050			<0.050			<0.050						
Chloroethane	<0.050	<0.050			<0.050			<0.050			<0.050						
Chloroform	<0.075	<0.075			<0.075			<0.075			<0.075						
Chloromethane	93.2	90.6			93.2			91.3			92						
1,2-Dichlorobenzene	94.3	92			93.1			84.9			85.2						
1,3-Dichlorobenzene																	
1,4-Dichlorobenzene																	
1,1-Dichloroethane																	
1,2-Dichloroethane																	
1,1-Dichloroethylene																	
1,2-dichloroethylene (Cis) (1,2-dichloroethene)																	
1,2-dichloroethylene (Trans) (1,2-dichloroethene)																	
Dichloromethane (DCM) (Methylene Chloride)																	
1,2-dichloropropane (Propylene Dichloride)																	
cis-1,3-Dichloropropylene																	
trans-1,3-Dichloropropylene																	
1,3-Dichloropropene (cis & trans)																	
Ethylbenzene																	
Methyl tert-Butyl Ether																	
Styrene																	
1,1,1,2-Tetrachloroethane																	
1,1,2,2-Tetrachloroethane																	
Tetrachloroethylene (PCE/PERC)																	
Toluene																	
1,1,1-Trichloroethane																	
1,1,2-Trichloroethane																	
Trichloroethylene (TCE)																	
Trichlorofluoromethane (Freon 11)																	
Vinyl Chloride (Chloroethene)																	
o-Xylene																	
m,p-Xylenes																	
Xylenes, Total																	
4-Bromofluorobenzene (SS)																	
1,4-Difluorobenzene (SS)																	
Hydrocarbons (Soil)																	
EPH (C10-C19)																	
EPH (C19-C32)																	
LEPH (C10-C19) Less PAHs																	
HEPH (C19-C32) Less PAHs																	
2-Bromobenzotrifluoride	88.5	82.5			87.1			77			77.3						
Polycyclic Aromatic Hydrocarbons (Soil)																	
Acenaphthene	<0.0050	<0.0050			<0.0050			<0.0050			<0.0050						
Acenaphthylene	<0.0050	<0.0050			<0.0050			<0.0050			<0.0050						
Anthracene	<0.0040	<0.0040			<0.0040			<0.0040			<0.0040						
Benz(a)anthracene	<0.010	<0.010			<0.010			<0.010			<0.010						
Benzo(a)pyrene	<0.010	<0.010			<0.010			<0.010			<0.010						
Benzo(b,j) fluoranthene	<0.010	<0.010			<0.010			<0.010			<0.010						
Benzo(b,j,k)fluoranthene	<0.015	<0.015			<0.015			<0.015			<0.015						
Benzo(g,h,i)perylene	<0.010	<0.010			<0.010			<0.010			<0.010						
Benzo(k)fluoranthene	<0.010	<0.010			<0.010			<0.010			<0.010						
Chrysene	<0.010	<0.010			<0.010			<0.010			<0.010						
Dibenz(a,h)anthracene	<0.0050	<0.0050			<0.0050			<0.0050			<0.0050						
Fluoranthene	<0.010	<0.010			<0.010			<0.010			<0.010						
Fluorene	<0.010	<0.010			<0.010			<0.010			<0.010						
Indeno(1,2,3-c,d)pyrene	<0.010	<0.010			<0.010			<0.010			<0.010						
1-Methylnaphthalene																	
2-Methylnaphthalene	<0.010	<0.010			<0.010			<0.010			<0.010						
Naphthalene	<0.010	<0.010			<0.010			<0.010			<0.010						
Phenanthrene	<0.010	<0.010			<0.010			<0.010			<0.010						
Pyrene																	
Quinoline																	
Acenaphthene d10	101.9	97.2			100.3			82.2			98.7						
Chrysene d12	104.3	108.7			111.9			97.8			107.6						
Naphthalene d8	89.2	95.8			85.3			75.2			87.2						
Phenanthrene d10	108.2	107.4			110.2			93			99.3						
Benzo(a)pyrene Total Potency Equivalence (TPE)	<0.020	<0.020			<0.020			<0.020			<0.020						
Index of Additive Cancer Risk	<0.15	<0.15			<0.15			<0.15			<0.15						

Notes:

(a) Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

(b) BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Sample ID / Parameter	Lowest Detectio	Units	CCME		NOAA Sediment Benchmarks						
			ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET
Physical Properties											
Moisture	0.25	%	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-
Texture		-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Metals											
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (Soil)											
VOC Sample Container		-	-	-	-	-	-	-	-	-	-
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)											
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-

Sample ID	SN-3-3	SN-2-3	SN-1-3	SW-5-1	SW-5-2	SW-5-3	SW-1-1	SW-1-2	SW-1-3	SW-3-2	SW-3-3	DUP F	SE-1-1	SE-1-2	SE-1-3	DUP E	SE-2-1	SE-2-2
Date Sampled	12-Aug-2017	12-Aug-2017	12-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017
Laboratory Sample ID	L1977406-35	L1977406-36	L1977406-37	L1977406-38	L1977406-39	L1977406-40	L1977406-41	L1977406-42	L1977406-43	L1977406-44	L1977406-45	L1977406-46	L1977406-47	L1977406-48	L1977406-49	L1977406-50	L1977406-51	L1977406-52
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																		
Moisture				28.7			13.3					24.3	22.7			21.1	23	
pH (1:2 soil:water)	8.35	8.27	8.48	8.26	8.20	8.18	8.43	8.67	8.49	8.28	8.26	8.33	8.34	8.31	8.18	8.25	8.11	8.35
% Gravel (>2mm)	3.8	20.0	13.7	1.1	<1.0	1.0	25.1	48.5	51.5	5.1	19.9	11.1	9.3	22.4	45.9	49.7	82.3	39.8
% Sand (2.0mm - 0.063mm)	27.9	37.9	44.7	66.8	61.8	54.9	73.2	50.4	46.8	56.0	41.8	49.1	54.4	44.2	33.8	30.2	13.0	42.5
% Silt (0.063mm - 4um)	47.2	32.5	32.8	28.1	32.8	37.9	1.1	<1.0	1.3	30.9	31.3	31.8	28.6	26.6	16.3	16.0	3.6	13.4
% Clay (<4um)	21.1	9.6	8.9	4.0	4.6	6.2	<1.0	<1.0	<1.0	8.1	7.0	7.9	7.7	6.8	4.0	4.1	1.1	4.4
Texture	Silt loam	Loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sand	Sand	Sand	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Loamy sand	Sandy loam
Organic / Inorganic Carbon (Soil)																		
Total Inorganic Carbon	2.32	2.03	1.87	1.65	1.68	1.57	0.87	1.05	0.83	2.06	1.73	1.54	2.00	1.86	1.80	1.74	1.66	1.83
Total Organic Carbon	3	2.38	2.84	2.79	2.75	2.85	0.61	0.33	0.42	2.34	2.9	2.63	2.68	2.47	2.18	2.21	1.93	1.35
Metals																		
Aluminum (Al)	8500	6330	5440	3980	4250	5590	797	810	1100	5160	6070	5060	4850	4770	3990	4800	3800	4140
Antimony (Sb)	0.17	0.12	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	4.43	6.79	2.31	2.72	3.74	7.03	0.44	0.45	0.47	4.93	5.39	4.24	3.75	4.96	4.06	3.89	3.79	4.04
Barium (Ba)	22.2	17.5	15.0	13.3	14.8	22.0	1.9	2.2	3.9	17.6	20.4	15.3	15.3	15.4	13.2	14.6	12.5	14.6
Beryllium (Be)	0.55	0.44	0.35	0.27	0.32	0.38	<0.10	<0.10	<0.10	0.34	0.42	0.34	0.31	0.34	0.30	0.33	0.25	0.29
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	59.3	46.6	39.3	30.3	31.5	42.2	7.8	7.3	7.7	35.6	42.9	36.8	35.6	35.6	30.0	34.6	27.2	31.5
Cadmium (Cd)	0.10	0.05	0.08	0.03	<0.020	0.03	<0.020	<0.020	<0.020	0.04	0.04	0.03	0.05	0.04	0.04	0.04	0.04	0.05
Calcium (Ca)	89800	75000	73800	68600	75100	88100	37500	26000	20900	72900	86600	72800	71000	72200	62300	74200	55000	61400
Chromium (Cr)	27.7	20.0	18.1	15.2	16.9	21.3	2.6	3.1	3.7	19.3	22.1	18.2	16.5	16.2	14.8	17.1	12.8	13.7
Cobalt (Co)	4.76	3.73	3.12	3.04	3.11	3.95	0.58	0.59	0.76	3.26	3.86	3.02	2.96	3.01	2.74	2.81	2.26	2.56
Copper (Cu)	11.0	8.1	6.7	6.0	6.5	8.2	1.2	1.1	1.6	6.2	7.5	5.8	6.2	6.2	8.2	5.8	4.3	5.0
Iron (Fe)	14500	12500	10200	10700	11600	15600	1970	3200	4040	11600	13300	10700	12100	11400	11600	11200	9610	10500
Lead (Pb)	8.34	6.23	5.19	3.57	3.82	5.01	1.14	1.20	0.94	4.97	5.78	4.77	4.97	4.92	4.18	4.78	3.91	4.49
Lithium (Li)	40.7	31.1	25.7	22.0	23.7	29.7	4.9	4.5	5.9	24.5	28.8	23.7	23.6	24.1	19.9	23.5	17.7	20.0
Magnesium (Mg)	43900	37500	35200	36100	39700	45900	15400	12200	10600	38700	46900	39900	34800	35300	30900	31800	24100	29300
Manganese (Mn)	152	143	113	137	135	166	32	32	36	128	153	119	127	131	126	118	92	109
Mercury (Hg)	0.0141	0.0121	0.0087	0.0056	0.0059	0.0085	<0.0050	<0.0050	<0.0050	0.0089	0.0100	0.0079	0.0104	0.0092	0.0084	0.0113	0.0076	0.0077
Molybdenum (Mo)	0.41	0.39	0.33	0.29	0.29	0.35	0.12	0.10	0.12	0.30	0.39	0.30	0.32	0.33	0.35	0.30	0.41	0.32
Nickel (Ni)	**15.50**	11.30	9.97	8.36	9.14	11.70	1.87	1.48	2.14	10.30	11.80	9.66	9.10	9.12	8.43	9.06	6.99	8.83
Phosphorus (P)	460	518	344	466	504	1050	87	77	95	533	563	483	376	441	365	394	385	403
Potassium (K)	3530	2710	2290	1930	1960	2540	330	360	490	2410	2740	2280	2150	2090	1770	2090	1760	1840
Selenium (Se)	0.26	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	5310	4520	3330	4900	3580	5180	1480	1410	1600	3990	5030	4060	4000	3790	4520	3480	3690	3640
Strontium (Sr)	59.1	51.8	48.6	41.8	43.3	67.1	25.5	16.0	12.8	50.0	56.2	44.8	48.0	50.1	43.9	50.8	55.0	44.8
Sulfur (S)	<1000	<1000	<1000	1000	<1000	1200	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.154	0.113	0.097	0.090	0.080	0.116	<0.050	<0.050	<0.050	0.107	0.116	0.092	0.093	0.089	0.080	0.097	0.078	0.082
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	309	250	238	251	250	317	33	36	57	290	334	266	235	224	211	215	198	202
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	1.29	0.89	0.85	0.65	0.75	0.93	0.22	0.22	0.21	0.87	0.89	0.75	0.80	0.76	0.72	0.83	0.65	0.75
Vanadium (V)	32.7	24.8	20.4	14.3	15.7	20.1	3.1	3.3	3.8	20.6	23.4	20.6	19.1	18.9	17.1	18.3	15.8	19.1
Zinc (Zn)	23.9	18.2	15.4	12.3	12.2	17.4	2.2	2.4	3.4	15.8	17.8	14.4	14.7	14.0	13.9	13.4	11.4	13.2
Zirconium (Zr)	9.7	6.9	7.3	5.7	6.0	7.2	1.3	1.4	1.6	5.6	6.6	6.2	5.9	5.7	4.4	6.0	4.6	4.5
Volatile Organic Compounds (Soil)																		
VOC Sample Container				Field MeOH			Field MeOH					Field MeOH	Field MeOH			Field MeOH	Field MeOH	
Benzene				<0.0050			<0.0050					<0.0050	<0.0050			<0.0050	<0.0050	
Bromodichloromethane (BDCM)				<0.015			<0.015					<0.015	<0.015			<0.015	<0.015	
Bromoform (Tribromomethane)				<0.20			<0.20					<0.20	<0.20			<0.20	<0.20	
Carbon Tetrachloride				<0.050			<0.050					<0.050	<0.050			<0.050	<0.050	
Chlorobenzene				<0.050			<0.050					<0.050	<0.050			<0.050	<0.050	
Dichloromethane (DCM) (Methylene Chloride)				<0.050			<0.050					<0.050	<0.050			<0.050	<0.050	
Chloroethane				<0.050			<0.050					<0.050	<0.050			<0.050	<0.050	
Chloroform				<0.075			<0.075					<0.075	<0.075			<0.075	<0.075	
Chloromethane				96.4			106.7					94.3	105.8			99	81.3	
1,2-Dichlorobenzene				91.7			96.3					87.3	97.8			90.5	82.5	
1,3-Dichlorobenzene																		
1,4-Dichlorobenzene																		
1,1-Dichloroethane																		
1,2-Dichloroethane																		
1,1-Dichloroethylene																		
1,2-dichloroethylene (Cis) (1,2-dichloroethene)																		
1,2-dichloroethylene (Trans) (1,2-dichloroethene)																		
Dichloromethane (DCM) (Methylene Chloride)																		
1,2-dichloropropane (Propylene Dichloride)																		
cis-1,3-Dichloropropylene																		
trans-1,3-Dichloropropylene																		
1,3-Dichloropropene (cis & trans)																		
Ethylbenzene																		
Methyl tert-Butyl Ether																		
Styrene																		
1,1,1,2-Tetrachloroethane																		
1,1,2,2-Tetrachloroethane																		
Tetrachloroethylene (PCE/PERC)																		
Toluene																		
1,1,1-Trichloroethane																		
1,1,2-Trichloroethane																		
Trichloroethylene (TCE)																		
Trichlorofluoromethane (Freon 11)																		
Vinyl Chloride (Chloroethene)																		
o-Xylene																		
m,p-Xylenes																		
Xylenes, Total																		
4-Bromofluorobenzene (SS)																		
1,4-Difluorobenzene (SS)																		
Hydrocarbons (Soil)																		
EPH (C10-C19)																		
EPH (C19-C32)																		
LEPH (C10-C19) Less PAHs																		
HEPH (C19-C32) Less PAHs																		
2-Bromobenzotrifluoride				83.2			80.3					89	80.7			84.6	78.5	
Polycyclic Aromatic Hydrocarbons (Soil)																		
Acenaphthene				<0.0050			<0.0050					<0.0050	<0.0050			<0.0050	<0.0050	
Acenaphthylene				<0.0050			<0.0050					<0.0050	<0.0050			<0.0050	<0.0050	
Anthracene				<0.0040			<0.0040					<0.0040	<0.0040			<0.0040	<0.0040	
Benz(a)anthracene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Benzo(a)pyrene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Benzo(b,j) fluoranthene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Benzo(b,j,k)fluoranthene				<0.015			<0.015					<0.015	<0.015			<0.015	<0.015	
Benzo(g,h,i)perylene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Benzo(k)fluoranthene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Chrysene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Dibenz(a,h)anthracene				<0.0050			<0.0050					<0.0050	<0.0050			<0.0050	<0.0050	
Fluoranthene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Fluorene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Indeno(1,2,3-c,d)pyrene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
1-Methylnaphthalene																		
2-Methylnaphthalene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Naphthalene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Phenanthrene				<0.010			<0.010					<0.010	<0.010			<0.010	<0.010	
Pyrene																		
Quinoline																		
Acenaphthene d10				79.4			79.7					78.2	75.3			101.2	76.8	
Chrysene d12				93.7			94.4					91.5	82.4			111.2	91.3	
Naphthalene d8				76.2			75.9					74.2	68.7			91.6	71.7	
Phenanthrene d10				89.6			83.1					89.4	80.4			106.5	85.2	
Benzo(a)pyrene Total Potency Equivalence (TPE)				<0.020			<0.020					<0.020	<0.020			<0.020	<0.020	
Index of Additive Cancer Risk				<0.15			<0.15					<0.15	<0.15			<0.15	<0.15	

Sample ID	SE-2-3	DUP D	SE-3-1	SE-3-2	SE-3-3	DUP C	SW-4-1	SW-4-2	DUP B	SW2-3	SW-4-3	SW-1-1	SW-1-2	SW-1-3	SW-2-1	SW-2-2	SW-2-3
Date Sampled	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	13-Aug-2017	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018
Laboratory Sample ID	L1977406-53	L1977406-54	L1977406-55	L1977406-56	L1977406-57	L1977406-58	L1977406-59	L1977406-60	L1977406-61	L1977406-62	L1977406-63	L2148903-1	L2148903-2	L2148903-3	L2148903-4	L2148903-5	L2148903-6
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																	
Moisture		20.4	31.9			25.5	24.3		41.6			22.2			23.1		
pH (1:2 soil:water)	8.35	8.38	8.23	8.27	8.23	8.14	8.18	8.17	8.02	8.20	8.19	8.20	8.41	8.30	8.21	8.22	8.22
% Gravel (>2mm)	10.5	22.9	7.8	30.8	32.0	50.0	9.2	3.2	5.1	13.0	4.4	3.0	1.9	5.0	8.7	16.5	12.7
% Sand (2.0mm - 0.063mm)	47.6	59.5	63.6	47.6	46.4	34.7	55.1	61.9	22.4	81.7	48.1	60.8	95.4	74.9	62.6	49.9	53.3
% Silt (0.063mm - 4um)	32.5	13.1	21.1	15.6	16.0	11.7	29.3	29.0	49.5	4.0	39.3	28.6	2.0	15.8	23.4	26.8	28.3
% Clay (<4um)	9.5	4.5	7.6	5.9	5.6	3.5	6.5	5.9	23.0	1.3	8.2	7.6	<1.0	4.3	5.3	6.7	5.6
Texture	Sandy loam	Loamy sand	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Silt loam	Sand	Sandy loam	Sandy loam	Sand	Loamy sand	Sandy loam	Sandy loam	Sandy loam
Organic / Inorganic Carbon (Soil)																	
Total Inorganic Carbon	1.92	1.39	1.83	1.71	1.77	1.56	1.70	1.67	2.38	0.84	1.51	1.13	0.608	0.934	1.14	1.31	1.35
Total Organic Carbon	2.38	1.15	1.53	1.79	1.32	1.6	1.99	2.18	3.5	0.74	3.03	2.18	0.44	1.56	2.07	2.54	2.72
Metals																	
Aluminum (Al)	5310	2960	4140	4440	4500	4380	4940	4140	8520	917	6090	4810	898	3770	4480	5110	5300
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	2.95	4.05	3.28	3.23	3.50	3.25	6.53	6.54	4.10	0.72	10.30	3.93	0.47	3.51	4.54	3.85	4.43
Barium (Ba)	15.6	10.5	12.9	14.3	14.8	13.7	16.9	14.9	23.2	2.8	22.9	15.6	2.38	11.8	15.0	16.4	18.0
Beryllium (Be)	0.37	0.23	0.28	0.31	0.28	0.30	0.33	0.29	0.57	<0.10	0.41	0.30	<0.10	0.24	0.28	0.29	0.32
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	36.5	23.8	32.2	30.8	30.6	31.6	37.8	31.9	61.4	8.4	45.1	32.7	7.4	23.9	30.2	34.5	35.0
Cadmium (Cd)	0.05	0.03	0.04	0.04	0.03	0.06	0.06	<0.020	0.10	<0.020	0.04	0.05	<0.020	0.02	0.03	0.08	0.04
Calcium (Ca)	74900	56700	56700	55000	52900	57900	70800	73400	80500	19500	94500	63800	16800	45600	60500	70400	66900
Chromium (Cr)	17.3	10.2	13.2	14.5	15.1	13.9	18.0	16.0	27.5	4.6	22.6	17.8	3.6	12.5	16.2	17.1	17.7
Cobalt (Co)	3.03	1.88	2.34	2.50	2.54	2.34	3.19	2.78	4.39	0.70	4.06	2.92	0.58	2.32	2.83	2.92	3.10
Copper (Cu)	6.7	3.8	5.0	5.4	4.8	4.8	6.1	5.2	10.1	1.3	8.1	5.63	0.96	4.25	4.71	5.60	5.76
Iron (Fe)	10100	7660	8740	9700	9970	9390	12300	10700	13500	5410	15200	11900	2230	10700	12700	10900	12800
Lead (Pb)	5.31	3.42	4.69	4.50	4.43	4.45	4.60	4.02	9.66	1.19	5.95	4.31	0.93	3.37	3.78	4.42	4.49
Lithium (Li)	25.5	15.7	20.4	20.5	20.0	20.0	23.7	22.1	41.8	5.5	30.9	22.5	4.4	16.5	20.7	22.1	23.6
Magnesium (Mg)	38000	23800	26200	27000	26600	25300	35200	34300	45300	8950	47000	34700	9730	23100	30900	32900	33800
Manganese (Mn)	127	80	88	98	97	92	136	118	146	36	194	113	24.2	100	118	117	125
Mercury (Hg)	0.0097	0.0071	0.0094	0.0123	0.0087	0.0103	0.0090	0.0073	0.0208	<0.0050	0.0097	0.0090	<0.0050	0.0061	0.0070	0.0097	0.0094
Molybdenum (Mo)	0.30	0.26	0.52	0.36	0.32	0.29	0.32	0.26	1.19	0.18	0.42	0.37	0.12	0.30	0.38	0.33	0.39
Nickel (Ni)	9.63	5.91	7.71	8.09	7.83	7.68	9.90	8.66	**15.80**	2.06	12.50	9.31	1.90	6.85	8.54	9.29	9.62
Phosphorus (P)	594	378	388	366	400	379	599	548	538	110	929	394	109	361	402	463	506
Potassium (K)	2330	1350	1890	2050	2000	1970	2350	2040	3630	430	2810	2210	410	1660	2170	2320	2320
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.40	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	0.22	<0.20
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	4130	3090	4800	3580	3710	4580	4400	4050	7420	1350	5020	4070	854	2700	3380	4410	2850
Strontium (Sr)	50.3	43.0	43.0	40.2	43.0	45.5	54.2	47.2	56.4	15.1	66.6	41.8	9.54	29.9	45.6	76.9	46.8
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1400	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.100	0.061	0.082	0.077	0.083	0.078	0.101	0.088	0.170	<0.050	0.126	0.096	<0.050	0.076	0.093	0.094	0.102
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	241	145	201	198	218	193	277	243	308	54	312	256	55.4	209	288	256	278
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.85	0.55	0.81	0.68	0.73	0.67	0.69	0.67	1.59	0.29	0.96	0.687	0.162	0.620	0.617	0.694	0.746
Vanadium (V)	21.1	13.2	17.3	17.4	17.5	17.7	20.3	17.0	33.1	4.4	23.8	19.3	3.44	14.2	17.1	19.3	19.6
Zinc (Zn)	14.7	9.3	12.3	12.6	12.9	12.0	13.9	12.1	24.0	3.4	16.9	14.3	2.8	12.1	13.5	14.3	15.6
Zirconium (Zr)	6.9	3.5	3.9	4.7	4.6	4.7	6.0	5.6	7.8	1.4	7.5	4.9	1.0	3.6	4.4	4.1	4.4
Volatile Organic Compounds (Soil)																	
VOC Sample Container		Field MeOH	Field MeOH			Field MeOH	Field MeOH		Field MeOH			Field MeOH			Field MeOH		
Benzene		<0.0050	<0.0050			<0.0050	<0.0050		<0.0050			<0.0050			<0.0050		
Bromodichloromethane (BDCM)		<0.015	<0.015			<0.015	<0.015		<0.015			<0.050			<0.050		
Bromoform (Tribromomethane)		<0.20	<0.20			<0.20	<0.20		<0.20			<0.050			<0.050		
Carbon Tetrachloride		<0.050	<0.050			<0.050	<0.050		<0.050			<0.050			<0.050		
Chlorobenzene		<0.050	<0.050			<0.050	<0.050		<0.050			<0.050			<0.050		
Dichloromethane (DCM) (Methylene Chloride)		<0.050	<0.050			<0.050	<0.050		<0.050			<0.050			<0.050		
Chloroethane		<0.050	<0.050			<0.050	<0.050		<0.050			<0.10			<0.10		
Chloroform		<0.075	<0.075			<0.075	<0.075		<0.075			<0.10			<0.10		
Chloromethane		90.4	88.5			71.6	82.5		81			<0.10			<0.10		
1,2-Dichlorobenzene		87.7	87.3			70.7	87.5		80.5			<0.050			<0.050		
1,3-Dichlorobenzene												<0.050			<0.050		
1,4-Dichlorobenzene												<0.050			<0.050		
1,1-Dichloroethane												<0.050			<0.050		
1,2-Dichloroethane												<0.050			<0.050		
1,1-Dichloroethylene												<0.050			<0.070		
1,2-dichloroethylene (Cis) (1,2-dichloroethene)												<0.050			<0.050		
1,2-dichloroethylene (Trans) (1,2-dichloroethene)												<0.050			<0.050		
Dichloromethane (DCM) (Methylene Chloride)												<0.30			<0.30		
1,2-dichloropropane (Propylene Dichloride)												<0.050			<0.050		
cis-1,3-Dichloropropylene												<0.050			<0.050		
trans-1,3-Dichloropropylene												<0.050			<0.050		
1,3-Dichloropropene (cis & trans)												<0.10			<0.10		
Ethylbenzene												<0.015			<0.015		
Methyl tert-Butyl Ether												<0.20			<0.20		
Styrene												<0.050			<0.050		
1,1,1,2-Tetrachloroethane												<0.050			<0.050		
1,1,2,2-Tetrachloroethane												<0.050			<0.050		
Tetrachloroethylene (PCE/PERC)												<0.050			<0.050		
Toluene												<0.050			<0.050		
1,1,1-Trichloroethane												<0.050			<0.050		
1,1,2-Trichloroethane												<0.050			<0.050		
Trichloroethylene (TCE)												<0.010			<0.010		
Trichlorofluoromethane (Freon 11)												<0.10			<0.10		
Vinyl Chloride (Chloroethene)												<0.10			<0.10		
o-Xylene												<0.050			<0.050		
m,p-Xylenes												<0.050			<0.050		
Xylenes, Total												<0.075			<0.075		
4-Bromofluorobenzene (SS)												89.8			74.1		
1,4-Difluorobenzene (SS)												83.2			74.8		
Hydrocarbons (Soil)																	
EPH (C10-C19)												<200			<200		
EPH (C19-C32)												<200			<200		
LEPH (C10-C19) Less PAHs												<200			<200		
HEPH (C19-C32) Less PAHs												<200			<200		
2-Bromobenzotrifluoride		88.4	78.1			80.3	79.4		76.9			94.4			95		
Polycyclic Aromatic Hydrocarbons (Soil)																	
Acenaphthene		<0.0050	<0.0050			<0.0050	<0.0050		<0.0050			<0.0050			<0.0050		
Acenaphthylene		<0.0050	<0.0050			<0.0050	<0.0050		<0.0050			<0.0050			<0.0050		
Anthracene		<0.0040	<0.0040			<0.0040	<0.0040		<0.0040			<0.0040			<0.0040		
Benz(a)anthracene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Benzo(a)pyrene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Benzo(b,j) fluoranthene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Benzo(b,j,k)fluoranthene		<0.015	<0.015			<0.015	<0.015		<0.015			<0.015			<0.015		
Benzo(g,h,i)perylene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Benzo(k)fluoranthene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Chrysene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Dibenz(a,h)anthracene		<0.0050	<0.0050			<0.0050	<0.0050		<0.0050			<0.0050			<0.0050		
Fluoranthene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Fluorene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
1-Methylnaphthalene												<0.050			<0.050		
2-Methylnaphthalene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Naphthalene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Phenanthrene		<0.010	<0.010			<0.010	<0.010		<0.010			<0.010			<0.010		
Pyrene												<0.010			<0.010		
Quinoline												<0.050			<0.050		
Acenaphthene d10		80.7	82.9			79.4	77.4		74.6			91.1			88		
Chrysene d12		95.2	92.7			98.7	86.8		89			106.1			99.2		
Naphthalene d8		76.1	78.3			80.3	74.7		72			90.4			85.7		
Phenanthrene d10		89.4	91.9			90.6	88.9		84.2			103.8			94.1		
Benzo(a)pyrene Total Potency Equivalence (TPE)		<0.020	<0.020			<0.020	<0.020		<0.020			<0.020			<0.020		
Index of Additive Cancer Risk		<0.15	<0.15			<0.15	<0.15		<0.15			<0.15			<0.15		

Notes:

[a] Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b] BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Sample ID Date Sampled Laboratory Sample ID Parameter	Lowest Detectio	Units	CCME		NOAA Sediment Benchmarks						
			ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET
Physical Properties											
Moisture	0.25	%	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-
Texture		-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Metals											
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (Soil)											
VOC Sample Container		-	-	-	-	-	-	-	-	-	-
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]		-	-	-	-	-	-	0.01
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)											
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-

Sample ID	SW-3-1	SW-3-2	SW-3-3	SW-4-1	SW-4-2	DUP B (SW-4-2)	Relative Percent Difference	SW-4-3	SW-5-1	SW-5-2	SW-5-3	DUP A (SW-5-3)	Relative Percent Difference
Date Sampled	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	13-Aug-2018		11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	13-Aug-2018	
Laboratory Sample ID	L2148903-7	L2148903-8	L2148903-9	L2148903-10	L2148903-11	L2148903-65		L2148903-12	L2148903-13	L2148903-14	L2148903-15	L2148903-64	
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment		Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Properties													
Moisture	26.9			21.4			NA		20.9				NA
pH (1:2 soil:water)	7.99	8.08	8.25	8.12	8.23	8.28	0.6%	8.06	8.46	8.34	8.52	8.27	3.0%
% Gravel (>2mm)	5.0	1.3	2.7	4.4	2.5	3.3	NA	3.3	2.3	4.8	7.3	1.7	124.4%
% Sand (2.0mm - 0.063mm)	46.9	51.4	55.6	55.7	60.3	67.4	11.1%	59.7	73.3	69.2	76.3	82.7	8.1%
% Silt (0.063mm - 4um)	40.5	39.9	35.0	35.3	33.2	25.5	26.2%	32.3	21.1	22.9	14.3	13.3	7.2%
% Clay (<4um)	7.6	7.4	6.7	4.5	4.1	3.8	NA	4.8	3.3	3.1	2.1	2.3	NA
Texture	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Loamy sand	NA	Sandy loam	Loamy sand	Loamy sand	Loamy sand	Sand	NA
Organic / Inorganic Carbon (Soil)													
Total Inorganic Carbon	1.25	1.19	1.14	0.983	1.12	1.10	1.8%	1.08	1.17	1.17	1.03	1.20	15.2%
Total Organic Carbon	3.24	3.09	2.95	3.38	3.1	2.61	17.2%	3.32	2.95	2.93	2.17	2.07	4.7%
Metals													
Aluminum (Al)	5840	5580	4320	4600	4500	4720	4.8%	4560	3290	3640	3480	3320	4.7%
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Arsenic (As)	10.60	9.63	4.33	4.39	4.37	4.01	8.6%	4.93	1.78	1.97	2.66	1.80	38.6%
Barium (Ba)	20.2	18.7	14.7	14.9	15.7	12.9	19.6%	15.2	10.9	11.1	10.1	8.73	14.6%
Beryllium (Be)	0.37	0.34	0.27	0.40	0.28	0.27	NA	0.28	0.22	0.22	0.21	0.22	NA
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Boron (B)	44.5	38.6	29.8	41.6	30.8	31.6	2.6%	31.4	24.1	25.4	24.6	25.6	4.0%
Cadmium (Cd)	0.03	0.03	0.06	<0.020	<0.020	<0.020	NA	0.03	<0.020	0.02	<0.020	0.02	NA
Calcium (Ca)	88500	75200	69700	110000	75000	74600	0.5%	74700	73200	71800	69100	59800	14.4%
Chromium (Cr)	21.7	19.2	15.5	17.6	16.9	16.6	0.0	16.4	12.7	12.9	13.1	11.7	0.1
Cobalt (Co)	3.63	3.47	2.59	3.08	2.97	2.73	8.4%	3.13	2.53	2.52	2.41	2.29	5.1%
Copper (Cu)	7.22	6.35	4.97	6.10	5.77	6.05	4.7%	6.47	4.31	4.46	5.18	4.77	8.2%
Iron (Fe)	16300	14900	10800	13900	13000	13000	0.0%	14000	9620	10100	10400	10200	1.9%
Lead (Pb)	4.86	4.54	3.75	5.20	3.77	3.61	4.3%	3.70	2.77	2.89	2.71	2.82	4.0%
Lithium (Li)	29.0	25.6	20.2	33.0	23.3	22.6	3.1%	23.4	20.1	20.9	20.2	18.1	11.0%
Magnesium (Mg)	48500	39900	32700	46300	39700	41100	3.5%	40300	37400	36500	35000	28200	21.5%
Manganese (Mn)	158	148	110	149	136	140	2.9%	156	127	129	116	117	0.9%
Mercury (Hg)	0.0085	0.0090	0.0071	0.0071	0.0084	0.0082	NA	0.0070	0.0050	0.0061	<0.0050	0.0067	NA
Molybdenum (Mo)	0.54	0.35	0.28	0.68	0.30	0.33	NA	0.39	0.32	0.38	0.27	0.35	NA
Nickel (Ni)	11.00	10.30	8.08	9.06	8.79	8.56	2.7%	8.64	6.67	6.91	6.80	6.58	3.3%
Phosphorus (P)	1020	1040	494	668	640	530	18.8%	720	310	349	374	287	26.3%
Potassium (K)	2770	2430	1930	2080	2020	2150	6.2%	2080	1570	1650	1610	1650	2.5%
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Sodium (Na)	5560	4420	2720	3520	4050	3650	10.4%	4820	2830	2480	2840	3230	12.9%
Strontium (Sr)	66.1	57.7	47.6	65.4	44.2	48.8	9.9%	46.9	38.9	37.6	36.1	37.8	4.6%
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	NA	<1000	<1000	<1000	<1000	<1000	NA
Thallium (Tl)	0.110	0.099	0.075	0.119	0.081	0.076	NA	0.085	0.066	0.067	0.066	0.068	NA
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<2.0	<2.0	<2.0	NA
Titanium (Ti)	321	276	228	261	253	253	0.0%	250	216	216	219	215	1.8%
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50	NA
Uranium (U)	0.774	0.753	0.662	0.907	0.742	0.683	8.3%	0.713	0.521	0.824	0.582	0.655	11.8%
Vanadium (V)	23.2	21.0	16.5	16.4	15.9	15.5	2.5%	15.8	11.7	12.3	12.0	10.9	9.6%
Zinc (Zn)	15.6	15.3	11.7	12.5	11.8	11.3	4.3%	12.7	9.5	9.5	9.1	9.4	NA
Zirconium (Zr)	5.9	5.2	4.3	6.7	4.4	5.9	29.1%	3.5	4.1	5.4	4.8	3.6	NA
Volatile Organic Compounds (Soil)													
VOC Sample Container	Field MeOH			Field MeOH			NA		Field MeOH				NA
Benzene	<0.0050			<0.0050			NA		<0.0050				NA
Bromodichloromethane (BDCM)	<0.050			<0.050			NA		<0.050				NA
Bromoform (Tribromomethane)	<0.050			<0.050			NA		<0.050				NA
Carbon Tetrachloride	<0.050			<0.050			NA		<0.050				NA
Chlorobenzene	<0.050			<0.050			NA		<0.050				NA
Dichloromethane (DCM) (Methylene Chloride)	<0.050			<0.050			NA		<0.050				NA
Chloroethane	<0.10			<0.10			NA		<0.10				NA
Chloroform	<0.10			<0.10			NA		<0.10				NA
Chloromethane	<0.10			<0.10			NA		<0.10				NA
1,2-Dichlorobenzene	<0.050			<0.050			NA		<0.050				NA
1,3-Dichlorobenzene	<0.050			<0.050			NA		<0.050				NA
1,4-Dichlorobenzene	<0.050			<0.050			NA		<0.050				NA
1,1-Dichloroethane	<0.050			<0.050			NA		<0.050				NA
1,2-Dichloroethane	<0.050			<0.050			NA		<0.050				NA
1,1-Dichloroethylene	<0.20			<0.050			NA		<0.050				NA
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	<0.050			<0.050			NA		<0.050				NA
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	<0.050			<0.050			NA		<0.050				NA
Dichloromethane (DCM) (Methylene Chloride)	<0.30			<0.30			NA		<0.30				NA
1,2-dichloropropane (Propylene Dichloride)	<0.050			<0.050			NA		<0.050				NA
cis-1,3-Dichloropropylene	<0.050			<0.050			NA		<0.050				NA
trans-1,3-Dichloropropylene	<0.050			<0.050			NA		<0.050				NA
1,3-Dichloropropene (cis & trans)	<0.10			<0.10			NA		<0.10				NA
Ethylbenzene	<0.015			<0.015			NA		<0.015				NA
Methyl tert-Butyl Ether	<0.20			<0.20			NA		<0.20				NA
Styrene	<0.050			<0.050			NA		<0.050				NA
1,1,1,2-Tetrachloroethane	<0.050			<0.050			NA		<0.050				NA
1,1,2,2-Tetrachloroethane	<0.050			<0.050			NA		<0.050				NA
Tetrachloroethylene (PCE/PERC)	<0.050			<0.050			NA		<0.050				NA
Toluene	<0.050			<0.050			NA		<0.050				NA
1,1,1-Trichloroethane	<0.050			<0.050			NA		<0.050				NA
1,1,2-Trichloroethane	<0.050			<0.050			NA		<0.050				NA
Trichloroethylene (TCE)	<0.010			<0.010			NA		<0.010				NA
Trichlorofluoromethane (Freon 11)	<0.10			<0.10			NA		<0.10				NA
Vinyl Chloride (Chloroethene)	<0.10			<0.10			NA		<0.10				NA
o-Xylene	<0.050			<0.050			NA		<0.050				NA
m,p-Xylenes	<0.050			<0.050			NA		<0.050				NA
Xylenes, Total	<0.075			<0.075			NA		<0.075				NA
4-Bromofluorobenzene (SS)	93.6			91.3			NA		90.7				NA
1,4-Difluorobenzene (SS)	99.9			91.8			NA		98.3				NA
Hydrocarbons (Soil)													
EPH (C10-C19)	<200			<200			NA		<200				NA
EPH (C19-C32)	<200			<200			NA		<200				NA
LEPH (C10-C19) Less PAHs	<200			<200			NA		<200				NA
HEPH (C19-C32) Less PAHs	<200			<200			NA		<200				NA
2-Bromobenzotrifluoride	96.8			96.2			NA		91.9				NA
Polycyclic Aromatic Hydrocarbons (Soil)													
Acenaphthene	<0.0050			<0.0050			NA		<0.0050				NA
Acenaphthylene	<0.0050			<0.0050			NA		<0.0050				NA
Anthracene	<0.0040			<0.0040			NA		<0.0040				NA
Benz(a)anthracene	<0.010			<0.010			NA		<0.010				NA
Benzo(a)pyrene	<0.010			<0.010			NA		<0.010				NA
Benzo(b,j) fluoranthene	<0.010			<0.010			NA		<0.010				NA
Benzo(b,j,k)fluoranthene	<0.015			<0.015			NA		<0.015				NA
Benzo(g,h,i)perylene	<0.010			<0.010			NA		<0.010				NA
Benzo(k)fluoranthene	<0.010			<0.010			NA		<0.010				NA
Chrysene	<0.010			<0.010			NA		<0.010				NA
Dibenz(a,h)anthracene	<0.0050			<0.0050			NA		<0.0050				NA
Fluoranthene	<0.010			<0.010			NA		<0.010				NA
Fluorene	<0.010			<0.010			NA		<0.010				NA
Indeno(1,2,3-c,d)pyrene	<0.010			<0.010			NA		<0.010				NA
1-Methylnaphthalene	<0.050			<0.050			NA		<0.050				NA
2-Methylnaphthalene	<0.010			<0.010			NA		<0.010				NA
Naphthalene	<0.010			<0.010			NA		<0.010				NA
Phenanthrene	<0.010			<0.010			NA		<0.010				NA
Pyrene	<0.010			<0.010			NA		<0.010				NA
Quinoline	<0.050			<0.050			NA		<0.050				NA
Acenaphthene d10	92.5			87.5			NA		91				NA
Chrysene d12	104.8			99.1			NA		102.4				NA
Naphthalene d8	90.7			85.6			NA		88.6				NA
Phenanthrene d10	98.9			93.5			NA		96.4				NA
Benzo(a)pyrene Total Potency Equivalence (TPE)	<0.020			<0.020			NA		<0.020				NA
Index of Additive Cancer Risk	<0.15			<0.15			NA		<0.15				NA

Sample ID	SE-1-2	SE-1-3	SE-2-1	SE-2-2	SE-2-3	SE-3-1	SE-3-2	SE-3-3	BE-2-1	DUP F(BE-2-1)	Relative Percent Difference
Date Sampled	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	12-Aug-2018	13-Aug-2018	
Laboratory Sample ID	L2148903-17	L2148903-18	L2148903-19	L2148903-20	L2148903-21	L2148903-22	L2148903-23	L2148903-24	L2148903-43	L2148903-69	
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Properties											
Moisture			23.3			21.5			22.4		NA
pH (1:2 soil:water)	8.57	8.43	8.29	8.33	8.39	8.30	8.34	8.26	8.35	8.44	1.1%
% Gravel (>2mm)	6.3	4.0	17.5	10.2	23.6	6.8	21.7	24.2	5.5	3.2	52.9%
% Sand (2.0mm - 0.063mm)	87.3	90.6	57.0	60.4	49.8	72.2	60.2	55.6	43.2	45.3	4.7%
% Silt (0.063mm - 4um)	4.6	3.6	20.0	23.4	23.3	15.6	14.0	15.2	39.4	38.9	1.3%
% Clay (<4um)	1.8	1.7	5.6	6.0	3.3	5.3	4.1	5.0	11.9	12.6	5.7%
Texture	Sand	Sand	Sandy loam	Sandy loam	Sandy loam	Loamy sand	Loamy sand	Sandy loam / Loamy sand	Loam	Loam	NA
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	0.738	0.525	1.37	1.62	1.32	1.14	1.85	1.17	1.62	1.77	8.8%
Total Organic Carbon	0.41	0.78	1.9	2.43	1.24	1.68	1.91	1.56	2.77	3.65	27.4%
Metals											
Aluminum (Al)	1460	1990	3780	4880	3870	3660	3410	2920	3900	6140	44.6%
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Arsenic (As)	1.18	1.47	3.65	2.88	2.99	3.27	3.10	2.95	2.84	2.81	1.1%
Barium (Ba)	4.23	5.76	11.7	14.0	12.6	10.6	10.7	10.7	12.1	14.7	19.4%
Beryllium (Be)	<0.10	0.12	0.26	0.30	0.24	0.24	0.24	0.21	0.24	0.35	NA
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Boron (B)	9.7	13.3	26.3	35.0	27.4	25.0	24.4	21.6	27.5	36.2	27.3%
Cadmium (Cd)	<0.020	<0.020	0.03	0.04	0.03	0.03	0.02	0.03	0.04	0.04	NA
Calcium (Ca)	20800	28400	57200	63600	52400	46400	44200	41300	52600	76300	36.8%
Chromium (Cr)	5.3	7.3	12.7	16.3	13.1	12.0	12.6	10.6	12.1	18.5	0.4
Cobalt (Co)	1.01	1.47	2.36	2.72	2.23	2.11	2.17	1.91	2.08	3.18	41.8%
Copper (Cu)	2.46	2.71	4.82	5.55	4.45	3.95	4.06	3.68	4.15	6.71	47.1%
Iron (Fe)	6290	10200	9710	10500	9660	8620	8870	7790	7840	9980	24.0%
Lead (Pb)	1.31	1.78	3.81	4.39	3.46	3.59	3.34	3.20	3.87	5.62	36.9%
Lithium (Li)	6.5	8.5	19.1	21.4	17.3	16.9	15.3	13.9	17.3	25.8	39.4%
Magnesium (Mg)	11400	13200	29300	35300	28000	24900	23300	22400	26100	41900	46.5%
Manganese (Mn)	46.9	67.4	98.1	112	93.3	83.5	85.7	79.8	87.7	122	32.7%
Mercury (Hg)	<0.0050	<0.0050	0.0079	0.0081	0.0071	0.0073	0.0068	0.0076	0.0083	0.0105	NA
Molybdenum (Mo)	0.17	0.29	0.30	0.31	0.29	0.27	0.33	0.28	0.31	0.28	NA
Nickel (Ni)	3.00	4.60	7.44	8.79	7.23	6.54	6.81	6.33	6.54	9.90	40.9%
Phosphorus (P)	197	197	337	363	330	303	349	323	353	371	5.0%
Potassium (K)	640	880	1700	2220	1600	1620	1410	1230	1680	2570	41.9%
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Sodium (Na)	1320	2700	3840	4990	2430	3230	3490	3430	3460	3090	11.3%
Strontium (Sr)	13.1	19.9	37.7	43.4	40.0	31.9	32.7	34.2	53.6	55.2	2.9%
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	NA
Thallium (Tl)	<0.050	<0.050	0.071	0.086	0.071	0.069	0.062	0.059	0.070	0.099	NA
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA
Titanium (Ti)	83.0	111	180	238	205	179	190	152	176	251	35.1%
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA
Uranium (U)	0.252	0.376	0.546	0.703	0.601	0.493	0.563	0.479	0.588	0.900	41.9%
Vanadium (V)	5.34	7.16	15.3	18.8	15.6	14.6	14.4	12.5	15.3	20.6	29.5%
Zinc (Zn)	4.6	6.3	11.5	12.7	10.8	10.6	10.6	9.6	10.9	15.0	31.7%
Zirconium (Zr)	1.9	2.2	3.4	6.2	4.5	3.3	3.8	2.7	3.5	7.4	71.6%
Volatile Organic Compounds (Soil)											
VOC Sample Container			Field MeOH			Field MeOH			Field MeOH		NA
Benzene			<0.0050			<0.0050			<0.0050		NA
Bromodichloromethane (BDCM)			<0.050			<0.050			<0.050		NA
Bromoform (Tribromomethane)			<0.050			<0.050			<0.050		NA
Carbon Tetrachloride			<0.050			<0.050			<0.050		NA
Chlorobenzene			<0.050			<0.050			<0.050		NA
Dichloromethane (DCM) (Methylene Chloride)			<0.050			<0.050			<0.050		NA
Chloroethane			<0.10			<0.10			<0.10		NA
Chloroform			<0.10			<0.10			<0.10		NA
Chloromethane			<0.10			<0.10			<0.10		NA
1,2-Dichlorobenzene			<0.050			<0.050			<0.050		NA
1,3-Dichlorobenzene			<0.050			<0.050			<0.050		NA
1,4-Dichlorobenzene			<0.050			<0.050			<0.050		NA
1,1-Dichloroethane			<0.050			<0.050			<0.050		NA
1,2-Dichloroethane			<0.050			<0.050			<0.050		NA
1,1-Dichloroethylene			<0.15			<0.20			<0.050		NA
1,2-dichloroethylene (Cis) (1,2-dichloroethene)			<0.050			<0.050			<0.050		NA
1,2-dichloroethylene (Trans) (1,2-dichloroethene)			<0.050			<0.050			<0.050		NA
Dichloromethane (DCM) (Methylene Chloride)			<0.30			<0.30			0.35		NA
1,2-dichloropropane (Propylene Dichloride)			<0.050			<0.050			<0.050		NA
cis-1,3-Dichloropropylene			<0.050			<0.050			<0.050		NA
trans-1,3-Dichloropropylene			<0.050			<0.050			<0.050		NA
1,3-Dichloropropene (cis & trans)			<0.10			<0.10			<0.10		NA
Ethylbenzene			<0.015			<0.015			<0.015		NA
Methyl tert-Butyl Ether			<0.20			<0.20			<0.20		NA
Styrene			<0.050			<0.050			<0.050		NA
1,1,1,2-Tetrachloroethane			<0.050			<0.050			<0.050		NA
1,1,2,2-Tetrachloroethane			<0.050			<0.050			<0.050		NA
Tetrachloroethylene (PCE/PERC)			<0.050			<0.050			<0.050		NA
Toluene			<0.050			<0.050			<0.050		NA
1,1,1-Trichloroethane			<0.050			<0.050			<0.050		NA
1,1,2-Trichloroethane			<0.050			<0.050			<0.050		NA
Trichloroethylene (TCE)			<0.010			<0.010			<0.010		NA
Trichlorofluoromethane (Freon 11)			<0.10			<0.10			<0.10		NA
Vinyl Chloride (Chloroethene)			<0.10			<0.10			<0.10		NA
o-Xylene			<0.050			<0.050			<0.050		NA
m,p-Xylenes			<0.050			<0.050			<0.050		NA
Xylenes, Total			<0.075			<0.075			<0.075		NA
4-Bromofluorobenzene (SS)			89.5			91.6			98.7		NA
1,4-Difluorobenzene (SS)			82.8			80.6			98.7		NA
Hydrocarbons (Soil)											
EPH (C10-C19)			<200			<200			<200		NA
EPH (C19-C32)			<200			<200			<200		NA
LEPH (C10-C19) Less PAHs			<200			<200			<200		NA
HEPH (C19-C32) Less PAHs			<200			<200			<200		NA
2-Bromobenzotrifluoride			93.9			92.3			95.1		NA
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene			<0.0050			<0.0050			<0.0050		NA
Acenaphthylene			<0.0050			<0.0050			<0.0050		NA
Anthracene			<0.0040			<0.0040			<0.0040		NA
Benz(a)anthracene			<0.010			<0.010			<0.010		NA
Benzo(a)pyrene			<0.010			<0.010			<0.010		NA
Benzo(b,j) fluoranthene			<0.020			<0.010			<0.010		NA
Benzo(b,j,k)fluoranthene			<0.022			<0.015			<0.015		NA
Benzo(g,h,i)perylene			0.011			<0.010			<0.010		NA
Benzo(k)fluoranthene			<0.010			<0.010			<0.010		NA
Chrysene			<0.010			<0.010			<0.010		NA
Dibenz(a,h)anthracene			<0.0050			<0.0050			<0.0050		NA
Fluoranthene			<0.010			<0.010			<0.010		NA
Fluorene			<0.010			<0.010			<0.010		NA
Indeno(1,2,3-c,d)pyrene			0.010			<0.010			<0.010		NA
1-Methylnaphthalene			<0.050			<0.050			<0.050		NA
2-Methylnaphthalene			<0.010			<0.010			<0.010		NA
Naphthalene			<0.010			<0.010			<0.010		NA
Phenanthrene			<0.010			<0.010			<0.010		NA
Pyrene			<0.010			<0.010			<0.010		NA
Quinoline			<0.050			<0.050			<0.050		NA
Acenaphthene d10			90.3			88			96		NA
Chrysene d12			101.7			92.3			114.3		NA
Naphthalene d8			87.2			85.9			92.4		NA
Phenanthrene d10			97.1			91.9			110.4		NA
Benzo(a)pyrene Total Potency Equivalence (TPE)			<0.020			<0.020			<0.020		NA
Index of Additive Cancer Risk			<0.15			<0.15			<0.15		NA

Sample ID	BE-2-2	BE-2-3	SE-4-1	SE-4-2	SE-4-3	SE-5-1	SE-5-2	SE-5-3	SC-2-1	SC-2-2
Date Sampled	12-Aug-2018	12-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018	11-Aug-2018
Laboratory Sample ID	L2148903-44	L2148903-45	L2148903-25	L2148903-26	L2148903-27	L2148903-28	L2148903-29	L2148903-30	L2148903-31	L2148903-32
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties										
Moisture			27.9			24.4			37.7	
pH (1:2 soil:water)	8.42	8.18	8.20	8.25	8.15	8.30	8.23	8.24	8.13	8.17
% Gravel (>2mm)	6.5	37.2	3.7	10.2	5.6	2.6	4.1	6.0	1.5	4.9
% Sand (2.0mm - 0.063mm)	69.7	34.0	47.3	62.6	51.1	55.0	67.8	51.2	30.4	31.4
% Silt (0.063mm - 4um)	18.4	22.0	38.2	21.2	33.4	31.5	20.5	30.7	50.5	47.2
% Clay (<4um)	5.5	6.8	10.8	6.0	10.0	11.0	7.6	12.1	17.6	16.6
Texture	Loamy sand	Sandy loam	Loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Silt loam	Silt loam
Organic / Inorganic Carbon (Soil)										
Total Inorganic Carbon	1.16	1.65	1.45	1.35	1.35	1.33	1.12	1.51	1.70	1.85
Total Organic Carbon	1.5	2.46	2.53	1.45	2.46	1.82	1.46	1.89	3.12	3.06
Metals										
Aluminum (Al)	5360	4880	6290	4410	5390	5610	4260	7440	8920	8860
Antimony (Sb)	<0.10	<0.10	0.12	<0.10	<0.10	0.10	<0.10	0.12	0.18	0.16
Arsenic (As)	3.26	4.49	5.15	3.21	6.14	2.34	5.33	6.70	4.31	4.67
Barium (Ba)	15.9	14.7	16.5	12.3	15.1	12.7	13.5	18.3	22.6	22.6
Beryllium (Be)	0.37	0.32	0.41	0.28	0.35	0.36	0.27	0.51	0.55	0.57
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	38.1	35.0	42.1	29.6	39.1	36.4	31.2	54.1	59.7	59.1
Cadmium (Cd)	0.03	0.07	0.05	0.07	0.03	0.06	0.03	0.05	0.07	0.07
Calcium (Ca)	79900	66300	72100	52500	66300	58700	41900	65300	86300	85700
Chromium (Cr)	18.9	16.5	20.5	14.5	17.4	18.1	13.5	22.4	26.2	26.8
Cobalt (Co)	3.27	2.86	3.36	2.42	2.97	2.98	2.37	3.73	4.18	4.12
Copper (Cu)	6.91	6.70	7.19	4.84	6.14	6.07	4.51	7.56	9.20	8.81
Iron (Fe)	10500	10100	11900	8650	11100	9110	8690	12300	13500	13900
Lead (Pb)	5.50	5.01	6.36	4.44	5.13	5.50	4.07	8.85	8.40	8.36
Lithium (Li)	28.8	24.1	28.5	19.2	23.6	25.0	18.7	35.2	39.7	39.7
Magnesium (Mg)	43300	35000	39600	27500	33600	32900	22300	33900	51200	50500
Manganese (Mn)	130	124	126	94.8	120	107	90.2	144	151	153
Mercury (Hg)	0.0085	0.0118	0.0118	0.0093	0.0109	0.0079	0.0077	0.0128	0.0155	0.0150
Molybdenum (Mo)	0.34	0.30	0.42	0.26	0.32	0.36	0.27	0.44	0.75	0.58
Nickel (Ni)	10.40	9.14	10.90	7.81	9.48	9.50	7.46	12.20	14.40	14.20
Phosphorus (P)	378	507	554	397	582	352	444	546	553	612
Potassium (K)	2310	2020	2740	1720	2270	2390	1860	3060	3860	3810
Selenium (Se)	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21	0.35	0.35
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	3590	4040	5070	3510	4600	4150	4400	5000	7470	7080
Strontium (Sr)	46.5	65.6	56.2	53.9	84.9	37.6	50.1	52.5	70.5	60.8
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1200	1000
Thallium (Tl)	0.093	0.088	0.115	0.073	0.092	0.106	0.077	0.139	0.152	0.145
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	244	223	281	204	265	252	212	308	351	339
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.813	0.773	0.861	0.625	0.748	0.785	0.554	1.02	1.23	1.13
Vanadium (V)	21.0	20.3	25.3	17.7	20.2	22.1	17.3	26.5	30.9	30.6
Zinc (Zn)	15.4	14.4	16.8	12.1	15.0	14.5	11.6	18.0	23.0	22.0
Zirconium (Zr)	7.0	4.8	5.9	4.5	5.4	6.8	4.9	8.6	7.8	7.8
Volatile Organic Compounds (Soil)										
VOC Sample Container			Field MeOH			Field MeOH			Field MeOH	
Benzene			<0.0050			<0.0050			<0.0050	
Bromodichloromethane (BDCM)			<0.050			<0.050			<0.050	
Bromoform (Tribromomethane)			<0.050			<0.050			<0.050	
Carbon Tetrachloride			<0.050			<0.050			<0.050	
Chlorobenzene			<0.050			<0.050			<0.050	
Dichloromethane (DCM) (Methylene Chloride)			<0.050			<0.050			<0.050	
Chloroethane			<0.10			<0.10			<0.10	
Chloroform			<0.10			<0.10			<0.10	
Chloromethane			<0.10			<0.10			<0.10	
1,2-Dichlorobenzene			<0.050			<0.050			<0.050	
1,3-Dichlorobenzene			<0.050			<0.050			<0.050	
1,4-Dichlorobenzene			<0.050			<0.050			<0.050	
1,1-Dichloroethane			<0.050			<0.050			<0.050	
1,2-Dichloroethane			<0.050			<0.050			<0.050	
1,1-Dichloroethylene			<0.15			<0.15			<0.20	
1,2-dichloroethylene (Cis) (1,2-dichloroethene)			<0.050			<0.050			<0.050	
1,2-dichloroethylene (Trans) (1,2-dichloroethene)			<0.050			<0.050			<0.050	
Dichloromethane (DCM) (Methylene Chloride)			<0.30			<0.30			<0.30	
1,2-dichloropropane (Propylene Dichloride)			<0.050			<0.050			<0.050	
cis-1,3-Dichloropropylene			<0.050			<0.050			<0.050	
trans-1,3-Dichloropropylene			<0.050			<0.050			<0.050	
1,3-Dichloropropene (cis & trans)			<0.10			<0.10			<0.10	
Ethylbenzene			<0.015			<0.015			<0.015	
Methyl tert-Butyl Ether			<0.20			<0.20			<0.20	
Styrene			<0.050			<0.050			<0.050	
1,1,1,2-Tetrachloroethane			<0.050			<0.050			<0.050	
1,1,2,2-Tetrachloroethane			<0.050			<0.050			<0.050	
Tetrachloroethylene (PCE/PERC)			<0.050			<0.050			<0.050	
Toluene			<0.050			<0.050			<0.050	
1,1,1-Trichloroethane			<0.050			<0.050			<0.050	
1,1,2-Trichloroethane			<0.050			<0.050			<0.050	
Trichloroethylene (TCE)			<0.010			<0.010			<0.010	
Trichlorofluoromethane (Freon 11)			<0.10			<0.10			<0.10	
Vinyl Chloride (Chloroethene)			<0.10			<0.10			<0.10	
o-Xylene			<0.050			<0.050			<0.050	
m,p-Xylenes			<0.050			<0.050			<0.050	
Xylenes, Total			<0.075			<0.075			<0.075	
4-Bromofluorobenzene (SS)			97.2			90.8			82.4	
1,4-Difluorobenzene (SS)			86.2			84.6			72.3	
Hydrocarbons (Soil)										
EPH (C10-C19)			<200			<200			<200	
EPH (C19-C32)			<200			<200			<200	
LEPH (C10-C19) Less PAHs			<200			<200			<200	
HEPH (C19-C32) Less PAHs			<200			<200			<200	
2-Bromobenzotrifluoride			94.6			97.2			95.1	
Polycyclic Aromatic Hydrocarbons (Soil)										
Acenaphthene			<0.0050			<0.0050			<0.0050	
Acenaphthylene			<0.0050			<0.0050			<0.0050	
Anthracene			<0.0040			<0.0040			<0.0040	
Benz(a)anthracene			<0.010			<0.010			<0.010	
Benzo(a)pyrene			<0.010			<0.010			<0.010	
Benzo(b,j) fluoranthene			<0.010			<0.010			<0.010	
Benzo(b,j,k)fluoranthene			<0.015			<0.015			<0.015	
Benzo(g,h,i)perylene			<0.010			0.011			<0.010	
Benzo(k)fluoranthene			<0.010			<0.010			<0.010	
Chrysene			<0.010			<0.010			<0.010	
Dibenz(a,h)anthracene			<0.0050			<0.0050			<0.0050	
Fluoranthene			<0.010			<0.010			<0.010	
Fluorene			<0.010			<0.010			<0.010	
Indeno(1,2,3-c,d)pyrene			<0.010			<0.010			<0.010	
1-Methylnaphthalene			<0.050			<0.050			<0.050	
2-Methylnaphthalene			<0.010			<0.010			<0.010	
Naphthalene			<0.010			<0.010			<0.010	
Phenanthrene			<0.010			<0.010			<0.010	
Pyrene			<0.010			<0.010			<0.010	
Quinoline			<0.050			<0.050			<0.050	
Acenaphthene d10			89.6			91.7			92	
Chrysene d12			100.3			103.4			103.3	
Naphthalene d8			87.6			86.6			88.1	
Phenanthrene d10			94.1			105.2			105.4	
Benzo(a)pyrene Total Potency Equivalence (TPE)			<0.020			<0.020			<0.020	
Index of Additive Cancer Risk			<0.15			<0.15			<0.15	

Notes:

[a] Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b] BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Sample ID			CCME		NOAA Sediment Benchmarks						
Parameter	Lowest Detectio	Units	ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET
Physical Properties											
Moisture	0.25	%	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-
Texture		-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Metals											
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (Soil)											
VOC Sample Container		-	-	-	-	-	-	-	-	-	-
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)											
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-

Sample ID	SC-2-3	SC-3-1	DUP C (SC-3-1)		SC-3-2	SC-3-3	BE-5-1	BE-5-2	BE-5-3	SC-4-1	DUP-D (SC-4-1)	
Date Sampled	11-Aug-2018	12-Aug-2018	13-Aug-2018	Relative Percent Difference	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	13-Aug-2018	Relative Percent Difference
Laboratory Sample ID	L2148903-33	L2148903-34	L2148903-66		L2148903-35	L2148903-36	L2148903-46	L2148903-47	L2148903-48	L2148903-37	L2148903-67	
Parameter	Sediment	Sediment	Sediment		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Properties												
Moisture		46.8		NA			41.7					NA
pH (1:2 soil:water)	8.20	7.98	8.08	1.2%	7.95	8.07	8.13	8.24	8.13	8.14	8.21	0.9%
% Gravel (>2mm)	6.0	3.9	<1.0	NA	2.7	1.7	5.9	8.0	7.0	7.0	11.2	46.2%
% Sand (2.0mm - 0.063mm)	30.5	18.8	21.6	13.9%	18.9	22.8	23.7	39.1	31.7	32.3	33.6	3.9%
% Silt (0.063mm - 4um)	48.0	56.3	57.2	1.6%	59.3	56.7	51.4	41.3	46.2	40.5	37.7	7.2%
% Clay (<4um)	15.6	21.0	20.8	1.0%	19.1	18.8	19.1	11.6	15.1	20.1	17.6	13.3%
Texture	Silt loam	Silt loam	Silt loam	NA	Silt loam	Silt loam	Silt loam	Loam	Silt loam	Loam	Loam	NA
Organic / Inorganic Carbon (Soil)												
Total Inorganic Carbon	1.85	1.95	2.02	3.5%	1.87	1.82	1.88	1.55	1.67	1.99	2.12	6.3%
Total Organic Carbon	3.01	3.5	3.7	5.6%	3.6	3.5	3.2	2.78	3.24	2.78	2.9	4.2%
Metals												
Aluminum (Al)	8660	9250	10400	11.7%	10400	10800	9200	5590	8830	10600	10800	1.9%
Antimony (Sb)	0.17	0.22	0.21	NA	0.22	0.22	0.18	<0.10	0.15	0.17	0.15	NA
Arsenic (As)	5.52	4.89	4.57	6.8%	4.57	4.33	4.14	2.43	3.88	4.96	4.47	10.4%
Barium (Ba)	22.9	24.4	22.4	8.5%	26.2	28.7	29.9	15.4	24.3	34.9	31.4	10.6%
Beryllium (Be)	0.55	0.61	0.54	12.2%	0.61	0.59	0.55	0.40	0.54	0.62	0.54	13.8%
Bismuth (Bi)	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Boron (B)	59.6	64.7	61.5	5.1%	69.6	68.6	58.8	39.5	58.7	63.5	56.4	11.8%
Cadmium (Cd)	0.07	0.09	0.09	NA	0.10	0.11	0.09	0.05	0.08	0.10	0.10	5.9%
Calcium (Ca)	85800	87900	74000	17.2%	80700	83000	79000	71800	76900	80500	79100	1.8%
Chromium (Cr)	26.4	29.6	29.5	0.0	30.5	30.8	27.8	18.3	26.0	31.1	29.7	0.0
Cobalt (Co)	4.13	4.47	4.55	1.8%	4.69	4.67	4.34	3.02	4.14	5.07	5.10	0.6%
Copper (Cu)	8.79	10.4	10.3	1.0%	10.2	10.3	10.1	6.24	9.18	10.6	10.4	1.9%
Iron (Fe)	14200	14900	14200	4.8%	14900	14800	13500	9500	12600	15400	14500	6.0%
Lead (Pb)	8.74	9.52	9.47	0.5%	9.78	9.62	9.01	5.61	8.16	9.29	9.43	1.5%
Lithium (Li)	39.9	44.1	39.5	11.0%	43.4	43.2	38.7	26.7	37.6	41.5	38.5	7.5%
Magnesium (Mg)	48700	52900	49700	6.2%	50300	51000	44400	40700	43500	39100	40200	2.8%
Manganese (Mn)	151	156	164	5.0%	164	166	154	125	147	160	152	5.1%
Mercury (Hg)	0.0158	0.0182	0.0206	NA	0.0205	0.0201	0.0206	0.0110	0.0166	0.0227	0.0227	NA
Molybdenum (Mo)	0.56	1.01	1.05	3.9%	0.97	1.14	0.76	0.31	0.64	0.83	0.76	8.8%
Nickel (Ni)	14.20	**16.00**	**16.10**	0.6%	**16.50**	**16.40**	**15.20**	10.20	14.80	**17.20**	**16.50**	4.2%
Phosphorus (P)	621	609	577	5.4%	647	608	547	415	568	525	530	0.9%
Potassium (K)	3740	4030	4230	4.8%	4370	4440	3700	2290	3630	4330	4110	5.2%
Selenium (Se)	0.30	0.45	0.43	NA	0.41	0.42	0.40	<0.20	0.37	0.46	0.53	NA
Silver (Ag)	<0.10	<0.10	<0.10	NA	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Sodium (Na)	6000	10300	8330	21.1%	9260	7200	7700	3660	6060	8560	8690	1.5%
Strontium (Sr)	64.9	67.9	57.1	17.3%	57.7	55.8	65.7	46.6	67.9	74.0	77.3	4.4%
Sulfur (S)	1300	1500	1700	NA	1600	1200	1400	<1000	<1000	1400	1500	NA
Thallium (Tl)	0.146	0.170	0.173	NA	0.173	0.167	0.157	0.095	0.142	0.169	0.176	NA
Tin (Sn)	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA
Titanium (Ti)	352	314	358	13.1%	375	379	340	260	346	388	381	1.8%
Tungsten (W)	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA
Uranium (U)	1.20	1.37	1.47	7.0%	1.49	1.55	1.39	0.877	1.36	1.47	1.43	2.8%
Vanadium (V)	30.9	35.8	35.7	0.3%	36.9	35.8	31.8	20.2	29.4	33.7	31.9	5.5%
Zinc (Zn)	21.9	25.1	25.3	0.8%	26.0	26.0	23.9	15.7	22.3	27.7	26.9	2.9%
Zirconium (Zr)	7.3	6.7	8.4	22.5%	8.4	8.7	7.5	6.1	8.0	8.9	9.3	4.4%
Volatile Organic Compounds (Soil)												
VOC Sample Container		Field MeOH		NA			Field MeOH					NA
Benzene		<0.0050		NA			<0.011					NA
Bromodichloromethane (BDCM)		<0.050		NA			<0.050					NA
Bromoform (Tribromomethane)		<0.050		NA			<0.050					NA
Carbon Tetrachloride		<0.050		NA			<0.050					NA
Chlorobenzene		<0.050		NA			<0.050					NA
Dichloromethane (DCM) (Methylene Chloride)		<0.050		NA			<0.050					NA
Chloroethane		<0.10		NA			<0.10					NA
Chloroform		<0.10		NA			<0.10					NA
Chloromethane		<0.10		NA			<0.10					NA
1,2-Dichlorobenzene		<0.050		NA			<0.050					NA
1,3-Dichlorobenzene		<0.050		NA			<0.050					NA
1,4-Dichlorobenzene		<0.050		NA			<0.050					NA
1,1-Dichloroethane		<0.050		NA			<0.050					NA
1,2-Dichloroethane		<0.050		NA			<0.085					NA
1,1-Dichloroethylene		<0.35		NA			<0.50					NA
1,2-dichloroethylene (Cis) (1,2-dichloroethene)		<0.050		NA			<0.050					NA
1,2-dichloroethylene (Trans) (1,2-dichloroethene)		<0.050		NA			<0.050					NA
Dichloromethane (DCM) (Methylene Chloride)		<0.30		NA			0.46					NA
1,2-dichloropropane (Propylene Dichloride)		<0.050		NA			<0.050					NA
cis-1,3-Dichloropropylene		<0.050		NA			<0.050					NA
trans-1,3-Dichloropropylene		<0.050		NA			<0.050					NA
1,3-Dichloropropene (cis & trans)		<0.10		NA			<0.10					NA
Ethylbenzene		<0.015		NA			<0.015					NA
Methyl tert-Butyl Ether		<0.20		NA			<0.20					NA
Styrene		<0.050		NA			<0.050					NA
1,1,1,2-Tetrachloroethane		<0.050		NA			<0.050					NA
1,1,2,2-Tetrachloroethane		<0.050		NA			<0.050					NA
Tetrachloroethylene (PCE/PERC)		<0.050		NA			<0.050					NA
Toluene		<0.050		NA			0.106					NA
1,1,1-Trichloroethane		<0.050		NA			<0.050					NA
1,1,2-Trichloroethane		<0.050		NA			<0.050					NA
Trichloroethylene (TCE)		<0.010		NA			<0.010					NA
Trichlorofluoromethane (Freon 11)		<0.10		NA			<0.10					NA
Vinyl Chloride (Chloroethene)		<0.10		NA			<0.10					NA
o-Xylene		<0.050		NA			<0.050					NA
m,p-Xylenes		<0.050		NA			<0.050					NA
Xylenes, Total		<0.075		NA			<0.075					NA
4-Bromofluorobenzene (SS)		83.5		NA			115.8					NA
1,4-Difluorobenzene (SS)		83.9		NA			125.6					NA
Hydrocarbons (Soil)												
EPH (C10-C19)		<200		NA			<200					NA
EPH (C19-C32)		<200		NA			<200					NA
LEPH (C10-C19) Less PAHs		<200		NA			<200					NA
HEPH (C19-C32) Less PAHs		<200		NA			<200					NA
2-Bromobenzotrifluoride		101.7		NA			97.1					NA
Polycyclic Aromatic Hydrocarbons (Soil)												
Acenaphthene		<0.0050		NA			<0.0050					NA
Acenaphthylene		<0.0050		NA			<0.0050					NA
Anthracene		<0.0040		NA			<0.0040					NA
Benz(a)anthracene		<0.010		NA			<0.010					NA
Benzo(a)pyrene		<0.010		NA			<0.010					NA
Benzo(b,j) fluoranthene		<0.010		NA			<0.010					NA
Benzo(b,j,k)fluoranthene		<0.015		NA			<0.015					NA
Benzo(g,h,i)perylene		<0.010		NA			<0.010					NA
Benzo(k)fluoranthene		<0.010		NA			<0.010					NA
Chrysene		<0.010		NA			<0.010					NA
Dibenz(a,h)anthracene		<0.0050		NA			<0.0050					NA
Fluoranthene		<0.010		NA			<0.010					NA
Fluorene		<0.010		NA			<0.010					NA
Indeno(1,2,3-c,d)pyrene		<0.010		NA			<0.010					NA
1-Methylnaphthalene		<0.050		NA			<0.050					NA
2-Methylnaphthalene		<0.010		NA			<0.010					NA
Naphthalene		<0.010		NA			<0.010					NA
Phenanthrene		<0.010		NA			<0.010					NA
Pyrene		<0.010		NA			<0.010					NA
Quinoline		<0.050		NA			<0.050					NA
Acenaphthene d10		98.3		NA			96					NA
Chrysene d12		111.9		NA			110.9					NA
Naphthalene d8		95		NA			91					NA
Phenanthrene d10		114.4		NA			113					NA
Benzo(a)pyrene Total Potency Equivalence (TPE)		<0.020		NA			<0.020					NA
Index of Additive Cancer Risk		<0.15		NA			<0.15					NA

Sample ID	SC-4-2	SC-4-3	SC-5-1	SC-5-2	SC-5-3	SN-1-1	SN-1-2	SN-1-3	SN-2-1	DUP-E (SN-2-1)	
Date Sampled	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	12-Aug-2018	13-Aug-2018	Relative Percent Difference
Laboratory Sample ID	L2148903-38	L2148903-39	L2148903-40	L2148903-41	L2148903-42	L2148903-49	L2148903-50	L2148903-51	L2148903-52	L2148903-68	
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Properties											
Moisture		56.4	36.0			26.7			26.1		NA
pH (1:2 soil:water)	7.99	8.09	8.18	8.16	8.16	8.33	8.40	8.39	8.29	8.36	0.8%
% Gravel (>2mm)	13.0	9.7	3.4	2.3	7.7	7.8	7.0	27.8	4.4	4.9	NA
% Sand (2.0mm - 0.063mm)	27.4	30.6	44.3	41.6	43.1	55.3	41.4	39.0	41.7	39.8	4.7%
% Silt (0.063mm - 4um)	41.0	43.3	39.4	43.5	38.4	29.7	39.8	26.3	40.7	43.6	6.9%
% Clay (<4um)	18.5	16.4	13.0	12.6	10.9	7.2	11.8	6.9	13.2	11.7	12.0%
Texture	Silt loam	Silt loam	Loam	Loam	Loam / Sandy loam	Sandy loam	Loam	Sandy loam	Loam	Loam	NA
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	1.93	2.00	1.39	1.30	1.52	1.38	1.63	1.50	1.63	1.84	12.1%
Total Organic Carbon	3.2	3.3	2.18	5.58	2.23	2.1	3.04	2.63	2.66	3.9	37.8%
Metals											
Aluminum (Al)	9460	9260	7170	7730	7600	5330	6280	5420	7720	7070	8.8%
Antimony (Sb)	0.17	0.15	0.13	0.13	0.12	<0.10	0.10	<0.10	0.12	0.12	NA
Arsenic (As)	6.41	6.39	3.12	4.26	2.84	4.84	2.71	3.81	6.60	6.00	9.5%
Barium (Ba)	29.5	31.4	20.3	18.5	18.9	15.6	15.4	15.0	20.5	17.2	17.5%
Beryllium (Be)	0.56	0.51	0.46	0.45	0.47	0.33	0.36	0.35	0.45	0.39	NA
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Boron (B)	65.6	59.3	42.2	46.7	44.4	35.9	41.3	39.1	50.8	41.6	19.9%
Cadmium (Cd)	0.22	0.13	0.08	0.06	0.07	0.04	0.08	0.05	0.07	0.07	NA
Calcium (Ca)	74300	86500	57600	49400	58600	67700	78800	73500	87200	81200	7.1%
Chromium (Cr)	28.9	28.3	24.6	25.5	25.7	17.5	19.3	17.5	22.9	21.3	0.1
Cobalt (Co)	4.85	4.56	3.87	3.82	3.93	3.10	3.27	3.01	4.02	3.87	3.8%
Copper (Cu)	10.8	10.4	7.72	7.72	7.62	6.37	6.77	7.14	8.52	8.14	4.6%
Iron (Fe)	14900	14200	12400	12000	11600	14100	10200	12900	14000	12600	10.5%
Lead (Pb)	8.80	8.53	7.07	6.61	6.75	4.72	5.65	4.97	6.63	6.23	6.2%
Lithium (Li)	38.5	36.1	28.5	28.3	30.4	23.4	26.2	25.1	33.5	29.1	14.1%
Magnesium (Mg)	34700	33300	30900	31500	34300	36400	39500	37700	46100	44200	4.2%
Manganese (Mn)	151	139	129	126	127	142	116	134	170	168	1.2%
Mercury (Hg)	0.0267	0.0247	0.0168	0.0156	0.0156	0.0110	0.0110	0.0101	0.0146	0.0156	NA
Molybdenum (Mo)	1.90	1.08	0.63	0.67	0.72	0.39	0.57	0.34	0.37	0.34	NA
Nickel (Ni)	**16.10**	**15.50**	**15.20**	**15.80**	**15.90**	9.37	10.40	9.30	12.40	11.90	4.1%
Phosphorus (P)	747	601	517	637	513	445	331	390	524	481	8.6%
Potassium (K)	4220	3970	2740	2890	2850	2290	2520	2260	3220	2770	15.0%
Selenium (Se)	0.67	0.63	0.35	0.34	0.34	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Sodium (Na)	13800	11700	5900	6230	6320	3670	4470	3440	4420	3890	12.8%
Strontium (Sr)	133	170	74.7	57.2	55.2	43.3	50.3	46.5	55.4	59.2	6.6%
Sulfur (S)	3200	2500	<1000	<1000	<1000	<1000	1200	<1000	<1000	<1000	NA
Thallium (Tl)	0.164	0.158	0.126	0.122	0.123	0.090	0.112	0.096	0.123	0.116	NA
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA
Titanium (Ti)	341	336	323	349	345	252	262	253	305	276	10.0%
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA
Uranium (U)	1.52	1.33	1.29	1.29	1.28	0.757	0.977	0.816	0.971	0.892	8.5%
Vanadium (V)	33.1	32.5	26.1	25.9	23.7	19.8	21.9	19.6	27.9	25.4	9.4%
Zinc (Zn)	26.4	26.2	22.1	21.0	21.6	14.8	15.5	14.6	18.7	17.8	4.9%
Zirconium (Zr)	7.1	6.7	5.3	5.6	6.3	5.6	8.1	7.0	7.5	7.0	6.9%
Volatile Organic Compounds (Soil)											
VOC Sample Container		Field MeOH	Field MeOH			Field MeOH			Field MeOH		NA
Benzene		<0.012	<0.0050			<0.0050			<0.0050		NA
Bromodichloromethane (BDCM)		<0.050	<0.050			<0.050			<0.050		NA
Bromoform (Tribromomethane)		<0.050	<0.050			<0.050			<0.050		NA
Carbon Tetrachloride		<0.050	<0.050			<0.050			<0.050		NA
Chlorobenzene		<0.050	<0.050			<0.050			<0.050		NA
Dichloromethane (DCM) (Methylene Chloride)		<0.050	<0.050			<0.050			<0.050		NA
Chloroethane		<0.10	<0.10			<0.10			<0.10		NA
Chloroform		<0.10	<0.10			<0.10			<0.10		NA
Chloromethane		<0.10	<0.10			<0.10			<0.10		NA
1,2-Dichlorobenzene		<0.050	<0.050			<0.050			<0.050		NA
1,3-Dichlorobenzene		<0.050	<0.050			<0.050			<0.050		NA
1,4-Dichlorobenzene		<0.050	<0.050			<0.050			<0.050		NA
1,1-Dichloroethane		<0.050	<0.050			<0.050			<0.050		NA
1,2-Dichloroethane		<0.090	<0.050			<0.050			<0.050		NA
1,1-Dichloroethylene		<0.30	<0.050			<0.10			<0.050		NA
1,2-dichloroethylene (Cis) (1,2-dichloroethene)		<0.050	<0.050			<0.050			<0.050		NA
1,2-dichloroethylene (Trans) (1,2-dichloroethene)		<0.050	<0.050			<0.050			<0.050		NA
Dichloromethane (DCM) (Methylene Chloride)		<0.30	0.66			<0.30			<0.30		NA
1,2-dichloropropane (Propylene Dichloride)		<0.050	<0.050			<0.050			<0.050		NA
cis-1,3-Dichloropropylene		<0.050	<0.050			<0.050			<0.050		NA
trans-1,3-Dichloropropylene		<0.050	<0.050			<0.050			<0.050		NA
1,3-Dichloropropene (cis & trans)		<0.10	<0.10			<0.10			<0.10		NA
Ethylbenzene		<0.015	<0.015			<0.015			<0.015		NA
Methyl tert-Butyl Ether		<0.20	<0.20			<0.20			<0.20		NA
Styrene		<0.050	<0.050			<0.050			<0.050		NA
1,1,1,2-Tetrachloroethane		<0.050	<0.050			<0.050			<0.050		NA
1,1,2,2-Tetrachloroethane		<0.050	<0.050			<0.050			<0.050		NA
Tetrachloroethylene (PCE/PERC)		<0.050	<0.050			<0.050			<0.050		NA
Toluene		<0.075	<0.050			<0.050			<0.050		NA
1,1,1-Trichloroethane		<0.050	<0.050			<0.050			<0.050		NA
1,1,2-Trichloroethane		<0.050	<0.050			<0.050			<0.050		NA
Trichloroethylene (TCE)		<0.010	<0.010			<0.010			<0.010		NA
Trichlorofluoromethane (Freon 11)		<0.10	<0.10			<0.10			<0.10		NA
Vinyl Chloride (Chloroethene)		<0.10	<0.10			<0.10			<0.10		NA
o-Xylene		<0.050	<0.050			<0.050			<0.050		NA
m,p-Xylenes		<0.050	<0.050			<0.050			<0.050		NA
Xylenes, Total		<0.075	<0.075			<0.075			<0.075		NA
4-Bromofluorobenzene (SS)		90.5	91			79.3			86.5		NA
1,4-Difluorobenzene (SS)		90.7	86.6			72.9			86.5		NA
Hydrocarbons (Soil)											
EPH (C10-C19)		<200	<200			<200			<200		NA
EPH (C19-C32)		<200	<200			<200			<200		NA
LEPH (C10-C19) Less PAHs		<200	<200			<200			<200		NA
HEPH (C19-C32) Less PAHs		<200	<200			<200			<200		NA
2-Bromobenzotrifluoride		97.2	93.7			93			92.5		NA
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene		<0.0050	<0.0050			<0.0050			<0.0050		NA
Acenaphthylene		<0.0050	<0.0050			<0.0050			<0.0050		NA
Anthracene		<0.0040	<0.0040			<0.0040			<0.0040		NA
Benz(a)anthracene		<0.010	<0.010			<0.010			<0.010		NA
Benzo(a)pyrene		<0.010	<0.010			<0.010			<0.010		NA
Benzo(b,j) fluoranthene		<0.010	<0.010			<0.010			<0.010		NA
Benzo(b,j,k)fluoranthene		<0.015	<0.015			<0.015			<0.015		NA
Benzo(g,h,i)perylene		<0.010	<0.010			<0.010			<0.010		NA
Benzo(k)fluoranthene		<0.010	<0.010			<0.010			<0.010		NA
Chrysene		<0.010	<0.010			<0.010			<0.010		NA
Dibenz(a,h)anthracene		<0.0050	<0.0050			<0.0050			<0.0050		NA
Fluoranthene		<0.010	<0.010			<0.010			<0.010		NA
Fluorene		<0.010	<0.010			<0.010			<0.010		NA
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010			<0.010			<0.010		NA
1-Methylnaphthalene		<0.050	<0.050			<0.050			<0.050		NA
2-Methylnaphthalene		<0.010	<0.010			<0.010			<0.010		NA
Naphthalene		<0.010	<0.010			<0.010			<0.010		NA
Phenanthrene		<0.010	<0.010			<0.010			<0.010		NA
Pyrene		<0.010	<0.010			<0.010			<0.010		NA
Quinoline		<0.050	<0.050			<0.050			<0.050		NA
Acenaphthene d10		91.4	88.9			92			92.5		NA
Chrysene d12		100.1	99.1			122.2			105.8		NA
Naphthalene d8		86.6	85			88.1			88.9		NA
Phenanthrene d10		106.7	103.4			104.6			106.3		NA
Benzo(a)pyrene Total Potency Equivalence (TPE)		<0.020	<0.020			<0.020			<0.020		NA
Index of Additive Cancer Risk		<0.15	<0.15			<0.15			<0.15		NA

Sample ID	SN-2-2	SN-2-3	SN-3-1	SN-3-2	SN-3-3	SN-4-1	SN-4-2	SN-4-3	SN-5-1	SN-5-2	SN-5-3
Date Sampled	12-Aug-2018	12-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018	13-Aug-2018
Laboratory Sample ID	L2148903-53	L2148903-54	L2148903-55	L2148903-56	L2148903-57	L2148903-58	L2148903-59	L2148903-60	L2148903-61	L2148903-62	L2148903-63
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties											
Moisture			29.1			29.1			30.4		
pH (1:2 soil:water)	8.35	8.37	8.27	8.37	8.26	8.30	8.37	8.38	8.30	8.32	8.35
% Gravel (>2mm)	7.8	5.9	13.7	5.5	6.6	17.0	4.5	4.8	7.1	2.8	6.0
% Sand (2.0mm - 0.063mm)	43.4	45.1	29.5	47.0	40.8	30.7	32.0	39.3	32.3	40.7	25.9
% Silt (0.063mm - 4um)	36.6	37.2	40.0	33.8	38.6	35.5	44.0	37.5	39.4	35.8	45.3
% Clay (<4um)	12.2	11.8	16.9	13.6	14.0	16.8	19.5	18.3	21.1	20.8	22.8
Texture	Loam	Loam	Silt loam	Loam	Loam	Loam	Silt loam / Loam	Loam	Loam	Loam	Silt loam
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	1.69	1.63	1.94	1.63	1.81	1.96	2.01	1.97	2.27	2.06	2.17
Total Organic Carbon	2.73	2.83	3.1	2.27	2.74	2.77	2.94	2.56	2.9	2.81	3.1
Metals											
Aluminum (Al)	6210	5670	9160	8480	7190	8860	8690	7850	8770	8760	9960
Antimony (Sb)	0.11	<0.10	0.15	0.14	0.11	0.17	0.15	0.15	0.17	0.14	0.17
Arsenic (As)	4.32	4.07	4.77	4.38	8.94	7.66	7.26	3.87	6.68	6.69	3.90
Barium (Ba)	17.7	15.2	23.0	18.8	17.0	23.5	21.1	18.3	25.4	21.3	24.3
Beryllium (Be)	0.38	0.36	0.51	0.47	0.41	0.50	0.46	0.43	0.51	0.47	0.56
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	43.0	40.1	54.7	51.8	46.9	57.3	53.3	49.9	55.4	55.2	62.4
Cadmium (Cd)	0.07	0.05	0.12	0.10	0.05	0.08	0.09	0.12	0.11	0.13	0.12
Calcium (Ca)	81600	77500	96000	80300	74400	84400	82500	78700	93300	90100	89800
Chromium (Cr)	19.0	17.5	25.7	23.3	20.3	24.7	22.9	21.6	24.9	23.7	26.7
Cobalt (Co)	3.37	3.25	4.49	3.74	3.48	4.40	3.97	3.61	4.62	4.10	4.44
Copper (Cu)	7.29	6.84	10.3	9.17	7.89	9.82	9.43	9.09	10.3	9.79	11.3
Iron (Fe)	11100	10800	14500	12900	13400	15300	14700	12200	14900	14300	14800
Lead (Pb)	5.94	5.63	7.67	6.94	6.25	7.85	7.46	6.88	8.06	7.43	8.56
Lithium (Li)	28.7	26.7	37.9	35.8	30.7	37.2	36.6	33.9	37.6	35.5	42.8
Magnesium (Mg)	39500	38800	44600	41100	38300	42400	40200	38100	42800	40500	43500
Manganese (Mn)	132	130	160	138	146	169	174	131	174	175	163
Mercury (Hg)	0.0115	0.0112	0.0159	0.0161	0.0152	0.0178	0.0165	0.0153	0.0178	0.0179	0.0199
Molybdenum (Mo)	0.32	0.30	0.41	0.35	0.33	0.40	0.37	0.39	0.40	0.41	0.39
Nickel (Ni)	10.30	9.65	14.20	12.70	11.40	13.80	12.90	12.30	14.10	13.50	**15.30**
Phosphorus (P)	389	408	444	404	530	560	532	361	482	454	399
Potassium (K)	2500	2370	3700	3450	3050	3610	3640	3270	3650	3590	4110
Selenium (Se)	<0.20	<0.20	0.22	0.21	0.22	0.24	0.26	0.21	0.24	0.22	0.27
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	4100	3460	5060	4690	4760	4750	4570	4740	5440	5190	5630
Strontium (Sr)	53.1	49.5	63.6	55.5	56.8	59.0	62.0	57.8	75.8	67.1	67.2
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.106	0.104	0.136	0.121	0.110	0.138	0.130	0.123	0.136	0.124	0.151
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	249	232	328	281	257	309	282	247	300	275	316
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.876	0.878	1.18	0.973	0.858	0.999	0.946	1.14	1.06	0.965	1.16
Vanadium (V)	22.3	21.6	34.2	29.7	26.5	34.4	32.7	29.2	33.8	32.1	35.7
Zinc (Zn)	15.5	14.9	22.1	19.8	17.4	22.7	21.2	20.1	23.9	22.1	25.7
Zirconium (Zr)	7.6	7.1	8.7	8.8	6.9	8.2	8.0	8.1	7.9	7.5	10.3
Volatile Organic Compounds (Soil)											
VOC Sample Container			Field MeOH			Field MeOH			Field MeOH		
Benzene			<0.0050			<0.0050			<0.0050		
Bromodichloromethane (BDCM)			<0.050			<0.050			<0.050		
Bromoform (Tribromomethane)			<0.050			<0.050			<0.050		
Carbon Tetrachloride			<0.050			<0.050			<0.050		
Chlorobenzene			<0.050			<0.050			<0.050		
Dichloromethane (DCM) (Methylene Chloride)			<0.050			<0.050			<0.050		
Chloroethane			<0.10			<0.10			<0.10		
Chloroform			<0.10			<0.10			<0.10		
Chloromethane			<0.10			<0.10			<0.10		
1,2-Dichlorobenzene			<0.050			<0.050			<0.050		
1,3-Dichlorobenzene			<0.050			<0.050			<0.050		
1,4-Dichlorobenzene			<0.050			<0.050			<0.050		
1,1-Dichloroethane			<0.050			<0.050			<0.050		
1,2-Dichloroethane			<0.050			<0.050			<0.050		
1,1-Dichloroethylene			<0.050			<0.050			<0.050		
1,2-dichloroethylene (Cis) (1,2-dichloroethene)			<0.050			<0.050			<0.050		
1,2-dichloroethylene (Trans) (1,2-dichloroethene)			<0.050			<0.050			<0.050		
Dichloromethane (DCM) (Methylene Chloride)			<0.30			<0.30			<0.30		
1,2-dichloropropane (Propylene Dichloride)			<0.050			<0.050			<0.050		
cis-1,3-Dichloropropylene			<0.050			<0.050			<0.050		
trans-1,3-Dichloropropylene			<0.050			<0.050			<0.050		
1,3-Dichloropropene (cis & trans)			<0.10			<0.10			<0.10		
Ethylbenzene			<0.015			<0.015			<0.015		
Methyl tert-Butyl Ether			<0.20			<0.20			<0.20		
Styrene			<0.050			<0.050			<0.050		
1,1,1,2-Tetrachloroethane			<0.050			<0.050			<0.050		
1,1,2,2-Tetrachloroethane			<0.050			<0.050			<0.050		
Tetrachloroethylene (PCE/PERC)			<0.050			<0.050			<0.050		
Toluene			<0.050			<0.050			<0.050		
1,1,1-Trichloroethane			<0.050			<0.050			<0.050		
1,1,2-Trichloroethane			<0.050			<0.050			<0.050		
Trichloroethylene (TCE)			<0.010			<0.010			<0.010		
Trichlorofluoromethane (Freon 11)			<0.10			<0.10			<0.10		
Vinyl Chloride (Chloroethene)			<0.10			<0.10			<0.10		
o-Xylene			<0.050			<0.050			<0.050		
m,p-Xylenes			<0.050			<0.050			<0.050		
Xylenes, Total			<0.075			<0.075			<0.075		
4-Bromofluorobenzene (SS)			73.9			82			71.2		
1,4-Difluorobenzene (SS)			83.8			94.1			72		
Hydrocarbons (Soil)											
EPH (C10-C19)			<200			<200			<200		
EPH (C19-C32)			<200			<200			<200		
LEPH (C10-C19) Less PAHs			<200			<200			<200		
HEPH (C19-C32) Less PAHs			<200			<200			<200		
2-Bromobenzotrifluoride			91.7			88.9			90.2		
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene			<0.0050			<0.0050			<0.0050		
Acenaphthylene			0.0060			<0.0050			<0.0050		
Anthracene			<0.0040			<0.0040			<0.0040		
Benz(a)anthracene			0.011			<0.010			<0.010		
Benzo(a)pyrene			0.037			<0.010			<0.010		
Benzo(b,j) fluoranthene			0.035			<0.010			<0.010		
Benzo(b,j,k)fluoranthene			0.05			<0.015			<0.015		
Benzo(g,h,i)perylene			0.053			<0.010			<0.010		
Benzo(k)fluoranthene			0.015			<0.010			<0.010		
Chrysene			0.013			<0.010			<0.010		
Dibenz(a,h)anthracene			0.0069			<0.0050			<0.0050		
Fluoranthene			<0.010			<0.010			<0.010		
Fluorene			<0.010			<0.010			<0.010		
Indeno(1,2,3-c,d)pyrene			0.049			<0.010			<0.010		
1-Methylnaphthalene			<0.050			<0.050			<0.050		
2-Methylnaphthalene			<0.010			<0.010			<0.010		
Naphthalene			<0.010			<0.010			<0.010		
Phenanthrene			<0.010			<0.010			<0.010		
Pyrene			<0.010			<0.010			<0.010		
Quinoline			<0.050			<0.050			<0.050		
Acenaphthene d10			88.6			89.5			89.1		
Chrysene d12			112			109.4			104.3		
Naphthalene d8			85.7			85.6			85.1		
Phenanthrene d10			103.8			102.7			105.1		
Benzo(a)pyrene Total Potency Equivalence (TPE)			0.056			<0.020			<0.020		
Index of Additive Cancer Risk			0.51			<0.15			<0.15		

Notes:

[a]Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b]BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Appendix D: Sediment Screening Table (2017 - 2020) for
Marine Environmental Effects Monitoring 2020

Sample ID			CCME		NOAA Sediment Benchmarks							SE18-1	SE18-2	SE-1	SE-2	SE-3	SE-4	SE-5	SE-6	SE-7	SE-8	DUPA	SW-1	DUP B	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SNW-1	SNW-2	DUP-C	SNW-3	SNW-4	SNW-5	SNE-1	SNE-2	DUP-D	SNW-6	SNW-7	SNW-8	SNE-3	SNE-4	SNE-5
Date Sampled												21-Sep-2019	21-Sep-2019	21-Sep-2019	22-Sep-2019	22-Sep-2019	22-Sep-2019	23-Sep-2019	24-Sep-2019	24-Sep-2019	24-Sep-2019	24-Sep-2019	27-Sep-2019	27-Sep-2019	27-Sep-2019	27-Sep-2019	27-Sep-2019	27-Sep-2019	28-Sep-2019	28-Sep-2019	28-Sep-2019	28-Sep-2019	30-Sep-2019	30-Sep-2019	30-Sep-2019	1-Oct-2019	1-Oct-2019	1-Oct-2019	1-Oct-2019	1-Oct-2019	2-Oct-2019	2-Oct-2019	2-Oct-2019	3-Oct-2019	3-Oct-2019	3-Oct-2019
Laboratory Sample ID												L2355484-1	L2355484-2	L2355484-3	L2355484-4	L2355484-5	L2355484-6	L2355484-7	L2355484-8	L2355484-9	L2355484-10	L2355484-11	L2359868-1	L2359868-2	L2359868-3	L2359868-4	L2359868-5	L2359868-6	L2359868-7	L2359868-8	L2359868-9	L2359868-10	L2360531-1	L2360531-2	L2360531-3	L2360531-4	L2360531-5	L2360531-6	L2360531-7	L2360531-8	L2360531-9	L2360531-10	L2360531-11	L2365825-1	L2365825-2	L2365825-3
Parameter	Lowest Detectio	Units	ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Physical Properties																																														
Moisture	0.25	%	-	-	-	-	-	-	-	-	-	17.7	16.9	27.9	14.2	25.3	16.4	30.1	26.7	26.4	33.3	27.7	16.4	15.8	22.6	26.3	24.6	28.5	24.1	28.4	27.4	23.4	26.3	24.4	28.9	29.4	31.6	17.5	30.1	28.9	27.5	31.5	33.2	22.5	32.1	34.2
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-	8.39	8.35	8.15	8.43	8.23	8.46	8.11	8.12	8.10	8.03	8.13	8.48	8.49	8.25	8.00	8.19	7.96	7.92	8.29	8.10	8.33	8.37	8.35	8.29	8.23	8.26	8.53	7.30	7.82	8.34	8.26	8.26	8.14	8.11	8.09
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-	6.0	15.2	23.9	12.4	11.9	6.8	15.8	14.0	16.1	8.2	14.0	6.7	4.8	2.5	6.1	6.7	6.0	2.3	4.4	3.4	5.8	8.0	13.4	9.1	11.7	9.7	11.4	10.1	13.9	6.2	5.0	7.1	33.2	9.5	5.4
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-	85.0	66.5	45.4	83.5	55.7	81.1	38.4	48.0	56.0	58.7	54.1	82.9	86.5	83.0	57.3	56.6	53.4	54.0	53.3	50.8	55.7	39.3	40.3	38.6	28.4	32.7	64.2	39.2	38.8	39.2	37.8	31.1	34.6	30.8	22.7
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-	7.0	14.3	24.3	2.8	25.6	9.1	35.8	29.0	21.0	25.6	25.2	8.1	6.6	11.2	29.5	29.2	32.3	35.6	33.9	37.9	30.7	40.4	35.6	40.4	45.1	41.9	18.8	38.5	36.6	37.6	39.7	42.6	24.8	43.4	49.4
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-	2.0	3.9	6.4	1.3	6.8	3.1	10.0	9.0	6.9	7.4	6.6	2.3	2.1	3.3	7.1	7.5	8.4	8.1	8.3	7.9	7.7	12.3	10.7	11.8	14.8	15.7	5.6	12.2	10.7	17.1	17.4	19.1	7.4	16.2	22.5
Texture		-	-	-	-	-	-	-	-	-	-	Sand	Loamy sand	Sandy loam	Sand	Sandy loam	Sand	Loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sand	Sand	and / Loamy sa	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Loam	Loam	Loam	Silt loam	Silt loam	Sandy loam	Loam	Loam	Loam	Loam	Silt loam	am / Sandy loa	Silt loam	Silt loam
Organic / Inorganic Carbon (Soil)																																														
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	0.88	1.42	1.48	0.87	1.66	1.08	1.71	1.83	1.74	1.44	1.82	1.02	0.82	0.95	1.69	1.66	1.65	1.54	1.67	1.53	1.80	2.07	1.80	2.13	2.40	2.27	1.24	2.48	2.00	2.35	2.42	2.66	2.43	2.40	2.90
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	0.36	0.87	2.32	0.42	1.5	0.61	2.43	1.71	1.26	1.48	1.58	0.85	1.19	1.27	2.89	2.53	3.04	3.08	3.26	3.76	2.65	2.58	2.81	3.1	3.1	2.8	1.69	2.9	2.73	2.42	2.4	2.7	1.64	2.48	2.4
Metals																																														
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00	1520	3190	4570	1160	4730	2270	5890	5090	4440	4150	4630	1840	1710	2570	4490	5040	5020	5110	5530	5700	4460	5970	5770	6170	7160	7430	3440	5890	5610	6690	8640	7820	5400	8960	10900
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	0.13	0.12	0.12	0.14	0.14	<0.10	0.11	0.11	0.17	0.19	0.13	0.10	0.16	0.21
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00	1.02	2.70	3.78	0.67	3.89	1.79	4.21	4.02	4.72	4.41	4.13	1.76	1.84	2.60	3.90	4.45	5.57	6.29	4.86	4.01	3.67	4.76	4.39	7.72	5.48	6.99	2.40	6.27	6.04	6.32	9.11	7.13	6.54	8.46	12.40
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00	4.9	10.5	15.1	4.0	14.4	6.6	15.3	14.1	12.0	12.6	14.0	7.1	5.4	9.3	15.3	16.8	16.4	19.3	19.4	19.7	13.1	17.9	17.1	17.9	19.8	23.4	11.1	18.5	16.4	19.6	24.6	20.6	15.8	25.2	29.8
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	0.22	0.28	<0.10	0.26	0.18	0.35	0.31	0.27	0.25	0.29	0.12	0.12	0.17	0.28	0.31	0.33	0.31	0.33	0.34	0.28	0.35	0.37	0.39	0.45	0.48	0.20	0.36	0.37	0.40	0.54	0.45	0.34	0.58	0.69
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-	10.3	20.4	32.0	8.9	31.5	15.3	38.0	35.1	28.2	27.7	31.3	10.8	11.0	16.0	29.1	32.7	35.2	34.8	35.2	35.3	29.6	37.4	39.2	45.0	45.8	50.1	22.5	40.3	38.0	45.0	58.0	53.1	38.6	62.0	74.3
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00	<0.020	0.02	0.05	<0.020	0.03	<0.020	0.05	0.04	0.03	0.03	0.05	<0.020	<0.020	<0.020	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.09	0.08	0.06	0.09	0.08	0.05	0.12	0.06	0.09	0.12	0.08	0.06	0.07	0.12
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-	23500	42100	59700	21700	52700	31700	60600	55200	43600	41100	60600	26200	26000	36100	62700	66000	68400	71500	73800	76100	59600	74900	76500	83200	77200	80500	41900	67600	64500	75500	90500	91900	75700	87200	90500
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00	6.5	12.0	15.4	3.9	14.9	8.1	18.7	16.1	14.3	13.9	15.5	7.0	7.0	10.2	16.5	17.6	18.1	19.1	20.1	21.6	15.0	20.6	19.1	19.8	22.4	23.0	11.2	18.1	17.6	20.1	25.3	22.4	16.8	26.3	29.3
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00	0.99	2.09	2.69	0.73	2.60	1.47	3.11	2.73	2.58	2.56	2.79	1.23	1.20	1.72	2.82	3.05	2.97	3.15	3.29	3.51	2.65	3.73	3.53	3.53	4.06	4.19	1.87	3.40	3.37	3.77	4.70	4.26	3.17	4.87	5.32
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00	1.9	3.9	5.8	1.2	5.2	2.7	6.7	5.7	5.0	5.5	6.0	2.4	2.3	3.2	5.4	5.7	5.7	6.1	6.9	7.1	5.8	8.3	8.0	7.8	9.3	9.5	4.2	7.3	7.0	9.2	10.5	9.3	6.5	10.3	11.9
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00	6170	9090	11600	3040	10600	5810	11700	10600	9910	9850	10100	6750	6970	8500	12300	13300	13300	13300	13300	12300	12300	12700	11900	13300	13600	14200	7460	12200	11900	12500	16800	13900	11500	17000	19800
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00	1.51	3.01	4.68	1.32	4.53	2.22	5.45	5.02	4.29	4.39	4.88	1.75	1.71	2.35	4.51	4.24	4.38	4.36	4.58	4.58	4.07	5.98	5.79	6.08	7.17	7.30	3.59	5.73	5.76	6.80	8.23	7.04	5.23	8.34	9.57
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	6.4	14.3	21.6	6.0	19.9	9.8	24.5	21.5	18.3	17.2	20.5	7.5	7.4	11.1	19.9	21.8	23.0	23.3	23.7	25.7	19.1	26.4	27.0	29.2	33.4	35.5	14.3	25.4	25.6	30.4	40.3	32.3	26.8	43.2	49.9
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-	12400	21700	30400	12500	29500	15900	35900	30100	25600	23300	31500	13600	13600	20700	32900	37600	37400	40200	42900	46300	33100	46100	41000	43400	45000	42700	24500	37800	35500	36800	47300	42000	35100	46600	44800
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00	45	87	117	37	114	60	125	113	104	106	117	56	60	80	124	134	135	146	144	143	129	155	142	160	154	164	82	155	151	137	199	165	143	194	194
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41	<0.0050	0.0069	0.0100	<0.0050	0.0113	<0.0050	0.0122	0.0124	0.0102	0.0109	0.0129	<0.0050	<0.0050	<0.0050	0.0087	0.0087	0.0097	0.0097	0.0121	0.0108	0.0092	0.0109	0.0128	0.0126	0.0130	0.0140	0.0074	0.0116	0.0121	0.0128	0.0146	0.0137	0.0122	0.0166	0.0197
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	0.18	0.30	0.69	0.32	0.39	0.27	0.45	0.38	0.32	0.41	0.62	0.14	0.15	0.20	0.34	0.34	0.31	0.36	0.37	0.34	0.29	0.34	0.35	0.37	0.36	0.37	0.26	0.35	0.36	0.38	0.46	0.37	0.33	0.41	0.50
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00	3.27	6.65	8.88	2.22	8.23	4.46	10.30	8.87	8.49	8.20	9.18	3.91	3.82	5.30	9.14	9.48	9.69	10.10	10.60	11.60	8.41	11.70	11.10	11.50	12.90	13.50	6.12	10.50	10.50	12.00	14.60	13.00	9.66	15.00	16.80
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-	163	301	408	145	425	197	439	441	390	448	460	204	219	340	438	431	559	684	588	470	378	514	456	608	502	522	323	489	460	508	647	470	477	626	922
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-	670	1410	1950	500	2050	1000	2450	2120	1800	1740	1960	820	790	1240	2020	2240	2310	2340	2560	2620	1900	2530	2460	2730	3000	3120	1510	2570	2360	2740	3570	3140	2190	3590	4370
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	<0.20	0.22	<0.20	0.21	<0.20	0.20	0.26	0.20	<0.20	0.30	0.31
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-	1600	2110	4290	1180	3970	2010	4630	3970	3810	4700	4700	2110	1530	2300	3370	3920	4800	3550	4670	3990	3340	4730	4470	5010	4910	5220	2540	5720	4520	4570	6530	5040	3860	5850	6530
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	15.2	27.5	50.2	12.3	38.5	22.5	39.2	38.7	34.4	36.3	57.3	18.6	17.4	23.8	38.0	41.0	44.4	45.8	50.8	45.9	35.9	48.7	52.2	57.1	51.0	57.2	29.8	57.3	47.7	52.7	66.3	60.4	47.1	59.0	73.8
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	0.064	0.087	<0.050	0.085	<0.050	0.101	0.087	0.075	0.078	0.083	<0.050	<0.050	0.053	0.092	0.088	0.093	0.089	0.105	0.100	0.074	0.117	0.107	0.105	0.132	0.128	0.059	0.106	0.098	0.117	0.137	0.116	0.089	0.143	0.170
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	88	193	237	78	231	124	252	232	195	217	216	119	111	172	280	264	264	290	287	327	216	250	239	255	273	274	160	234	228	245	343	260	219	338	358
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.33	0.54	1.07	0.41	0.84	0.57	0.99	0.77	0.66	0.78	0.80	0.31	0.35	0.45	0.72	0.69	0.72	0.77	0.76	0.76	0.70	0.93	0.94	0.90	1.05	0.96	0.60	0.77	0.77	1.00	1.07	0.90	0.73	1.07	1.32
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00	6.0	12.8	18.7	4.9	18.3	8.9	22.3	20.2	18.3	17.4	20.2	7.6	7.5	10.4	17.6	19.5	19.5	19.7	23.5	22.6	17.2	25.4	23.8	25.1	29.2	31.1	13.5	24.3	23.6	28.2	37.2	31.1	22.3	37.1	42.8
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00	5.2	9.8	16.3	4.3	14.5	6.6	16.9	14.8	13.9	13.4	14.7	8.2	6.3	8.9	13.8	14.1	14.0	13.9	15.0	14.9	12.5	18.1	17.4	18.1	21.0	21.5	10.1	19.3	17.6	21.0	24.9	20.4	15.5	25.8	29.1
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	2.0	3.5	4.6	1.9	4.6	2.9	5.1	4.8	4.1	3.3	4.0	1.9	2.4	2.9	4.5	4.8	4.9	5.4	5.5	6.7	5.1	6.5	6.7	6.5	7.3	7.8	4.4	5.7	5.5	6.9	8.5	7.2	4.7	8.5	9.1
Volatile Organic Compounds (Soil)																																														
VOC Sample Container		-	-	-	-	-	-	-	-	-	-	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH												Field MeOH	Field MeOH	Field MeOH
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0107	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050												<0.0050	<0.0050	<0.0050
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,3-Dichlorobenzene	0.050	mg/kg	-		-	-	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30												<0.30	<0.30	<0.30
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015												<0.015	<0.015	<0.015
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20												<0.20	<0.20	<0.20
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.103	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010												<0.010	<0.010	<0.010
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10												<0.10	<0.10	<0.10
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050												<0.050	<0.050	<0.050
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075												<0.075	<0.075	<0.075
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	82.4	74.6	77.2	78.2	80.1	93.4	86.3	99.6	96.1	88.4	75.4	93	78.6	97.3	86.4	78.3	88.9	81.8	83.1	78.5	83.7												77.6	89.5	74.3
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	92.6	84.9	78.9	73.5	91	100.6	87.3	111.8	102.6	80.6	83.3	75.6	90.9	96.4	87.4	91.5	66.1	73.4	73.4	88.3	71.7												70.4	102.7	84
Hydrocarbons (Soil)																																														
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-	89	86.1	88.4	90.9	89.2	85.8	84.9	90.7	84.6	90.3	88.5	93.9	85	90.4	91.6	92.1	87.2	86	94.7	95.4	91.1	87.5	90.7	90.5	90.9	88.1	92.5	88	98.4	91.1	88	93.1	83.5	93.4	90.3
Polycyclic Aromatic Hydrocarbons (Soil)																																														
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.008	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.031	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	<0.010	<0.010	0.028	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.048	<0.010	<0.010	0.032	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.069	<0.015	<0.015	0.047	<0.015	<0.015	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]		-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.04	<0.010	<0.010	0.051	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.041	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0070	<0.0050	<0.0050	<0.0050	<0.0050	0.0177	<0.0070	<0.0050	0.0098	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.034	<0.010	<0.010	0.038	<0.010	<0.010	<0.010	<0.010	<0.010
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.043	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.042	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-																																			
Chrysene d12		%	-	-	-	-	-	-	-	-	-	101.5	111.2	113.8	111.6	102.3	108.9	92	108.2	105.1	105.1	112.3	101.4	110	94	109.8	102.8	104.2	100.6	111.9	110.9	103.3	71.4	73.9	71.1	69.6	69.7	74.2	76.7	102.6	71.2	69.9	95.9	95.3	104.4	97.7
Naphthalene d8		%	-	-	-	-	-	-	-	-	-	101.7	112.6	111.4	115.2	107.1	109.1	103.7	112.6	105.9	108.7	112.9	109.7	114.8	102.6	111.2	100.9	108.3	103.2	109.6	108	101.1	91	91.6	90.8	88.5	89.5	90.3	97.6	101.9	90.3	90.3	93.6	96.3	107.2	103.4
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-	102.9	114.6	114	116.2	107	110.5	104.8	111.1	106.5	109.3	113.8	112.4	115.2	105.7	114.9	101.9	110	108	113.1	113	108.5	88.2	92.8	92.2	88.2	90.7	90.8	96.3	72.7	89.7	89.1	97.8	96.2	107.3	101.7
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.065	<0.020	<0.020	0.047	<0.020	<0.020	<0.020	<0.020	<0.020
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.73	<0.15	<0.15	0.45	<0.15	<0.15	<0.15	<0.15	<0.15

Notes:

[a] Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b] BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Appendix D: Sediment Screening Table (2017 - 2020) for Marine Environmental Effects Monitoring 2020

Sample ID			CCME		NOAA Sediment Benchmarks							SNE-6	SNE-7	SNE-8
Date Sampled												3-Oct-2019	3-Oct-2019	3-Oct-2019
Laboratory Sample ID												L2365825-4	L2365825-5	L2365825-6
Parameter	Lowest Detectio	Units	ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET	Soil	Soil	Soil
Physical Properties														
Moisture	0.25	%	-	-	-	-	-	-	-	-	-	34.1	36	34.8
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-	8.12	8.11	8.09
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-	8.3	1.6	2.9
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-	23.7	21.1	21.1
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-	47.8	53.3	53.0
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-	20.2	24.0	22.9
Texture		-	-	-	-	-	-	-	-	-	-	Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon (Soil)														
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	2.82	2.93	2.56
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	1.76	2.3	2.7
Metals														
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00	9620	12000	10900
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30	0.20	0.23	0.20
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00	11.00	8.23	7.39
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00	27.1	30.1	28.5
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	0.64	0.73	0.69
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-	68.7	77.6	70.9
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00	0.10	0.13	0.10
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-	90600	92400	86900
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00	28.4	32.7	30.8
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00	5.30	5.82	5.52
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00	11.7	13.2	12.3
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00	18400	19500	18500
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00	9.60	10.30	9.66
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	47.2	54.0	52.1
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-	45300	46600	44600
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00	207	196	191
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41	0.0214	0.0199	0.0192
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	0.61	0.50	0.46
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00	16.70	18.60	17.40
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-	679	613	585
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-	3770	4510	4410
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00	0.33	0.32	0.32
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-	6470	6430	6350
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	64.1	61.3	58.8
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-	<1000	<1000	<1000
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.160	0.185	0.163
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	334	391	366
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	1.25	1.54	1.39
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00	39.9	45.2	41.7
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00	28.4	33.1	30.5
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	8.4	11.0	10.3
Volatile Organic Compounds (Soil)														
VOC Sample Container		-	-	-	-	-	-	-	-	-	-	Field MeOH	Field MeOH	Field MeOH
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-	<0.0050	<0.0050	<0.0050
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-		<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00	<0.015	<0.015	<0.015
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06	<0.050	<0.050	<0.050
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	<0.10	<0.10	<0.10
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00	<0.075	<0.075	<0.075
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	83.8	79.7	83.3
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	94.9	77.5	72.5
Hydrocarbons (Soil)														
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	<200	<200	<200
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-	83.8	86.6	90.6
Polycyclic Aromatic Hydrocarbons (Soil)														
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071	<0.0050	<0.0050	<0.0050
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100	<0.010	<0.010	<0.010
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800	<0.010	<0.010	<0.010
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800	<0.010	<0.010	<0.010
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230	<0.0050	0.0088	0.0076
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300	<0.010	<0.010	<0.010
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600	<0.010	<0.010	<0.010
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-	<0.050	<0.050	<0.050
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064	<0.010	<0.010	<0.010
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230	<0.010	<0.010	<0.010
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660	<0.010	<0.010	<0.010
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400	<0.010	<0.010	<0.010
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-			
Chrysene d12		%	-	-	-	-	-	-	-	-	-	92.8	95.9	106
Naphthalene d8		%	-	-	-	-	-	-	-	-	-	95.5	97.9	108.9
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-	94.7	98.1	108.5
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-	<0.15	<0.15	<0.15

Sample ID	SE-9	SE-10	SW-9	SW-10	SNW-9	SNW-10	SNE-9	SNE-10	SNE-11	SE-11	SW-11	SW-12	DUPA	SW-1
Date Sampled	4-Oct-2019	4-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	5-Oct-2019	6-Oct-2019	6-Oct-2019	6-Aug-2020	5-Aug-2020
Laboratory Sample ID	L2365825-7	L2365825-8	L2365825-9	L2365825-10	L2365825-11	L2365825-12	L2365825-13	L2365825-14	L2365825-15	L2365825-16	L2365825-17	L2365825-18	L2487428	L2487428
Parameter	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Sediment	Sediment
Physical Properties														
Moisture	25.7	Sample	27.3	25.4	31.5	28.2	37.6	36.5	35.8	32.1	22.3	21.8	21.8	17.2
pH (1:2 soil:water)	8.19	8.24	8.28	8.25	8.20	7.92	8.06	8.14	8.17	8.24	8.74	8.63	8.54	8.37
% Gravel (>2mm)	17.7	14.1	3.0	1.0	10.6	24.7	4.0	5.6	5.3	9.7	<1.0	1.9	2.0	21.6
% Sand (2.0mm - 0.063mm)	57.8	59.9	54.4	66.9	22.8	29.5	15.8	21.7	26.7	37.2	81.3	77.0	60.1	68.7
% Silt (0.063mm - 4um)	19.3	20.1	36.9	28.2	45.6	31.2	54.7	49.5	46.3	41.0	15.1	18.2	31.5	7.7
% Clay (<4um)	5.2	5.8	5.7	3.9	21.0	14.5	25.4	23.2	21.7	12.1	2.8	2.9	6.4	2.0
Texture	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Silt loam	Loam	Silt loam	Silt loam	Silt loam	Loam	Loamy sand	Loamy sand	Sandy loam	Sand
Organic / Inorganic Carbon (Soil)														
Total Inorganic Carbon	1.50	1.74	2.12	1.82	3.10	3.05	3.15	3.11	3.65	2.40	1.81	1.88	1.94	1.62
Total Organic Carbon	1.78	1.52	2.9	2.49	2.7	1.9	2.2	2.1	1.4	2.23	1.45	1.42	3.2	2.01
Metals														
Aluminum (Al)	4500	4750	5650	4190	9530	8890	12100	11200	12100	7440	2900	3110	5240	2250
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	0.17	0.19	0.25	0.23	0.23	0.14	<0.10	<0.10	0.11	0.10
Arsenic (As)	5.37	4.08	4.25	3.94	5.65	10.10	10.20	8.97	11.00	5.13	1.51	1.54	3.89	2.56
Barium (Ba)	11.9	12.6	18.3	12.5	23.9	24.1	33.4	31.6	32.4	19.2	9.0	10.2	16.1	8.8
Beryllium (Be)	0.30	0.29	0.38	0.28	0.63	0.55	0.73	0.69	0.71	0.45	0.19	0.21	0.30	0.15
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.2	0.2
Boron (B)	32.6	33.3	40.6	31.7	66.2	61.6	77.3	73.8	78.7	52.9	22.2	24.1	36.2	15.6
Cadmium (Cd)	0.03	0.03	0.02	<0.020	0.13	0.09	0.10	0.10	0.12	0.06	<0.020	<0.020	0.03	0.02
Calcium (Ca)	46500	45500	90900	74100	103000	88300	90600	89100	89400	67400	56000	68100	75600	32600
Chromium (Cr)	13.8	15.1	21.1	16.0	27.4	25.5	33.8	31.1	33.3	22.8	10.9	12.7	18.4	8.6
Cobalt (Co)	2.67	2.66	3.57	2.86	5.03	4.73	6.15	5.63	6.02	3.61	2.04	2.18	3.15	1.60
Copper (Cu)	5.1	5.7	7.3	5.4	11.2	10.3	13.6	12.9	13.5	8.0	3.8	4.2	6.4	2.8
Iron (Fe)	10600	9760	14000	12900	15300	16500	20700	19100	20600	12800	9860	9960	13400	8360
Lead (Pb)	4.33	4.63	4.60	3.49	8.75	8.05	10.20	10.10	10.40	6.86	2.50	2.75	4.31	2.10
Lithium (Li)	18.7	19.5	32.2	23.0	48.7	42.9	52.5	49.5	52.7	31.4	16.2	19.2	21.3	9.2
Magnesium (Mg)	22500	22100	45100	37200	44500	38600	47500	44500	44400	36000	26500	33800	37900	16100
Manganese (Mn)	125	103	153	136	178	193	230	208	220	134	93	108	128	71
Mercury (Hg)	0.0097	0.0101	0.0093	0.0068	0.0146	0.0181	0.0221	0.0207	0.0215	0.0152	<0.0050	<0.0050	0.0083	0.0050
Molybdenum (Mo)	0.30	0.31	0.36	0.29	0.49	0.45	0.54	0.52	0.54	0.49	0.28	0.28	0.35	0.18
Nickel (Ni)	7.84	8.35	11.00	8.21	15.80	14.90	19.00	17.70	18.90	12.40	5.80	6.46	9.93	4.81
Phosphorus (P)	540	452	494	493	470	627	767	603	645	535	254	277	419	265
Potassium (K)	1780	1880	2410	1830	3780	3520	4640	4400	4730	3040	1330	1340	2240	1040
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	0.27	0.28	0.34	0.33	0.35	0.30	<0.20	<0.20	0.20	0.20
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	0.1
Sodium (Na)	3900	4470	4100	4480	5430	5960	8240	6500	7680	6060	3400	2020	4170	3130
Strontium (Sr)	35.4	34.6	46.6	40.7	69.2	61.3	67.8	63.5	65.2	53.7	28.6	32.9	45.1	19.7
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1000	1000
Thallium (Tl)	0.076	0.080	0.096	0.075	0.154	0.142	0.174	0.178	0.179	0.117	0.052	0.056	0.090	0.050
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	241	240	320	240	316	333	392	360	376	301	181	192	284	150
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	0.5
Uranium (U)	0.72	0.76	0.82	0.63	1.45	1.08	1.32	1.31	1.39	1.09	0.48	0.53	0.70	0.41
Vanadium (V)	17.9	17.8	21.4	14.9	34.9	38.6	47.1	43.7	47.3	28.3	10.8	12.1	19.8	9.1
Zinc (Zn)	13.9	14.8	15.7	11.4	26.6	25.9	33.7	31.1	33.6	20.4	8.5	9.0	14.8	11.7
Zirconium (Zr)	4.7	5.1	6.6	5.6	10.5	7.6	10.6	9.9	10.5	6.0	4.3	4.9	5.4	2.3
Volatile Organic Compounds (Soil)														
VOC Sample Container	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	Field MeOH	-	-
Benzene	<0.0050	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0059	0.0057	0.0079	<0.0050	<0.0050	< 0.0050	< 0.0050
Bromodichloromethane (BDCM)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Bromoform (Tribromomethane)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Carbon Tetrachloride	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Chlorobenzene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Chloroethane	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10	< 0.10
Chloroform	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10	< 0.10
Chloromethane	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10	< 0.10
1,2-Dichlorobenzene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1-Dichloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,2-Dichloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1-Dichloroethylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	< 0.050	< 0.050
1,2-dichloropropane (Propylene Dichloride)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
cis-1,3-Dichloropropylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-
trans-1,3-Dichloropropylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-
1,3-Dichloropropene (cis & trans)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-
Ethylbenzene	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	< 0.015	< 0.015
Methyl tert-Butyl Ether	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	< 0.20	< 0.20
Styrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1,1,2-Tetrachloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1,2,2-Tetrachloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Tetrachloroethylene (PCE/PERC)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.078	0.09	0.091	<0.050	<0.050	< 0.050	< 0.050
Toluene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1,1-Trichloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
1,1,2-Trichloroethane	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Trichloroethylene (TCE)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Trichlorofluoromethane (Freon 11)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10	< 0.10
Vinyl Chloride (Chloroethene)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10	< 0.10
o-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
m,p-Xylenes	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Xylenes, Total	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	< 0.075	< 0.075
4-Bromofluorobenzene (SS)	80.2	89.1	76.6	78.7	79.8	84.4	82.2	73.3	79.8	77.3	71.9	76	-	-
1,4-Difluorobenzene (SS)	93.1	102.6	82.9	88.4	55.7	82.3	94.7	78.5	74.8	78.8	82.2	82.8	-	-
Hydrocarbons (Soil)														
EPH (C10-C19)	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	< 200	< 200
EPH (C19-C32)	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	< 200	< 200
LEPH (C10-C19) Less PAHs	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	< 200	< 200
HEPH (C19-C32) Less PAHs	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	< 200	< 200
2-Bromobenzotrifluoride	90.1	90.5	87.5	90.6	89.6	86.8	90.1	93.9	87.6	87.4	89.6	93.4	-	-
Polycyclic Aromatic Hydrocarbons (Soil)														
Acenaphthene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050
Acenaphthylene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050
Anthracene	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	< 0.0040	< 0.0040
Benz(a)anthracene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Benzo(a)pyrene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Benzo(b,j,k)fluoranthene	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	< 0.015	< 0.015
Benzo(g,h,i)perylene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Chrysene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050
Fluoranthene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Fluorene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
1-Methylnaphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.010	< 0.010
2-Methylnaphthalene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Naphthalene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Phenanthrene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Pyrene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.010	< 0.010
Quinoline	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.050	< 0.050
Acenaphthene d10													-	-
Chrysene d12	96.8	98.3	93.9	107.8	96.5	96.5	95.3	100	99.9	90.3	95.2	99.2	-	-
Naphthalene d8	99.2	100.5	97.7	108.9	102.2	101.9	100.2	104.8	105.5	93.9	104.8	103.4	-	-
Phenanthrene d10	98.1	99.4	96.2	109.1	99.7	99.3	98.3	102.8	103.8	92.7	103.3	102.3	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	< 0.020	< 0.020
Index of Additive Cancer Risk	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	-	-

Sample ID	SW-11	SW-12	SW-13	SW-14	SW-15	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-9	DUP E	DUPB	DUP-C	SE-1
Date Sampled	30-Aug-2020	30-Aug-2020	31-Aug-2020	12-Aug-2020	6-Sep-2020	5-Aug-2020	5-Aug-2020	6-Aug-2020	6-Aug-2020	14-Aug-2020	18-Aug-2020	18-Aug-2020	29-Aug-2020	27-Aug-2020	9-Aug-2020	13-Aug-2020	9-Aug-2020
Laboratory Sample ID	VA20B5306	VA20B5306	VA20B5306	VA20B3177	VA20B6111	L2487428	L2487428	L2487428	L2487428	VA20B3177	VA20B5306	VA20B5306	VA20B5306	VA20B5306	L2487428	VA20B3177	L2487428
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																	
Moisture	28.4	24.4	25.6	26.9	30.2	18.1	20.5	21.9	22.3	26.3	23.2	31	26.3	25.2	21.3	33	25.6
pH (1:2 soil:water)	8.37	8.75	8.51	8.24	8.27	8.98	8.51	8.41	8.36	8.24	8.34	8.21	8.37	8.34	8.51	8.22	8.40
% Gravel (>2mm)	2.4	1.0	1.0	1.0	1.0	1.0	2.1	20.7	6.3	1.0	4.4	2.0	1.0	6.1	4.9	2.0	12.6
% Sand (2.0mm - 0.063mm)	74.1	91.1	70.7	52.1	52.3	95.7	68.7	49.8	55.6	57.9	50.8	37.0	53.1	46.4	62.1	42.1	57.5
% Silt (0.063mm - 4um)	19.4	7.0	24.9	41.0	42.0	2.7	23.7	24.6	31.1	33.4	38.3	51.8	39.1	36.3	26.2	42.7	23.4
% Clay (<4um)	4.1	1.9	3.8	6.6	5.6	1.0	5.6	4.8	7.0	8.1	6.5	9.2	6.8	11.2	6.8	13.2	6.5
Texture	-	-	-	-	-	Sand	Sandy loam	Sandy loam	Sandy loam	-	-	-	-	-	Sandy loam	-	Sandy loam
Organic / Inorganic Carbon (Soil)																	
Total Inorganic Carbon	1.73	1.62	1.81	1.75	2.16	1.04	1.67	1.87	1.98	1.68	2.02	2.29	1.91	2.61	2.03	2.14	2.26
Total Organic Carbon	3.4	2.87	4.04	4.17	4.33	1.06	2.53	3.08	2.92	3.24	3.79	4.1	3.77	3.17	2.64	3.17	2.71
Metals																	
Aluminum (Al)	3320	2290	4240	4720	4900	1710	4510	4150	4760	5150	5490	6860	5590	6340	4670	7600	4870
Antimony (Sb)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.13	< 0.10	0.15	< 0.10
Arsenic (As)	2.20	0.92	2.08	3.39	2.84	0.51	3.11	3.64	4.30	6.04	5.20	5.20	4.43	5.26	3.20	4.59	3.74
Barium (Ba)	10.6	7.0	11.8	16.0	14.4	5.1	15.5	14.0	15.3	17.6	18.0	20.4	17.4	17.7	13.2	17.6	13.9
Beryllium (Be)	0.22	0.13	0.27	0.31	0.30	0.10	0.27	0.27	0.31	0.33	0.31	0.39	0.37	0.38	0.28	0.47	0.29
Bismuth (Bi)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	< 0.20	< 0.20	< 0.20	< 0.20
Boron (B)	23.0	14.8	29.8	36.8	36.0	9.9	28.5	29.5	34.8	39.0	33.7	41.2	37.7	42.5	30.6	52.1	31.8
Cadmium (Cd)	0.02	0.02	0.02	0.03	0.02	0.02	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.05	0.03	0.06	0.04
Calcium (Ca)	56800	41000	80000	104000	94500	22100	64700	70800	73100	78700	80400	98000	84600	67100	61500	71600	61000
Chromium (Cr)	12.1	9.2	15.1	18.1	18.1	7.0	16.9	15.5	17.2	18.4	21.1	25.5	20.4	19.6	15.4	24.2	15.2
Cobalt (Co)	2.50	1.68	2.92	3.63	3.44	1.23	3.12	2.73	3.06	3.22	3.52	4.17	3.41	3.26	2.65	3.88	2.82
Copper (Cu)	4.4	2.7	5.2	7.0	6.9	1.5	5.6	5.4	5.7	5.6	6.8	8.5	6.8	6.4	5.1	8.0	5.3
Iron (Fe)	10400	5460	11100	13800	13200	3610	11300	11800	13300	14100	14100	16400	13400	11700	10600	12800	12000
Lead (Pb)	2.97	2.01	3.39	4.34	4.05	1.26	3.73	3.77	4.26	4.52	4.57	5.99	4.75	6.28	4.46	7.48	4.46
Lithium (Li)	17.8	12.2	24.4	28.3	27.8	6.9	18.2	18.3	20.4	23.9	21.5	27.6	27.7	26.4	19.4	33.2	19.2
Magnesium (Mg)	30000	20800	42600	52200	49600	12200	30300	34800	37800	38100	44800	53100	44000	33200	30400	42100	30900
Manganese (Mn)	120	74	133	185	181	44	119	113	130	135	142	175	144	123	112	129	120
Mercury (Hg)	0.0062	0.0050	0.0067	0.0087	0.0090	0.0050	0.0073	0.0071	0.0089	0.0091	0.0089	0.0123	0.0095	0.0134	0.0060	0.0128	0.0080
Molybdenum (Mo)	0.42	0.17	0.36	0.56	0.57	0.20	0.32	2.13	0.30	0.40	0.30	0.56	0.38	0.45	0.43	0.61	0.51
Nickel (Ni)	6.98	4.89	8.09	10.30	9.76	4.56	9.57	8.59	9.42	9.82	11.00	13.30	10.70	10.40	7.97	12.90	8.49
Phosphorus (P)	282	177	356	479	434	135	308	416	479	604	572	551	509	440	312	556	360
Potassium (K)	1480	1050	1860	2170	2210	770	2040	1770	2090	2320	2500	3030	2470	2590	1910	3210	1980
Selenium (Se)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	< 0.20	0.24	< 0.20
Silver (Ag)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	< 0.10	< 0.10	< 0.10	< 0.10
Sodium (Na)	3680	2270	4070	4980	4740	2150	3940	3600	5440	4060	3830	5210	3620	4190	3160	5150	3770
Strontium (Sr)	33.1	24.4	42.0	54.3	51.6	14.0	40.3	44.1	46.7	48.4	47.4	56.7	45.3	52.0	39.5	49.6	40.6
Sulfur (S)	1000	1000	1000	1100	1000	1000	1000	1000	1000	1000	1000	1000	1000	< 1000	< 1000	< 1000	< 1000
Thallium (Tl)	0.066	0.050	0.078	0.095	0.084	0.050	0.098	0.081	0.087	0.099	0.105	0.118	0.108	0.106	0.085	0.130	0.084
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	< 2.0	< 2.0	< 2.0	< 2.0
Titanium (Ti)	197	159	244	282	276	136	289	220	261	275	297	340	307	257	238	295	242
Tungsten (W)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	< 0.50	< 0.50	< 0.50	< 0.50
Uranium (U)	0.54	0.36	0.71	0.78	0.73	0.25	0.62	0.61	0.66	0.75	0.75	0.95	0.83	0.93	0.94	1.12	1.00
Vanadium (V)	12.7	8.0	14.6	17.6	17.5	6.1	17.9	17.0	18.6	20.4	20.6	25.7	20.9	24.6	17.3	28.1	17.6
Zinc (Zn)	10.2	6.8	11.6	16.0	14.0	5.9	16.1	13.4	14.9	15.9	15.3	18.8	15.4	17.6	14.8	20.6	14.9
Zirconium (Zr)	3.6	2.9	5.1	6.0	5.7	1.7	4.3	3.9	4.7	5.6	5.6	6.4	5.7	5.8	5.5	8.6	5.0
Volatile Organic Compounds (Soil)																	
VOC Sample Container	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Bromodichloromethane (BDCM)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bromoform (Tribromomethane)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Carbon Tetrachloride	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.050	< 0.10
Chloroform	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.050	< 0.10
Chloromethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.050	< 0.10
1,2-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloropropane (Propylene Dichloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
cis-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methyl tert-Butyl Ether	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.20	< 0.20	< 0.20	< 0.20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.20	< 0.050	< 0.20
Styrene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Tetrachloroethylene (PCE/PERC)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toluene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Trichloroethylene (TCE)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Trichlorofluoromethane (Freon 11)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.050	< 0.10
Vinyl Chloride (Chloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.050	< 0.10
o-Xylene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
m,p-Xylenes	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Xylenes, Total	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)																	
EPH (C10-C19)	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200	< 200
EPH (C19-C32)	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200	< 200
LEPH (C10-C19) Less PAHs	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200	< 200
HEPH (C19-C32) Less PAHs	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
2-Bromobenzotrifluoride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)																	
Acenaphthene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Acenaphthylene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Anthracene	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Benz(a)anthracene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j,k)fluoranthene	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Benzo(g,h,i)perylene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
2-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	< 0.050	< 0.050	< 0.050	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.010	< 0.050
Acenaphthene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene d12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene d8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.020	< 0.020	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.010	< 0.020
Index of Additive Cancer Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

[a] Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b] BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
<u>Value</u>	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Parameter	Lowest Detection	Units	CCME ISQG	CCME PEL	NOAA T_{20}	NOAA TEL	NOAA ERL	NOAA T_{50}	NOAA PEL	NOAA ERM	NOAA AET
Physical Properties											
Moisture	0.25	%	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-
Texture		-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)											
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-
Metals											
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Nickel (Ni)	0.50	mg/kg	30[(a)]	50[(a)]	15.00	15.90	20.90	47.00	42.80	51.60	110.00
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00
Silver (Ag)	0.10	mg/kg	1[(a)]	2.2[(a)]	0.23	0.73	1.00	1.10	1.77	3.70	3.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (Soil)											
VOC Sample Container		-	-	-	-	-	-	-	-	-	-
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	0.050	mg/kg	0.023[(a)]	-	-	-	-	-	-	-	0.01
1,3-Dichlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	
1,4-Dichlorobenzene	0.050	mg/kg	0.031[(a)]	0.09[(a)]	-	-	-	-	-	-	0.11
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)											
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)											
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[(a)]	0.78[(a)]	-	-	-	-	-	-	-
Benzo(k)fluoranthene	0.010	mg/kg	2.3[(a)]	4.5[(a)]	0.070	-	-	0.537			1.800
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[(a)]	0.88[(a)]	0.068	-	-	0.488			0.600
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[(b)]	0.021	0.020	0.070	0.128	0.201	0.670	0.064
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-

Sample ID	SE-10	SE-11	SE-12	SE-13	SE-14	SE-15	SE18-1	SE-2	SE-3	SE-4	SE-5	SE-6	SE-7	SE-8	SE-9	SE18-2
Date Sampled	27-Aug-2020	27-Aug-2020	30-Aug-2020	11-Sep-2020	13-Aug-2020	12-Sep-2020	10-Sep-2020	9-Aug-2020	9-Aug-2020	13-Aug-2020	13-Aug-2020	27-Aug-2020	27-Aug-2020	27-Aug-2020	27-Aug-2020	11-Aug-2020
Laboratory Sample ID	VA20B5306	VA20B5306	VA20B5306	VA20B6111	VA20B3177	VA20B6111	VA20B6111	L2487428	L2487428	VA20B3177	VA20B3177	VA20B5306	VA20B5306	VA20B5306	VA20B5306	L2489552
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																
Moisture	25.8	33.5	26.1	31	30.9	34.6	20	22.3	23.5	25.8	22	27.5	21	21.9	25	18.1
pH (1:2 soil:water)	8.30	8.30	8.43	8.03	8.24	8.08	8.31	8.39	8.48	8.29	8.39	8.31	8.10	8.39	8.33	8.31
% Gravel (>2mm)	34.3	9.0	10.7	2.9	2.8	2.7	2.0	5.4	6.1	13.4	1.3	10.8	42.3	23.2	3.0	16.3
% Sand (2.0mm - 0.063mm)	45.9	41.3	60.7	45.5	33.6	34.7	92.0	61.1	69.9	52.2	55.7	48.4	37.2	60.4	71.0	63.8
% Silt (0.063mm - 4um)	15.8	38.3	21.5	38.4	47.0	47.6	4.4	27.2	19.3	27.8	32.8	31.5	16.0	12.6	21.1	15.1
% Clay (<4um)	4.0	11.4	7.1	13.2	16.6	15.0	1.6	6.2	4.8	6.6	10.2	9.3	4.5	3.8	4.9	4.8
Texture	-	-	-	-	-	-	-	Sandy loam	Loamy sand	-	-	-	-	-	-	Loamy sand
Organic / Inorganic Carbon (Soil)																
Total Inorganic Carbon	2.04	2.58	2.22	2.99	2.12	3.26	1.71	2.16	2.08	1.95	1.91	2.59	2.58	2.14	1.57	1.36
Total Organic Carbon	2.63	2.72	3.07	2.94	3.36	2.21	1.29	2.8	2.37	2.93	3.16	3.25	2.85	2.33	1.85	3.06
Metals																
Aluminum (Al)	4530	7320	3480	6860	8110	7640	1620	4760	3680	4980	5640	5420	4780	3130	3770	3420
Antimony (Sb)	< 0.10	0.13	0.12	0.10	0.15	0.12	< 0.10	< 0.10	< 0.10	0.11	< 0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10
Arsenic (As)	4.69	4.52	2.70	4.01	5.28	4.22	1.30	3.35	2.57	4.00	3.08	4.75	5.69	2.89	3.34	3.21
Barium (Ba)	11.2	19.5	9.5	16.2	19.5	18.9	4.8	12.5	11.8	15.1	14.4	15.1	13.4	8.0	9.5	10.4
Beryllium (Be)	0.29	0.46	0.24	0.43	0.51	0.49	0.11	0.32	0.23	0.32	0.34	0.39	0.31	0.23	0.23	0.23
Bismuth (Bi)	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Boron (B)	31.2	48.9	24.2	45.2	55.3	49.5	11.6	32.0	25.0	35.2	38.4	38.8	34.8	21.1	23.2	23.6
Cadmium (Cd)	0.04	0.06	0.04	0.05	0.06	0.07	< 0.020	0.03	0.02	0.04	0.04	0.04	0.05	0.03	0.03	0.08
Calcium (Ca)	43900	66200	42100	71900	77600	79400	21300	61600	46300	65000	65400	68500	60400	34800	31800	47400
Chromium (Cr)	16.5	21.5	11.9	21.4	25.7	24.0	6.1	15.3	11.5	16.8	17.6	17.1	14.8	9.1	12.2	11.7
Cobalt (Co)	2.61	3.56	2.07	3.41	4.07	3.88	1.12	2.69	2.07	2.83	2.98	3.11	2.67	1.82	2.22	2.11
Copper (Cu)	4.7	7.4	4.3	7.2	8.6	8.5	2.0	5.2	4.0	5.5	5.9	6.2	5.4	4.1	4.2	4.3
Iron (Fe)	9690	12100	6920	11400	13500	12600	6990	10500	8200	11400	10700	11500	10800	7090	8610	9980
Lead (Pb)	4.42	7.07	4.41	6.09	7.52	7.41	1.47	4.42	3.36	5.30	5.37	6.42	5.16	3.23	3.82	3.15
Lithium (Li)	18.8	30.7	16.7	29.6	36.0	34.2	6.9	19.9	14.4	21.5	23.3	26.2	21.6	13.4	14.4	15.6
Magnesium (Mg)	21100	35300	20400	37500	43600	41300	10900	30900	24000	32500	34400	30900	28400	15200	17600	21700
Manganese (Mn)	116	133	77	121	134	139	48	109	86	115	111	114	116	76	93	90
Mercury (Hg)	0.0092	0.0159	0.0084	0.0123	0.0133	0.0147	< 0.0050	0.0059	0.0060	0.0127	0.0097	0.0128	0.0110	0.0071	0.0077	0.0060
Molybdenum (Mo)	0.32	0.66	0.31	0.47	0.62	0.51	0.21	0.45	0.32	0.41	0.44	0.45	0.35	0.21	0.28	0.31
Nickel (Ni)	7.92	11.50	6.66	11.00	13.80	13.10	3.19	7.88	6.51	9.15	9.47	9.63	8.40	5.23	6.65	6.59
Phosphorus (P)	438	477	281	472	563	488	164	329	263	419	435	403	436	258	337	377
Potassium (K)	1780	3000	1460	2920	3460	3180	780	1990	1520	2080	2370	2090	2000	1230	1490	1550
Selenium (Se)	< 0.20	0.31	< 0.20	0.21	0.26	0.28	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.21	0.23	< 0.20	< 0.20	< 0.20
Silver (Ag)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium (Na)	4250	5510	3380	5210	5050	5570	2440	4480	3610	4420	3560	4070	4120	3220	3310	2590
Strontium (Sr)	44.8	47.4	38.4	67.1	53.6	55.1	15.4	46.6	30.7	45.0	42.4	45.2	46.8	28.5	25.9	34.3
Sulfur (S)	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Thallium (Tl)	0.082	0.115	0.067	0.104	0.126	0.128	< 0.050	0.092	0.061	0.087	0.097	0.101	0.082	0.052	0.069	0.069
Tin (Sn)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Titanium (Ti)	221	299	168	278	318	308	95	224	193	223	240	222	212	145	217	185
Tungsten (W)	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Uranium (U)	0.69	1.03	0.57	0.83	1.09	1.06	0.29	0.92	0.59	0.80	0.83	1.07	0.74	0.52	0.68	0.58
Vanadium (V)	16.0	25.9	14.4	24.4	29.6	26.6	6.4	17.4	14.0	19.8	20.1	23.2	19.4	11.4	13.9	12.9
Zinc (Zn)	13.9	20.0	10.8	19.2	21.4	20.3	5.8	14.3	14.0	15.8	16.2	16.8	14.8	10.3	11.6	11.5
Zirconium (Zr)	4.4	6.6	3.7	6.6	9.2	7.1	2.2	5.3	4.0	5.2	6.6	4.7	3.4	2.7	4.0	4.2
Volatile Organic Compounds (Soil)																
VOC Sample Container	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	-
Bromodichloromethane (BDCM)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Bromoform (Tribromomethane)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Carbon Tetrachloride	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Chlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.059	< 0.050	< 0.050	< 0.050	-
Chloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Chloroform	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Chloromethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,2-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,3-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,4-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,2-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1-Dichloroethylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.059	< 0.050	< 0.050	< 0.050	-
1,2-dichloropropane (Propylene Dichloride)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
cis-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	-
Methyl tert-Butyl Ether	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.20	< 0.20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Styrene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1,1,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1,2,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Tetrachloroethylene (PCE/PERC)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Toluene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1,1-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
1,1,2-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Trichloroethylene (TCE)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-
Trichlorofluoromethane (Freon 11)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Vinyl Chloride (Chloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10	< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
o-Xylene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
m,p-Xylenes	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	-
Xylenes, Total	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	-
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)																
EPH (C10-C19)	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	-
EPH (C19-C32)	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	-
LEPH (C10-C19) Less PAHs	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	-
HEPH (C19-C32) Less PAHs	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-
2-Bromobenzotrifluoride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)																
Acenaphthene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Acenaphthylene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Anthracene	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Benz(a)anthracene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j,k)fluoranthene	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Benzo(g,h,i)perylene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
2-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	< 0.050	< 0.050	< 0.050	< 0.050	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.010	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene d12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene d8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020
Index of Additive Cancer Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	DUP-D	DUP-H	SNW-1	SNW-10	SNW-10	SNW-11	SNW-12	SNW-13	SNW-14	SNW-15	SNW-2	SNW-3	SNW-4	SNW-5	SNW-6	SNW-7	SNW-8	SNW-9
Date Sampled	15-Aug-2020	11-Sep-2020	6-Aug-2020	30-Aug-2020	8-Sep-2020	9-Sep-2020	9-Sep-2020	9-Sep-2020	9-Sep-2020	11-Sep-2020	15-Aug-2020	15-Aug-2020	25-Aug-2020	25-Aug-2020	25-Aug-2020	31-Aug-2020	8-Sep-2020	8-Sep-2020
Laboratory Sample ID	VA20B3177	VA20B6111	L2487428	VA20B5306	VA20B6111	VA20B6111	VA20B6111	VA20B6111	VA20B6111	VA20B6111	VA20B3177	VA20B3177	VA20B5306	VA20B5306	VA20B5306	VA20B5306	VA20B6111	VA20B6111
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																		
Moisture	26	29.2	20.2	23.7	30.5	31.9	30.1	30	30.3	29.7	25.7	28	29.3	29.2	23.5	27.8	29.5	31.9
pH (1:2 soil:water)	8.34	8.25	8.52	8.33	8.32	8.19	8.29	8.26	8.27	8.26	8.24	8.34	8.33	8.36	8.48	8.36	8.30	8.35
% Gravel (>2mm)	< 1.0	5.6	5.6	< 1.0	4.6	2.3	2.6	4.1	3.3	6.0	2.7	3.1	13.9	7.8	5.1	7.0	< 1.0	3.2
% Sand (2.0mm - 0.063mm)	42.8	33.4	60.5	69.6	33.0	26.2	21.2	30.2	32.1	37.0	47.1	40.9	30.5	29.7	41.1	37.2	38.3	18.7
% Silt (0.063mm - 4um)	44.0	43.0	27.2	25.8	43.3	48.8	50.4	44.5	47.8	39.9	38.8	40.6	43.0	47.0	39.2	39.5	45.6	53.3
% Clay (<4um)	13.0	18.0	6.7	4.2	19.1	22.7	25.8	21.2	16.8	17.1	11.4	15.4	12.6	15.5	14.6	16.3	15.3	24.8
Texture	-	-	Sandy loam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)																		
Total Inorganic Carbon	2.04	3.39	2.28	1.79	3.70	3.55	3.63	3.69	3.62	3.50	2.17	2.41	3.13	3.16	3.24	3.08	3.61	3.55
Total Organic Carbon	3.95	3.17	3.3	3.41	2.75	2.9	2.87	2.81	2.98	3.12	3.09	3.55	3.42	3.39	3.26	3.18	3.07	2.95
Metals																		
Aluminum (Al)	6390	8940	4030	3790	8120	10200	10800	9190	8330	8800	6520	7070	8200	7700	6660	7950	7240	9340
Antimony (Sb)	0.14	0.16	< 0.10	< 0.10	0.15	0.16	0.19	0.17	0.16	0.16	0.14	0.14	0.16	0.14	0.14	0.16	0.14	0.18
Arsenic (As)	5.48	6.37	2.33	3.43	7.60	5.07	4.36	4.97	6.62	6.63	5.27	4.83	5.83	5.82	4.79	6.42	6.81	4.56
Barium (Ba)	18.0	23.5	12.4	11.8	22.8	27.6	27.8	24.2	22.9	22.9	18.0	19.5	21.5	20.7	18.5	21.4	20.0	25.1
Beryllium (Be)	0.41	0.55	0.25	0.24	0.48	0.59	0.61	0.57	0.49	0.56	0.40	0.45	0.51	0.51	0.43	0.47	0.49	0.56
Bismuth (Bi)	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Boron (B)	45.4	58.3	28.9	25.7	53.6	61.3	67.3	58.9	54.0	58.9	45.7	49.0	53.2	54.2	45.4	52.9	48.4	59.4
Cadmium (Cd)	0.08	0.09	0.05	< 0.020	0.09	0.10	0.15	0.13	0.08	0.13	0.08	0.07	0.09	0.11	0.10	0.09	0.08	0.12
Calcium (Ca)	87500	90600	61800	66200	84300	102000	107000	97400	99100	102000	85700	90100	87300	85000	75600	85200	89400	94900
Chromium (Cr)	20.4	24.0	14.2	14.8	23.2	28.6	30.5	26.1	25.5	24.6	20.4	22.4	24.4	22.4	19.8	22.4	25.3	26.7
Cobalt (Co)	3.73	4.44	2.65	2.67	4.31	5.00	5.20	4.68	4.72	4.42	3.67	4.10	4.32	4.16	3.61	4.26	4.08	4.80
Copper (Cu)	7.7	9.6	5.6	4.9	10.0	11.4	12.2	10.7	10.7	9.9	7.5	8.6	9.8	9.0	8.2	9.1	9.0	11.4
Iron (Fe)	13100	14700	12400	11800	14700	16100	16500	14800	15500	15000	13100	13600	14500	13800	12000	13400	14000	14700
Lead (Pb)	6.11	7.74	3.84	3.25	7.54	8.49	9.28	8.04	7.99	7.89	6.13	6.84	7.91	7.79	7.20	7.37	6.88	8.58
Lithium (Li)	28.6	36.5	17.1	19.7	35.6	40.5	45.6	39.2	37.5	36.6	28.1	32.8	36.5	37.2	31.6	35.4	33.4	41.5
Magnesium (Mg)	41100	37600	29600	35800	40100	45900	47100	40600	42500	39500	42400	43000	42900	37600	34400	37700	40000	43100
Manganese (Mn)	143	157	112	118	168	166	170	152	174	161	140	148	156	153	136	156	165	161
Mercury (Hg)	0.0112	0.0152	0.0071	0.0056	0.0164	0.0166	0.0157	0.0144	0.0156	0.0155	0.0110	0.0123	0.0154	0.0153	0.0143	0.0162	0.0146	0.0158
Molybdenum (Mo)	0.43	0.38	0.35	0.30	0.40	0.35	0.53	0.50	0.42	0.40	0.43	0.40	0.37	0.40	0.38	0.40	0.37	0.43
Nickel (Ni)	11.40	13.60	7.92	7.64	13.70	**15.60**	**16.90**	14.50	14.60	13.40	11.20	12.60	13.20	12.50	11.00	12.90	13.40	**15.30**
Phosphorus (P)	451	469	293	409	523	432	409	427	483	439	448	437	434	464	366	441	477	461
Potassium (K)	2690	3670	1680	1640	3420	4050	4370	3750	3350	3630	2740	2960	3300	3170	2680	3160	2800	3810
Selenium (Se)	0.21	0.25	< 0.20	< 0.20	0.24	0.27	0.24	0.24	0.28	0.31	< 0.20	< 0.20	0.26	0.23	0.24	0.24	0.24	0.26
Silver (Ag)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium (Na)	4010	5190	3570	3470	5200	6200	5800	5350	5480	5180	4470	4680	4740	4880	3550	4390	5090	5350
Strontium (Sr)	54.0	67.4	38.3	40.6	62.9	67.5	69.0	76.6	66.9	71.9	83.8	56.2	56.0	53.7	48.7	61.1	61.1	59.9
Sulfur (S)	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Thallium (Tl)	0.107	0.137	0.077	0.072	0.125	0.156	0.170	0.150	0.133	0.137	0.118	0.121	0.144	0.133	0.122	0.121	0.110	0.148
Tin (Sn)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Titanium (Ti)	262	289	197	220	259	339	348	309	284	286	264	272	290	263	235	257	238	299
Tungsten (W)	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Uranium (U)	0.98	1.06	0.61	0.60	0.94	1.23	1.60	1.26	1.05	1.06	0.99	1.02	1.12	1.04	1.02	1.00	0.88	1.29
Vanadium (V)	25.9	33.2	15.8	14.3	32.9	36.4	38.6	34.2	33.8	33.0	26.1	27.0	31.1	29.6	26.9	31.5	30.3	36.1
Zinc (Zn)	18.8	23.3	13.2	10.9	22.3	26.9	28.9	24.8	25.0	23.4	18.4	19.8	22.2	21.9	20.3	20.8	20.8	25.7
Zirconium (Zr)	7.5	8.0	4.6	3.9	7.6	8.2	10.2	8.6	7.6	8.0	7.1	7.3	6.7	6.0	6.3	7.2	6.8	8.9
Volatile Organic Compounds (Soil)																		
VOC Sample Container	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Bromodichloromethane (BDCM)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bromoform (Tribromomethane)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Carbon Tetrachloride	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloroethane	< 0.050	< 0.050	< 0.10	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloroform	< 0.050	< 0.050	< 0.10	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloromethane	< 0.050	< 0.050	< 0.10	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloropropane (Propylene Dichloride)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
cis-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.015	< 0.015	< 0.015	< 0.015	-	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methyl tert-Butyl Ether	< 0.050	< 0.050	< 0.20	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Styrene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2,2-Tetrachloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Tetrachloroethylene (PCE/PERC)	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toluene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2-Trichloroethane	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Trichloroethylene (TCE)	< 0.010	< 0.010	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Trichlorofluoromethane (Freon 11)	< 0.050	< 0.050	< 0.10	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Vinyl Chloride (Chloroethene)	< 0.050	< 0.050	< 0.10	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
o-Xylene	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.056	< 0.050	< 0.050	< 0.050	< 0.050
m,p-Xylenes	< 0.050	< 0.050	< 0.050	< 0.050	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Xylenes, Total	< 0.075	< 0.075	< 0.075	< 0.075	-	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
4-Bromofluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)																		
EPH (C10-C19)	< 200	< 200	< 200	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200
EPH (C19-C32)	< 200	< 200	< 200	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200
LEPH (C10-C19) Less PAHs	< 200	< 200	< 200	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	-	-	-	-	< 200	< 200
HEPH (C19-C32) Less PAHs	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
2-Bromobenzotrifluoride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)																		
Acenaphthene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Acenaphthylene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Anthracene	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Benz(a)anthracene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j,k)fluoranthene	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Benzo(g,h,i)perylene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
2-Methylnaphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.010	< 0.010	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene d12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene d8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.010	< 0.010	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Index of Additive Cancer Risk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

[(a)]Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[(b)]BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
Value	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

Appendix D: Sediment Screening Table (2017 - 2020) for Marine Environmental Effects Monitoring 2020

Sample ID			CCME		NOAA Sediment Benchmarks							DUP F	DUP G	SNE-1	SNE-10	SNE-11	SNE-12	SNE-13	SNE-14	SNE-15	SNE-2	SNE-3	SNE-4	SNE-5	SNE-6	SNE-7	SNE-8	SNE-9
Date Sampled												28-Aug-2020	29-Aug-2020	28-Aug-2020	7-Sep-2020	10-Sep-2020	10-Sep-2020	12-Sep-2020	31-Aug-2020	12-Sep-2020	28-Aug-2020	28-Aug-2020	29-Aug-2020	29-Aug-2020	30-Aug-2020	7-Sep-2020	7-Sep-2020	7-Sep-2020
Laboratory Sample ID												VA20B5306	VA20B5306	VA20B5306	VA20B6111	VA20B6111	VA20B6111	VA20B6111	VA20B5306	VA20B6111	VA20B5306	VA20B5306	VA20B5306	VA20B5306	VA20B5306	VA20B6111	VA20B6111	VA20B6111
Parameter	Lowest Detectio	Units	ISQG	PEL	T_{20}	TEL	ERL	T_{50}	PEL	ERM	AET	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Properties																												
Moisture	0.25	%	-	-	-	-	-	-	-	-	-	18.3	30	19.4	35.8	38.2	36.6	36.1	34.9	38.3	25.9	20.5	32	34.3	34.1	34.7	35.9	35.6
pH (1:2 soil:water)	0.10	pH	-	-	-	-	-	-	-	-	-	8.52	8.40	8.49	8.26	8.12	8.19	8.19	8.30	8.07	8.39	8.50	8.27	8.35	8.28	8.21	8.17	8.28
% Gravel (>2mm)	1.0	%	-	-	-	-	-	-	-	-	-	5.6	23.8	10.0	2.4	3.6	3.2	2.1	4.5	1.6	3.2	7.7	1.8	8.5	1.6	2.8	8.3	< 1.0
% Sand (2.0mm - 0.063mm)	1.0	%	-	-	-	-	-	-	-	-	-	64.9	21.6	61.8	18.6	21.3	16.5	16.8	14.2	12.2	51.8	50.9	29.6	22.9	16.2	22.4	19.0	15.6
% Silt (0.063mm - 4um)	1.0	%	-	-	-	-	-	-	-	-	-	22.9	41.0	22.2	55.6	49.7	53.5	53.9	56.2	57.1	34.1	32.4	50.2	48.8	58.7	52.1	51.0	57.2
% Clay (<4um)	1.0	%	-	-	-	-	-	-	-	-	-	6.6	13.6	6.0	23.4	25.4	26.8	27.2	25.1	29.1	10.9	9.0	18.4	19.8	23.5	22.7	21.7	27.0
Texture		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon (Soil)																												
Total Inorganic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	2.70	2.92	2.63	3.44	3.49	3.45	3.58	3.03	3.50	2.93	3.18	3.08	3.01	3.03	3.41	3.41	3.32
Total Organic Carbon	0.050	%	-	-	-	-	-	-	-	-	-	3.17	3.47	3.14	2.58	2.57	2.64	2.41	3.01	2.57	3.29	3.34	3.28	3.28	3.2	2.34	2.43	2.57
Metals																												
Aluminum (Al)	50	mg/kg	-	-	-	-	-	-	-	-	18000.00	4090	9140	4080	10600	11200	10800	12100	13200	11300	5740	5010	9390	10700	11100	10400	11200	11100
Antimony (Sb)	0.10	mg/kg	-	-	0.63	-	-	2.40	-	-	9.30	< 0.10	0.17	< 0.10	0.20	0.22	0.21	0.24	0.26	0.25	0.13	< 0.10	0.17	0.21	0.21	0.20	0.19	0.20
Arsenic (As)	0.10	mg/kg	7.24	41.6	7.40	7.24	8.20	20.00	41.60	70.00	35.00	2.08	5.08	2.15	8.87	10.20	7.54	8.58	6.41	7.86	5.24	2.93	4.79	6.87	6.89	5.79	8.99	4.98
Barium (Ba)	0.50	mg/kg	-	-	-	130.10	-				48.00	11.2	23.1	11.8	29.8	32.7	30.7	35.1	34.4	34.5	16.6	15.9	24.6	26.9	28.3	26.7	28.1	29.1
Beryllium (Be)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	0.27	0.54	0.24	0.64	0.71	0.59	0.72	0.74	0.72	0.39	0.31	0.59	0.68	0.70	0.56	0.64	0.63
Bismuth (Bi)	0.20	mg/kg	-	-	-	-	-	-	-	-	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Boron (B)	5.0	mg/kg	-	-	-	-	-	-	-	-	-	27.1	57.0	27.4	67.1	69.3	67.8	72.1	76.0	68.5	41.0	34.5	63.0	68.7	69.2	60.1	66.5	67.7
Cadmium (Cd)	0.020	mg/kg	0.7	4.2	0.38	0.68	1.20	1.40	4.21	9.60	3.00	0.06	0.09	0.06	0.11	0.12	0.10	0.11	0.12	0.13	0.08	0.06	0.10	0.11	0.13	0.11	0.09	0.12
Calcium (Ca)	50	mg/kg	-	-	-	-	-	-	-	-	-	54400	84500	48800	88900	93300	87700	95000	90200	104000	69700	74100	94200	90800	96900	85200	85500	92100
Chromium (Cr)	0.50	mg/kg	52.3	160	49.00	52.30	81.00	141.00	160.00	370.00	62.00	12.6	25.9	13.2	30.3	31.0	30.4	34.1	33.8	33.1	18.3	15.6	26.6	29.8	30.1	28.4	30.3	31.8
Cobalt (Co)	0.10	mg/kg	-	-	-	-	-	-	-	-	10.00	2.24	4.63	2.30	5.58	5.81	5.39	6.19	6.22	6.25	3.40	2.77	4.84	5.26	5.62	5.13	5.48	5.72
Copper (Cu)	0.50	mg/kg	18.7	108	32.00	18.70	34.00	94.00	108.00	270.00	390.00	4.6	10.2	4.6	12.6	13.4	12.6	14.1	13.9	14.9	7.2	5.9	10.6	11.7	12.4	11.6	12.4	13.1
Iron (Fe)	50	mg/kg	-	-	-	-	-	-	-	-	220000.00	8050	14400	8060	18200	20100	17900	20400	19400	20200	11200	9000	15200	17000	17600	16200	18200	17300
Lead (Pb)	0.50	mg/kg	30.2	112	30.00	30.24	46.70	94.00	112.00	218.00	400.00	4.27	8.98	4.46	9.43	10.30	9.49	10.70	11.00	11.30	6.59	5.26	9.34	9.74	10.30	8.90	9.38	9.86
Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	18.3	38.3	18.1	44.1	45.6	43.3	47.8	53.9	48.6	27.3	23.4	42.0	46.5	49.9	41.9	44.2	46.1
Magnesium (Mg)	20	mg/kg	-	-	-	-	-	-	-	-	-	25300	41600	25800	45200	44300	43100	46900	48000	49500	34600	34300	42500	44800	45800	43800	45000	46000
Manganese (Mn)	1.0	mg/kg	-	-	-	-	-	-	-	-	260.00	89	165	88	204	209	194	218	211	229	124	119	166	177	192	171	212	180
Mercury (Hg)	0.0050	mg/kg	0.13	0.7	0.14	0.13	0.15	0.48	0.70	0.71	0.41	0.0080	0.0157	0.0086	0.0190	0.0190	0.0187	0.0210	0.0206	0.0223	0.0132	0.0100	0.0162	0.0184	0.0190	0.0170	0.0191	0.0171
Molybdenum (Mo)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	0.25	0.41	0.29	0.49	0.54	0.51	0.55	0.58	0.61	0.32	0.25	0.46	0.50	0.53	0.42	0.45	0.51
Nickel (Ni)	0.50	mg/kg	30[a]	50[a]	15.00	15.90	20.90	47.00	42.80	51.60	110.00	6.92	14.40	7.15	17.50	18.00	17.20	19.10	18.90	19.50	10.40	8.61	14.90	16.30	17.00	16.50	17.40	18.30
Phosphorus (P)	50	mg/kg	-	-	-	-	-	-	-	-	-	259	429	250	611	650	542	633	507	624	506	289	449	522	527	543	680	546
Potassium (K)	100	mg/kg	-	-	-	-	-	-	-	-	-	1660	3620	1720	4270	4560	4470	4920	5180	4510	2330	2050	3860	4390	4300	4140	4460	4560
Selenium (Se)	0.20	mg/kg	-	-	-	-	-	-	-	-	1.00	< 0.20	0.25	< 0.20	0.29	0.34	0.32	0.39	0.36	0.32	< 0.20	< 0.20	0.27	0.33	0.32	0.29	0.32	0.33
Silver (Ag)	0.10	mg/kg	1[a]	2.2[a]	0.23	0.73	1.00	1.10	1.77	3.70	3.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sodium (Na)	50	mg/kg	-	-	-	-	-	-	-	-	-	2450	4850	3110	6510	7590	7090	7210	6880	7830	4080	3200	5650	6160	6410	6200	6630	6820
Strontium (Sr)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	33.4	59.0	34.2	67.5	69.9	66.4	71.9	64.1	72.5	44.5	45.3	60.6	60.0	65.5	57.0	63.4	60.4
Sulfur (S)	1000	mg/kg	-	-	-	-	-	-	-	-	-	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
Thallium (Tl)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.075	0.155	0.075	0.160	0.177	0.174	0.188	0.192	0.194	0.105	0.089	0.166	0.170	0.184	0.160	0.158	0.174
Tin (Sn)	2.0	mg/kg	-	-	-	0.05	-	-	-	-	3.40	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Titanium (Ti)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	174	309	182	327	357	342	384	389	347	244	198	326	351	360	319	334	348
Tungsten (W)	0.50	mg/kg	-	-	-	-	-	-	-	-	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Uranium (U)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.69	1.26	0.67	1.30	1.32	1.27	1.68	1.56	1.55	0.93	0.79	1.35	1.39	1.56	1.27	1.15	1.52
Vanadium (V)	0.20	mg/kg	-	-	-	-	-	-	-	-	57.00	15.5	33.1	15.5	42.0	45.3	41.6	47.0	46.4	45.2	24.0	18.6	34.4	39.0	40.7	37.8	41.1	41.7
Zinc (Zn)	2.0	mg/kg	124	271	94.00	124.00	150.00	245.00	271.00	410.00	410.00	11.2	24.0	11.6	29.4	32.6	31.0	34.9	32.5	36.5	17.2	14.3	25.9	28.3	29.9	28.2	30.0	31.3
Zirconium (Zr)	1.0	mg/kg	-	-	-	-	-	-	-	-	-	4.5	8.2	4.5	9.4	9.1	9.3	9.5	10.5	8.7	5.7	4.8	8.8	8.5	9.6	8.5	9.1	10.5
Volatile Organic Compounds (Soil)																												
VOC Sample Container		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	0.0050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Bromodichloromethane (BDCM)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bromoform (Tribromomethane)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Carbon Tetrachloride	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlorobenzene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	0.072	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.086	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloroethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloroform	0.10	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chloromethane	0.10	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	0.050	mg/kg	0.023[a]	-	-	-	-	-	-	-	0.01	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	0.050	mg/kg	-		-	-	-	-	-	-		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	0.050	mg/kg	0.031[a]	0.09[a]	-	-	-	-	-	-	0.11	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1-Dichloroethylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichloromethane (DCM) (Methylene Chloride)	0.30	mg/kg	-	-	-	-	-	-	-	-	-	0.072	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.086	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-dichloropropane (Propylene Dichloride)	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
cis-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.015	mg/kg	-	-	-	-	-	-	-	-	0.00	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Methyl tert-Butyl Ether	0.20	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Styrene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2,2-Tetrachloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Tetrachloroethylene (PCE/PERC)	0.050	mg/kg	-	-	-	-	-	-	-	-	0.06	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toluene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.061	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,1-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,1,2-Trichloroethane	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Trichloroethylene (TCE)	0.010	mg/kg	-	-	-	-	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Trichlorofluoromethane (Freon 11)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Vinyl Chloride (Chloroethene)	0.10	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
o-Xylene	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
m,p-Xylenes	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Xylenes, Total	0.075	mg/kg	-	-	-	-	-	-	-	-	0.00	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
4-Bromofluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons (Soil)																												
EPH (C10-C19)	200	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	< 200	< 200	< 200	< 200	-	< 200	-	-	-	-	-	< 200	< 200	< 200
EPH (C19-C32)	200	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	< 200	< 200	< 200	< 200	-	< 200	-	-	-	-	-	< 200	< 200	< 200
LEPH (C10-C19) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	< 200	< 200	< 200	< 200	-	< 200	-	-	-	-	-	< 200	< 200	< 200
HEPH (C19-C32) Less PAHs	200	mg/kg	-	-	-	-	-	-	-	-	-	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
2-Bromobenzotrifluoride		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (Soil)																												
Acenaphthene	0.0050	mg/kg	0.00671	0.0889	0.019	0.007	0.016	0.116	0.089	0.500	0.130	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Acenaphthylene	0.0050	mg/kg	0.00587	0.128	0.014	0.006	0.044	0.140	0.128	0.640	0.071	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Anthracene	0.0040	mg/kg	0.0469	0.245	0.034	0.047	0.085	0.290	0.245	1.100	0.280	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Benz(a)anthracene	0.010	mg/kg	0.0748	0.693	0.061	0.075	0.261	0.466	0.693	1.600	0.960	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	0.010	mg/kg	0.0888	0.763	0.069	0.089	0.430	0.520	0.763	1.600	1.100	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j) fluoranthene	0.010	mg/kg	-	-	0.130	-	-	1.107	-	-	1.800	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(b,j,k)fluoranthene	0.015	mg/kg	-	-	-	-	-	-	-	-	-	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Benzo(g,h,i)perylene	0.010	mg/kg	0.31[a]	0.78[a]	-	-	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	0.010	mg/kg	2.3[a]	4.5[a]	0.070	-	-	0.537			1.800	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	0.010	mg/kg	0.108	0.846	0.082	0.108	0.384	0.650	0.846	2.800	0.950	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	0.0050	mg/kg	0.00622	0.135	0.019	0.006	0.063	0.113	0.135	0.260	0.230	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	0.010	mg/kg	0.113	1.494	0.119	0.113	0.600	1.034	1.494	5.100	1.300	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	0.010	mg/kg	0.0212	0.144	0.019	0.021	0.019	0.114	0.144	0.540	0.120	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)pyrene	0.010	mg/kg	0.34[a]	0.88[a]	0.068	-	-	0.488			0.600	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene	0.050	mg/kg	-	-	0.021	-	-	0.094	-	-	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
2-Methylnaphthalene	0.010	mg/kg	0.0202	0.201[b]	0.021	0.020	0.070	0.128	0.201	0.670	0.064	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	0.010	mg/kg	0.0346	0.391	0.030	0.035	0.160	0.217	0.391	2.100	0.230	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	0.010	mg/kg	0.0867	0.544	0.068	0.087	0.240	0.455	0.544	1.500	0.660	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	0.010	mg/kg	0.153	1.398	0.125	0.153	0.665	0.932	1.398	2.600	2.400	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Quinoline	0.050	mg/kg	-	-	-	-	-	-	-	-	-	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene d10		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene d12		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene d8		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10		%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	0.020	mg/kg	-	-	-	-	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Index of Additive Cancer Risk	0.15	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

[a]Guideline value substituted with the BC ENV Working Sediment Guideline in the absence of an applicable CCME Sediment Guideline

[b]BC ENV Working Working PEL is 0.202 mg/kg

Value	Greater than CCME ISQG guideline
Value	Greater than CCME ISQG and PEL guidelines
<u>Value</u>	Greater than BC ENV working lower SWQG
Value	Greater than BC ENV working upper SWQG
Value	Greater than NOAA sediment Benchmarks T_{20} guideline
Value	Greater than NOAA sediment Benchmarks TEL guideline
Value	Greater than NOAA sediment Benchmarks ERLguideline
Value	Greater than NOAA sediment Benchmarks T_{50} guideline
Value	Greater than NOAA sediment Benchmarks PEL guideline

mg/kg - miligram per kilogram, um - nicrometer; mm - millimeter; CCME - Canadian Council of Miniters of the Environment; ISQG - interim sediment quality guidelines; PEL - probable effects levels; BC ENV - British Columbia Ministry of Environment; SWQG - working sediment quality guidelines; NOAA - National Oceanic and Atmospheric Administration; T20 - Concentrations corresponding to 20% probably of observing toxicity; TEL -Threshold Effects Levels; REL - Effect Range Low, T50 - Concentrations corresponding to 50% probably of observing toxicity; PEL - Probably Effect Levels; pH - scale of acidity, % - percentage; "-" - no value

APPENDIX 3E

Sediment QA/QC Table

Appendix E: Sediment Relative Percentage
Difference Table for Marine Environmental Effects Monitoring Program 2020

Golder Sample ID Sample Matrix Sampling Date	Units	DUP-C SED 13-Aug-20	SE-14 SED 13-Aug-20	Calculated RPD (%)	DUP-B SED 9-Aug-20	SE-2 SED 9-Aug-20	Calculated RPD (%)	DUP-E SED 27-Aug-20	SE-6 SED 27-Aug-20	Calculated RPD (%)	DUP-F SED 28-Aug-20	SNE-1 SED 28-Aug-20	Calculated RPD (%)	DUP-G SED 29-Aug-20	SNE-4 SED 29-Aug-20	Calculated RPD (%)	DUP H SED 11-Sep-20	SNW-15 SED 11-Sep-20	Calculated RPD (%)	DUP-D SED 15-Aug-20	SNW-2 SED 15-Aug-20	Calculated RPD (%)	DUP-A SED 6-Aug-20	SW-4 SED 6-Aug-20	Calculated RPD (%)
Physical Properties																									
Moisture	%	33	30.9	6.6	21.3	22.3	4.6	25.2	27.5	8.7	18.3	19.4	5.8	30	32	6.5	29.2	29.7	1.7	26	25.7	1.2	21.8	21.9	0.5
pH (1:2 soil:water)	pH	8.22	8.24	0.2	8.51	8.39	1.4	8.34	8.31	0.4	8.52	8.49	0.4	8.4	8.27	1.6	8.25	8.26	0.1	8.34	8.24	1.2	8.54	8.41	1.5
% Gravel (>2mm)	%	2	2.8	33.3	4.9	5.4	9.7	6.1	10.8	**55.6**	5.6	10	**56.4**	23.8	1.8	**171.9**	5.6	6	6.9	< 1.0	2.7	-	2	20.7	**164.8**
% Sand (2.0mm - 0.063mm)	%	42.1	33.6	22.5	62.1	61.1	1.6	46.4	48.4	4.2	64.9	61.8	4.9	21.6	29.6	31.3	33.4	37	10.2	42.8	47.1	9.6	60.1	49.8	18.7
% Silt (0.063mm - 4um)	%	42.7	47	9.6	26.2	27.2	3.7	36.3	31.5	14.2	22.9	22.2	3.1	41	50.2	20.2	43	39.9	7.5	44	38.8	12.6	31.5	24.6	24.6
% Clay (<4um)	%	13.2	16.6	22.8	6.8	6.2	9.2	11.2	9.3	18.5	6.6	6	9.5	13.6	18.4	30.0	18	17.1	5.1	13	11.4	13.1	6.4	4.8	28.6
Texture	-	-	-	-	Sandy loam	Sandy loam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Sandy loam	Sandy loam	-
Organic / Inorganic Carbon																									
Total Inorganic Carbon	%	2.14	2.12	0.9	2.03	2.16	6.2	2.61	2.59	0.8	2.7	2.63	2.6	2.92	3.08	5.3	3.39	3.5	3.2	2.04	2.17	6.2	1.94	1.87	3.7
Total Organic Carbon	%	3.17	3.36	5.8	2.64	2.8	5.9	3.17	3.25	2.5	3.17	3.14	1.0	3.47	3.28	5.6	3.17	3.12	1.6	3.95	3.09	24.4	3.2	3.08	3.8
Metals																									
Aluminum (Al)	mg/kg	7600	8110	6.5	4670	4760	1.9	6340	5420	15.6	4090	4080	0.2	9140	9390	2.7	8940	8800	1.6	6390	6520	2.0	5240	4150	23.2
Antimony (Sb)	mg/kg	0.15	0.15	0.0	< 0.10	< 0.10	-	0.13	0.12	8.0	< 0.10	< 0.10	-	0.17	0.17	0.0	0.16	0.16	0.0	0.14	0.14	0.0	0.11	0.1	9.5
Arsenic (As)	mg/kg	4.59	5.28	14.0	3.2	3.35	4.6	5.26	4.75	10.2	2.08	2.15	3.3	5.08	4.79	5.9	6.37	6.63	4.0	5.48	5.27	3.9	3.89	3.64	6.6
Barium (Ba)	mg/kg	17.6	19.5	10.2	13.2	12.5	5.4	17.7	15.1	15.9	11.2	11.8	5.2	23.1	24.6	6.3	23.5	22.9	2.6	18	18	0.0	16.1	14	14.0
Beryllium (Be)	mg/kg	0.47	0.51	8.2	0.28	0.32	13.3	0.38	0.39	2.6	0.27	0.24	11.8	0.54	0.59	8.8	0.55	0.56	1.8	0.41	0.4	2.5	0.3	0.27	10.5
Bismuth (Bi)	mg/kg	< 0.20	< 0.20	-	< 0.20	< 0.20	-	< 0.20	< 0.20	-	< 0.20	< 0.20	-	< 0.20	< 0.20	-	< 0.20	< 0.20	-	< 0.20	< 0.20	-	0.2	0.2	0.0
Boron (B)	mg/kg	52.1	55.3	6.0	30.6	32	4.5	42.5	38.8	9.1	27.1	27.4	1.1	57	63	10.0	58.3	58.9	1.0	45.4	45.7	0.7	36.2	29.5	20.4
Cadmium (Cd)	mg/kg	0.055	0.056	1.8	0.034	0.034	0.0	0.053	0.044	18.6	0.057	0.063	10.0	0.088	0.103	15.7	0.09	0.129	35.6	0.083	0.08	3.7	0.029	0.036	21.5
Calcium (Ca)	mg/kg	71600	77600	8.0	61500	61600	0.2	67100	68500	2.1	54400	48800	10.9	84500	94200	10.9	90600	102000	11.8	87500	85700	2.1	75600	70800	6.6
Chromium (Cr)	mg/kg	24.2	25.7	6.0	15.4	15.3	0.7	19.6	17.1	13.6	12.6	13.2	4.7	25.9	26.6	2.7	24	24.6	2.5	20.4	20.4	0.0	18.4	15.5	17.1
Cobalt (Co)	mg/kg	3.88	4.07	4.8	2.65	2.69	1.5	3.26	3.11	4.7	2.24	2.3	2.6	4.63	4.84	4.4	4.44	4.42	0.5	3.73	3.67	1.6	3.15	2.73	14.3
Copper (Cu)	mg/kg	7.96	8.6	7.7	5.05	5.15	2.0	6.44	6.21	3.6	4.59	4.58	0.2	10.2	10.6	3.8	9.58	9.88	3.1	7.7	7.46	3.2	6.38	5.43	16.1
Iron (Fe)	mg/kg	12800	13500	5.3	10600	10500	0.9	11700	11500	1.7	8050	8060	0.1	14400	15200	5.4	14700	15000	2.0	13100	13100	0.0	13400	11800	12.7
Lead (Pb)	mg/kg	7.48	7.52	0.5	4.46	4.42	0.9	6.28	6.42	2.2	4.27	4.46	4.4	8.98	9.34	3.9	7.74	7.89	1.9	6.11	6.13	0.3	4.31	3.77	13.4
Lithium (Li)	mg/kg	33.2	36	8.1	19.4	19.9	2.5	26.4	26.2	0.8	18.3	18.1	1.1	38.3	42	9.2	36.5	36.6	0.3	28.6	28.1	1.8	21.3	18.3	15.2
Magnesium (Mg)	mg/kg	42100	43600	3.5	30400	30900	1.6	33200	30900	7.2	25300	25800	2.0	41600	42500	2.1	37600	39500	4.9	41100	42400	3.1	37900	34800	8.5
Manganese (Mn)	mg/kg	129	134	3.8	112	109	2.7	123	114	7.6	89.4	88	1.6	165	166	0.6	157	161	2.5	143	140	2.1	128	113	12.4
Mercury (Hg)	mg/kg	0.0128	0.0133	3.8	0.006	0.0059	1.7	0.0134	0.0128	4.6	0.008	0.0086	7.2	0.0157	0.0162	3.1	0.0152	0.0155	2.0	0.0112	0.011	1.8	0.0083	0.0071	15.6
Molybdenum (Mo)	mg/kg	0.61	0.62	1.6	0.43	0.45	4.5	0.45	0.45	0.0	0.25	0.29	14.8	0.41	0.46	11.5	0.38	0.4	5.1	0.43	0.43	0.0	0.35	2.13	**143.5**
Nickel (Ni)	mg/kg	12.9	13.8	6.7	7.97	7.88	1.1	10.4	9.63	7.7	6.92	7.15	3.3	14.4	14.9	3.4	13.6	13.4	1.5	11.4	11.2	1.8	9.93	8.59	14.5
Phosphorus (P)	mg/kg	556	563	1.3	312	329	5.3	440	403	8.8	259	250	3.5	429	449	4.6	469	439	6.6	451	448	0.7	419	416	0.7
Potassium (K)	mg/kg	3210	3460	7.5	1910	1990	4.1	2590	2090	21.4	1660	1720	3.6	3620	3860	6.4	3670	3630	1.1	2690	2740	1.8	2240	1770	23.4
Selenium (Se)	mg/kg	0.24	0.26	8.0	< 0.20	< 0.20	-	0.2	0.21	4.9	< 0.20	< 0.20	-	0.25	0.27	7.7	0.25	0.31	21.4	0.21	< 0.20	-	0.2	0.2	0.0
Silver (Ag)	mg/kg	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10	< 0.10	-	0.1	0.1	0.0
Sodium (Na)	mg/kg	5150	5050	2.0	3160	4480	34.6	4190	4070	2.9	2450	3110	23.7	4850	5650	15.2	5190	5180	0.2	4010	4470	10.8	4170	3600	14.7
Strontium (Sr)	mg/kg	49.6	53.6	7.8	39.5	46.6	16.5	52	45.2	14.0	33.4	34.2	2.4	59	60.6	2.7	67.4	71.9	6.5	54	83.8	43.3	45.1	44.1	2.2
Sulfur (S)	mg/kg	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	< 1000	< 1000	-	1000	1000	0.0
Thallium (Tl)	mg/kg	0.13	0.126	3.1	0.085	0.092	7.9	0.106	0.101	4.8	0.075	0.075	0.0	0.155	0.166	6.9	0.137	0.137	0.0	0.107	0.118	9.8	0.09	0.081	10.5
Tin (Sn)	mg/kg	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	< 2.0	< 2.0	-	2	2	0.0
Titanium (Ti)	mg/kg	295	318	7.5	238	224	6.1	257	222	14.6	174	182	4.5	309	326	5.4	289	286	1.0	262	264	0.8	284	220	25.4
Tungsten (W)	mg/kg	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	< 0.50	< 0.50	-	0.5	0.5	0.0
Uranium (U)	mg/kg	1.12	1.09	2.7	0.943	0.92	2.5	0.928	1.07	14.2	0.692	0.666	3.8	1.26	1.35	6.9	1.06	1.06	0.0	0.975	0.989	1.4	0.7	0.609	13.9
Vanadium (V)	mg/kg	28.1	29.6	5.2	17.3	17.4	0.6	24.6	23.2	5.9	15.5	15.5	0.0	33.1	34.4	3.9	33.2	33	0.6	25.9	26.1	0.8	19.8	17	15.2
Zinc (Zn)	mg/kg	20.6	21.4	3.8	14.8	14.3	3.4	17.6	16.8	4.7	11.2	11.6	3.5	24	25.9	7.6	23.3	23.4	0.4	18.8	18.4	2.2	14.8	13.4	9.9
Zirconium (Zr)	mg/kg	8.6	9.2	6.7	5.5	5.3	3.7	5.8	4.7	21.0	4.5	4.5	0.0	8.2	8.8	7.1	8	8	0.0	7.5	7.1	5.5	5.4	3.9	32.3
Volatile Organic Compounds																									
VOC Sample Container	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/kg	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Bromodichloromethane (BDCM)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Bromoform (Tribromomethane)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Carbon Tetrachloride	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Chlorobenzene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Dichloromethane (DCM) (Methylene Chloride)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	0.059	-	0.072	< 0.050	-	< 0.050	0.086	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Chloroethane	mg/kg	< 0.050	< 0.050	-	< 0.10	< 0.10	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.10	< 0.10	-
Chloroform	mg/kg	< 0.050	< 0.050	-	< 0.10	< 0.10	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.10	< 0.10	-
Chloromethane	mg/kg	< 0.050	< 0.050	-	< 0.10	< 0.10	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.10	< 0.10	-
1,2-Dichlorobenzene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,3-Dichlorobenzene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,4-Dichlorobenzene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1-Dichloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,2-Dichloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1-Dichloroethylene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (Cis) (1,2-dichloroethene)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,2-dichloroethylene (Trans) (1,2-dichloroethene)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Dichloromethane (DCM) (Methylene Chloride)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	0.059	-	0.072	< 0.050	-	< 0.050	0.086	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,2-dichloropropane (Propylene Dichloride)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
cis-1,3-Dichloropropylene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (cis & trans)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-
Methyl tert-Butyl Ether	mg/kg	< 0.050	< 0.050	-	< 0.20	< 0.20	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.20	< 0.20	-
Styrene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1,1,2-Tetrachloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1,2,2-Tetrachloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Tetrachloroethylene (PCE/PERC)	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Toluene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	0.061	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1,1-Trichloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
1,1,2-Trichloroethane	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Trichloroethylene (TCE)	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Trichlorofluoromethane (Freon 11)	mg/kg	< 0.050	< 0.050	-	< 0.10	< 0.10	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.10	< 0.10	-
Vinyl Chloride (Chloroethene)	mg/kg	< 0.050	< 0.050	-	< 0.10	< 0.10	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.10	< 0.10	-
o-Xylene	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
m,p-Xylenes	mg/kg	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-
Xylenes, Total	mg/kg	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-	< 0.075	< 0.075	-
4-Bromofluorobenzene (SS)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Difluorobenzene (SS)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																									
EPH (C10-C19)	mg/kg	< 200	< 200	-	< 200	< 200	-	-	-	-	-	-	-	-	-	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-
EPH (C19-C32)	mg/kg	< 200	< 200	-	< 200	< 200	-	-	-	-	-	-	-	-	-	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-
LEPH (C10-C19) Less PAHs	mg/kg	< 200	< 200	-	< 200	< 200	-	-	-	-	-	-	-	-	-	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-
HEPH (C19-C32) Less PAHs	mg/kg	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-	< 200	< 200	-
2-Bromobenzotrifluoride	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																									
Acenaphthene	mg/kg	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Acenaphthylene	mg/kg	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Anthracene	mg/kg	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-
Benz(a)anthracene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(a)pyrene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(b,j) fluoranthene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(b,j,k)fluoranthene	mg/kg	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-	< 0.015	< 0.015	-
Benzo(g,h,i)perylene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Benzo(k)fluoranthene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Chrysene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Dibenz(a,h)anthracene	mg/kg	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-	< 0.0050	< 0.0050	-
Fluoranthene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Fluorene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Indeno(1,2,3-c,d)pyrene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
1-Methylnaphthalene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
2-Methylnaphthalene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Naphthalene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Phenanthrene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Pyrene	mg/kg	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-
Quinoline	mg/kg	< 0.010	< 0.010	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.050	< 0.050	-	< 0.010	< 0.010	-	< 0.050	< 0.050	-
Acenaphthene d10	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene d12	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene d8	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene d10	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene Total Potency Equivalence (TPE)	mg/kg	< 0.010	< 0.010	-	< 0.020	< 0.020	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.010	< 0.010	-	< 0.020	< 0.020	-
Index of Additive Cancer Risk	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

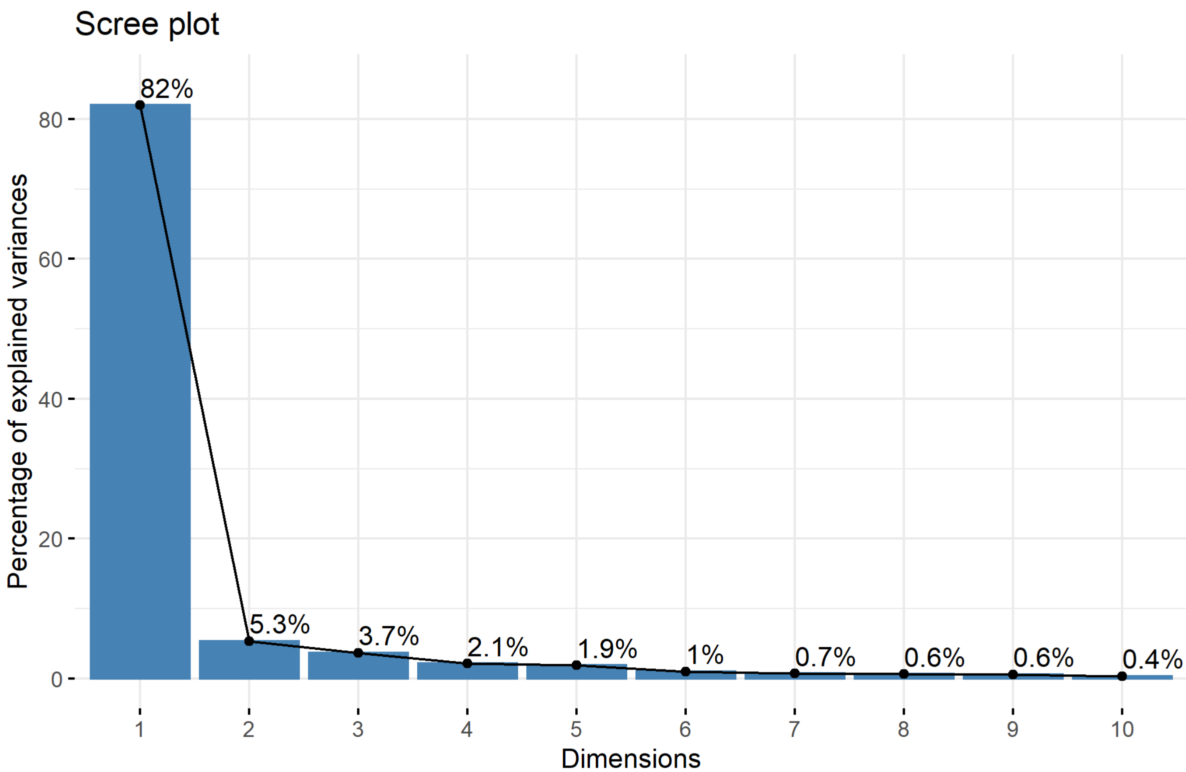
RPD - realtive percentage difference; mg/kg - miligram per kilogram; um - nicrometer; mm - millimeter; pH - scale of acidity; % - percentage; "-" - no value; SED - sediment; "<" - less than the detection limit

Value RPD exceeds the RPD or DF alert limit

APPENDIX 3F

Sediment PCA Results

APPENDIX 3F
Principal Component Analysis



APPENDIX 3F
Principal Component Analysis

Eigenvalues

Principal Component	Eigenvalue	Percentage of Total Variance Explained	Cumulative Percentage of Variance
comp 1	31.15	81.98	81.98
comp 2	2.03	5.35	87.33
comp 3	1.40	3.67	91.00
comp 4	0.81	2.13	93.13
comp 5	0.72	1.89	95.02
comp 6	0.39	1.02	96.04
comp 7	0.27	0.72	96.75
comp 8	0.24	0.63	97.38
comp 9	0.22	0.59	97.97
comp 10	0.13	0.35	98.32
comp 11	0.13	0.34	98.66
comp 12	0.08	0.22	98.88
comp 13	0.07	0.18	99.06
comp 14	0.06	0.16	99.22
comp 15	0.05	0.13	99.35
comp 16	0.04	0.11	99.45
comp 17	0.04	0.10	99.55
comp 18	0.03	0.09	99.64
comp 19	0.03	0.07	99.71
comp 20	0.02	0.06	99.77
comp 21	0.02	0.05	99.81
comp 22	0.02	0.04	99.85
comp 23	0.01	0.03	99.88
comp 24	0.01	0.02	99.91
comp 25	0.01	0.02	99.93
comp 26	0.01	0.02	99.95
comp 27	0.01	0.01	99.96
comp 28	0.00	0.01	99.97
comp 29	0.00	0.01	99.98
comp 30	0.00	0.01	99.98
comp 31	0.00	0.01	99.99
comp 32	0.00	0.00	99.99
comp 33	0.00	0.00	100.00
comp 34	0.00	0.00	100.00
comp 35	0.00	0.00	100.00
comp 36	0.00	0.00	100.00
comp 37	0.00	0.00	100.00
comp 38	0.00	0.00	100.00

APPENDIX 3F
Principal Component Analysis

Correlations between variables and principal components (Loadings)

Variable	PC1	PC2	PC3
pH	-0.64	-0.09	-0.50
Moisture_pct	0.88	-0.07	-0.07
InorganicCarbon	0.83	-0.32	-0.03
TotalOrganicCarbon	0.21	0.84	-0.01
Gravel_pct	-0.28	-0.23	0.85
Sand_pct	-0.96	0.11	-0.18
Silt_pct	0.97	0.12	-0.14
Clay_pct	0.94	-0.27	-0.14
Fines_pct	0.98	-0.02	-0.14
Aluminum_mg.kg	0.99	-0.10	-0.03
Antimony_mg.kg	0.87	-0.37	-0.11
Arsenic_mg.kg	0.87	-0.05	0.30
Barium_mg.kg	0.99	-0.03	-0.03
Beryllium_mg.kg	0.99	-0.10	0.01
Boron_mg.kg	0.99	-0.05	0.01
Cadmium_mg.kg	0.86	-0.31	-0.02
Calcium_mg.kg	0.88	0.39	-0.07
Chromium_mg.kg	0.99	0.03	-0.03
Cobalt_mg.kg	0.99	0.03	-0.05
Copper_mg.kg	0.99	-0.04	-0.03
Iron_mg.kg	0.94	0.17	0.08
Lead_mg.kg	0.98	-0.15	0.02
Lithium_mg.kg	0.99	0.00	-0.06
Magnesium_mg.kg	0.86	0.49	-0.09
Manganese_mg.kg	0.94	0.23	0.01
Mercury_mg.kg	0.96	-0.12	0.08
Molybdenum_mg.kg	0.45	0.34	0.30
Nickel_mg.kg	0.99	-0.01	-0.05
Phosphorus_mg.kg	0.85	0.26	0.27
Potassium_mg.kg	0.99	-0.06	-0.04
Sodium_mg.kg	0.94	-0.04	0.07
Strontium_mg.kg	0.92	0.16	0.08
Thallium_mg.kg	0.98	-0.01	0.02
Titanium_mg.kg	0.93	0.21	-0.04
Uranium_mg.kg	0.96	-0.07	-0.01
Vanadium_mg.kg	0.99	-0.11	-0.01
Zinc_mg.kg	0.98	-0.14	0.02
Zirconium_mg.kg	0.97	0.02	-0.12

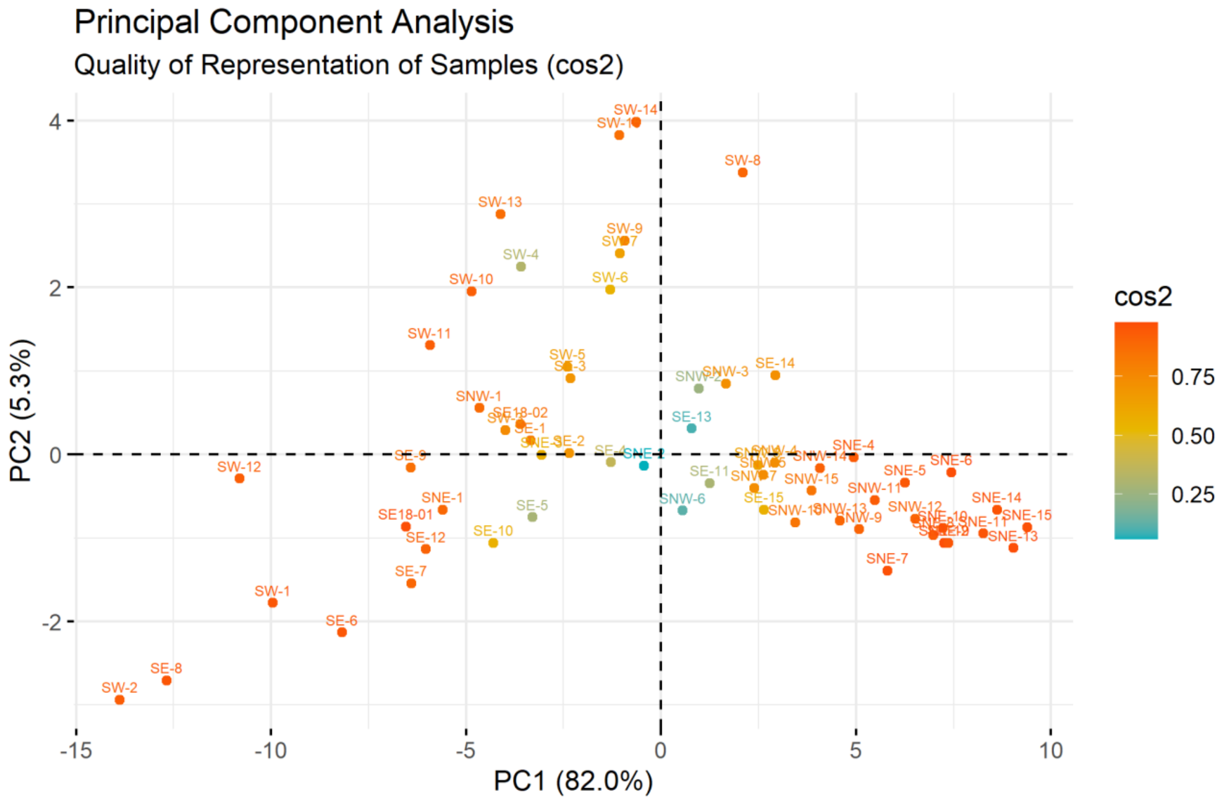
APPENDIX 3F
Principal Component Analysis

Description of Correlations between Variables and Dimension 1

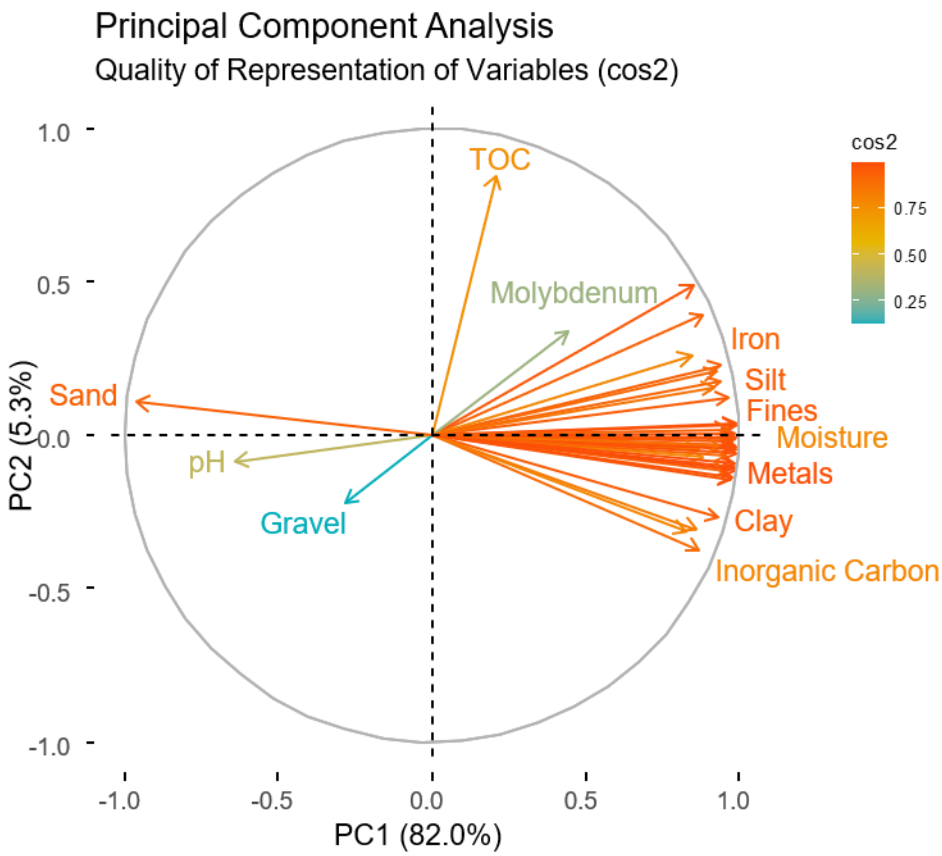
Variable	Correlation Coefficient	*P*-value
Copper_mg.kg	0.99	3.64E-57
Cobalt_mg.kg	0.99	2.35E-56
Nickel_mg.kg	0.99	5.68E-56
Boron_mg.kg	0.99	4.86E-55
Potassium_mg.kg	0.99	1.29E-53
Chromium_mg.kg	0.99	2.21E-53
Vanadium_mg.kg	0.99	7.10E-53
Aluminum_mg.kg	0.99	2.64E-51
Beryllium_mg.kg	0.99	1.02E-49
Lithium_mg.kg	0.99	9.91E-49
Barium_mg.kg	0.99	2.38E-48
Thallium_mg.kg	0.98	4.50E-47
Fines_pct	0.98	4.09E-44
Zinc_mg.kg	0.98	1.47E-43
Lead_mg.kg	0.98	4.40E-41
Zirconium_mg.kg	0.97	2.58E-37
Silt_pct	0.97	1.10E-36
Mercury_mg.kg	0.96	2.40E-34
Uranium_mg.kg	0.96	3.15E-34
Iron_mg.kg	0.94	4.27E-30
Manganese_mg.kg	0.94	1.16E-29
Sodium_mg.kg	0.94	4.30E-29
Clay_pct	0.94	9.67E-29
Titanium_mg.kg	0.93	2.84E-27
Strontium_mg.kg	0.92	4.74E-26
Calcium_mg.kg	0.88	2.72E-21
Moisture_pct	0.88	4.92E-21
Arsenic_mg.kg	0.87	2.80E-20
Antimony_mg.kg	0.87	4.41E-20
Cadmium_mg.kg	0.86	3.01E-19
Magnesium_mg.kg	0.86	8.95E-19
Phosphorus_mg.kg	0.85	4.50E-18
InorganicCarbon	0.83	7.39E-17
Molybdenum_mg.kg	0.45	0.00028
Gravel_pct	-0.28	0.02702
pH	-0.64	2.36E-08
Sand_pct	-0.96	2.71E-35

APPENDIX 3F
Principal Component Analysis

Quality of Representation of Individual Samples and Variables

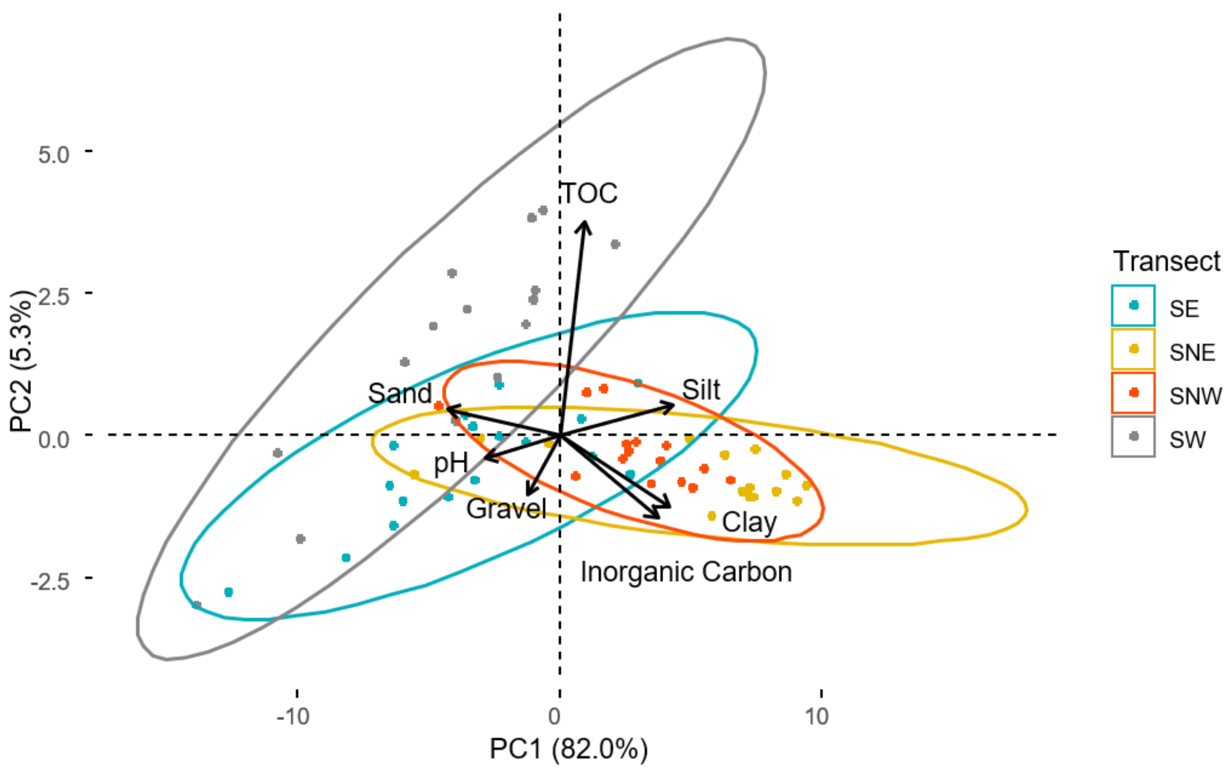


APPENDIX 3F
Principal Component Analysis



APPENDIX 3F
Principal Component Analysis

Principal Component Analysis - Scatter Plot



Chapter 4.0 Benthic Infauna

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

Submitted to:

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1663724-281c-R-Rev1-34000

18 August 2021

Table of Contents

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
Adj. R2	Adjusted R squared value
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
BACI	Before/After Control/Impact
Biologica	Biologica Environmental Services Ltd.
Df	Degrees of freedom
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
HDPE	High-density polyethylene
IDW	Inverse Distance Weighting
LSA	Local Study Area
MEEMP	Marine Environmental Effects Monitoring Program
NIRB	Nunavut Impact Review Board
Org/m^2	Organisms per squared meter
PC	Project Certificate
QA/QC	Quality Assurance/Quality Control
RM	Repeated Measures
SDI	Simpson's Diversity Index
SEI	Simpson's Evenness Index
TOC	Total Organic Carbon
TSS	Total Suspended Solids
m^2	Square metre
m	Metre

4.0 BENTHIC INFAUNA

4.1 Introduction

This chapter presents the results of the benthic infaunal monitoring program, a component of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted at Milne Port and in Milne Inlet during the 2020 open-water season. The benthic infaunal component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the PC Conditions described in Chapter 1.0, Table 1-2. Project Certificate (PC) Conditions related to the monitoring of benthic infauna include PC Conditions No. 99 (a) and 99 (c). The benthic infauna component as presented here with quantitative sampling of benthic infauna was added to the MEEMP in 2018 and has been monitored annually since for a total of three consecutive years.

4.1.1 Objectives

The overall MEEMP objectives are outlined in Section 1.3. Objectives specific to the benthic infaunal component are to:

- Evaluate benthic infaunal communities in Milne Inlet within the local study area (LSA) for the purpose of identifying Project-related effects.
- Verify predictions made in the FEIS and other submissions to the Nunavut Impact Review Board (NIRB) regarding effects on benthic infauna communities, as applicable.
- Recommend any necessary and appropriate changes to the benthic infauna component of the MEEMP for future years.

4.2 Study Design

The MEEMP sampling design for marine sediment quality and benthic infauna is based on a radial gradient transect design extending out from the Ore Dock (Figure 3-1) which represents a potential point source for the Project (e.g., for ore dust, hydrocarbon release, wastewater, and site runoff) and physical interactions as a result of Project activities (e.g., sediment re-suspension and transportation). The radial pattern was designed to detect potential Project-related effects based on marine sediment quality and benthic infaunal communities along four transects (East, West, Northeast and Northwest) with increasing distance from the point source (15 stations per transect). From the Ore Dock (i.e., point source), stations have been established along the distance gradient which allows for the spatial evaluation of biotic data in relation to abiotic parameters (SEM 2015). To address the component objectives stated above, this design is also used to identify adverse (negative) environmental effects for further mitigation measures and/or alterations to Project activities.

The 15 stations per transect are co-located with the marine sediment quality stations (Section 3.0) to allow for evaluation of exposure data (marine sediment quality) in relation to biological variables (benthic infaunal community characteristics). The two Coastal Transects (East and West) and the two Northern Offshore Transects (Northwest and Northeast) are described in detail in Section 3.2.

4.2.1 Modifications to the Program (2020)

A Coastal Transect was removed from the sampling program in 2020 as discussed in Section 3.2.1. The 2020 sampling program comprises the first year that all 15 stations along each of the four transects (East, West, Northwest and Northeast) were sampled as intended for the gradient sampling design[1]. In 2020, benthic infauna samples were consistently collected at each station using a Van Veen grab. This is a change from the 2019 sampling program where benthic infauna samples were collected using either a standard Ponar or Van Veen sediment grab. Due to the large volume of the Van Veen grab, each of the triplicate grabs were consistently split in the field and one quarter of the sample retained for processing and identification by the taxonomy laboratory.

4.2.2 Indicators

For benthic infauna, four endpoints are adopted as effect indicators: total density, taxa richness, and Simpson's diversity and evenness indices. These indicators are calculated from data collected according to the radial gradient design and analyzed statistically to evaluate Project-related effects within the Milne Inlet study area. The purpose of the radial transect design adopted for the sediment and benthic MEEMP monitoring programs is to assess marine sediment quality and benthic invertebrate communities over time, and similar to previous years, to investigate the potential for project-related effects on these components. The overall trend in benthic communities is compared spatially and temporally examining changes in density, richness, and diversity[2].

4.3 Materials and Methods

4.3.1 Field Methodology

Benthic infauna samples were collected from 60 stations along four transects (East, West, Northeast and Northwest) and were each co-located with a sediment sampling station (Figure 3-2). Samples were collected as composites of three individual grabs from each station using a standard Van Veen sampler with a surface area of 0.1 m². Each benthic grab sample was examined for acceptability using the criteria outlined in Section 3.3.1. Upon acceptance, each of the three individual grab samples were split using a field splitter (Appendix 4A – Photo 2) constructed specifically for the purpose of this program due to the large volume of the Van Veen sampler.

The composite material from each station was gently rinsed with filtered seawater through a 1-cm mesh sieve to initially remove larger organisms that could otherwise become damaged when the composite material was subsequently filtered through a 0.5 mm mesh sieve. The 1-cm sieved samples were either retained as whole samples, or further split into ½ or ¼, such that a reasonable volume would be submitted to the taxonomy laboratory. Large debris, such as gravel and cobble, were checked for encrusting fauna and included in the sample jar if potential encrusting epifauna were observed. The 1-cm mesh sieved composited material was further split in half, totalling a ¼ field split. The ¼ field split sample was retained and transferred to an aluminum sieving table. The sample was gently rinsed through a 0.5-mm mesh sieve with filtered seawater. Representative photographs were taken of each sieved sample, including a visible sample label (Appendix 4A). Remaining material on the sieve was placed in pre-labeled 1-L wide-mouth high-density polyethylene (HDPE) sample jars

---

[1] An unexpected health and safety incident disrupted the 2019 sampling schedule, such that only a subset of the intended benthic infaunal stations were sampled in that year.

[2] Simpson's Evenness index was not considered to be a primary effect indicator.

and preserved in a 10% buffered formalin solution. The containers were then sealed and inverted several times to promote homogenization with the formalin. Containers were labeled internally and externally with water-resistant labels. Samples were sent to Biologica Environmental Services Ltd. (Biologica) for sorting and taxonomic identifications, as per the 2018 and 2019 MEEMP programs. Details on laboratory methods are provided in Appendix 4B.

4.3.2 Data Analysis

The statistical approach for the benthic infauna component is based on repeated measures (RM) distance regression analyses, with each station re-sampled over time. The RM distance regression analysis is an alternative to the Before/After Control/Impact (BACI) analysis of variance (ANOVA) design and has higher sensitivity to change and is more robust than simple comparison of parameters between control and impact areas. Analysis of covariance (ANCOVA) is applied to baseline and annual monitoring data to compare gradients in the regression lines for the four transects in order to determine if benthic infauna monitoring results are significantly different from baseline conditions or previous MEEMP years. Statistical analysis is focused on four key benthic infauna indicators (i.e., invertebrate density, richness, diversity, and evenness), consistent with previous MEEMP years.

Data Screening

The benthic samples sent to Biologica were sorted using dissecting microscopes at 10-40x magnification. The 1-cm sample fraction was processed based on the field split (no further splitting by Biologica). The fine 0.5mm sample fraction (¼ field split) was further split into another quarter (¼) by Biologica for a final 1/16 split of the composite sample, using a Caton tray. The sample was spread evenly on a Caton grid and subsampled via sequential random quadrat sorting. Each subsample was sorted until a minimum ¼ split was reached and taxonomic identifications were carried out to the lowest practicable level.

Taxonomy data provided by Biologica were screened for incidental organisms not considered to be part of the marine benthic community, such as freshwater, terrestrial, planktonic, and parasitic taxa. Meiofauna, such as nematodes, were removed from benthic analysis because these species often fall through the 0.5-mm mesh sieve used to separate benthic infauna from sediments in the field. Nematode species counts would thus not represent true population numbers at each station and could bias station comparisons of total abundance, relative abundance, and species diversity. Eliminated taxa, not expected to have significant direct exposure to sediments, included *Themisto libellula* (planktonic, Amphipoda), Nematoda (meiofauna), Chironomidae (subfamily Diamesinae, Orthocladiinae, and Clinocerinae, brackish), Acari (freshwater), fish (Cottidae), and some Ostracoda (planktonic), Copepoda (parasitic), and Isopoda (parasitic) taxa.

Benthic Community Effect Indicators

Taxonomic identifications and abundance data provided by Biologica (Appendix 4C) were used to calculate community indicators to assess benthic infauna communities at the stations sampled in 2020. These indicators included: density, richness (to the lowest practicable level), Simpson's Diversity Index, Simpson's Evenness Index, and the relative abundance of dominant taxa.

Organism Density

Total invertebrate density was calculated as the number of organisms per square metre (org/m^2) for each station. The surface area of the Van Veen (0.1 m^2) was multiplied by three to account for the three composite grab samples using the following equation:

number of organisms per station
(grab sampler area × 3 composites)

Richness

Richness is the total number of unique taxa per station. Richness provides an indication of the diversity of benthic invertebrates in an area; a higher richness value typically indicates a healthier and balanced community. Because the three composite grab samples from each station were combined prior to taxonomy, the richness metric indicated the variety of taxa on a station-wide basis (i.e., replicate station richness) rather than the average number of taxa per individual grab.

Simpson's Diversity Index

Simpson's Diversity Index (SDI) measures the proportional distribution of organisms in the community. The SDI considers the variety of taxa and also how evenly the total density is distributed among these taxa. Certain conditions may favour one taxa over another, resulting in the community being dominated by a few taxa, which is reflected in decreased diversity (Simpson 1949). The SDI values range between zero and one, where lower values indicate a less diverse community and higher values indicate a more diverse community. The SDI was calculated using the formula provided by Krebs (Krebs 1999):

$$SDI = 1 - \sum_{i=1}^{S} (p_i)^2$$

Where:

- SDI = Simpson's diversity index
- S = the total number of taxa
- p_i = the proportion of the i^{th} taxon

Simpson's Evenness Index

Simpson's Evenness Index (SEI) is a measure of how evenly the total invertebrate density is distributed among the taxa present at the station. The SEI is included along with the SDI to provide context as to whether richness or the distribution of total density among taxa is driving the SDI values. The SEI is also expressed as a value between one and zero, with one representing high evenness (i.e., equal numbers of all taxa present in a sample) and zero representing low evenness (i.e., a high degree of dominance by one or a few taxa). The SEI values were calculated using the following formula (Smith and Wilson 1996):

$$SEI = 1 / \sum_{i=1}^{S} (p_i)^2 / S$$

Where:

- SEI = Simpson's evenness index

- S = the total number of taxa
- p_i = the proportion of the i^{th} taxon

Statistical Analysis

Benthic infauna data collected over the last three years (i.e., 2018 to 2020) were analyzed separately for the combined 2019–2020 dataset and the combined 2018–2020 (West, East and Northwest Transects only) dataset to assess spatial and temporal gradients, respectively[3]. Both analyses were conducted using general linear modelling and included main effects of distance from transect origin, year (as a categorical variable), transect, all possible interactions among the three variables, and percent fines. Model residuals were examined to identify departures from linear regression assumptions – normality, homoscedasticity (equal variances), and linearity in predictors (lack of structure in residuals). For some variables, percent fines and / or distance from the Ore Dock were modeled as second-degree polynomials to account for nonlinear patterns between the response variables and these two predictors. Statistical outliers and influential points were identified and removed during the analysis but were shown on the plots depicting raw values and model predictions for transparency. Following linear regressions, multiple comparisons were performed to assess differences in modelled benthic infauna indicator variables among years at select distances along the transects. These multiple comparisons were performed at distances of 150 m, 650 m, 1,000 m, 1,500 m, and 2,000 m along each transect for each year, as applicable based on the length of the transect. Holm-Sidak method was used for p-value adjustments. The analyses of benthic fauna total density, richness, SDI, and SEI were performed in the statistical environment R v.4.0.3 (R 2020), using the packages "car" (Fox and Weisberg 2019), "emmeans" (Lenth 2020), and "multcomp" (Hothorn et al. 2008).

Inverse Distance Weighting (IDW) of Benthic Infauna Diversity Metrices

An Inverse Distance Weighting (IDW) interpolation method in ArcGIS was used to create Figures 4-2 (total density), 4-4 (total richness), 4-6 (SDI), and 4-8 (SEI) to provide a visual depiction of the spatial variability in these benthic community indicators across the study area, as informed by the results of the radial gradient study design in 2020. IDW is a deterministic interpolation method that assumes the variable being interpolated decreases in influence (its weight) with increased distance from its sample location, and conversely, that an interpolated value is most influenced by the known sample(s) closest to it.

4.3.3 Quality Management

Quality assurance and quality control (QA/QC) procedures were applied to the field collection, data analysis, and reporting tasks within the benthic infauna component to verify that the data presented were valid and of acceptable quality to address objectives stated in Section 4.1.1.

---

[3] Prior to statistical analysis the richness, SDI, and SEI indicators were recalculated for the 2019 benthic dataset and the richness values were recalculated for 2018 to allow for a consistent dataset for the temporal comparisons.

4.3.3.1 Field QA/QC

QA/QC measures undertaken to confirm benthic infauna sample integrity are the same as those described for sediment quality as described in Section 3.3.3.1.

4.3.3.2 Laboratory and Data Analysis QA/QC

Biologica laboratory QA/QC measures included an assessment of sorting recovery, identification error, and precision/accuracy of sub-sampling. Laboratory procedures included sample sorting measures, spot-checks, preliminary counting of major groups, and collaborative identification to accurately identify species to their lowest practicable level. Further detailed discussion of the laboratory QA/QC procedures used by Biologica and the findings of their QA/QC assessment are provided in their laboratory reports in Appendix 4B and 4C.

Benthic data received from Biologica were reviewed upon receipt to verify that specified laboratory data quality objectives were met. No inconsistencies were noted that required follow up with the laboratory. Screening of the benthic data and calculation of the benthic indicators were reviewed by a second biologist prior to statistical analysis.

4.4 Results

Benthic invertebrate infauna samples were collected from 60 stations arranged along four transects (i.e., East, West, Northeast, and Northwest) extending out from the Ore Dock. Summary results of the taxonomic analysis of benthic infauna are available in Appendix 4D and photographs are available in Appendix 4A. The laboratory results and methods report provided by Biologica is provided in Appendix 4B and 4C.

4.4.1 2020 Benthic Invertebrate Community Indicators

Benthic invertebrate community indicators used to evaluate infauna along the four transects are depicted in Figure 4-1 to Figure 4-15 and summary statistics (mean, median, minimum, maximum, count, standard deviation, and standard error) for those indicators are presented in Appendix 4D. An evaluation of the four indicators is provided below with a focus on mean +/- SE values.

- **Total Density**—Densities were greater and more variable along the East and West Transects (26,835 ± 3,523 org/m^2 and 9,888 ± 1,241 org/m^2, respectively) compared to the Northwest and Northeast Transects (7,140 ± 551 org/m^2 and 5,437 ± 613 org/m^2, respectively) (Figure 4-1). As the mean values suggest and as shown on Figure 4-2, total densities were higher along the East Transect compared to the West Transect.
- **Richness**— (i.e., number of unique taxa) was on average higher along the East Transect (59 ± 2) compared to the other three transects (Figure 4-3), which had similar mean values (i.e., 40 ± 4 [West]; 42 ± 2 [Northwest], and 38 ± 2 [Northeast]. Higher richness values per stations on the East Transect relative to the other three transects is shown on Figure 4-4.
- **Simpson's Diversity Index**—SDI was high overall for all four transects, ranging from 0.88 ± 0.02 (West) to 0.93 ± 0.004 (Northwest) (Figure 4-5 and Figure 4-6).
- **Simpson's Evenness Index**—SEI was somewhat variable along the four transects but was typically higher along the Northwest (0.35 ± 0.02) and Northeast Transects (0.38 ± 0.03) when compared to the East (0.17 ± 0.01) and West Transects (0.28 ± 0.03) (Figure 4-7 and Figure 4-8). On the scale of 0 to 1, evenness values across all transects were reasonably low as shown on Figure 4-8 reflective of the natural community.

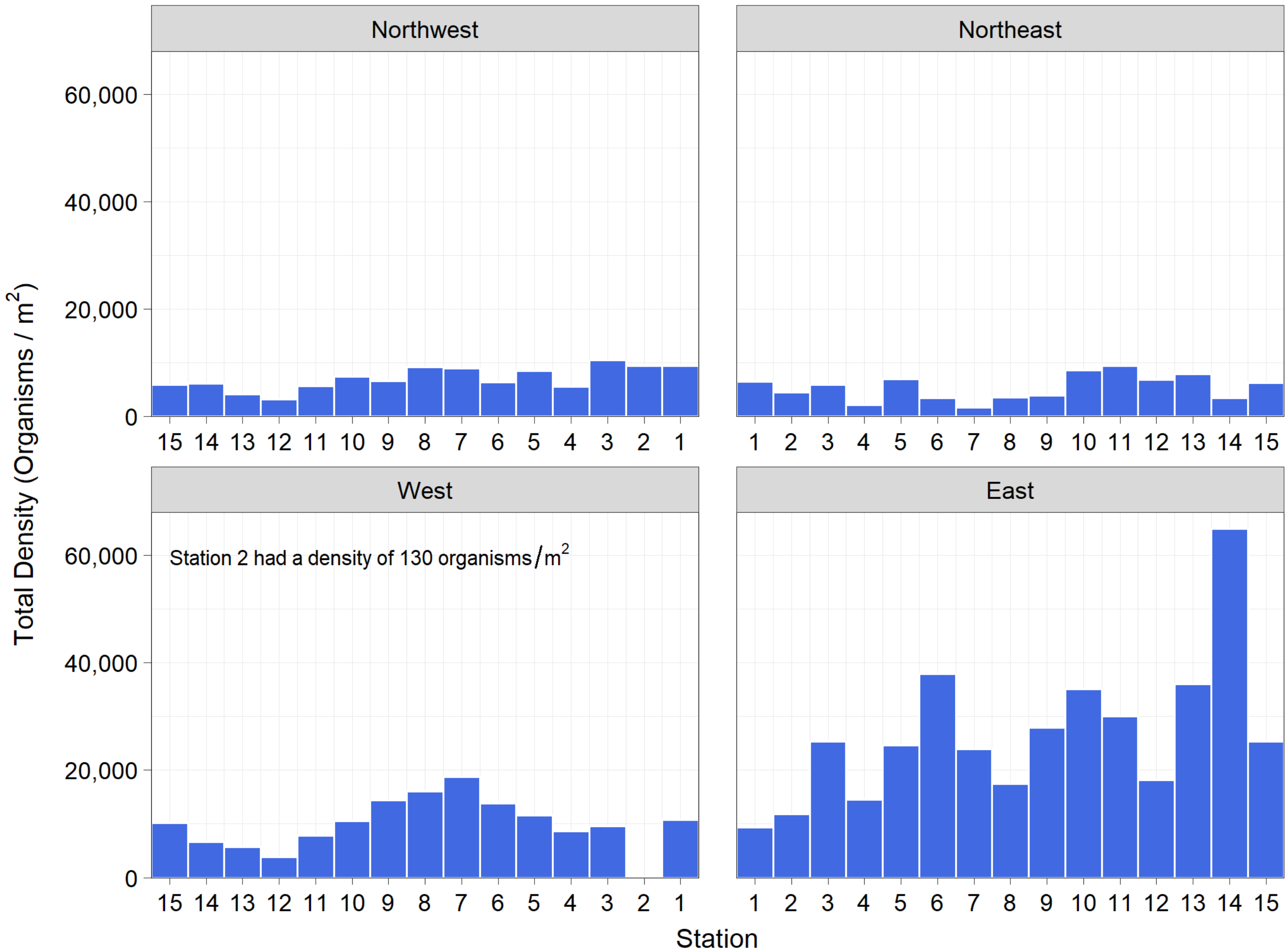
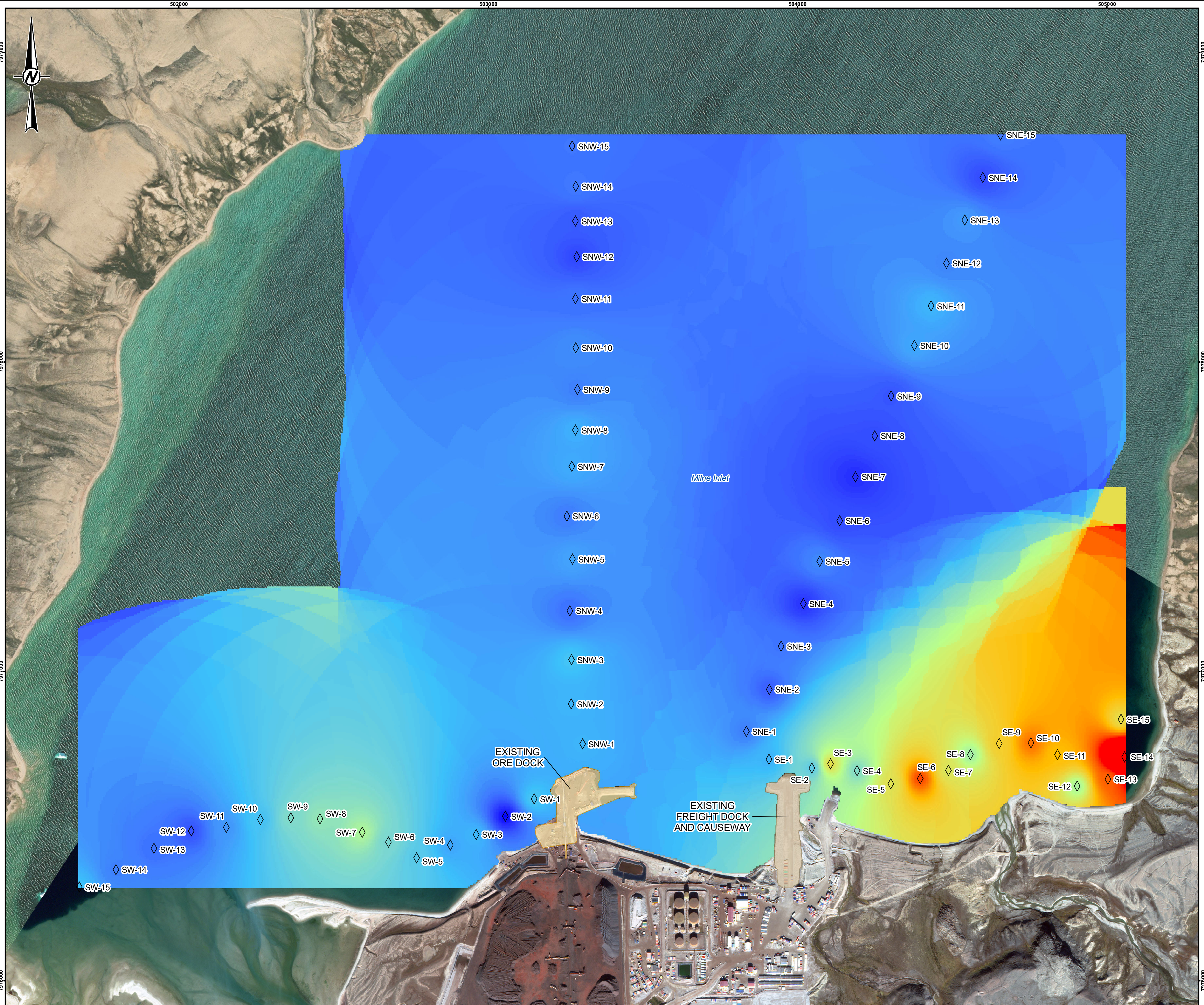


Figure 4-1: Total density of benthic infauna for sampling stations along coastal (east, west) and northern offshore transects extending from the ore dock, Milne Port, 2020. Note: The scale is different for the east transect compared to the other transects.



LEGEND

◊ 2020 BENTHIC INFAUNA SAMPLING STATIONS

EXISTING FREIGHT DOCK AND CAUSEWAY

EXISTING ORE DOCK

BENTHIC DENSITY

40000+
30000
20000
10000
0

0 250 500

1:12,500 METRES

NOTE(S)

IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
IDW INTERPOLATION OF TOTAL DENSITY OF BENTHIC INFAUNA FOR SAMPLING STATIONS ALONG COASTAL AND NORTHERN OFFSHORE TRANSECTS EXTENDING FROM THE ORE DOCK, MILNE PORT, 2020

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	KW
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	4-2

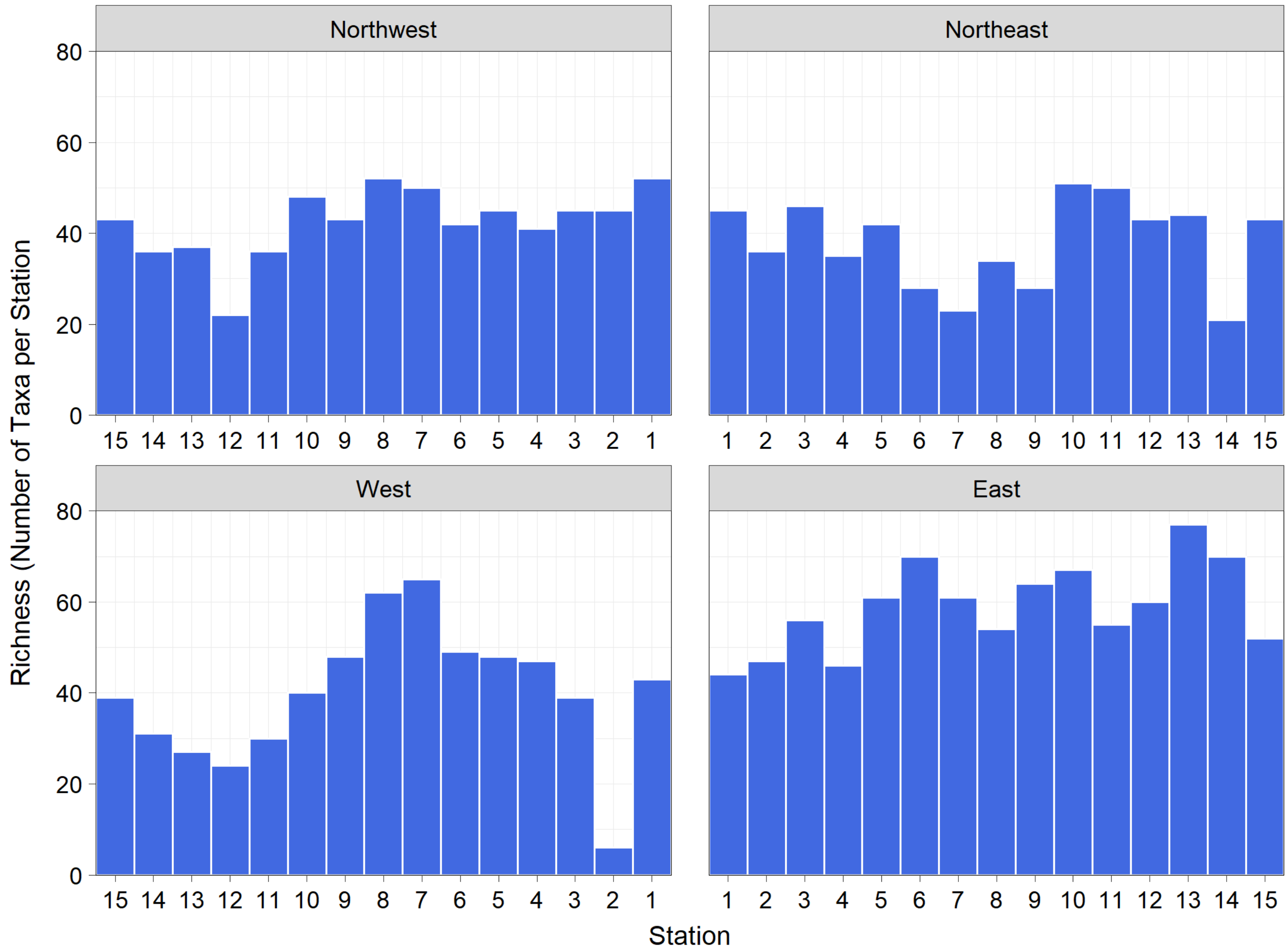
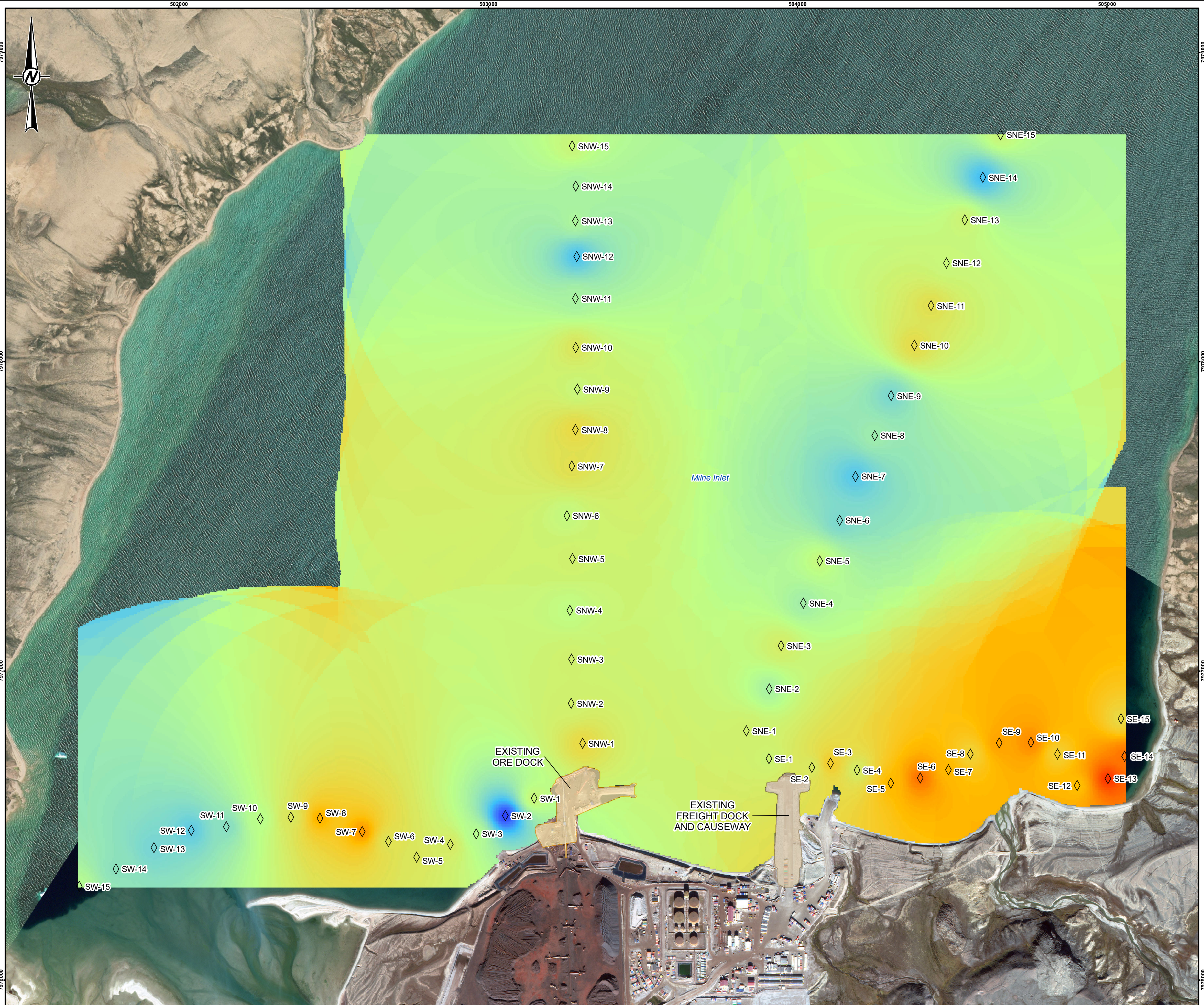


Figure 4-3: Total richness of benthic infauna for sampling stations along coastal and northern offshore transects extending from the ore dock, Milne Port, 2020.



LEGEND

2020 BENTHIC INFAUNA SAMPLING STATIONS

EXISTING FREIGHT DOCK AND CAUSEWAY

EXISTING ORE DOCK

RICHNESS

High : 80

60

40

20

Low : 0

0 250 500

1:12,500 METRES

NOTE(S)

IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
IDW INTERPOLATION OF RICHNESS INDEX OF BENTHIC INFAUNA FOR SAMPLING STATIONS ALONG COASTAL AND NORTHERN OFFSHORE TRANSECTS EXTENDING FROM THE ORE DOCK, MILNE PORT, 2020

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	KW
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
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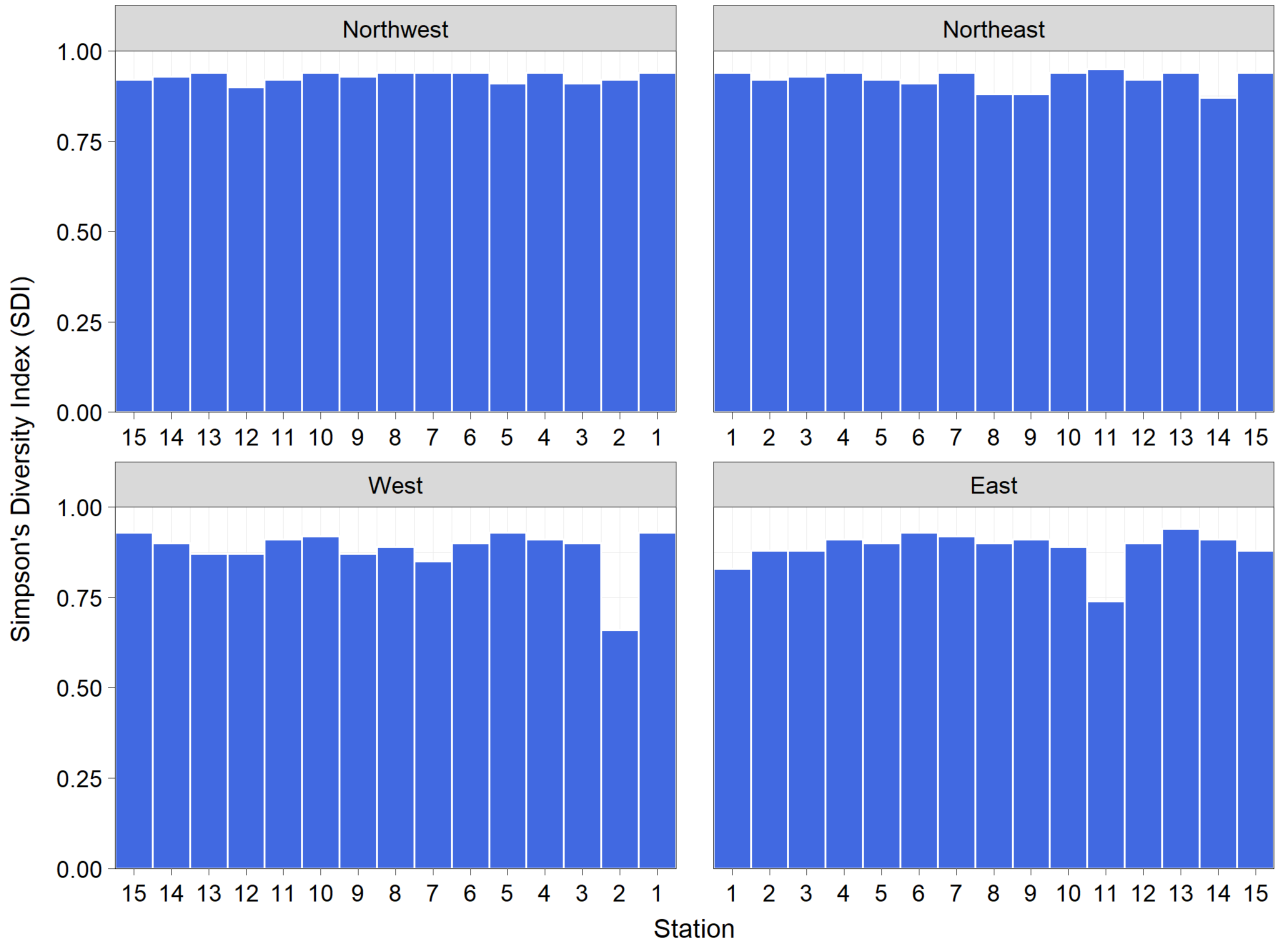
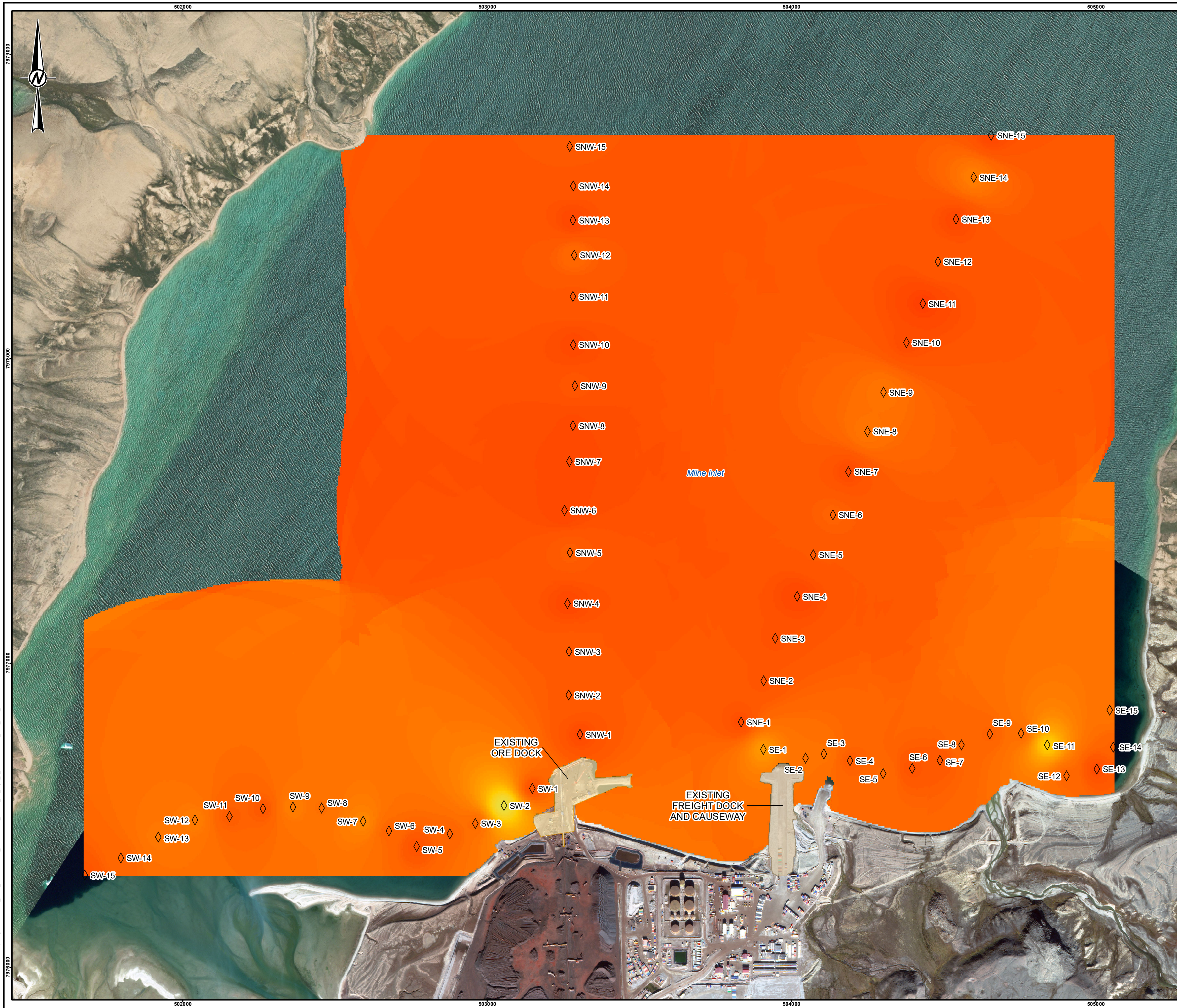


Figure 4-5: Simpson's diversity index of benthic infaunal communities from sampling stations along coastal and northern offshore transects extending from the ore dock, Milne Port, 2020.



LEGEND

- 2020 BENTHIC INFAUNA SAMPLING STATIONS
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

SIMPSON'S DIVERSITY INDEX

High : 1
0.75
0.50
0.25
Low : 0

0 250 500
1:12,500 METRES

NOTE(S)

IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
IDW INTERPOLATION OF SIMPSON'S DIVERSITY INDEX OF BENTHIC INFAUNA FOR SAMPLING STATIONS ALONG COASTAL AND NORTHERN OFFSHORE TRANSECTS EXTENDING FROM THE ORE DOCK, MILNE PORT, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	KW
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
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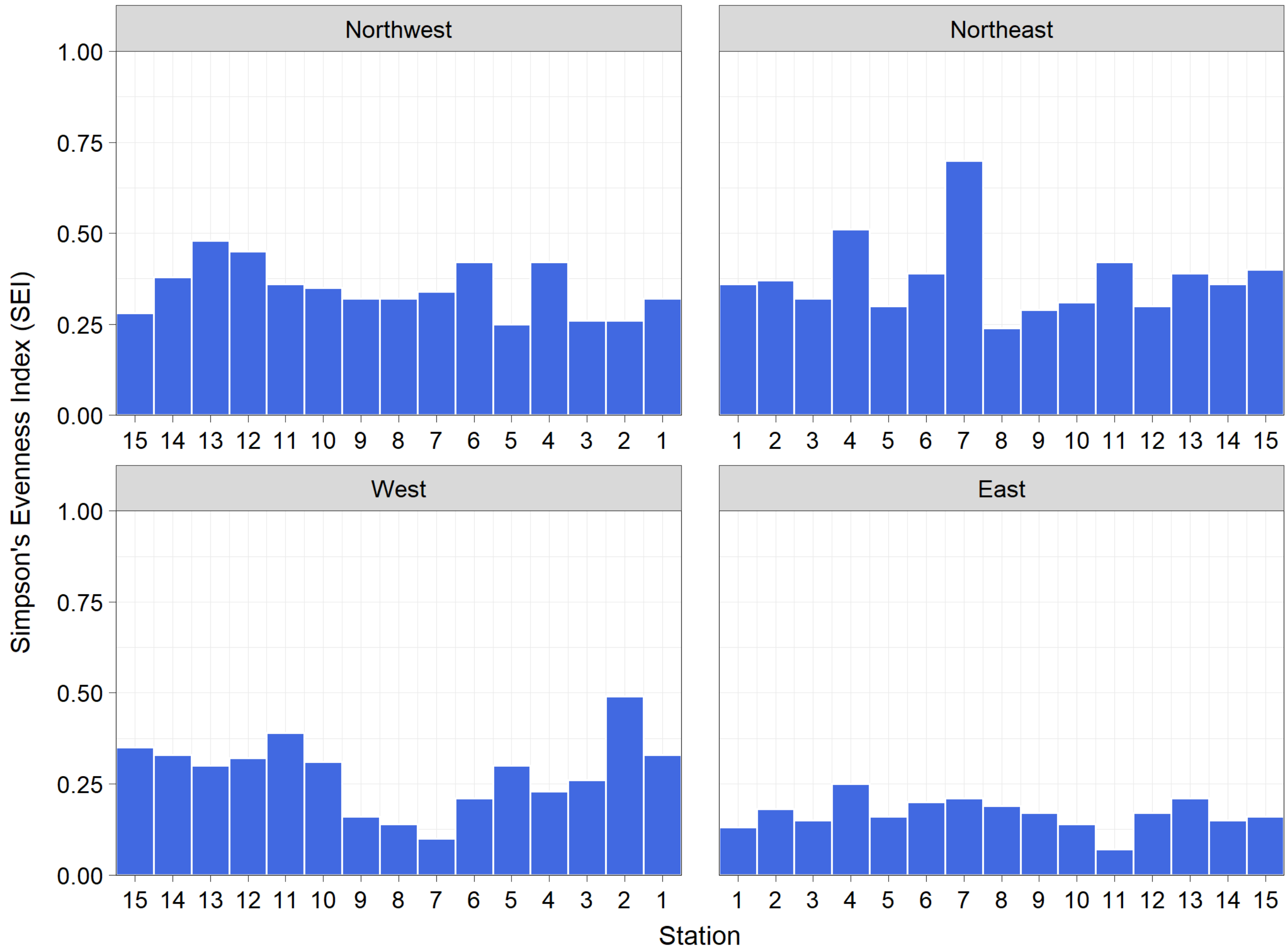
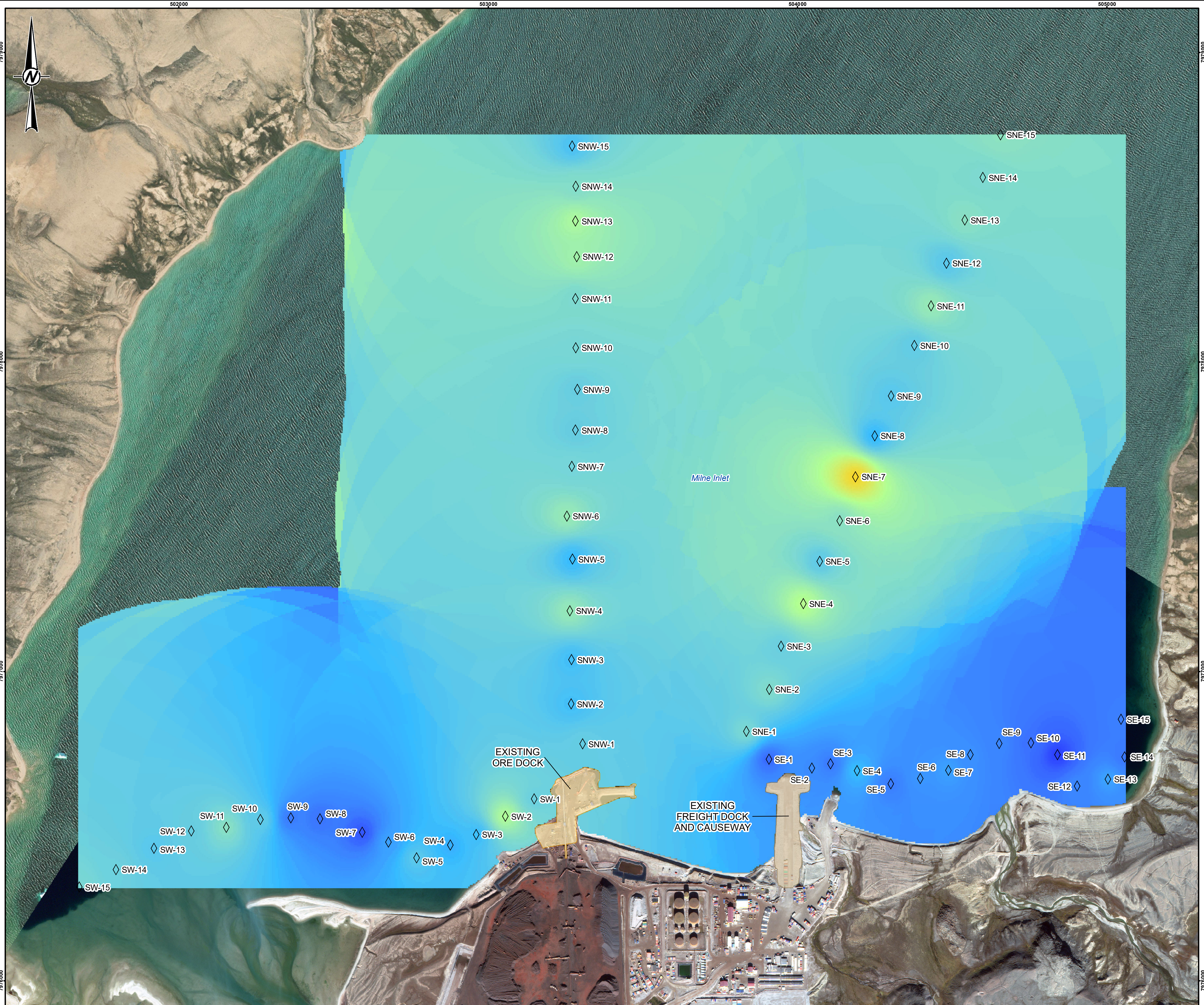


Figure 4-7: Evenness of benthic infaunal communities from sampling stations along coastal and northern offshore transects extending from the ore dock, Milne Port, 2020.



LEGEND

- ◊ 2020 BENTHIC INFAUNA SAMPLING STATIONS
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

SIMPSON'S EVENNESS INDEX

High : 1
0.75
0.50
0.25
Low : 0

0 250 500
1:12,500 METRES

NOTE(S)
IDW INTERPOLATION METHOD:
GRID SIZE: 5 m
VARIABLE SEARCH RADIUS: 750 m
MAXIMUM SAMPLE POINTS: 12
POWER: 2

REFERENCE(S)
BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGER CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
IDW INTERPOLATION OF SIMPSON'S EVENNESS INDEX OF BENTHIC INFAUNA FOR SAMPLING STATIONS ALONG COASTAL AND NORTHERN OFFSHORE TRANSECTS EXTENDING FROM THE ORE DOCK, MILNE PORT, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	KW
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	4-8

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4.4.2 2020 Relative Densities of Benthic Invertebrate Taxa

Benthic communities sampled at stations along the four transects were mainly dominated by Polychaeta (26 to 91%) (Figure 4-9). The second largest taxonomic group in the Coastal Transects was Malacostraca (1 to 60%), while the Northern Offshore Transects shared relative densities more evenly between Malacostraca, Bivalvia, Ostracoda, and other major taxa. The polychaete *Pholoe minuta* accounted for approximately 14% of total density across the transects.

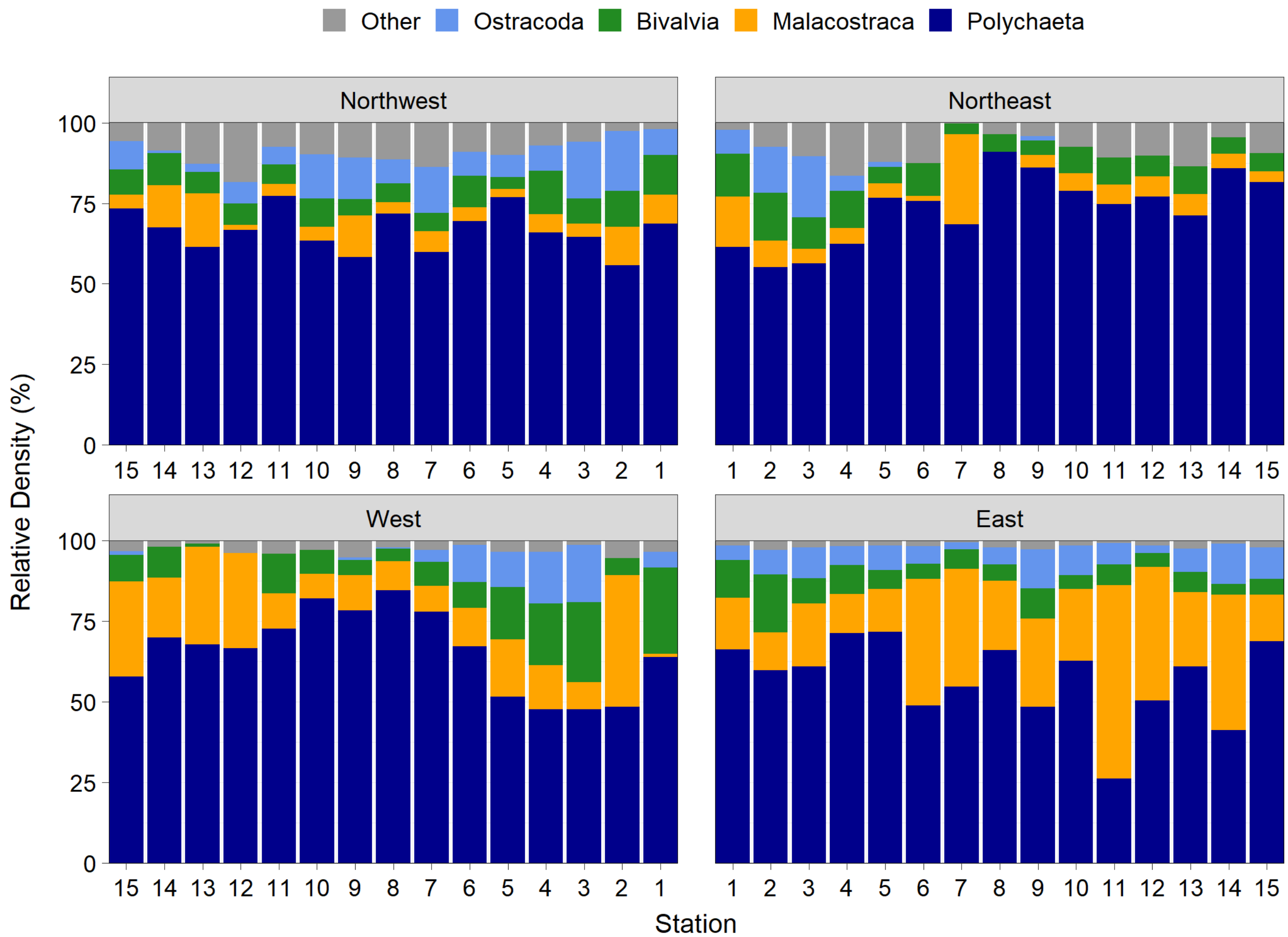


Figure 4-9: Relative density of major benthic infauna taxa from sampling stations along coastal and northern offshore transects extending from the ore dock, Milne Port, 2020

4.4.3 Statistical Comparisons of Community Indicators

4.4.3.1 Total Density

4.4.3.1.1 2019/2020: Spatial and Temporal Comparison

Total density was analyzed using a linear regression model, with main effects being distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the variables. Additionally, a main effect of percent fines was also used to account for the ecological relationship between total density and percent fines (modelled as a second-degree polynomial to account for the non-linearity in total density relative to percent fines). Total density was natural-log transformed prior to analysis. The model explained 74% of the data variability. The three-way interaction was not significant (p-value=0.815; Table 4-1); however, two-way interactions between distance and transect, and between year and transect were statistically significant (p-value<0.001 and p-value=0.005, respectively), indicating a significant difference in the relationship between total density of benthic infauna taxa and distance among transects, and between total density of benthic infauna and transects between years (Table 4-1). Percent fines was also a statistically significant explanatory variable of benthic infauna total density (p-value<0.001).

A single sample (SW-2), collected in 2020 at a distance of approximately 224 m from the Ore Dock, was considered a statistical outlier with very low total density compared to the other stations along the West Transect. Percent fines were relatively low (3%) at the station, and although fines were a statistically significant explanatory variable, the linear regression model did not adequately explain this data point.

Table 4-1: ANOVA Summary of Benthic Infauna Total Density by Year and Transect in 2019 and 2020

Adj. R^2	Parameter	Df	F value	p-value
0.740	Distance from transect origin	1	0.3	0.572
	Year	1	0.4	0.528
	Transect	3	36.2	<0.001
	Distance × Year	1	2.1	0.148
	Distance × Transect	3	10.3	**<0.001**
	Year × Transect	3	4.7	**0.005**
	Distance × Year × Transect	3	0.3	0.815
	Fines	2	9.6	**<0.001**

Notes: Adj. R_2= Adjusted R squared value; Df= degrees of freedom. Total density was natural-log transformed prior to analysis and fines were modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Natural log-transformed total density had a linear relationship with distance from the Ore Dock along all transects, indicating that densities tended to either progressively increase, decrease, or remain stable, with increasing distance from the Ore Dock, depending on the transect or the year (Figure 4-10). For both years, density increased along the East Transect with distance from the Ore Dock (Figure 4-10) but decreased with distance along the West Transect[4] (Figure 4-10). Densities along the Northern Offshore Transects, tended to be lower than the Coastal Transects; however, like the Coastal Transects, the two northern transects showed differing spatial patterns with distance from the Ore Dock in 2020 (specifically, density increased along the Northeast Transect, whereas density decreased along the Northwest Transect). Compared with 2019, densities in 2020 were not significantly lower along any of the four transects. The only differences identified were significantly higher densities along the Northwest Transect at 650 m and 1,000 m from the Ore Dock in 2020 compared to 2019 (Table 4-2)[5].

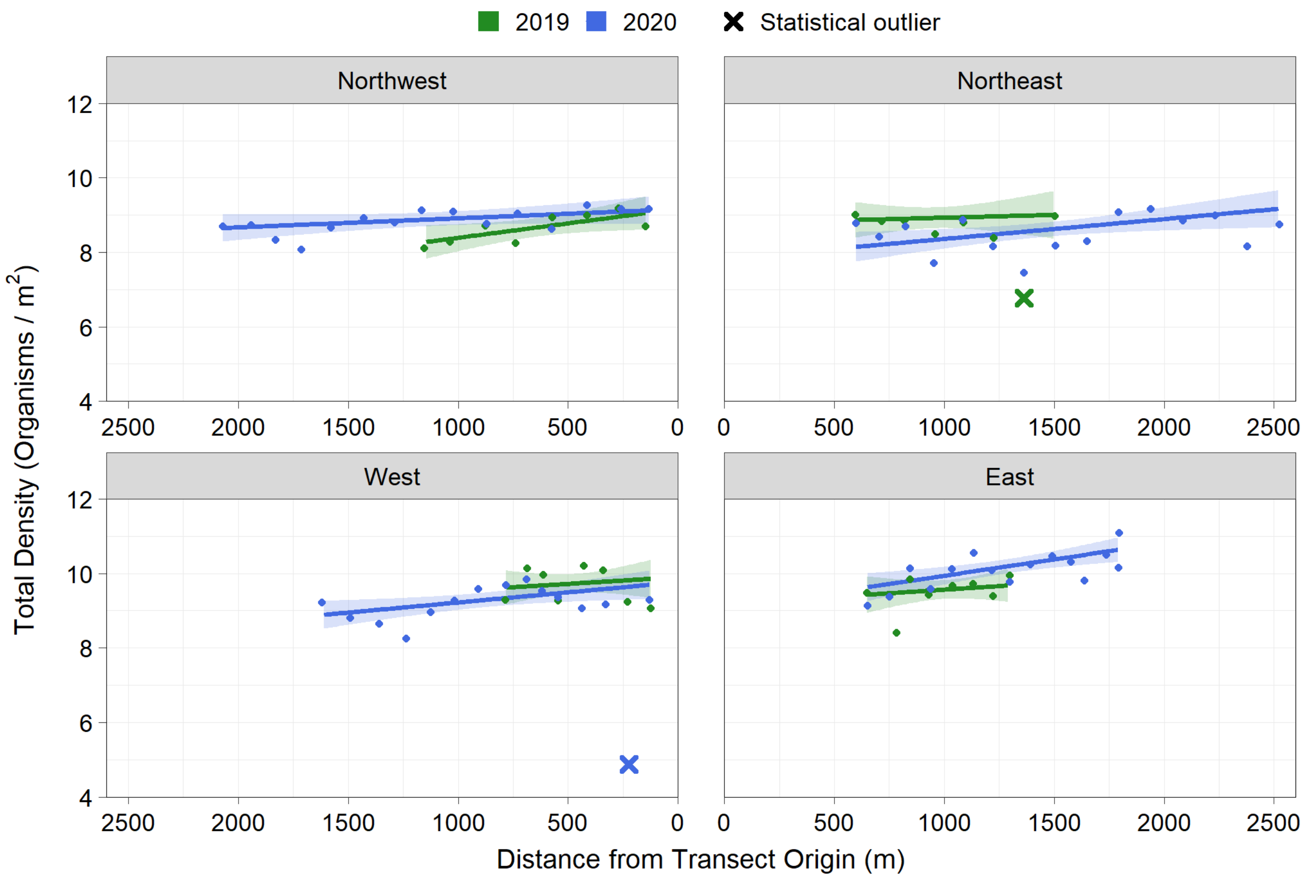


Figure 4-10: Observed (points) and estimated (lines) benthic infauna total density relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

[4] Statistical comparison at 1,500 m from the Ore Dock was not possible since the data were not available for the 2019 sampling year.

[5] No data were collected in 2019 along the Northwest Transect at farther distances, precluding comparisons to 2020.

Table 4-2: Multiple Comparisons of Benthic Infauna Total Density between Years, within Distance/Transect Combinations in 2019 and 2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
150	—	—
650	a	a
1,000	a	a
1,500	a	a
West Transect		
150	a	a
650	a	a
1,000	a	a
1,500	—	—
Northeast Transect		
150	—	—
650	a	a
1,000	a	a
1,500	a	a
2,000	—	—
Northwest Transect		
150	a	a
650	a	b
1,000	a	b
1,500	—	—
2,000	—	—

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: “a” is the lowest estimated fines value, “b” representing the next higher, and so on. Grey shading depicts significant, increasing trends between consecutive years. “—” represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

4.4.3.1.2 2018–2020: Temporal Comparison

Total densities were analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. Additionally, a main effect of percent fines, which was modelled as a second-degree polynomial to account for the non-linearity in total density of benthic infauna relative to percent fines, was included to account for the ecological relationship between these two variables. The model explained 78% of the data variability, and the three-way interaction was not statistically significant (p-value=0.092; Table 4-3). The two-way interaction between distance and transect was statistically significant (p-value<0.001), indicating significant differences in the relationship between total density of benthic infauna and distance along different transects. Year was a statistically significant explanatory variable of benthic infauna total density (p-value=0.047), indicating significant differences in total density between years. Percent fines was also a statistically significant explanatory variable of benthic infauna total density (p-value<0.001).

Comparison of trends between years was not possible for the Northeast Transect because 2019 was the first year that this transect was sampled. The following distance-based trends were noted for the East, West, and Northwest Transects.

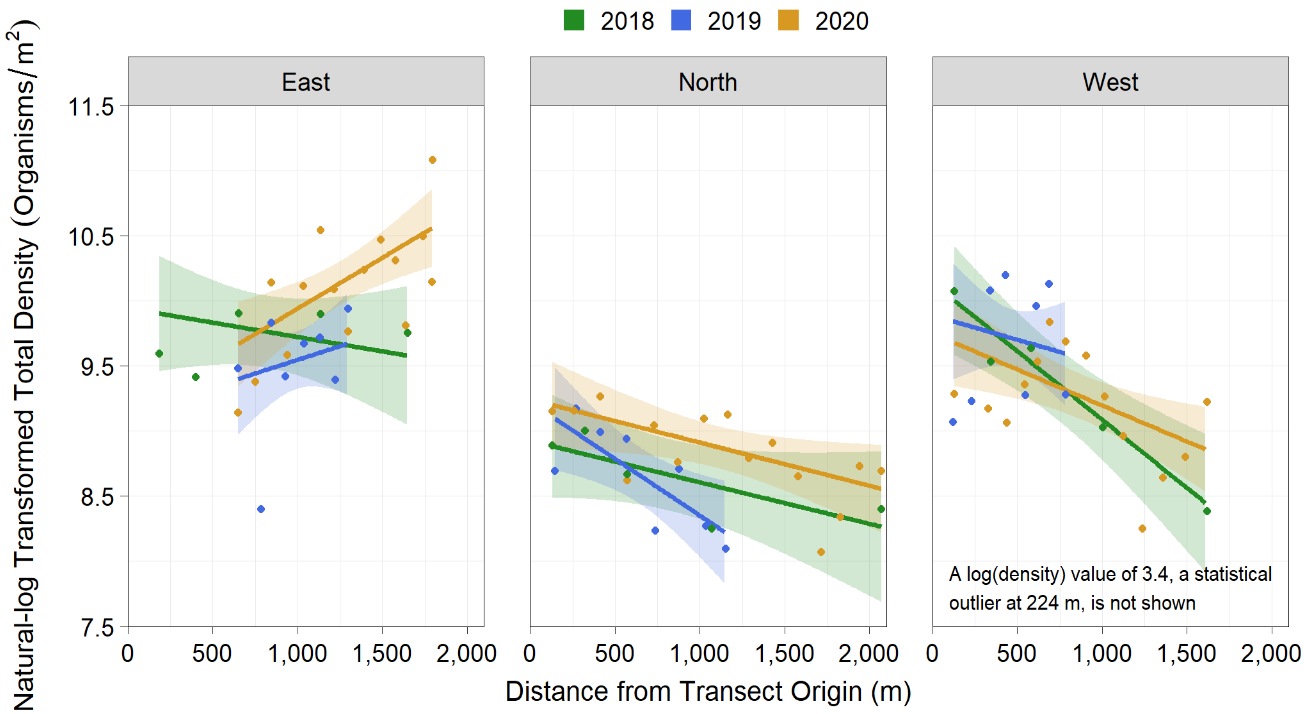
Table 4-3: ANOVA Summary of Benthic Infauna Total Density by Year and Transect, 2018-2020

Adj. R^2	Parameter	Df	*F* value	p-value
0.776	Distance from transect origin	1	16.4	<0.001
	Year	2	3.2	**0.047**
	Transect	2	74.5	<0.001
	Distance x Year	2	2.6	0.079
	Distance x Transect	2	13.4	**<0.001**
	Year x Transect	4	1.8	0.147
	Distance x Year x Transect	4	2.1	0.092
	Fines	2	11.5	**<0.001**

Notes: Adj. $R2$= Adjusted *R* squared value; Df= degrees of freedom. Total density was natural-log transformed prior to analysis and fines were modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Overall, natural log-transformed density had a linear relationship with distance from the Ore Dock along all transects (Figure 4-11). Benthic invertebrates appeared to be more abundant along the East Transect compared to the West and the Northwest Transects. Infauna were present in higher densities in 2020 compared to previous years along the East and Northwest Transects. There were no significant differences in densities between years along the Coastal Transects, and the same was true for the Northern Offshore Transect, except at 650 m and 1,000 m from the Ore Dock (2020 > 2019) (Table 4-4)[6]. Thus, invertebrate densities were not significantly lower in 2020 relative to 2018 or 2019.

[6] No data were collected in 2019 along the Northwest Transect at farther distances, precluding comparisons to 2020.



[7]

Figure 4-11: Observed (points) and estimated (lines) benthic infauna total density relative to sampling distance along transects, 2018-2020. Ribbons are 95% confidence intervals.

Table 4-4: Multiple Comparisons of Benthic Infauna Total Density between Years, within Distance/Transect Combinations, 2018-2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year		
	2018	2019	2020
East Transect			
150	—	—	—
650	a	a	a
1,000	a	a	a
1,500	a	a	a
West Transect			
150	a	a	a
650	a	a	a
1,000	a	a	a
1,500	a	—	a
North Transect			
150	a	a	a
650	ab	a	b
1,000	ab	a	b
1,500	ab	—	b
2,000	a	—	a

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: "a" is the lowest estimated total density value, "b" representing the next higher, and so on. Grey shading depicts significant, increasing trends between consecutive years. "—" represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

[7] North Transect in Figure refers to Northwest Transect in 2019-2020.

4.4.3.2 Richness

4.4.3.2.1 2019/2020: Spatial and Temporal Comparison

Richness was analyzed using a linear regression model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. Additionally, a main effect of percent fines was modelled as a second-degree polynomial to account for the non-linearity in richness relative to percent fines. The model explained 59% of the data variability, and the three-way interaction was not statistically significant (p-value=0.088; Table 4-5). The only two-way interaction that was statistically significant was the Distance-Transect interaction (p-value<0.001), indicating significant differences in the relationship between richness and distance between transects. Percent fines was a statistically significant explanatory variable of benthic infauna richness (p-value<0.001). The effect of year was significant (p=0.001), indicating a difference in richness between years.

A single sample (SW-2), collected in 2020 at a distance of approximately 224 m from the Ore Dock, had very low fines content (3%), resulting in a low richness. This sample was not found to be a statistical outlier, since the model accounted for the relationship between fines and richness.

Table 4-5: ANOVA Summary of Benthic Infauna Richness by Transect in 2019 and 2020

Adj. R^2	Parameter	Df	*F* value	p-value
0.591	Distance from transect origin	1	0.1	0.734
	Year	1	12.6	**0.001**
	Transect	3	11.5	<0.001
	Distance x Year	1	2.9	0.091
	Distance × Transect	3	8.8	**<0.001**
	Year x Transect	3	1.1	0.373
	Distance x Year x Transect	3	2.3	0.088
	Fines	2	18.8	**<0.001**

Notes: Adj. R^2= Adjusted *R* squared value; Df= degrees of freedom. Percent fines were modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Natural log-transformed richness had a linear relationship with distance from the Ore Dock along all transects (Figure 4-12), indicating that richness tended to either progressively increase, decrease, or remain stable, with increasing distance from the Ore Dock, depending on the transect or the year. There were no statistically significant differences in richness between the two sampling years along the four transects, except for two isolated instances, as summarized below. These exceptions were measured at a distance of 150 m along the West Transect (2020<2019), and at 1,000 m along the Northeast Transect (2020<2019) (Table 4-6).

- **East Transect**— richness generally increased with distance from the Ore Dock in both 2019 and 2020 (Figure 4-12), but estimates were not significantly different between years (Table 4-6).
- **West Transect**— richness showed an overall decrease with distance from the Ore Dock (Figure 4-12). In 2020, richness was significantly lower at 150 m from the Ore Dock compared to 2019 (Table 4-6), but not at 650 m from the dock.

- **Northeast Transect**— richness generally increased with distance from the Ore Dock (Figure 4-12). In 2020, richness was significantly lower at 1,000 m from the Ore Dock compared to 2019 (Table 4-6), but not at adjacent distances (i.e., 650 m and 1,500 m)[8].
- **Northwest Transect**—richness showed a decrease with distance from the Ore Dock (Figure 4-12) but was not significantly different between years (Table 4-6)[9].

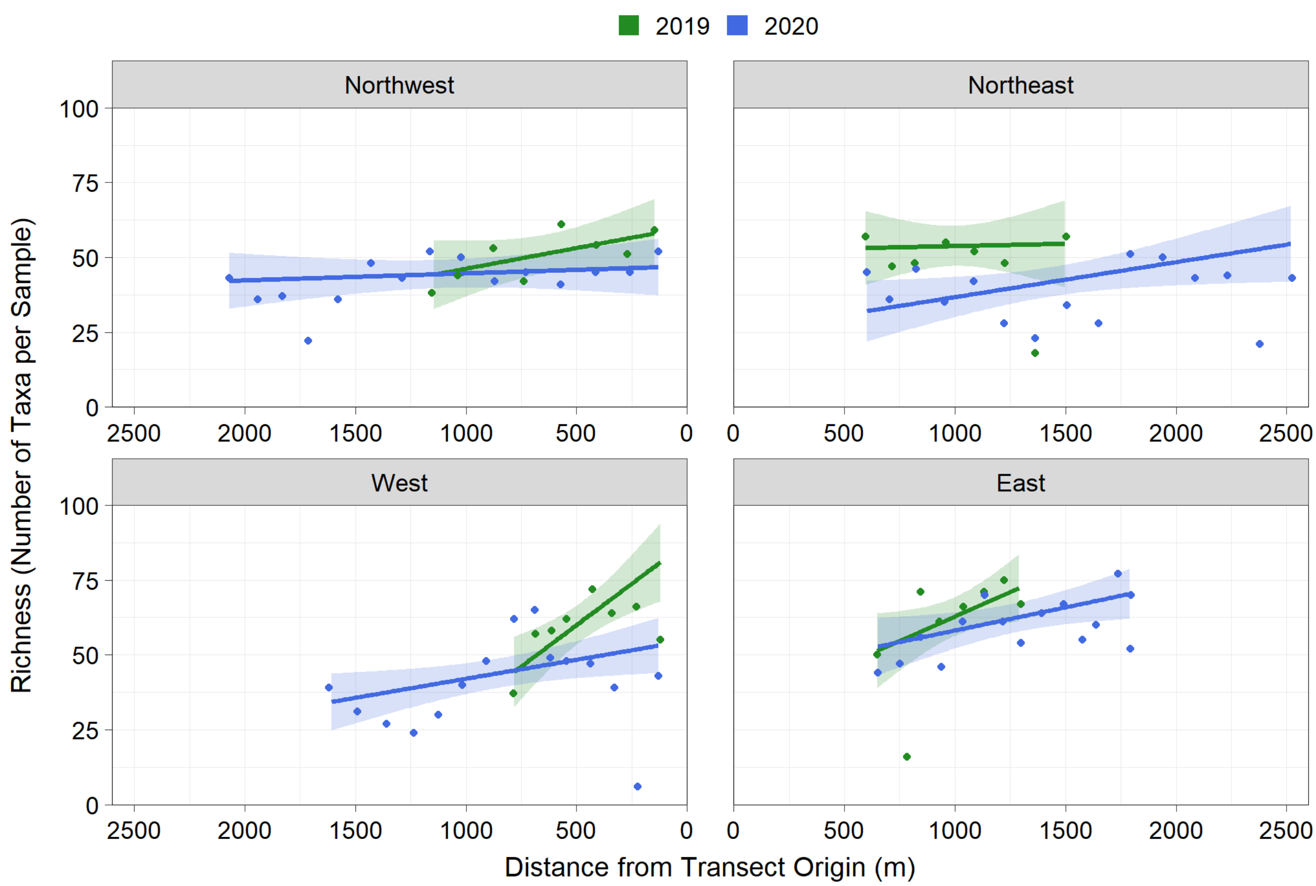


Figure 4-12: Observed (points) and estimated (lines) benthic infauna richness relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

[8] Statistical comparisons beyond 1,500 m from the Ore Dock were not possible since data were not available for the 2019 sampling year.

[9] Statistical comparisons beyond 1,000 m from the Ore Dock were not possible since data were not available for the 2019 sampling year.

Table 4-6: Multiple Comparison of Benthic Infauna Richness between Years, within Distance/Transect Combinations in 2019 and 2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
150	—	—
650	a	a
1,000	a	a
1,500	a	a
West Transect		
150	<u>b</u>	<u>a</u>
650	a	a
1,000	a	a
1,500	—	—
Northeast Transect		
150	—	—
650	a	a
1,000	<u>b</u>	<u>a</u>
1,500	a	a
2,000	—	—
Northwest Transect		
150	a	a
650	a	a
1,000	a	a
1,500	—	—
2,000	—	—

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: "a" is the lowest estimated fines value, "b" representing the next higher, and so on. Underlined letters represent significant, decreasing trends between consecutive years. "—" represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

4.4.3.2.2 2018–2020: Temporal Comparison

Richness was analyzed using a linear regression model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. Additionally, a main effect of percent fines, which was modelled as a second-degree polynomial to account for the non-linearity in richness relative to percent fines, was used to account for the ecological relationship between these two variables. The model explained 65% of the data variability, and the three-way interaction was statistically significant (p-value<0.001; Table 4-7), indicating significant interannual differences in the relationship between richness and distance along different transects. Percent fines was also a statistically significant explanatory variable of benthic infauna richness (p-value<0.001).

A single sample, collected in 2020 at a distance of approximately 224 m from the dock, had a very low fines (3%) content, resulting in low richness. This sample was not found to be a statistical outlier, since the model accounted for the relationship between fines and richness. Comparison of trends between years was not possible for the Northeast Transect because 2019 was the first year that this transect was sampled.

Table 4-7: ANOVA Summary of Benthic Infauna Richness by Year and Transect, 2018-2020

Adj. R^2	Parameter	Df	*F* value	p-value
0.653	Distance from transect origin	1	7.6	0.008
	Year	2	8.8	<0.001
	Transect	2	24.4	<0.001
	Distance × Year	2	2.3	0.109
	Distance × Transect	2	8.9	<0.001
	Year × Transect	4	0.6	0.691
	Distance × Year × Transect	4	5.9	**<0.001**
	Fines	2	22.9	**<0.001**

Notes: Adj. R^2= Adjusted *R* squared value; Df= degrees of freedom. Percent fines was modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Natural log-transformed richness of benthic invertebrates had a linear relationship with distance from the Ore Dock along all transects (Figure 4-13). Although there were some significant differences among years as described below, no consistent differences (i.e., trends) were found among sampling years.

- **East Transect**—richness increased with distance from the Ore Dock in 2020 and 2019 but decreased with distance in 2018 (Figure 4-13). Estimates in 2020 were not significantly different from the previous two years (Table 4-8).
- **West Transect**—richness generally decreased with distance from the Ore Dock in all years (Figure 4-13). At 150 m from the Ore Dock, 2020 richness was significantly lower than 2019 but not 2018 (Table 4-8).
- **North Transect (Northwest Transect in 2019 and 2020)**— richness showed a general decrease with distance in both 2019 and 2020, but not in 2018 (Figure 4-13). In 2020 richness was only significantly lower than 2018 at 1,000 m from the Ore Dock (Table 4-8).

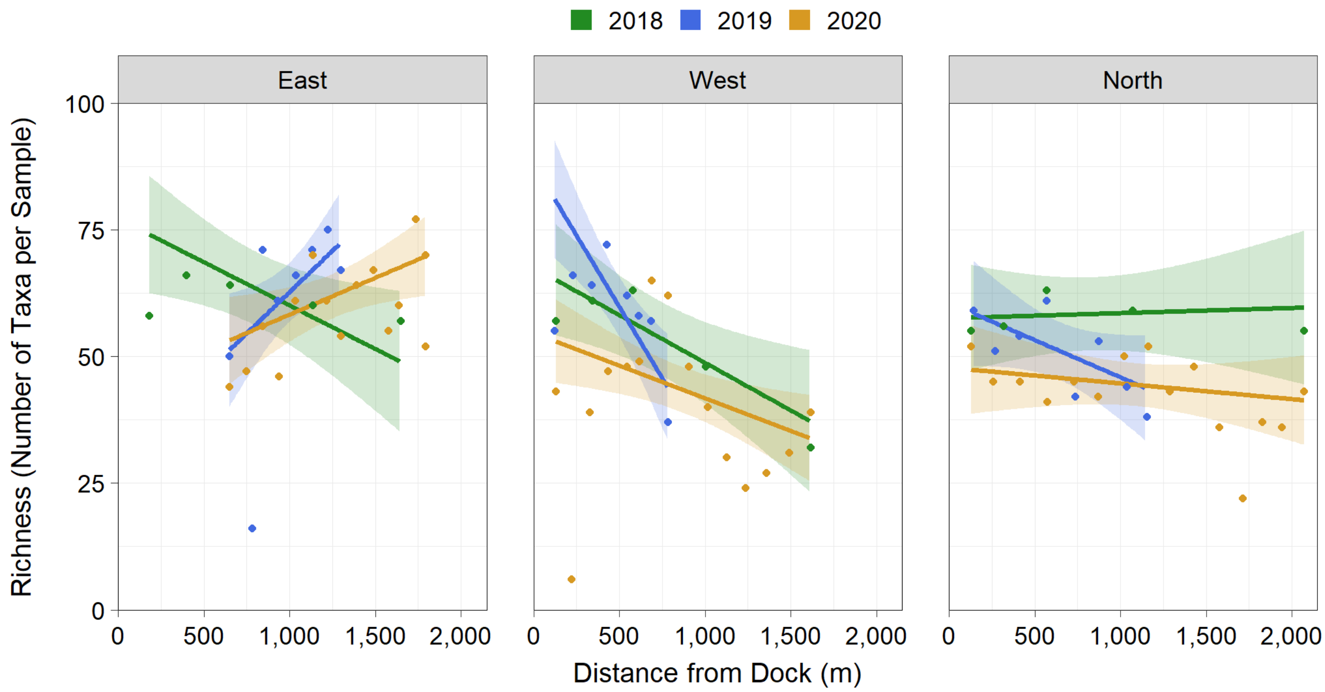


Figure 4-13[10]: Observed (points) and estimated (lines) benthic infauna richness relative to sampling distances along transects, 2018-2020. Ribbons are 95% confidence intervals.

Table 4-8: Multiple Comparisons of Benthic Infauna Richness between Years, within Distance/Transect Combinations, 2018-2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year		
	2018	2019	2020
East Transect			
150	—	—	—
650	b	A	a
1,000	a	A	a
1,500	a	B	ab
West Transect			
150	ab	B	a
650	a	A	a
1,000	a	A	a
1,500	a	—	a
North Transect			
150	a	A	a
650	a	A	a
1,000	b	Ab	a
1,500	a	—	a
2,000	a	—	a

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: "a" is the lowest estimated richness value, "b" representing the next higher, and so on. Grey shading depicts significant, increasing trends between consecutive years and underlined letters represent significant, decreasing trends between consecutive years. "—" represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

[10] North Transect in Figure refers to Northwest Transect in 2019-2020.

4.4.3.3 Simpson's Diversity Index

4.4.3.3.1 2019/2020: Spatial and Temporal Comparison

Simpson's Diversity Index (SDI) was analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. Additionally, a main effect of percent fines was used to account for the ecological relationship between SDI and fines content. Distance was modelled as a second-degree polynomial to account for the non-linearity in SDI relative to distance along the transect. The model explained 65% of the data variability, and the three-way interaction between distance, transect, and year was statistically significant (p-value<0.001; Table 4-9), indicating interannual differences in the relationship between SDI and distance along different transects. Percent fines was not a statistically significant explanatory variable of benthic infauna SDI (p-value=0.756).

Table 4-9: ANOVA Summary of Benthic Infauna Simpson's Diversity Index by Transect in 2019 and 2020

Adj. R^2	Parameter	Df	*F* value	p-value
0.645	Distance from transect origin	2	1.8	0.182
	Year	3	9.8	<0.001
	Transect	5	9.7	<0.001
	Distance x Year	2	3.0	0.055
	Distance × Transect	6	8.3	<0.001
	Year x Transect	3	5.8	0.001
	Distance x Year x Transect	6	8.5	**<0.001**
	Fines	1	0.1	0.756

Notes: Adj. $R2$= Adjusted R squared value; Df= degrees of freedom. Distance was modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Natural log-transformed SDI had a non-linear relationship with distance from the Ore Dock along the Coastal Transects in both sampling years, and in 2019 along the Northeast Transect; otherwise, the relationship was almost linear and generally stable (Figure 4-14). Significant comparisons between 2019 and 2020 were only identified at three distances along the Coastal Transects, and in those instances diversity was higher in 2020 (Figure 4-14, Table 4-10)[11] and as summarized below:

- **East Transect**—SDI showed a general increase with distance from the Ore Dock, peaking at ~1,000 m in 2019 and ~1,500 m in 2020, followed by a decrease at farther distances (Figure 4-14). Diversity did not vary significantly between years, except at a distance of 650 m (2020 >2019) (Table 4-10).
- **West Transect**—SDI generally decreased with distance from the Ore Dock in 2019 and had a shallow U-shape relationship with distance in 2020 (Figure 4-14). Diversity was significantly higher in 2020 compared to 2019 at 650 m and 1,000 m from the Ore Dock (Table 4-10),
- **Northeast and Northwest Transects**—SDI only varied slightly with distance from the Ore Dock and was not significantly different between the two years (Figure 4-14; Table 4-10).

[11] Statistical comparisons at 1,500 m from the Ore Dock was not possible since the data were not available for the 2019 sampling year.

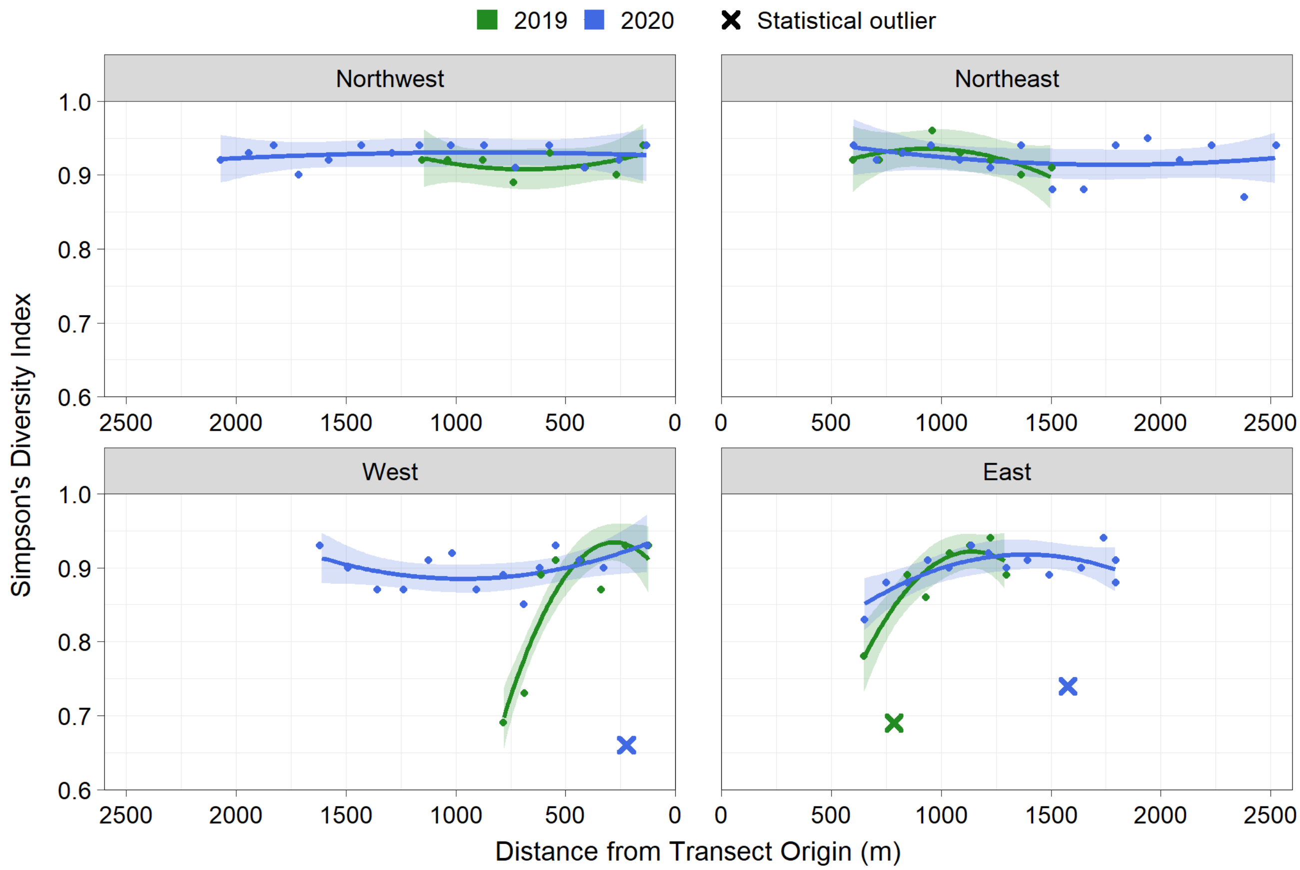


Figure 4-14: Observed (points) and estimated (lines) benthic infauna simpson's diversity index relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

Table 4-10: Multiple Comparisons of Benthic Infauna Simpson's Diversity Index between Years, within Distance/Transect Combinations in 2019 and 2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
150	–	–
650	a	b
1,000	a	a
1,500	a	a
West Transect		
150	a	a
650	a	b
1,000	a	b
1,500	–	–
Northeast Transect		
150	–	–
650	a	a
1,000	a	a
1,500	a	a
2,000	–	–
Northwest Transect		
150	a	a
650	a	a
1,000	a	a
1,500	–	–
2,000	–	–

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: "a" is the lowest estimated fines value, "b" representing the next higher, and so on. Grey shading depicts significant, increasing trends between consecutive years. "—" represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

4.4.3.4 Simpson's Evenness Index

4.4.3.4.1 2019/2020: Spatial and Temporal Comparison

The Simpson's Evenness Index (SEI) was analyzed using a general linear model, with main effects of distance from the Ore Dock, year (as a categorical variable), transect, and all possible interactions between the three variables. Additionally, a main effect of percent fines, which was modelled as a second-degree polynomial to account for the non-linearity in SEI relative to percent fines, was used to account for the ecological relationship between SEI and fines content. Distance was also modelled as a second-degree polynomial to account for the non-linearity in SEI relative to distance along the transect. The model explained 67% of the data variability, and the three-way interaction between distance, transect, and year was not statistically significant (p-value=0.057; Table 4-11). The two-way interaction between distance and transect was significant (p-value=0.041; Table 4-11), indicating differences in the relationship between SEI and distance along different transects. The main effect of year was significant ($p<0.001$), indicating a significant difference in SEI between the two sampling years. Percent fines was a statistically significant explanatory variable of benthic infauna SEI (p-value=0.017).

Table 4-11: ANOVA Summary of Benthic Infauna Simpson's Evenness Index by Transect in 2019 and 2020

Adj. R^2	Parameter	Df	*F* value	p-value
0.671	Distance from transect origin	2	3.7	0.029
	Year	3	7.0	**<0.001**
	Transect	6	14.9	<0.001
	Distance x Year	2	0.3	0.733
	Distance × Transect	6	2.4	**0.041**
	Year x Transect	3	0.9	0.443
	Distance x Year x Transect	6	2.2	0.057
	Fines	2	4.3	**0.017**

Notes: Adj. $R2$= Adjusted R squared value; Df= degrees of freedom. Percent fines and distance were modelled as a second-degree polynomial. p-values of significant interactions (p-value<0.05) and significant main effects (where no significant interactions were found) are shown in bold.

Natural log-transformed SEI had a non-linear relationship with distance from the Ore Dock in 2019 along the Northeast and Northwest Transects, and along the West Transect in 2020, but not in other transect-year combinations (Figure 4-15). Evenness tended to be higher in 2020 compared to 2019 along the West, Northeast, and Northwest Transects, but was similar to 2019 along the East Transect, as summarized below:

- **East Transect**—SEI remained fairly stable with distance from the Ore Dock in 2020 (Figure 4-15) and was not significantly different between years (Table 4-12).
- **West Transect**— in 2020, SEI decreased with distance from the Ore Dock until 750 m, after which there was an increase (Figure 4-15). SEI was only significantly different between years at 150 m and 650 m from the Ore Dock (2020>2019) (Table 4-12)[12].
- **Northeast Transect**— SEI remained relatively stable along the transect length in 2020 (Figure 4-15). SEI was significantly higher in 2020 compared to 2019 at 650 m and 1,500 m from the Ore Dock (Table 4-12), but not at 1,000 m (Figure 4-15)[8].
- **Northwest Transect**— In both years SEI showed an overall increase with distance from the Ore Dock (Figure 4-15) and there were no significant differences between years, except at 650 m from the Ore Dock (2020>2019) (Table 4-12)[13].

[12] Statistical comparison at 1,500 m from the Ore Dock was not possible since the data were not available for the 2019 sampling year.

[13] Statistical comparison at 2,000 m was not possible since the data were not available for the 2019 sampling year.

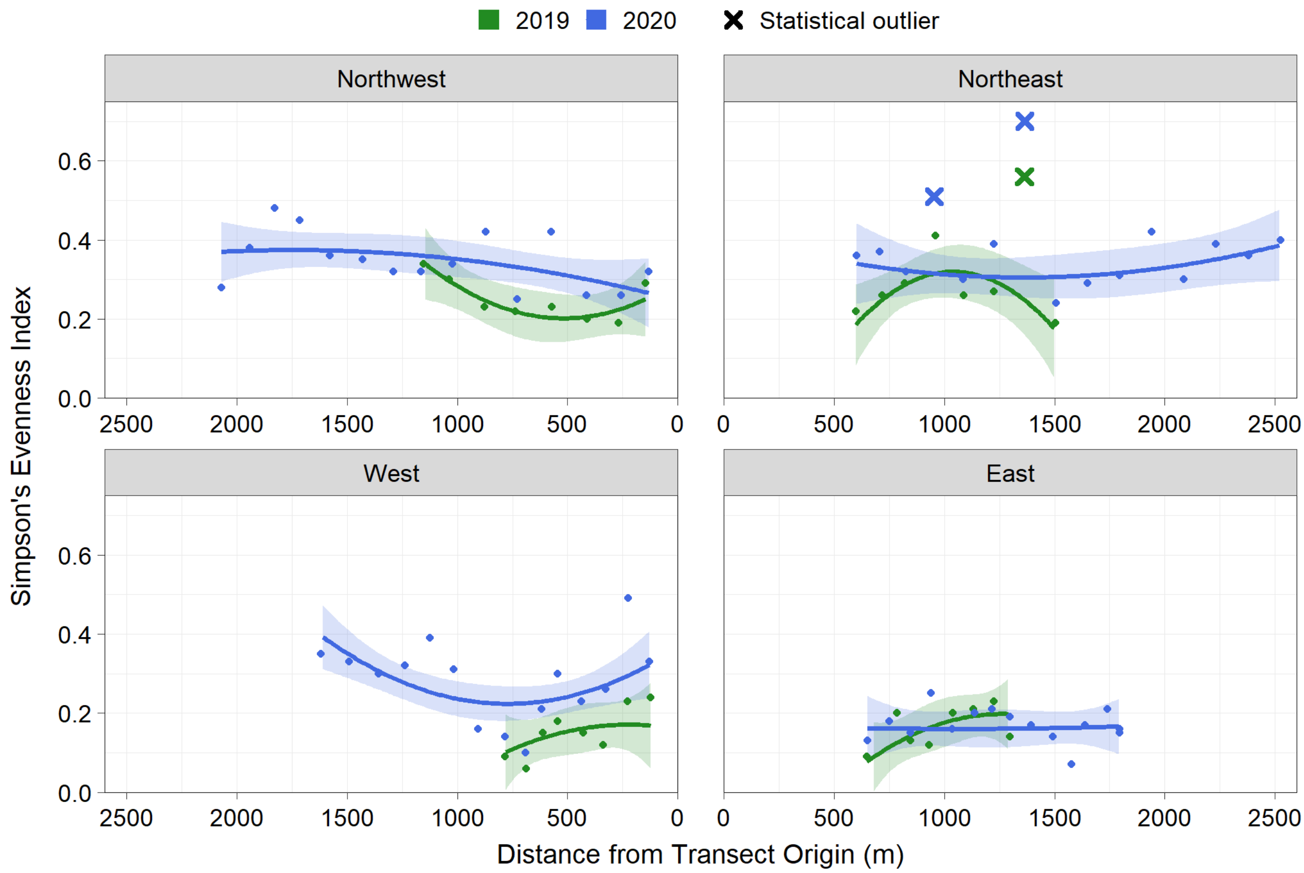


Figure 4-15: Observed (points) and estimated (lines) benthic infauna simpson's evenness index relative to sampling distance along transects in 2019 and 2020. Ribbons are 95% confidence intervals.

Table 4-12: Multiple Comparisons of Benthic Infauna Simpson's Evenness Index between Years, within Distance/Transect Combinations in 2019 and 2020 (Adjusted to Mean Fines)

Transect and Distance from Origin (m)	Sampling Year	
	2019	2020
East Transect		
150	–	–
650	a	a
1,000	a	a
1,500	a	a
West Transect		
150	a	b
650	a	b
1,000	a	a
1,500	–	–
Northeast Transect		
150	–	–
650	a	b
1,000	a	a
1,500	a	b
2,000	–	–
Northwest Transect		
150	a	a
650	a	b
1,000	a	a
1,500	–	–
2,000	–	–

Notes: Years that do not share letters (within every distance in each transect) are significantly different from each other. Increasing letters represent an increase in values: "a" is the lowest estimated fines value, "b" representing the next higher, and so on. Grey shading depicts significant, increasing trends between consecutive years. "—" represents a distance where temporal comparisons could not be made, as samples were not collected at the given distance over the specific sampling period.

4.5 Discussion

As observed in 2018 and 2019, benthic infaunal communities in Milne Inlet were mainly dominated by polychaetes. Malacostraca crustaceans were co-dominant with polychaetes along the Coastal Transects whereas further offshore in deeper waters, polychaetes co-existed with Malacostraca crustaceans, bivalves, and ostracods. These observed differences in relative community composition between the Coastal and Northern Offshore Transects are expected and reflect the natural variation in substrate characteristics between nearshore and offshore habitats as described in Section 3.5. The proportion of fine-grained sediments increased with greater distance from the shore due to internal mixing and sediment redistribution processes, such that finer sediments tended to accumulate further from shore. Closer to shore at shallower depths, substrates were more variable due to the influence of the nearshore environment and features such as Phillips Creek.

Marine benthic infaunal communities are influenced by abiotic factors, such as sediment grain size, organic carbon concentration, depth, inundation time, and salinity (Peterson 1991; Wilson 1991; Eckman 1996; Ricciardi and Bourget 1999; Hyland et al. 2005). When comparing nearshore and offshore habitats, water depth becomes an important consideration as the density and biomass of marine benthic infauna generally decreases with increasing water depth and distance from land (Wei et al. 2010; Degen et al. 2015). The driving force behind this pattern is the decrease in food input, depending on the regionally varying surface production and the assimilation efficiency in the water column (Gage and Tyler 1991; Levin et al. 2003). Productivity (and hence food) tends to be higher in shallower, nearshore habitats, primarily due to increased light penetration through the water column to the bottom sediments, and warmer ambient water temperatures. In deeper waters, such as those along the Northern Offshore Transects, decreased light penetration and colder water temperatures naturally limit benthic habitat productivity. At comparable depths, sediment grain size is likely the single best predictor of benthic invertebrate community characteristics (Ricciardi and Bourget 1999). In general, smaller sediment grain sizes correspond to higher invertebrate abundance, biomass, and diversity (Heck et al. 1995; Sewell 1996) because of the larger available surface area for adhesion of organic particles (i.e., total organic carbon [TOC]), which constitute an important food source for invertebrates. Habitats with finer sediment therefore tend to be naturally more productive and support more abundant communities.

As expected, benthic infauna densities were higher but more variable along the Coastal Transects, relative to those in deeper waters. Within the shallower Coastal environment, benthic densities were naturally higher in sheltered areas characterized by finer sediments but were lower in more exposed areas with sandier substrates (Figure 3-10, Figure 4-2). In addition to density, other indicators were also influenced by differences between coastal and offshore habitats, as well as differences within the coastal habitat such as richness (Figure 4-4), diversity (Figure 4-6), and evenness (Figure 4-8). Total density and richness tended to be lower offshore relative to nearshore as expected in less productive waters. Within the nearshore habitats, both density and richness were higher along the more sheltered East Transect, compared to the more exposed West Transect (also influenced by the inflow of freshwater from Phillips Creek). Variability within the Coastal Transects is likely due to natural variability in substrate type, in addition to the influence of the Phillips Creek inflow, through localized changes in substrate type, hydrology, and water quality (e.g., Total Suspended Solids (TSS), salinity).

In 2020, benthic infaunal communities were diverse throughout the study area and well established in both habitat types (Figure 4-6). There were no consistent differences (i.e., trends, or directional change) between years (2020 vs 2019, or between 2020 vs 2018/2019) in benthic community indicators along each of the four transects. Isolated instances where indicators were significantly different between years did occur; however, in these cases, densities, diversity, and evenness were higher in 2020, with lower richness in 2020 compared to 2019 but not 2018. Statistical differences also tended to occur with greater distance from the Ore Dock rather than closer to the dock. These results do not align with the community response pattern typical of a toxicological impairment due to contaminant exposure (i.e., a significant decrease in both density and richness). If both these indicators were to show a pattern of being significantly reduced, then the community could become increasingly simplified as contaminant-sensitive taxa disappear or numbers are diminished, leaving more tolerant taxa to dominate the community (Environment Canada 2012). However, the 2020 results are more consistent with expected natural variability for these benthic habitat types within Milne Inlet and there is no evidence to suggest that benthic infaunal communities have been affected by the Project. A lack of adverse effects on local benthic communities that can be linked to the Project is consistent with FEIS predictions of no significant adverse residual effects to Arctic char habitat. In 2020, mitigation measures appeared to be functioning as intended and Project operational activities were being managed in a way that did not adversely affect benthic infauna at Milne Port.

It should be noted that one station (SW-2) does stand out as an anomaly in 2020 with substantially reduced density, richness, diversity, and with more evenly distributed taxa. The sediment composition at the station was 96% sand, which was at the extreme end of the substrate variation observed along the Coastal Transects. Sandier sediments would be expected at this station due to the coastal topography as discussed above in Section 3 and as observed in 2019. It is possible there could have been some localized physical disturbance at this station in 2020, but the data suggest that any potential influence on benthic infauna was isolated and small-scale. This observation will undergo additional follow up and potentially targeted sampling as part of future monitoring.

4.6 Conclusions and Recommendations

The successful implementation of the fully expanded benthic infaunal sampling program in 2020 combined with a total of three years of comprehensive data analysis, collectively indicate that the Project has not adversely impacted benthic communities in Milne Port. Evidence for this conclusion is supported by the evaluation of community effect indicators that show benthic communities are healthy and not demonstrating responses indicative of disturbance or contamination. The spatial variability observed in 2020 is to be expected in the coastal and offshore benthic habitats present at Milne Port and remained within the range of variation documented in previous years.

The data suggest that monitoring of benthic infaunal communities is not required annually. Moving forward it is recommended that monitoring of benthic infaunal communities within the study area should continue, but at a reduced monitoring frequency (i.e., every 2-3 years), commensurate with the low magnitude and localized effects of the Project on both marine sediment quality and benthic communities within Milne Inlet. The observation at one station that stood out as an anomaly in 2020 will undergo additional follow up and potentially targeted sampling as part of future monitoring efforts.

4.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

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APPENDIX 4A

Photos

Photo 1 – Benthic sample on 1.0 cm sieve, collected at station SNE-7 on 07 September 2020

Photo 2 – Field crew rinsing benthic samples on the field splitter, collected from station SNE-8 on 07 September 2020

Photo 3 – Benthic sample on 0.50 mm sieve, collected at station SW-2 on 05 August 2020

Photo 4 – Benthic invertebrate sample on 0.50 mm sieve, collected at station SW-3 on 06 August 2020

Photo 5 – Benthic sample on 1.0 cm sieve, collected at station SW-5 on 06 August 2020

Photo 6 – Benthic sample on 1.00 cm sieve, collected at station SW-6 on 15 August 2020

Photo 7 – Benthic sample on 0.50 mm sieve, collected at station SW-15 on 06 September 2020, with cone worm (*Cistenides granulate*)

Photo 8 – Benthic sample on 1.0 cm sieve, collected at station SE-4 on 13 August 2020

Photo 9 – Benthic sample on 1.0 cm sieve, collected at station SE-5 on 13 August 2020

Photo 10 – Benthic sample on 1.0 cm sieve, collected at station SE-14 on 14 August 2020

Photo 11 – Benthic sample on 0.50 mm sieve, collected at station SE-15 on 13 September 2020

Photo 12 – Benthic sample on 1.0 cm sieve, collected at station SNW-3 on 15 August 2020

Photo 13 – Benthic sample on 1.0 cm sieve, collected at station SNW-7 on 04 September 2020

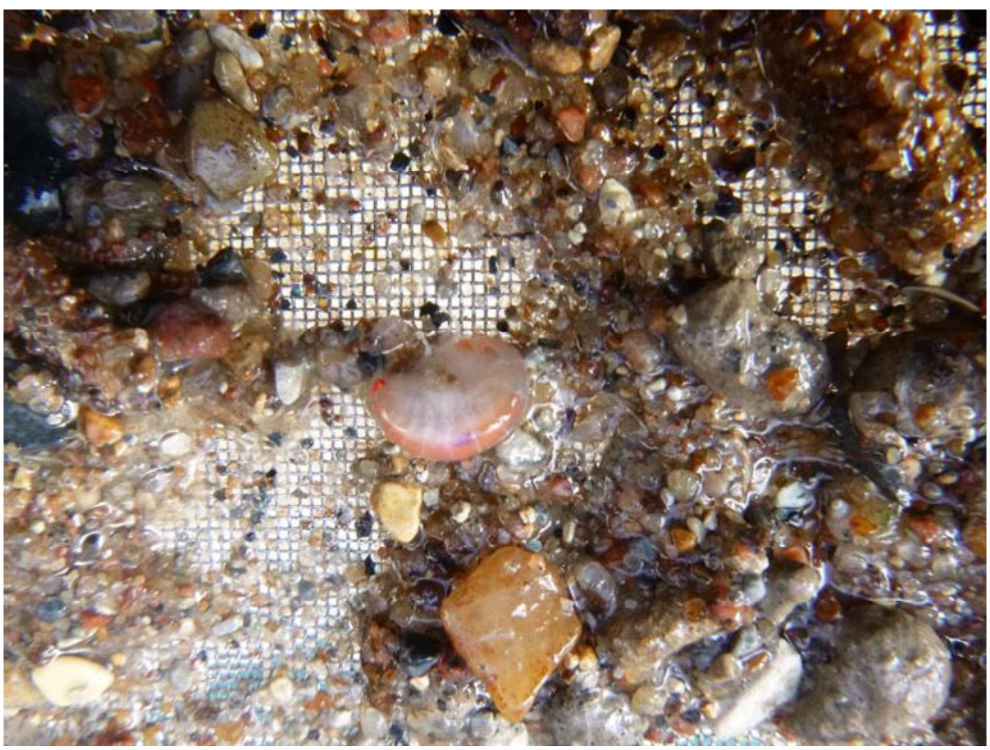

Photo 14 – Amphipod collected at station SNW-7 on 04 September 2020.

Photo 15 – Benthic sample on 0.50 mm sieve, collected at station SNW-15 on 11 September 2020

APPENDIX 4B

Biologica Lab Methods and QA/QC

Marine Benthic Enumeration and Identification Methods
Client: Golder
Project: Baffinland Iron Mine MEEMP, 2020
Protocol: EEM

Sample Inventory

Sample arrival: Aug. 24 & Sept. 28, 2020
Number of samples: 62
Number of jars: 198
Screen size: 500 µm
Biologica project number: 20-045

The chain of custody documents were checked and approved with the client. Samples were transferred from formalin into 70% ethanol, and stained with Rose Bengal to aid in sorting. Each sample was provided a unique identification number and placed in the queue for analysis.

Table 1. Summary of benthic samples processed for Golder Baffinland Iron Mine MEEMP, 2020

Client Sample ID	Date Sampled	Biologica Sample ID	# of Jars	Field Screen	Field Split	Final Split	Organisms Counted
SW-1	5-Aug-20	mb20-045-001	1	500 µm	1/4	1/16	196
			1	1.0 cm	1/4	1/4	29
SW-2	5-Aug-20	mb20-045-002	1	500 µm	1/4	1/16	2
			1	1.0 cm	Whole	Whole	7
SW-3	6-Aug-20	mb20-045-003	1	500 µm	1/4	1/16	173
			2	1.0 cm	Whole	Whole	114
SW-4	6-Aug-20	mb20-045-004	1	500 µm	1/4	1/16	157
			2	1.0 cm	Whole	Whole	94
SW-5	6-Aug-20	mb20-045-005	1	500 µm	1/4	1/16	212
			2	1.0 cm	Whole	Whole	76
SE-1	9-Aug-20	mb20-045-006	2	500 µm	1/4	1/16	171
			2	1.0 cm	Whole	Whole	58
SE-2	9-Aug-20	mb20-045-007	1	500 µm	1/4	1/16	219
			2	1.0 cm	Whole	Whole	62
SE-3	9-Aug-20	mb20-045-008	1	500 µm	1/4	1/16	470
			2	1.0 cm	Whole	Whole	86
SW-6	15-Aug-20	mb20-045-021	1	500 µm	1/4	1/16	256
			1	1.0 cm	Whole	Whole	48
SW-7	18-Aug-20	mb20-045-022	1	500 µm	1/4	1/16	346
			2	1.0 cm	Whole	Whole	97
SW-8	18-Aug-20	mb20-045-023	1	500 µm	1/4	1/16	297
			2	1.0 cm	Whole	Whole	80
SW-9	30-Aug-20	mb20-045-024	1	500 µm	1/4	1/16	270
	29-Aug-20		2	1.0 cm	Whole	Whole	17

Client Sample ID	Date Sampled	Biologica Sample ID	# of Jars	Field Screen	Field Split	Final Split	Organisms Counted
SW-10	30-Aug-20	mb20-045-025	1	500 µm	1/4	1/16	195
			1	1.0 cm	Whole	Whole	40
SW-11	30-Aug-20	mb20-045-026	1	500 µm	1/4	1/16	147
			n/a	1.0 cm	n/a	n/a	0
SW-12	30-Aug-20	mb20-045-027	1	500 µm	1/4	1/16	72
			2	1.0 cm	Whole	Whole	75
SW-13	31-Aug-20	mb20-045-028	1	500 µm	1/4	1/16	111
			1	1.0 cm	Whole	Whole	1
SW-14	13-Aug-20	mb20-045-029	1	500 µm	1/4	1/16	124
			1	1.0 cm	Whole	Whole	7
SW-15	6-Sep-20	mb20-045-030	1	500 µm	1/4	1/16	191
			1	1.0 cm	Whole	Whole	18
SE-4	13-Aug-20	mb20-045-031	2	500 µm	1/4	1/16	267
			2	1.0 cm	1/4	1/4	20
SE-5	13-Aug-20	mb20-045-032	1	500 µm	1/4	1/16	457
			2	1.0 cm	Whole	Whole	84
SE-6	27-Aug-20	mb20-045-033	2	500 µm	1/4	1/16	727
			1	1.0 cm	Whole	Whole	76
SE-7	27-Aug-20	mb20-045-034	2	500 µm	1/4	1/16	446
			3	1.0 cm	Whole	Whole	62
SE-8	27-Aug-20	mb20-045-035	2	500 µm	1/4	1/16	324
			3	1.0 cm	Whole	Whole	40
SE-9	27-Aug-20	mb20-045-036	1	500 µm	1/4	1/16	519
			2	1.0 cm	Whole	Whole	99
SE-10	27-Aug-20	mb20-045-037	1	500 µm	1/4	1/16	653
			4	1.0 cm	Whole	Whole	157
SE-11	28-Sep-20	mb20-045-038	1	500 µm	1/4	1/16	556
			3	1.0 cm	Whole	Whole	105
SE-12	31-Aug-20	mb20-045-039	1	500 µm	1/4	1/16	338
			2	1.0 cm	Whole	Whole	62
SE-13	12-Sep-20	mb20-045-040	2	500 µm	1/4	1/16	671
	11/12-Sept-20		2	1.0 cm	Whole	Whole	72
SE-14	14-Aug-20	mb20-045-041	1	500 µm	1/4	1/16	1214
			2	1.0 cm	Whole	Whole	74
SE-15	13-Sep-20	mb20-045-042	4	500 µm	1/4	1/16	474
			2	1.0 cm	Whole	Whole	36
SNW-1	14-Aug-20	mb20-045-043	2	500 µm	1/4	1/16	174
			2	1.0 cm	Whole	Whole	48
SNW-2	15-Aug-20	mb20-045-044	2	500 µm	1/4	1/16	174
			2	1.0 cm	Whole	Whole	63
SNW-3	15-Aug-20	mb20-045-045	2	500 µm	1/4	1/16	196
			2	1.0 cm	Whole	Whole	23
SNW-4	25-Aug-20	mb20-045-046	2	500 µm	1/4	1/16	101
			2	1.0 cm	Whole	Whole	45

Client Sample ID	Date Sampled	Biologica Sample ID	# of Jars	Field Screen	Field Split	Final Split	Organisms Counted
SNW-5	25-Aug-20	mb20-045-047	2	500 µm	1/4	1/16	155
			1	1.0 cm	1/4	1/4	14
SNW-6	25-Aug-20	mb20-045-048	3	500 µm	1/4	1/16	118
			3	1.0 cm	Whole	Whole	26
SNW-7	13-Sep-20	mb20-045-049	3	500 µm	1/4	1/16	166
			2	1.0 cm	Whole	Whole	23
SNW-8	8-Sep-20	mb20-045-050	2	500 µm	1/4	1/16	171
			2	1.0 cm	1/2	1/2	13
SNW-9	8-Sep-20	mb20-045-051	2	500 µm	1/4	1/16	123
			2	1.0 cm	Whole	Whole	7
SNW-10	9-Sep-20	mb20-045-052	2	500 µm	1/4	1/16	139
	8-Sep-20		2	1.0 cm	1/2	1/2	14
SNW-11	9-Sep-20	mb20-045-053	2	500 µm	1/4	1/16	107
			1	1.0 cm	1/2	1/2	3
SNW-12	9-Sep-20	mb20-045-054	2	500 µm	1/4	1/16	60
			1	1.0 cm	1/2	1/2	0
SNW-13	10-Sep-20	mb20-045-055	1	500 µm	1/4	1/16	78
	9-Sep-20		1	1.0 cm	Whole	Whole	3
SNW-14	10-Sep-20	mb20-045-056	2	500 µm	1/4	1/16	115
			1	1.0 cm	1/2	1/2	5
SNW-15	11-Sep-20	mb20-045-057	2	500 µm	1/4	1/16	112
			3	1.0 cm	Whole	Whole	15
SNE-1	28-Aug-20	mb20-045-058	2	500 µm	1/4	1/16	119
			2	1.0 cm	Whole	Whole	70
SNE-2	28-Aug-20	mb20-045-059	1	500 µm	1/4	1/16	83
			2	1.0 cm	Whole	Whole	21
SNE-3	28-Aug-20	mb20-045-060	2	500 µm	1/4	1/16	109
	29-Aug-20		2	1.0 cm	Whole	Whole	47
SNE-4	29-Aug-20	mb20-045-061	1	500 µm	1/4	1/16	38
			2	1.0 cm	Whole	Whole	54
SNE-5	29-Aug-20	mb20-045-062	1	500 µm	1/4	1/16	131
			2	1.0 cm	Whole	Whole	12
SNE-6	30-Aug-20	mb20-045-063	1	500 µm	1/4	1/16	65
			2	1.0 cm	Whole	Whole	13
SNE-7	7-Sep-20	mb20-045-064	1	500 µm	1/4	1/16	32
			1	1.0 cm	Whole	Whole	2
SNE-8	7-Sep-20	mb20-045-065	1	500 µm	1/4	1/16	65
			1	1.0 cm	Whole	Whole	16
SNE-9	8-Sep-20	mb20-045-066	1	500 µm	1/4	1/16	74
	7-Sep-20		2	1.0 cm	Whole	Whole	9
SNE-10	8-Sep-20	mb20-045-067	1	500 µm	1/4	1/16	162
			2	1.0 cm	Whole	Whole	9
SNE-11	10-Sep-20	mb20-045-068	1	500 µm	1/4	1/16	177
			1	1.0 cm	1/2	1/2	10

Client Sample ID	Date Sampled	Biologica Sample ID	# of Jars	Field Screen	Field Split	Final Split	Organisms Counted
SNE-12	11-Sep-20	mb20-045-069	1	500 µm	1/4	1/16	129
			1	1.0 cm	Whole	Whole	11
SNE-13	12-Sep-20	mb20-045-070	1	500 µm	1/4	1/16	148
			1	1.0 cm	Whole	Whole	15
SNE-14	31-Aug-20	mb20-045-071	1	500 µm	1/4	1/16	64
			1	1.0 cm	Whole	Whole	16
SNE-15	12-Sep-20	mb20-045-072	1	500 µm	1/4	1/16	117
			1	1.0 cm	Whole	Whole	12
BR-1	5-Sep-20	mb20-045-073	1	500 µm	1/4	1/16	467
			2	1.0 cm	Whole	Whole	47
BR-4	16-Aug-20	mb20-045-074	2	500 µm	1/4	1/16	462
			1	1.0 cm	1/4	1/4	34

Sample Processing

Sorting and Subsampling:

All samples were sorted using dissecting microscopes at 10–40x magnification by trained personnel. Microscopic sorting is the only way to ensure >90% of organisms are removed from the debris, which is required by EEM (Environment Canada; Environmental Effects Monitoring) guidelines for marine benthic analyses. To minimize potential sorter bias, samples were distributed among technicians such that no one person sorted all the replicates of a given sample.

Due to historically the large volumes and high abundances in the samples, samples were fractioned in the field into a 1.0 cm macro fraction and 500 µm fine fraction. This strategy was developed to maximize the detection of large and rare individuals in the macro fraction while accurately enumerating smaller organisms in the fine fraction. The macro 1.0 cm fraction was analyzed whole, with all large organisms (>1.0 cm) removed from the sample. The abundances of these large organisms should be comparable to historical estimates (SEM Ltd., 2016; Biologica, 2017–2019). In addition, all large debris in this fraction were checked microscopically, including rocks and other large debris to ensure encrusting organisms were accurately enumerated.

Biologica subsampled the fine 500 µm fraction. The 500 µm fraction was split in the field to 1/4. Biologica subsequently split this fraction by a second 1/4, for a final 1/16 split. Subsampling was done with a Caton tray (Caton, 1991). The sample was spread evenly over a Caton grid, and sequential random quadrats were selected and sorted until the minimum 1/4 split was reached.

Sorting QA/QC:

To ensure sorting efficiency was >95%, whole and/or partial sub-samples were re-sorted. Sorting efficiency was calculated using the following equation (where total count = final total number of organisms in sample):

Sorting efficiency = [1−(# of organisms in spotcheck or re-sort / total organisms)] x 100

*Total organisms includes the original count and the number found from the re-sort

Sorting efficiency QA/QC was performed on 37% of samples. 25–100% of the debris was re-sorted for the selected samples. All samples checked must meet or exceed 95% sorting efficiency. Any samples falling below 95% sorting efficiency were re-sorted in their entirety, and additional checks were undertaken as necessary. For quality assurance, QA re-sorts were performed on 10% of samples. Six samples were randomly selected and re-sorted in their entirety. Refer to Table 2 for sorting efficiency results.

Table 2. Summary of sorting QA/QC results for Golder Baffinland Iron Mine MEEMP, 2020

Client Sample ID	Biologica Sample ID	Sorting Efficiency QA Whole Re-sorts
SW-13	mb20-045-028	98.25%
SNW-7	mb20-045-049	98.25%
SNW-9	mb20-045-051	95.52%
SNW-14	mb20-045-056	98.43%
SNE-5	mb20-045-062	97.89%
SNE-14	mb20-045-071	95.52%
SW-13	mb20-045-028	97.31%
	Average:	**97.31%**

Identification and Invasive Species Detection:

All organisms were identified using a combination of dissecting (10–40x) and compound microscopes (100–1000x) and standard taxonomic keys (see methodological and taxonomic references) to the lowest practicable level (species whenever possible). All specimens were archived in air-tight glass vials with glycerin and 70% ethanol for long-term storage. Taxonomic data were recorded in Biologica's custom database.

During the identification process, taxonomists recorded if any identified taxa were beyond their recorded range and/or potentially introduced (originating from another location) or invasive (both introduced and appearing to proliferate with possible detrimental effects to the ecosystem and/or industry). One taxon was found to be a possible invasive species, *Marenzelleria viridis*. This species was observed in 2019 and sent for external verification to the University of Laval. The identification was agreed upon and has been included again in the 2020 data set. No other taxa observed were identified as invasive taxa. In addition, as verified by the University of Laval in 2019, the polychaete identified as *Sosane sp. nr. wireni* in previous years has been reported this year as *Sosane wireni*. The names of three polychaete taxa have also been corrected in the 2020 data set. These are: *Amphitrite cirrata*, previously identified as *Neoamphitrite affinis*; *Pholoe longa*, previously identified as *Pholoe minuta*; and *Pholoe minuta*, previously identified as *Pholoe tecta*. Individuals have been separated and referenced if verifications are required.

Data Management and Analysis

All data were recorded in Biologica's custom database. Total abundances were extrapolated for samples split in the field to represent the abundance from the whole sample. Organism densities were calculated by dividing the total organism abundance (extrapolated if the sample was split) using the area of a Van Veen grab (0.1 m^2), with three composite Van Veen grabs (3 x 0.1m^2) for each sample.

Results were provided to the Golder project manager in Excel spreadsheets via email.

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APPENDIX 4C

Infauna Data

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Abbreviations & Definitions

Worksheets:

1. Abbreviations & Definitions	Glossary of terms and outline of report.
2. Data - Matrix	Total abundance data in matrix format, including total taxa count per sample and total abundance per sample.
3. Data - Long	Raw abundance data in long format.
4. QC-QA Report	Results of sorting efficiency.
5. Provisional Taxa	Description of unique that are undescribed and assigned internal numbers (e.g., sp. 1, sp.2 etc.)
6. Taxaonomic Updates	Taxonomic updates for historical data considerations and verification purposes.

Life Stages:

A	Adult
Int	Intermediate - has adult features but not of typical reproductive size
J	Juvenile
L	Larvae
N	Nymph
P	Pupa
Col	Colony
Deut	Deutonymph
MEMO	Incidental taxa/fragments not included in data, or whose abundance is not generally captured accurately by 1.0mm screen.
Total Number of Taxa	Number of unique taxa (=species richness), not including higher-order taxa for which there exists a lower-order identification (e.g. not including *Lumbrineris* sp. if there exists *Lumbrineris cruzensis* in the data)
Total Number of Organisms	Total Abundance, not including incidental taxa

Biologica Coding

Major Taxonomic Groups:

Miscellaneous	
BRAC	Brachiopoda
BRYO	Bryozoa
CNAN	Cnidaria Anthozoa
CNHY	Cnidaria Hydrozoa
CNXX	Cnidaria
ENTO	Entoprocta
HEMI	Hemichordata
KINO	Kinorhyncha
NTEA	Nemertea
PHOR	Phoronida
PIXX	Pisces
PLTY	Platyhelminthes
PORI	Porifera
PRIA	Priapulida
SIPN	Sipuncula
TARD	Tardigrada
URAS	Ascidiacea
Annelida	
ANHI	Annelida Hirudinea
ANOL	Annelida Oligochaeta
EURA	Echiura
POER	Polychaeta Errantia
POSE	Polychaeta Sedentaria
POLY	Polychaeta
POXX	Polychaeta indet.
Arthropoda	
CHPY	Chelicerata Pycnogonida
CHAC	Chelicerata Arachnida
CRAM	Crustacea Amphipoda
CRCI	Crustacea Cirripedia
CRCO	Crustacea Copepoda
CRCU	Crustacea Cumacea
CRDE	Crustacea Decapoda
CRIS	Crustacea Isopoda
CRLE	Crustacea Leptostraca
CRMY	Crustacea Mysidacea
CROS	Crustacea Ostracoda
CRTA	Crustacea Tanaidacea
CRXX	Crustacea
Echinodermata	
ECAS	Echinodermata Asteroidea
ECCR	Echinodermata Crinoidea
ECEC	Echinodermata Echinoidea
ECHO	Echinodermata Holothuroidea
ECOP	Echinodermata Ophiuroidea
Mollusca	
MOAP	Mollusca Aplacophora
MOBI	Mollusca Bivalvia
MOCE	Mollusca Cephalopoda
MOGA	Mollusca Gastropoda
MOPO	Mollusca Polyplacophora
MOSC	Mollusca Scaphopoda

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Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organisms/m^2) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-001	mb20-045-002	mb20-045-003	mb20-045-004	mb20-045-005	mb20-045-006	mb20-045-007	mb20-045-008	mb20-045-021	mb20-045-022	mb20-045-023	mb20-045-024	mb20-045-025	mb20-045-026	mb20-045-027	mb20-045-028	mb20-045-029	mb20-045-030	mb20-045-031	mb20-045-032	mb20-045-033	mb20-045-034	mb20-045-035	mb20-045-036	mb20-045-037	mb20-045-038	mb20-045-039	mb20-045-040	mb20-045-041
Client Sample ID										SW-1	SW-2	SW-3	SW-4	SW-5	SE-1	SE-2	SE-3	SW-6	SW-7	SW-8	SW-9	SW-10	SW-11	SW-12	SW-13	SW-14	SW-15	SE-4	SE-5	SE-6	SE-7	SE-8	SE-9	SE-10	SE-11	SE-12	SE-13	SE-14
Date Sampled										5-Aug-20	5-Aug-20	6-Aug-20	6-Aug-20	6-Aug-20	9-Aug-20	9-Aug-20	9-Aug-20	15-Aug-20	18-Aug-20	18-Aug-20	29/30-Aug-20	30-Aug-20	30-Aug-20	30-Aug-20	31-Aug-20	13-Aug-20	6-Sep-20	13-Aug-20	13-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	28-Sep-20	31-Aug-20	10/12-Sept-20	14-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
ANNE	ANHI	Annelida	Clitellata	Rhynchobdellida	Piscicolidae		Mysidobdella sp.	1	48								32		16																			
ANNE	ANOL	Annelida	Clitellata	Enchytraeida	Enchytraeidae		Enchytraeidae indet.	1	144						32									32					16				64					
ANNE	EURA	Annelida	Polychaeta	Echiuroidea	Echiuridae		Echiurus echiurus	1	53															53														
ANNE	POER	Annelida	Polychaeta	Eunicida	Dorvilleidae		Ophryotrocha sp.	1	112														64		48													
ANNE	POER	Annelida	Polychaeta	Eunicida	Dorvilleidae		Parougia caeca	1	64																							16				16		
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Lumbrineridae indet.		1,472																		16				16			64			80	112
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma fragilis	1	6,979			16	1	17				32	16												16		16				96	
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma impatiens	1	624			64	16	80	112	208	112																					32
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma sp.		1,473											16					16			48	112	176	96	96		64	113	80	256	192
ANNE	POER	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphinae	Nothria conchylega	1	2,930																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Glyceridae		Glycera sp.	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Hesionidae	Microphthalminae	Microphthalmus sp.	1	32																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Hesionidae		Nereimyra aphroditoides	1	6,464	240		16	48	48	160	80	304	48	240	208	32	336	480	272	400	400	192	272	112	128	448	512	32	160	32	160		64
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Aglaophamus malmgreni	1	48																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Micronephthys cornuta	1	5,104	144		32	112	176	48	112	192	176	32	16	112	16			16	64	32	112	48	64	64	16	32	144		48	96	352
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys ciliata	1	68							1																					1	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys paradoxa	1	2																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys sp.		2									1																				
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nereididae	Nereidinae	Nereis zonata	1	423	8		6	19	18	3	17	18	17	18	16								116	33	49		16	16	17	2	17	16	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nereididae		Nereididae indet.		81						16			16																	1		32	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe longa	1	7,776	176		112	96	192	32	96	416	336	688	464	368	96	64			96	240	80	352	496	224	160	576	688	128	64	400	400
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe minuta	1	33,456	240		416	464	432	880	960	1,840	944	1,904	928	1,280	448	64			160	352	864	1,872	1,152	1,120	1,216	1,568	2,576	288	400	1,568	2,112
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe sp.		4,048	48		352		384	384	96	752	32		224	128							240					16		224	192	32	144
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eteone longa complex	1	240								16															16				16		
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eteone sp.		368	16									16	16		16	16	64	16	16			16	16					16	16		
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eulalia bilineata	1	1						1																							
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodocinae	Phyllodoce groenlandica	1	34		1													1	16		16											
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		Eteone flava	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Bylgides promamme	1	2																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Gattyana cirrhosa	1	240			2		1	1	1	17	18	2	3		16							3	16	1	16	1	3		3	18	5
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe imbricata	1	211					1						1								32			64	16			33		16	32
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe propinqua	1	1									1																				
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe rarispina	1	16						16																							
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe sp.		82			1			16									1														
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Hesperonoe sp.	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Polynoinae indet.		336									16		16	32	16	32			16		16				16	32	32			16	16
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Bylgides sarsi	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Melaenis loveni	1	1															1														
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Polynoidae indet.		32																		32											
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Ephesiella sp.	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Sphaerodoropsis biserialis	1	96																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Sphaerodoropsis minuta	1	32																		16											
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Anoplosyllinae	Syllides sp.	1	32																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Eusyllinae	Pionosyllis sp.	1	16										16																			
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Exogoninae	Exogone naidina	1	4,272																	48	16	112	208	384	112	128	48	160	80	224	832	1,328
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae		Pionosyllis compacta	1	16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae		Streptospinigera niuqtuut	1	16																					16								
ANNE	POSE	Annelida	Polychaeta	Sabellida	Fabriciidae		Fabriciidae indet.		16																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Fabriciidae		Pseudofabricia sp. nr. aberrans	1	288																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Galathowenia oculata	1	1,044																16									16			32	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Myriochele heeri	1	312																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Owenia fusiformis	1	243																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Chone duneri	1	49												17	32																
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Dialychone sp.		16																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Dialychone sp. 3	1	167														16	39	32	16												
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone analis	1	16																16													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone incolor	1	3,200									224	48	96	208	272	64	16	64	32	112	32	80	256	96	48	240	48	112	144	464	400
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone sp.		209																		16		64	16			16				16	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone sp. 1	1	49																						1							
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Branchiomma sp.	1	2						1					1																		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Dialychone sp. 1	1	400									16		32	16	16								64				16	16	16	128	48
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae indet.		224				32									16								48								64
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae sp. 3	1	144																									16			48	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae sp. 4	1	224																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Serpulidae	Spirorbinae	Bushiella (Jugaria) quadrangularis	1	16																													
ANNE	POSE	Annelida	Polychaeta	Sabellida	Serpulidae	Spirorbinae	Spirorbinae indet.		147	4	2			1					8													1						
ANNE	POSE	Annelida	Polychaeta	Sedentaria	Ampharetidae		Ampharete borealis	1	32												32																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Apistobranchidae		Apistobranchus sp.	1	256																				32	112	32	32				32		
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora caulleryi	1	32																													
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora quadrilobata	1	80											16												16			16	16	16	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora sp.		16																					16								
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Laonice cirrata	1	177																													
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Marenzelleria viridis	1	256														80	48	64	64												
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio (Prionospio) sp.	1	16																													
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio cirrifera	1	48																48													
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio sp.		4,064									112	32	64	176	128	80		80	112	80	48	16	16			16			32	80	48
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Pygospio elegans	1	400										64	32	32								32	16	16		32			64	32	16
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Scolelepis sp.	1	32															16							16							
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spio filicornis	1	16																												16	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spio sp.		32													16									16							
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spionidae indet.		176	16												16			32		32	16										
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete finmarchica	1	16																													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete petersenae	1	1,008			16							16			64	192		16	16	32		80	80	64	16	48	32	64	64	144	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete sp.		48									16		16																		16
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Anobothrus gracilis	1	16																													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Lysippe labiata	1	658											1											1						16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Sosane wireni	1	80																													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinninae	Melinna elisabethae	1	282																													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae		Ampharetidae indet.		144	32			16		16				16																			16
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae		Amphicteis sundevalli	1	19											1		16														1		1
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Aphelochaeta sp.	1	2,320																				96	192	128	32	16	16	176		352	336
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone bathyala	1	5,920	448		96	176	64		16	176	176	48	320	128	64	80			48	48	224	640	512	224	384	144	224	64	208	80	128
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone careyi	1	193										16			16	32	1			112											
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone pigmentata	1	1,424									16	48									48	96	48	16		16	64	80	32	48	48
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone setosa complex	1	880																					128	32	64	16	144	32	48	80	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone sp.		3,568	80			32	16					16	80	112	160	48		48	128	208	80	16	160	64	80	80	16		48	16	80
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Cirratulidae indet.		4,912				32	32	16	144	96	64	32	64	64	32	16			16	16	208	256	144	128	128	32	144	96	144	16	400
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Kirkegaardia sp.	1	48																					16	32							
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Tharyx sp.	1	272																									16				
ANNE	POSE	Annelida	Polychaeta	Terebellida	Flabelligeridae		Diplocirrus hirsutus	1	208																									16	32		32	16
ANNE	POSE	Annelida	Polychaeta	Terebellida	Pectinariidae		Cistenides granulata	1	1,585	352		44	4	56		48	80	16	65		66	46		13		96	81		16	37	80		5	47	55	25	80	48
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Polycirrinae	Polycirrus sp. complex	1	466										16	16	16									32	16	16	16					
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Lanassa venusta venusta	1	192													48	48		16												16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Laphania boecki	1	160														32				16		32	16	32						16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Leaena ebranchiata	1	16																													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Pista maculata	1	317	8		21	8	5	6	6	23	10	41	29	2	5						44	14	8	10	9	10	17	13	2	7	8
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Amphitrite cirrata	1	38					1		1		1	16													17	1			1		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae		Paramphitrite birulai	1	32											16		16																
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae		Terebellidae indet.		96									16																	16		48	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae	Trichobranchinae	Terebellides sp.	1	2,106	16			4	51		64	32	32	129	18	16	16	32					48	48	208	48	96	130	114	82	80	177	273
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae	Trichobranchinae	Trichobranchus glacialis	1	49																									16		1		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae		Trichobranchidae indet.		32																									32				
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Capitella capitata complex	1	320		16						32	16	32	16								16		16				80		16		
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Capitellidae indet.		16																													
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Mediomastus sp.	1	4,704	16		64	16			16	32	32	144	240	112	224	176	112	192	32	48	16	160	80	80	16	128	432	48	192	64	112
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Notomastus sp.	1	472									16																				
ANNE	POSE	Annelida	Polychaeta		Cossuridae		Cossura longocirrata	1	4,560				48	48		32	32	192	272	864	160	16						96	240	96	160	80	144	272	64	32	112	656
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Axiothella sp.	1	49												32													1				
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Clymenura polaris	1	48																													
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Clymenura sp.		112																													
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Euclymeninae indet.		336								16												16							16	64	16
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Microclymene sp.	1	144	16																				64								
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Praxillella gracilis	1	113																													
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Praxillella praetermissa	1	144													16															32	
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Maldaninae	Maldane sarsi	1	4,048	80		33	48	49	16	96	272											48	289	144	48			112	358		224	16
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Nicomachinae	Nicomachinae indet.		17																				16									
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Nicomachinae	Petaloproctus tenuis	1	1																				1									
ANNE	POSE	Annelida	Polychaeta		Maldanidae		Maldanidae indet.		115			1								1																	16	
ANNE	POSE	Annelida	Polychaeta		Maldanidae		Rhodine loveni	1	64																													
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina acuminata	1	128							16	16		48		16										32							
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina cylindricaudata	1	176																					16						32	32	48
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina sp.		176																												80	16
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Leitoscoloplos sp.	1	1,008											16							32	32	16								16	
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Scoloplos armiger	1	497	48		1						16			48							32	32	64	16	32	16	64		64		
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Scoloplos sp.		448	32		16	16		32	80	48		16			16	16					16	16			16	16	64		16		
ANNE	POSE	Annelida	Polychaeta		Orbiniidae		Orbiniidae indet.		32																													16
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea (Strelzovia) antennata	1	16												16																	
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea catherinae	1	128																													

Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organsisms/m²) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-001	mb20-045-002	mb20-045-003	mb20-045-004	mb20-045-005	mb20-045-006	mb20-045-007	mb20-045-008	mb20-045-021	mb20-045-022	mb20-045-023	mb20-045-024	mb20-045-025	mb20-045-026	mb20-045-027	mb20-045-028	mb20-045-029	mb20-045-030	mb20-045-031	mb20-045-032	mb20-045-033	mb20-045-034	mb20-045-035	mb20-045-036	mb20-045-037	mb20-045-038	mb20-045-039	mb20-045-040	mb20-045-041
Client Sample ID										SW-1	SW-2	SW-3	SW-4	SW-5	SE-1	SE-2	SE-3	SW-6	SW-7	SW-8	SW-9	SW-10	SW-11	SW-12	SW-13	SW-14	SW-15	SE-4	SE-5	SE-6	SE-7	SE-8	SE-9	SE-10	SE-11	SE-12	SE-13	SE-14
Date Sampled										5-Aug-20	5-Aug-20	6-Aug-20	6-Aug-20	6-Aug-20	9-Aug-20	9-Aug-20	9-Aug-20	15-Aug-20	18-Aug-20	18-Aug-20	29/30-Aug-20	30-Aug-20	30-Aug-20	30-Aug-20	31-Aug-20	13-Aug-20	6-Sep-20	13-Aug-20	13-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	28-Sep-20	31-Aug-20	10/12-Sept-20	14-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea hartmanae	1	544						32													16									32	
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea minuta	1	752						48			16										80	48	80	32	32	48	112		96	80	16
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea nolani	1	992					32					64			16						16				16	16	112		32		128
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea sp.		176											16									64	16							16	32
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Paraonidae indet.		128				16																									
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Paraonides sp.	1	32																									32				
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Polyphysia baffinensis	1	32																													
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Polyphysia crassa	1	48																												16	
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Scalibregma inflatum	1	4,914	48		64	32	80	16	32	96	160	256	224	176	384	64	128	16	32	16	96	128	352	352	96	528	432	113	64	384	256
ARTH	CHAR	Arthropoda	Arachnida	Trombidiformes	Halacaridae		Halacaridae indet.	1	64								16																					
ARTH	CHPY	Arthropoda	Pycnogonida	Pantopoda	Nymphonidae		Nymphon hirtipes	1	6			1							4	1																		
ARTH	CHPY	Arthropoda	Pycnogonida	Pantopoda	Nymphonidae		Nymphon sp.		38																							16	3	1				
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Ampelisca eschrichtii	1	16								16																					
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Ampeliscidae indet.		32							16				16																		
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Byblis sp.	1	128																													80
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Haploops sp.		112								96															16						
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Haploops tubicola	1	130							1														16			32		16	33	16	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Amphilochidae		Amphilochidae indet.	1	16																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Aoridae		Aoridae indet.	1	64																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylinae	Atylus carinatus	1	65										1																		64	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylinae	Atylus sp.		32																													16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae	Corophiinae	Crassicorophium clarencense	1	16																	16												
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae	Protomedeiinae	Protomedeia sp.	1	16																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae		Corophiidae indet.		48														32		16													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dexaminidae	Prophliantinae	Guernea nordenskioldi	1	9,520			80	160	288	176	144	688	112	48	80	80					16		256	448	1,072	576	528	880	288	352	432	784	1,072
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dulichiidae		Dulichia sp.	1	64												32	32																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dulichiidae		Dyopedos sp.	1	16											16																		
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ischyroceridae		Ischyroceridae indet.	1	16										16																			
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Melphidippidae		Melphidippa sp.	1	16																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Aceroides latipes	1	176																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Bathymedon obtusifrons	1	16																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Bathymedon sp.		256							16																	32					
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Deflexilodes sp.	1	32								32																					
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Monoculodes sp.	1	272											32			32		32		16		16			16	48				16	16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Monoculopsis sp.	1	96																48			32										
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Oedicerotidae indet.		1,232			32					16	16		48	32	48	32	96	176	48	128		16	80	48	16	80	80		16		48
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Paroediceros lynceus	1	144												16													16		16	16	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Paroediceros sp.		49							16			16					1														
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Rostroculodes sp.	1	192											16	32	16	32				16			16								16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Westwoodilla sp.	1	320							16		32	128																			80
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Phoxocephalidae	Harpiniinae	Harpinia serrata	1	272						16																							
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Podoceridae		Podoceridae indet.		16																				16									
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Pontogeneiidae		Pontoporeia femorata	1	3,184				16		16	32	48			16									32	208	240	96		96	304	16	48	1,200
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Stenothoidae		Stenothoidae indet.	1	64											16	16				16											16		
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Synopiidae		Tiron spiniferus	1	16																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Gronella groenlandica	1	48											48																		
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Hippomedon sp.	1	32																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomene sp.	1	48		16																											
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella minuta	1	32																			32										
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella pinguis	1	32																													
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella sp.		80				16																						16			
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Tryphosidae indet.		192										32											16			32				32	16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx lilljeborgi	1	16								16																					
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx nugax	1	16																										16			
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx ochoticus	1	1																	1												
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx sarsi	1	49								1		16								16	16										
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx sp.		193	16							16	16	16				16	16			1							64				32
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Onisimus sp.	1	224															160	16	16					32							
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Uristidae indet.		64																									16				
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda			Amphipoda indet.		128						16						16											16						
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda			Lysianassoidea indet.		704						48										16		608											
ARTH	CRCI	Arthropoda	Hexanauplia	Sessilia			Balanomorpha indet.	1	8	4									3																			
ARTH	CRCO	Arthropoda	Hexanauplia	Cyclopoida			Cyclopoida indet.	1	32																												16	
ARTH	CRCO	Arthropoda	Hexanauplia	Harpacticoida			Harpacticoida indet.	1	96																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Brachydiastylis resima	1	15,936			48	16			16						16							80	2,048	1,136	32	96	1,232	4,256	1,312	704	3,600
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis bradyi	1	80																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis goodsiri	1	80																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis lucifera	1	80					16																								
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis rathkei	1	400									32		16								32	16		16	32			32	64	48	80
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis scorpioides	1	1,104					16	32	16	48	32		32	16		16					32	32	160	48	112	32	32	16	64	64	80
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis sp.		448			16		32	16		16		16	32	16								32			16		16		32	16	96
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis spinulosa	1	96																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Lampropidae		Lamprops fuscatus	1	2,976			32	64	160	16	128		48	160	32	160	80	96	48	144	240	80	48	80	160	64	32	272	160	64	112	128	304
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Lampropidae		Lamprops sp.		288								256													16			16					
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella emarginata	1	32																			16										
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella sp.		464					16																	16			16				288
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella truncatula	1	352				16	16	16														16	64			16		16		16	160
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon nasica	1	752				16	16		16	64									16					32		256	16			176	
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon nasicoides	1	816					16	64			128		32								64	32	64	48	64	16	64	16			80
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon sp.		656												16										16	16	272	32			48	80
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Nannastacidae		Campylaspis rubicunda	1	32																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Nannastacidae		Nannastacidae indet.		48																													
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea			Cumacea indet.		64								16																					
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Crangonidae indet.		1																	1												
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Sabinea septemcarinata	1	4								2		1																			
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Sclerocrangon sp.	1	16								16																					
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Thoridae		Lebbeus polaris	1	2											2																		
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Desmosomatidae		Desmosomatidae indet.	1	352																													80
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Gnathiidae		Gnathia sp.	1	144								16																					
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Gnathiidae		Gnathiidae indet.		128	16																							16				16	16
ARTH	CROS	Arthropoda	Ostracoda	Myodocopida	Philomedidae		Philomedes sp.	1	19,072	160		512	416	384	128	272	736	480	208	16	32						32	256	560	624	160	272	1,024	960	592	128	784	2,432
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Akanthophoreidae		Akanthophoreus sp.	1	2,992			16	16	16	16			48			32	48		16	48	16	32		48	432	272	80	128	176	176	96	160	512
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Pseudotanaidae		Pseudotanais sp.	1	1,104												16								48	96	64	48	16	32	128	32	128	224
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Sphyrapodidae	Pseudosphyrapodinae	Pseudosphyrapus anomalus	1	336																													
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Typhlotanaidae		Typhlotanais sp.	1	816			16	32	32	16		128	32											80		32		48			32	16	
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea			Tanaidacea indet.		128																					16								
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Diamesinae	Diamesa sp.	1	32															16	16													
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Cricotopus/Orthocladius sp. Complex	1	16																16													
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Eukiefferiella sp.	1	32															16	16													
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Orthocladiinae indet.		48															32			16											
ARTH	INDI	Arthropoda	Insecta	Diptera	Empididae	Clinocerinae	Clinocera sp.	1	16																		16											
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus pallidus	1	1																													
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus droebachiensis	1	27			1	1		2		1		4	3								4	1		2		2	1		2	1	
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus sp.		33				1		4	1	1	16	3									4			2							
ECHI	ECHO	Echinodermata	Holothuroidea	Apodida	Myriotrochidae		Myriotrochus rinkii	1	98												64					1												
ECHI	ECHO	Echinodermata	Holothuroidea	Apodida			Apodida indet.		48																	16	16											
ECHI	ECHO	Echinodermata	Holothuroidea	Molpadida	Eupyrgidae		Eupyrgus scaber	1	16																													
ECHI	ECOP	Echinodermata	Ophiuroidea	Amphilepidida			Amphilepidida indet.	1	1																													1
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiopyrgidae		Ophiopleura borealis	1	6																													
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiocten affinis	1	983																						1							
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura robusta	1	120	16		17							16		2	17												18	1		16	
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura sarsii	1	78		2			1		3	2			2					1	2			1	2			2					
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura sp.		38			2	2	1					1																			
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae		Ophiuridae indet.		112										16														16					
ECHI	ECOP	Echinodermata	Ophiuroidea				Ophiuroidea indet.		192																													
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Calloporidae		Calloporidae indet.	1	16																													
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Escharellidae		Escharella sp.	1	32																													
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Eucrateidae		Eucratea sp.	1	1																													
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Myriaporidae		Leieschara sp.	1	32																													
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida			Cheilostomatida indet.		7																					2								
MISC	BRYO	Bryozoa	Gymnolaemata	Ctenostomatida	Alcyonidiidae		Alcyonidium sp.	1	7																													
MISC	BRYO	Bryozoa	Gymnolaemata	Gymnolaemata	Calloporidae		Calloporidae indet.	1	25	4					1															1								
MISC	BRYO	Bryozoa	Stenolaemata	Cyclostomatida	Crisiidae		Crisia sp.	1	32																													
MISC	BRYO	Bryozoa	Stenolaemata	Cyclostomatida	Tubuliporidae		Tubulipora sp.	1	112																													
MISC	BRYO	Bryozoa					Bryozoa indet.		16																													
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria	Edwardsiidae		Edwardsiidae indet.	1	64																													
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria	Halcampidae		Halcampa sp.	1	32																													
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria			Actiniaria indet.		18																													
MISC	CNAN	Cnidaria	Anthozoa	Spirularia	Cerianthidae		Cerianthus lloydii	1	16																													
MISC	CNAN	Cnidaria	Anthozoa				Anthozoa indet.		16																													
MISC	CNHY	Cnidaria	Hydrozoa	Anthoathecata	Bougainvilliidae		Bougainvilliidae indet.	1	41													5		10		2	5						2			1		
MISC	CNHY	Cnidaria	Hydrozoa	Anthoathecata			Anthoathecata indet.		21																													
MISC	CNHY	Cnidaria	Hydrozoa	Leptothecata			Leptothecata indet.	1	32																					32								
MISC	CNHY	Cnidaria	Hydrozoa	Limnomedusae	Monobrachiidae		Monobrachium parasitum	1	374	16			17	34		16	1	2	1		2	2	16				16		16		1		48	1		18	1	
MISC	CNHY	Cnidaria	Hydrozoa				Hydrozoa indet.		437				16				1	16		16	16	32	64		16	16	16	32					16	16			64	32
MISC	ENTO	Entoprocta		Coloniales	Barentsiidae		Barentsia sp.	1	16																													
MISC	ENTO	Entoprocta					Entoprocta indet.		1																													
MISC	HEMI	Hemichordata	Enteropneusta				Enteropneusta indet.	1	32																													
MISC	NTEA	Nemertea	Hoplonemertea	Monostilifera	Amphiporidae		Amphiporus sp.	1	16										16																			
MISC	NTEA	Nemertea	Hoplonemertea	Monostilifera	Tetrastemmatidae		Tetrastemmatidae indet.	1	32											16	16																	
MISC	NTEA	Nemertea	Hoplonemertea				Hoplonemertea indet.		1,024	16												32	16							48		48		16		16	48	128

Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organsisms/m^2) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-001	mb20-045-002	mb20-045-003	mb20-045-004	mb20-045-005	mb20-045-006	mb20-045-007	mb20-045-008	mb20-045-021	mb20-045-022	mb20-045-023	mb20-045-024	mb20-045-025	mb20-045-026	mb20-045-027	mb20-045-028	mb20-045-029	mb20-045-030	mb20-045-031	mb20-045-032	mb20-045-033	mb20-045-034	mb20-045-035	mb20-045-036	mb20-045-037	mb20-045-038	mb20-045-039	mb20-045-040	mb20-045-041
Client Sample ID										SW-1	SW-2	SW-3	SW-4	SW-5	SE-1	SE-2	SE-3	SW-6	SW-7	SW-8	SW-9	SW-10	SW-11	SW-12	SW-13	SW-14	SW-15	SE-4	SE-5	SE-6	SE-7	SE-8	SE-9	SE-10	SE-11	SE-12	SE-13	SE-14
Date Sampled										5-Aug-20	5-Aug-20	6-Aug-20	6-Aug-20	6-Aug-20	9-Aug-20	9-Aug-20	9-Aug-20	15-Aug-20	18-Aug-20	18-Aug-20	29/30-Aug-20	30-Aug-20	30-Aug-20	30-Aug-20	31-Aug-20	13-Aug-20	6-Sep-20	13-Aug-20	13-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	27-Aug-20	28-Sep-20	31-Aug-20	10/12-Sept-20	14-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
MISC	NTEA	Nemertea	Palaeonemertea		Carinomidae		Carinoma sp.	1	1															1														
MISC	NTEA	Nemertea	Palaeonemertea		Cephalotrichidae		Cephalothrix sp.	1	240	16										16										16				16				
MISC	NTEA	Nemertea	Palaeonemertea		Tubulanidae		Tubulanus sp.	1	32																													
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Cerebratulus sp.	1	16																													
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Lineidae indet.		582					1		16	32	16		2	16							16	32		16	32	1	32	18	16	32	
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Lineus sp.	1	48				16						32																			
MISC	NTEA	Nemertea					Nemertea indet.		80	16																												
MISC	PIXX	Chordata	Actinopterygii (Pisces)	Scorpaeniformes	Cottidae		Cottidae indet.	1	16				16																									
MISC	PORI	Porifera	Calcarea				Calcarea indet.	1	22	4																				1								
MISC	PORI	Porifera	Demospongiae				Demospongiae indet.	1	2																					2								
MISC	PRIA	Cephalorhyncha	Priapulida	Priapulomorpha	Priapulidae		Priapulus caudatus	1	16																													
MISC	PRIA	Cephalorhyncha	Priapulida	Priapulomorpha	Priapulidae		Priapulus sp.		96												80																	
MISC	PRIA	Cephalorhyncha	Priapulida				Priapulida indet.		32											32																		
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Golfingia sp.	1	16																													
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Golfingiidae indet.		242									1																				
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Nephasoma sp.	1	48																													
MISC	URAS	Chordata	Ascidiacea	Aplousobranchia			Aplousobranchia indet.	1	4																													
MISC	URAS	Chordata	Ascidiacea	Phlebobranchia	Ascidiidae		Ascidia sp.	1	2				1						1																			
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Pyuridae		Boltenia echinata	1	5								1	1															2		1			
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Pyuridae		Boltenia sp.		1																					1								
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Styelidae		Polycarpa fibrosa	1	2			1							1																			
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Styelidae		Polycarpa sp.		8	4										1															1			
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia			Stolidobranchia indet.		19																					2					1			
MISC	URAS	Chordata	Ascidiacea				Ascidiacea indet.		32																												32	
MOLL	MOAP	Mollusca	Caudofoveata	Chaetodermatida	Chaetodermatidae		Chaetoderma sp.	1	325																													
MOLL	MOAP	Mollusca	Caudofoveata				Caudofoveata indet.		96																													
MOLL	MOBI	Mollusca	Bivalvia	Adapedonta	Hiatellidae		Hiatella arctica	1	1,369	76		56	84	42	26	76	59	16	157	16	49	50					23	28	38	87	38	11	55	83	37		93	47
MOLL	MOBI	Mollusca	Bivalvia	Arcida	Arcidae		Bathyarca glacialis	1	77																													
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae	Clinocardiinae	Ciliatocardium ciliatum	1	35				3				2												17	1	2		2		1		1	2
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae	Clinocardiinae	Serripes groenlandicus	1	205	36		18	1	17	1		3		2	16	2		16	1		16	16		17			1	18	3				16
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae		Cardiidae indet.		16																													
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macoma calcarea	1	1,077	16		20	21	36	1	18	3	6	25	27	3	23	64			32	18	12	19	20	27	1	65	2	14	26	20	40
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macoma moesta	1	161	4			17	16		32	2		1										1						1	1	17	17
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macominae indet.		1,394	64		64	112	64	32			16	32	16	32	16			16	48		64	32	16			64	33	48	32	112	96
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte borealis	1	1,579	152		72	28	80	36	57	95	82									1	16	78	97	87	47	127	62	63	59	86	62
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte montagui	1	3,362	168		146	176	97	129	241	245		16									64	113	179	144	96	160	67	197	48	237	164
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte sp.		672	32		64		64		16	96											16		48	48		48	16	64		32	
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Axinopsida sp.	1	864	48				48	16				32	16		96	160			96	96				16			16	32			
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Thyasira sp.	1	1,312	144		96	32	16	16	64	32	32										16	16			48	32	48			32	
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Thyasiridae indet.		464						16													64				32						
MOLL	MOBI	Mollusca	Bivalvia	Myida	Myidae		Mya sp.		64																									16				48
MOLL	MOBI	Mollusca	Bivalvia	Myida	Myidae		Mya truncata	1	854	32				34	34	18	21	50	50	50	33	52		1				16	51	50	33	16	24	37	39		20	71
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae	Musculinae	Musculus discors	1	86			1	1			16	1	16		17	17						16											
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae	Musculinae	Musculus niger	1	20																													
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Dacrydium vitreum	1	32																													
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Musculus sp.	1	16																													
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Mytilidae indet.		64																									16				16
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana minuta	1	1,219	64		112	16	16		48	16	64	83		32						48	48	48	32	16		160	48	80	48	16	48
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana pernula	1	66																													2
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana sp.		208			32				32	16	48			16									16	16							
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Portlandia arctica	1	1																												1	
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiella frigida	1	64																													
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiella sp.		336											16																		
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiidae indet.		128																													
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida			Nuculanoidea indet.		176																			32					16					
MOLL	MOBI	Mollusca	Bivalvia	Nuculida	Nuculidae		Ennucula tenuis	1	1,137	16					16	16			16	16	16						32	16				16	16	1		16		16
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Pectinidae	Pedinae	Chlamys islandica	1	6	4									1											1								
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Pectinidae		Pectinidae indet.		1					1																								
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Propeamussiidae		Propeamussiidae indet.		96																													
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Propeamussiidae		Similipecten greenlandicus	1	242	8	2	4	8	12	1	5	3	2	6								1					1	1					
MOLL	MOBI	Mollusca	Bivalvia		Cuspidariidae		Cuspidaria sp.	1	64																													
MOLL	MOBI	Mollusca	Bivalvia		Periplomatidae		Periploma aleuticum	1	19					16																								1
MOLL	MOBI	Mollusca	Bivalvia		Thraciidae		Thracia myopsis	1	6																													
MOLL	MOBI	Mollusca	Bivalvia				Bivalvia indet.		304			32											48											16				
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Acteonidae		Acteocina sp.	1	112				16			16					16							16						32				
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichna alba	1	32																													
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichna sp.		80											16							16											
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichnidae indet.		32																													
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichnoides occultus	1	48										16																			16
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Philinidae		Philininae indet.	1	32																													
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Retusidae		Retusa sp.	1	160																				32	32			16		32		16	16
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea			Cephalaspidea indet.		160																					16			16	16				
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Capulidae		Ariadnaria borealis	1	32										16																			
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Naticidae	Polinicinae	Euspira pallida	1	129				17	16		16	16																				32	
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Naticidae		Naticidae indet.		16																									16				
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Rissoidae		Boreocingula castanea	1	160								48												16			16			16	16		
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Rissoidae		Rissoidae indet.		144			16		48																16			32			16		
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Buccinidae		Buccinum hydrophanum	1	3										1															1				1
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Cancellariidae	Admetinae	Admete viridula	1	32					16													16											
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Mangeliidae		Mangeliidae indet.	1	144	16																											16	
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Colloniidae		Moelleria costulata	1	16																													
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites helicinus	1	1																										1			
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites olivaceus	1	16																													
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites sp.		32																													
MOLL	MOGA	Mollusca	Gastropoda		Lepetidae		Lepeta caeca	1	263																													
MOLL	MOGA	Mollusca	Gastropoda				Gastropoda indet.		160							32					16						16			16	16							
MOLL	MOGA	Mollusca	Gastropoda				Patellogastropoda indet.		33						1				16																			
MOLL	MOPO	Mollusca	Polyplacophora	Chitonida	Tonicellidae	Tonicellinae	Tonicella marmorea	1	17						1																							
MOLL	MOSC	Mollusca	Scaphopoda	Gadilida	Gadilidae		Gadilidae indet.		64																													
MOLL	MOSC	Mollusca	Scaphopoda	Gadilida	Gadilidae		Siphonodentalium lobatum	1	32																													
							Total Abundance		**237,145**	**3,236**	**39**	**2,880**	**2,606**	**3,468**	**2,793**	**3,550**	**7,590**	**4,144**	**5,617**	**4,832**	**4,337**	**3,160**	**2,336**	**1,211**	**1,745**	**1,991**	**3,074**	**4,352**	**7,396**	**11,372**	**7,198**	**5,224**	**8,371**	**10,541**	**9,001**	**5,470**	**10,808**	**19,495**
							Total Unique Taxa (Species Richness)	**265**		**43**	**6**	**39**	**48**	**49**	**44**	**47**	**56**	**49**	**65**	**62**	**48**	**39**	**30**	**26**	**30**	**31**	**41**	**46**	**61**	**69**	**61**	**54**	**64**	**67**	**55**	**60**	**77**	**69**
							Grab Sampler		**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**
							# of Composite Grabs		**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
							Total Density (Organisms/m^2)		**790,483**	**10,787**	**130**	**9,600**	**8,687**	**11,560**	**9,310**	**11,833**	**25,300**	**13,813**	**18,723**	**16,107**	**14,457**	**10,533**	**7,787**	**4,037**	**5,817**	**6,637**	**10,247**	**14,507**	**24,653**	**37,907**	**23,993**	**17,413**	**27,903**	**35,137**	**30,003**	**18,233**	**36,027**	**64,983**
Freshwater taxa:																																						
MEMO	MEMO	Arthropoda	Arachnida				Acari indet. (freshwater)		64														16	16	32													
Incidental Taxa:																																						
MEMO	MEMO	Arthropoda	Hexanauplia				Copepoda indet. (parasitic)		53			1			1																		16	16				3
MEMO	MEMO	Arthropoda	Ostracoda				Ostracoda indet. (planktonic)		32								16																16					
MEMO	MEMO	Arthropoda					Isopoda indet. (parasitic)		1			1																										
MEMO	MEMO	Arthropoda					Themisto libellula (planktonic)		16																													
MEMO	MEMO	Echinodermata					Apodida indet. (fragments)		16										16																			
MEMO	MEMO	Nematoda					Nematoda indet.		64	16						16														16				16				
MEMO	MEMO						Egg/egg mass		417																					320				32				

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Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organsisms/m^2) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-042	mb20-045-043	mb20-045-044	mb20-045-045	mb20-045-046	mb20-045-047	mb20-045-048	mb20-045-049	mb20-045-050	mb20-045-051	mb20-045-052	mb20-045-053	mb20-045-054	mb20-045-055	mb20-045-056	mb20-045-057	mb20-045-058	mb20-045-059	mb20-045-060	mb20-045-061	mb20-045-062	mb20-045-063	mb20-045-064	mb20-045-065	mb20-045-066	mb20-045-067	mb20-045-068	mb20-045-069	mb20-045-070	mb20-045-071	mb20-045-072	mb20-045-073	mb20-045-074
Client Sample ID										SE-15	SNW-1	SNW-2	SNW-3	SNW-4	SNW-5	SNW-6	SNW-7	SNW-8	SNW-9	SNW-10	SNW-11	SNW-12	SNW-13	SNW-14	SNW-15	SNE-1	SNE-2	SNE-3	SNE-4	SNE-5	SNE-6	SNE-7	SNE-8	SNE-9	SNE-10	SNE-11	SNE-12	SNE-13	SNE-14	SNE-15	BR-1	BR-4
Date Sampled										13-Sep-20	14-Aug-20	15-Aug-20	15-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20	13-Sep-20	8-Sep-20	8-Sep-20	8/9-Sept-20	9-Sep-20	9-Sep-20	9/10-Sept-20	10-Sep-20	11-Sep-20	28-Aug-20	28-Aug-20	28/29-Aug-20	29-Aug-20	29-Aug-20	30-Aug-20	7-Sep-20	7-Sep-20	7/8-Sept-20	8-Sep-20	10-Sep-20	11-Sep-20	12-Sep-20	31-Aug-20	12-Sep-20	5-Sep-20	16-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
ANNE	ANHI	Annelida	Clitellata	Rhynchobdellida	Piscicolidae		Mysidobdella sp.	1	48																																	
ANNE	ANOL	Annelida	Clitellata	Enchytraeida	Enchytraeidae		Enchytraeidae indet.	1	144																																	
ANNE	EURA	Annelida	Polychaeta	Echiuroidea	Echiuridae		Echiurus echiurus	1	53																																	
ANNE	POER	Annelida	Polychaeta	Eunicida	Dorvilleidae		Ophryotrocha sp.	1	112																																	
ANNE	POER	Annelida	Polychaeta	Eunicida	Dorvilleidae		Parougia caeca	1	64																16	16																
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Lumbrineridae indet.		1,472					16		16	288	208	48			48	16	32	80					48					32	80	16	144		96		16
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma fragilis	1	6,979	48	48	96	224	112	336	80	224	272	336	176	336	208	192	192	368	33	144	128	32	400	192	64	304	288	464	352	400	240	256	224		
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma impatiens	1	624																																	
ANNE	POER	Annelida	Polychaeta	Eunicida	Lumbrineridae		Scoletoma sp.		1,473	64	48		64	16				16																								
ANNE	POER	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphinae	Nothria conchylega	1	2,930			53	53	42	120	242	97	368	128	176	96	48		304	96		16	54	2	32	98	32	96		32	128	128	240	105	144		
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Glyceridae		Glycera sp.	1	16								16																									
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Hesionidae	Microphthalminae	Microphthalmus sp.	1	32																																32	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Hesionidae		Nereimyra aphroditoides	1	6,464	528	48			16	16											144					16				16						224	32
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Aglaophamus malmgreni	1	48												16											16					16					
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Micronephthys cornuta	1	5,104	32	128	112	176	144	480	144	32	96	96	176	112	112	48	80	64	80	16	64	48	96		16	16	32	64	48	64		16	32	160	64
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys ciliata	1	68				16	1	16						16						1														16	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys paradoxa	1	2																									1			1					
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nephtyidae		Nephtys sp.		2					1																												
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nereididae	Nereidinae	Nereis zonata	1	423																	1																
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Nereididae		Nereididae indet.		81																															16		
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe longa	1	7,776	240															16							16									368	96
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe minuta	1	33,456	2,032	192	80	272	112	144	160	80	112	64	176	64		16	80	64	176	48	16	48	160	128		32	48	128	64	64	32	64	32	2,384	336
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Pholoidae		Pholoe sp.		4,048		64	32	64		128	16											16							16							48	416
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eteone longa complex	1	240				64		32	16															16				16	32	16					
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eteone sp.		368		16		32																	48			16	16								
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteoninae	Eulalia bilineata	1	1																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodocinae	Phyllodoce groenlandica	1	34																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		Eteone flava	1	16																	16																
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Bylgides promamme	1	2															2																		
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Gattyana cirrhosa	1	240	1														16																	32	64
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe imbricata	1	211	16																																
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe propinqua	1	1																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe rarispina	1	16																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Harmothoe sp.		82																																	64
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Hesperonoe sp.	1	16																							16										
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae	Polynoinae	Polynoinae indet.		336	16					16					16	32																					
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Bylgides sarsi	1	16												16																					
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Melaenis loveni	1	1																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Polynoidae		Polynoidae indet.		32																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Ephesiella sp.	1	16				16																													
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Sphaerodoropsis biserialis	1	96				16		32					16												16			16							
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Sphaerodoridae		Sphaerodoropsis minuta	1	32																																	16
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Anoplosyllinae	Syllides sp.	1	32																																32	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Eusyllinae	Pionosyllis sp.	1	16																																	
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae	Exogoninae	Exogone naidina	1	4,272	192			48	32		32	32		16	16	16		32												16	16		16			48	80
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae		Pionosyllis compacta	1	16						16																											
ANNE	POER	Annelida	Polychaeta	Phyllodocida	Syllidae		Streptospinigera niuqtuut	1	16																																	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Fabriciidae		Fabriciidae indet.		16																																	16
ANNE	POSE	Annelida	Polychaeta	Sabellida	Fabriciidae		Pseudofabricia sp. nr. aberrans	1	288					16													16			32			16	32	80	32		32	16	16		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Galathowenia oculata	1	1,044			50	35	3	20	16	48	48	32	112	16			32	16	2	82	130	66	64	16		16	32	48	32		16		48		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Myriochele heeri	1	312			2	64	1	4			48					16	32				17	16				16	48	16	16				16		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Oweniidae		Owenia fusiformis	1	243		16	89		1	16	16										1	18	38												16		32
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Chone duneri	1	49																																	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Dialychone sp.		16						16																											
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Dialychone sp. 3	1	167						32						16							16														
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone analis	1	16																																	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone incolor	1	3,200		48						32									32															16	16
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone sp.		209			1				16	16		16						16						16											
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae	Sabellinae	Euchone sp. 1	1	49														16													16	16					
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Branchiomma sp.	1	2																																	
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Dialychone sp. 1	1	400		16															16																
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae indet.		224									16										16		16												16
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae sp. 3	1	144											16																32		16		16		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Sabellidae		Sabellidae sp. 4	1	224										16	16			16	16				32		32			48				32			16		
ANNE	POSE	Annelida	Polychaeta	Sabellida	Serpulidae	Spirorbinae	Bushiella (Jugaria) quadrangularis	1	16																								16									
ANNE	POSE	Annelida	Polychaeta	Sabellida	Serpulidae	Spirorbinae	Spirorbinae indet.		147		1															2									16					16		96
ANNE	POSE	Annelida	Polychaeta	Sedentaria	Ampharetidae		Ampharete borealis	1	32																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Apistobranchidae		Apistobranchus sp.	1	256																																	16
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora caulleryi	1	32																									16						16		
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora quadrilobata	1	80																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Dipolydora sp.		16																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Laonice cirrata	1	177						16		16	16		16					16					16	16						16		49			
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Marenzelleria viridis	1	256																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio (Prionospio) sp.	1	16																																	16
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio cirrifera	1	48																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Prionospio sp.		4,064	16	352	208	224	128	80	112	80	80	64	80	80	16	16	64	64	192	176	48	16	48	16	16	48	48	96	128	96	48	48	80	176	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Pygospio elegans	1	400																							16	16								16	16
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Scolelepis sp.	1	32																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spio filicornis	1	16																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spio sp.		32																																	
ANNE	POSE	Annelida	Polychaeta	Spionida	Spionidae		Spionidae indet.		176	16																	16														16	16
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete finmarchica	1	16																												16					
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete petersenae	1	1,008	48							16																									
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Ampharete sp.		48																																	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Anobothrus gracilis	1	16																										16							
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Lysippe labiata	1	658								16	32	16			16	96	32	16	16						32	32		48	80	96	32	32	48		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharetinae	Sosane wireni	1	80										32																32		16					
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinninae	Melinna elisabethae	1	282		1	48	16	17		64	48						16			16	17	22	17													
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae		Ampharetidae indet.		144		16																										16			16		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Ampharetidae		Amphicteis sundevalli	1	19																																	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Aphelochaeta sp.	1	2,320	224	48	80	16	16	80	16	16	16		32	48	16			16			16		32			32		48	112	32	32			16	32
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone bathyala	1	5,920	32	192	64	96	64	32									32	48	240	32		16							112	32	96	48	64		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone careyi	1	193																																16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone pigmentata	1	1,424	96	48	32		32		32	64	64		48				48	80	32		16	16	48	32	16	16	16	64	48		16				
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone setosa complex	1	880	48							16	16			16						32	16							32	32		64	16	48		
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Chaetozone sp.		3,568		48	96	176	48	32	32	32	80	16	32	80	32	64	32		80	32	16	32	160	32	16	32	48	160	224	80	128	64	80	16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Cirratulidae indet.		4,912	240	112	240	80	64	48		112	80	16	16	48	16	32	16	80	16	16	48	32	32	32		16	80	144	192	144	224	80	96	208	32
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Kirkegaardia sp.	1	48																																	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Cirratulidae		Tharyx sp.	1	272	64															32													32		96	32	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Flabelligeridae		Diplocirrus hirsutus	1	208					16				16			16						16								16						16	16
ANNE	POSE	Annelida	Polychaeta	Terebellida	Pectinariidae		Cistenides granulata	1	1,585	80		1																													96	48
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Polycirrinae	Polycirrus sp. complex	1	466	1					16					16	16	32	32			16			16	16		32	32	32	64		16	1				
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Lanassa venusta venusta	1	192	32			16								16																					
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Laphania boecki	1	160																	16																
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Leaena ebranchiata	1	16											16																						
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Pista maculata	1	317	2																9																
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae	Terebellinae	Amphitrite cirrata	1	38																																	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae		Paramphitrite birulai	1	32																																	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Terebellidae		Terebellidae indet.		96							16																										
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae	Trichobranchinae	Terebellides sp.	1	2,106	97	18		16				48	16		16	16		16		16	3		17							16	16					49	32
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae	Trichobranchinae	Trichobranchus glacialis	1	49							16																									16	
ANNE	POSE	Annelida	Polychaeta	Terebellida	Trichobranchidae		Trichobranchidae indet.		32																																	
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Capitella capitata complex	1	320	16						16		16		16																	16					
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Capitellidae indet.		16													16																				
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Mediomastus sp.	1	4,704	768	32	32	64	16			96	48	16	32	32		96	16	16			32		32	32		16	16	64	96	48	16			288	16
ANNE	POSE	Annelida	Polychaeta		Capitellidae		Notomastus sp.	1	472			1		1	16	32	16		16	32	64	16	16		16			17	4	32		16	32	16	48	32	16		1	16		
ANNE	POSE	Annelida	Polychaeta		Cossuridae		Cossura longocirrata	1	4,560	160	208	144	48		32	16		32	16						32			16	16	16		16	16								16	160
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Axiothella sp.	1	49		16																															
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Clymenura polaris	1	48				16																													32
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Clymenura sp.		112									16										48														48
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Euclymeninae indet.		336		16					16		16	48		16			16											16		16	16		16		16
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Microclymene sp.	1	144		32						16														16											
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Praxillella gracilis	1	113			16						16	16									16	1	16			16					16				
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Euclymeninae	Praxillella praetermissa	1	144								16	32	16						16			16														
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Maldaninae	Maldane sarsi	1	4,048		2	48	48	131	32	64	16	80	32	32	96	16	16	144	48		16	48	2	176	80		80	160	112	80	112	144	80	176	16	128
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Nicomachinae	Nicomachinae indet.		17																				1													
ANNE	POSE	Annelida	Polychaeta		Maldanidae	Nicomachinae	Petaloproctus tenuis	1	1																																	
ANNE	POSE	Annelida	Polychaeta		Maldanidae		Maldanidae indet.		115				16		16												1							16								48
ANNE	POSE	Annelida	Polychaeta		Maldanidae		Rhodine loveni	1	64									32																			16					16
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina acuminata	1	128																																	
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina cylindricaudata	1	176						48																											
ANNE	POSE	Annelida	Polychaeta		Opheliidae	Ophelininae	Ophelina sp.		176																																80	
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Leitoscoloplos sp.	1	1,008		16		32	32	16	96	32	32	64	96	16	48	16	32	32	32		48		16	16			32	48	80	32	32				
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Scoloplos armiger	1	497									16																							48	
ANNE	POSE	Annelida	Polychaeta		Orbiniidae	Orbiniinae	Scoloplos sp.		448	16					16																											
ANNE	POSE	Annelida	Polychaeta		Orbiniidae		Orbiniidae indet.		32												16																					
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea (Strelzovia) antennata	1	16																																	
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea catherinae	1	128											16				16	16			32									32				16	

Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organsisms/m^2) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-042	mb20-045-043	mb20-045-044	mb20-045-045	mb20-045-046	mb20-045-047	mb20-045-048	mb20-045-049	mb20-045-050	mb20-045-051	mb20-045-052	mb20-045-053	mb20-045-054	mb20-045-055	mb20-045-056	mb20-045-057	mb20-045-058	mb20-045-059	mb20-045-060	mb20-045-061	mb20-045-062	mb20-045-063	mb20-045-064	mb20-045-065	mb20-045-066	mb20-045-067	mb20-045-068	mb20-045-069	mb20-045-070	mb20-045-071	mb20-045-072	mb20-045-073	mb20-045-074
Client Sample ID										SE-15	SNW-1	SNW-2	SNW-3	SNW-4	SNW-5	SNW-6	SNW-7	SNW-8	SNW-9	SNW-10	SNW-11	SNW-12	SNW-13	SNW-14	SNW-15	SNE-1	SNE-2	SNE-3	SNE-4	SNE-5	SNE-6	SNE-7	SNE-8	SNE-9	SNE-10	SNE-11	SNE-12	SNE-13	SNE-14	SNE-15	BR-1	BR-4
Date Sampled										13-Sep-20	14-Aug-20	15-Aug-20	15-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20	13-Sep-20	8-Sep-20	8-Sep-20	8/9-Sept-20	9-Sep-20	9-Sep-20	9/10-Sept-20	10-Sep-20	11-Sep-20	28-Aug-20	28-Aug-20	28/29-Aug-20	29-Aug-20	29-Aug-20	30-Aug-20	7-Sep-20	7-Sep-20	7/8-Sept-20	8-Sep-20	10-Sep-20	11-Sep-20	12-Sep-20	31-Aug-20	12-Sep-20	5-Sep-20	16-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea hartmanae	1	544		96	48	16	16	48		64	16	32								16				16			32	16			16		32		
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea minuta	1	752		16																														48	
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea nolani	1	992	80	16	16															16		16	16					32	16		32	16	48	48	208
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Aricidea sp.		176						16															16											
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Paraonidae indet.		128						16				16				16	16				16							16						16
ANNE	POSE	Annelida	Polychaeta		Paraonidae		Paraonides sp.	1	32																																
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Polyphysia baffinensis	1	32			16																						16							
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Polyphysia crassa	1	48								16														16										
ANNE	POSE	Annelida	Polychaeta		Scalibregmatidae		Scalibregma inflatum	1	4,914	32	32					16	16	16			16				16	16		16		32					16	16		16	1	16		16
ARTH	CHAR	Arthropoda	Arachnida	Trombidiformes	Halacaridae		Halacaridae indet.	1	64	48																																
ARTH	CHPY	Arthropoda	Pycnogonida	Pantopoda	Nymphonidae		Nymphon hirtipes	1	6																																
ARTH	CHPY	Arthropoda	Pycnogonida	Pantopoda	Nymphonidae		Nymphon sp.		38																				16			1					1				
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Ampelisca eschrichtii	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Ampeliscidae indet.		32																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Byblis sp.	1	128				16																16							16					
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Haploops sp.		112																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae		Haploops tubicola	1	130																	16															
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Amphilochidae		Amphilochidae indet.	1	16		16																															
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Aoridae		Aoridae indet.	1	64									16		16	16				16																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylinae	Atylus carinatus	1	65																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Atylidae	Atylinae	Atylus sp.		32	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae	Corophiinae	Crassicorophium clarencense	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae	Protomedeiinae	Protomedeia sp.	1	16														16																		
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Corophiidae		Corophiidae indet.		48																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dexaminidae	Prophliantinae	Guernea nordenskioldi	1	9,520	144	32						32		32	32					16	80				16						16					352	208
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dulichiidae		Dulichia sp.	1	64																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Dulichiidae		Dyopedos sp.	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Ischyroceridae		Ischyroceridae indet.	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Melphidippidae		Melphidippa sp.	1	16																					16											
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Aceroides latipes	1	176				16			16		32					32				32				16										32
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Bathymedon obtusifrons	1	16									16																							
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Bathymedon sp.		256			16							16			16																		144	16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Deflexilodes sp.	1	32																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Monoculodes sp.	1	272													48																			
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Monoculopsis sp.	1	96																															16	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Oedicerotidae indet.		1,232					16	16		16									32														48	48
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Paroediceros lynceus	1	144									16																						64	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Paroediceros sp.		49																						16										
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Rostroculodes sp.	1	192	16																															32	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Oedicerotidae		Westwoodilla sp.	1	320		16		16																													32
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Phoxocephalidae	Harpiniinae	Harpinia serrata	1	272		16	32														16															48	144
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Podoceridae		Podoceridae indet.		16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Pontogeneiidae		Pontoporeia femorata	1	3,184	432							16									16															48	304
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Stenothoidae		Stenothoidae indet.	1	64																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Synopiidae		Tiron spiniferus	1	16								16																									
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Gronella groenlandica	1	48																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Hippomedon sp.	1	32										32																							
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomene sp.	1	48																	16	16															
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella minuta	1	32																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella pinguis	1	32		16																														16	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Orchomenella sp.		80																							48										
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Tryphosidae		Tryphosidae indet.		192												16													16			16					16
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx lilljeborgi	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx nugax	1	16																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx ochoticus	1	1																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx sarsi	1	49																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Anonyx sp.		193																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Onisimus sp.	1	224																																
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda	Uristidae		Uristidae indet.		64													48																			
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda			Amphipoda indet.		128	48		16																													16	
ARTH	CRAM	Arthropoda	Malacostraca	Amphipoda			Lysianassoidea indet.		704																						16									16	
ARTH	CRCI	Arthropoda	Hexanauplia	Sessilia			Balanomorpha indet.	1	8		1																															
ARTH	CRCO	Arthropoda	Hexanauplia	Cyclopoida			Cyclopoida indet.	1	32																															16	
ARTH	CRCO	Arthropoda	Hexanauplia	Harpacticoida			Harpacticoida indet.	1	96			16	32															16					16									16
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Brachydiastylis resima	1	15,936	368				16	16				16	16																					176	736
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis bradyi	1	80																												64		16		
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis goodsiri	1	80									16					16			16			16				16								
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis lucifera	1	80																		16								48						
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis rathkei	1	400			16																													16
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis scorpioides	1	1,104	16	32				16			16							16	48	16			16											16	32
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis sp.		448		32																								16						32	16
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Diastylidae		Diastylis spinulosa	1	96							16		16	16																	32	16					
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Lampropidae		Lamprops fuscatus	1	2,976																															64	
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Lampropidae		Lamprops sp.		288																																
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella emarginata	1	32														16																			
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella sp.		464			48					16										16					16									16	16
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Eudorella truncatula	1	352																															16	
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon nasica	1	752			16	32										16							32					48							
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon nasicoides	1	816								16																				32	32	16	32		
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Leuconidae		Leucon sp.		656	16		16		16				32	16	16				16								32				16						
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Nannastacidae		Campylaspis rubicunda	1	32			32																														
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea	Nannastacidae		Nannastacidae indet.		48																																48
ARTH	CRCU	Arthropoda	Malacostraca	Cumacea			Cumacea indet.		64		48																															
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Crangonidae indet.		1																																
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Sabinea septemcarinata	1	4		1																															
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Crangonidae		Sclerocrangon sp.	1	16																																
ARTH	CRDE	Arthropoda	Malacostraca	Decapoda	Thoridae		Lebbeus polaris	1	2																																
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Desmosomatidae		Desmosomatidae indet.	1	352							32					16		16	16	16										32	16	32	16		16		64
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Gnathiidae		Gnathia sp.	1	144								16			16									32						32				32			
ARTH	CRIS	Arthropoda	Malacostraca	Isopoda	Gnathiidae		Gnathiidae indet.		128									16						16			16								16						
ARTH	CROS	Arthropoda	Ostracoda	Myodocopida	Philomedidae		Philomedes sp.	1	19,072	736	224	528	560	128	176	144	384	208	256	304	96	64	32	16	160	144	192	336	32	32				16							768	2,368
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Akanthophoreidae		Akanthophoreus sp.	1	2,992		16	16		16	16		32																								288	224
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Pseudotanaidae		Pseudotanais sp.	1	1,104	48									16		16		32																		96	64
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Sphyrapodidae	Pseudosphyrapodinae	Pseudosphyrapus anomalus	1	336		32	160	32				16									96																	
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea	Typhlotanaidae		Typhlotanais sp.	1	816									16					16	144	16	16		16						16	16	32	16	48				
ARTH	CRTA	Arthropoda	Malacostraca	Tanaidacea			Tanaidacea indet.		128				16	16		16			16																						48	
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Diamesinae	Diamesa sp.	1	32																																
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Cricotopus/Orthocladius sp. Complex	1	16																																
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Eukiefferiella sp.	1	32																																
ARTH	INDI	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Orthocladiinae indet.		48																																
ARTH	INDI	Arthropoda	Insecta	Diptera	Empididae	Clinocerinae	Clinocera sp.	1	16																																
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus pallidus	1	1				1																													
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus droebachiensis	1	27	1	1																															
ECHI	ECEC	Echinodermata	Echinoidea	Camarodonta	Strongylocentrotidae		Strongylocentrotus sp.		33																	1																
ECHI	ECHO	Echinodermata	Holothuroidea	Apodida	Myriotrochidae		Myriotrochus rinkii	1	98		1			16																	16											
ECHI	ECHO	Echinodermata	Holothuroidea	Apodida			Apodida indet.		48													16																				
ECHI	ECHO	Echinodermata	Holothuroidea	Molpadida	Eupyrgidae		Eupyrgus scaber	1	16			16																														
ECHI	ECOP	Echinodermata	Ophiuroidea	Amphilepidida			Amphilepidida indet.	1	1																																
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiopyrgidae		Ophiopleura borealis	1	6																								1				2				2	1	
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiocten affinis	1	983					19	20	48	64	96	32	32	64	64		48	16		19	52	3	32	32			16	48	64	64	33	16	16	32	52
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura robusta	1	120			1																														16
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura sarsii	1	78		1	5	1		4		1	2		2					1		1	4	1	16					1		17				3	
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	Ophiura sp.		38		16		16																													
ECHI	ECOP	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae		Ophiuridae indet.		112								48						32																			
ECHI	ECOP	Echinodermata	Ophiuroidea				Ophiuroidea indet.		192				16		32	16			16	16								16	32	16	16									16		
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Calloporidae		Calloporidae indet.	1	16																													16				
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Escharellidae		Escharella sp.	1	32																					32												
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Eucrateidae		Eucratea sp.	1	1																								1									
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida	Myriaporidae		Leieschara sp.	1	32															16														16				
MISC	BRYO	Bryozoa	Gymnolaemata	Cheilostomatida			Cheilostomatida indet.		7																				4						1							
MISC	BRYO	Bryozoa	Gymnolaemata	Ctenostomatida	Alcyonidiidae		Alcyonidium sp.	1	7			2	1	1			1								1	1																	
MISC	BRYO	Bryozoa	Gymnolaemata	Gymnolaemata	Calloporidae		Calloporidae indet.	1	25			1																	1				1							16		
MISC	BRYO	Bryozoa	Stenolaemata	Cyclostomatida	Crisiidae		Crisia sp.	1	32																			16												16		
MISC	BRYO	Bryozoa	Stenolaemata	Cyclostomatida	Tubuliporidae		Tubulipora sp.	1	112															16	16				16	48				16								
MISC	BRYO	Bryozoa					Bryozoa indet.		16				16																													
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria	Edwardsiidae		Edwardsiidae indet.	1	64						16																16							32				
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria	Halcampidae		Halcampa sp.	1	32									32																									
MISC	CNAN	Cnidaria	Anthozoa	Actiniaria			Actiniaria indet.		18									2		16																						
MISC	CNAN	Cnidaria	Anthozoa	Spirularia	Cerianthidae		Cerianthus lloydii	1	16																										16						
MISC	CNAN	Cnidaria	Anthozoa				Anthozoa indet.		16																														16		
MISC	CNHY	Cnidaria	Hydrozoa	Anthoathecata	Bougainvilliidae		Bougainvilliidae indet.	1	41																															16	
MISC	CNHY	Cnidaria	Hydrozoa	Anthoathecata			Anthoathecata indet.		21																	1																20
MISC	CNHY	Cnidaria	Hydrozoa	Leptothecata			Leptothecata indet.	1	32																																
MISC	CNHY	Cnidaria	Hydrozoa	Limnomedusae	Monobrachiidae		Monobrachium parasitum	1	374		1		16	16				18				16					16			32				1	16	16	2			16		
MISC	CNHY	Cnidaria	Hydrozoa				Hydrozoa indet.		437	16			32	16				2		2																						
MISC	ENTO	Entoprocta		Coloniales	Barentsiidae		Barentsia sp.	1	16																								16								
MISC	ENTO	Entoprocta					Entoprocta indet.		1																				1													
MISC	HEMI	Hemichordata	Enteropneusta				Enteropneusta indet.	1	32											16					16																	
MISC	NTEA	Nemertea	Hoplonemertea	Monostilifera	Amphiporidae		Amphiporus sp.	1	16																																
MISC	NTEA	Nemertea	Hoplonemertea	Monostilifera	Tetrastemmatidae		Tetrastemmatidae indet.	1	32																																
MISC	NTEA	Nemertea	Hoplonemertea				Hoplonemertea indet.		1,024	16		16		32	48		64	64	16			32	16	48				32							64	80	32	80			16	

Total abundance data in matrix format, including total taxa (species richness) count per sample, total abundance per sample and total density (organsisms/m^2) for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID										mb20-045-042	mb20-045-043	mb20-045-044	mb20-045-045	mb20-045-046	mb20-045-047	mb20-045-048	mb20-045-049	mb20-045-050	mb20-045-051	mb20-045-052	mb20-045-053	mb20-045-054	mb20-045-055	mb20-045-056	mb20-045-057	mb20-045-058	mb20-045-059	mb20-045-060	mb20-045-061	mb20-045-062	mb20-045-063	mb20-045-064	mb20-045-065	mb20-045-066	mb20-045-067	mb20-045-068	mb20-045-069	mb20-045-070	mb20-045-071	mb20-045-072	mb20-045-073	mb20-045-074
Client Sample ID										SE-15	SNW-1	SNW-2	SNW-3	SNW-4	SNW-5	SNW-6	SNW-7	SNW-8	SNW-9	SNW-10	SNW-11	SNW-12	SNW-13	SNW-14	SNW-15	SNE-1	SNE-2	SNE-3	SNE-4	SNE-5	SNE-6	SNE-7	SNE-8	SNE-9	SNE-10	SNE-11	SNE-12	SNE-13	SNE-14	SNE-15	BR-1	BR-4
Date Sampled										13-Sep-20	14-Aug-20	15-Aug-20	15-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20	13-Sep-20	8-Sep-20	8-Sep-20	8/9-Sept-20	9-Sep-20	9-Sep-20	9/10-Sept-20	10-Sep-20	11-Sep-20	28-Aug-20	28-Aug-20	28/29-Aug-20	29-Aug-20	29-Aug-20	30-Aug-20	7-Sep-20	7-Sep-20	7/8-Sept-20	8-Sep-20	10-Sep-20	11-Sep-20	12-Sep-20	31-Aug-20	12-Sep-20	5-Sep-20	16-Aug-20
								Grand Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
taxcode	grpcode	Phylum	Class	Order	Family	Subfamily	Taxon Name	Unique Taxa	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance	Abundance
MISC	NTEA	Nemertea	Palaeonemertea		Carinomidae		Carinoma sp.	1	1																																	
MISC	NTEA	Nemertea	Palaeonemertea		Cephalotrichidae		Cephalothrix sp.	1	240				16		32					32	16			16													16				16	32
MISC	NTEA	Nemertea	Palaeonemertea		Tubulanidae		Tubulanus sp.	1	32																											16				16		
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Cerebratulus sp.	1	16																16																	
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Lineidae indet.		582							16	32	16	32	32				16	16	16	16								32	32	16	16	16			
MISC	NTEA	Nemertea	Pilidiophora	Heteronemertea	Lineidae		Lineus sp.	1	48																																	
MISC	NTEA	Nemertea					Nemertea indet.		80												16										16							32				
MISC	PIXX	Chordata	Actinopterygii (Pisces)	Scorpaeniformes	Cottidae		Cottidae indet.	1	16																																	
MISC	PORI	Porifera	Calcarea				Calcarea indet.	1	22		16																		1													
MISC	PORI	Porifera	Demospongiae				Demospongiae indet.	1	2																																	
MISC	PRIA	Cephalorhyncha	Priapulida	Priapulomorpha	Priapulidae		Priapulus caudatus	1	16																																	16
MISC	PRIA	Cephalorhyncha	Priapulida	Priapulomorpha	Priapulidae		Priapulus sp.		96														16																			
MISC	PRIA	Cephalorhyncha	Priapulida				Priapulida indet.		32																																	
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Golfingia sp.	1	16					16																												
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Golfingiidae indet.		242			1			32				32	16	16	32	32					16		32								16		16		
MISC	SIPN	Sipuncula	Sipunculidea	Golfingiida	Golfingiidae		Nephasoma sp.	1	48								32																			16						
MISC	URAS	Chordata	Ascidiacea	Aplousobranchia			Aplousobranchia indet.	1	4																					1			2					1				
MISC	URAS	Chordata	Ascidiacea	Phlebobranchia	Ascidiidae		Ascidia sp.	1	2																																	
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Pyuridae		Boltenia echinata	1	5																																	
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Pyuridae		Boltenia sp.		1																																	
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Styelidae		Polycarpa fibrosa	1	2																																	
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia	Styelidae		Polycarpa sp.		8	1																							1									
MISC	URAS	Chordata	Ascidiacea	Stolidobranchia			Stolidobranchia indet.		19	16																																
MISC	URAS	Chordata	Ascidiacea				Ascidiacea indet.		32																																	
MOLL	MOAP	Mollusca	Caudofoveata	Chaetodermatida	Chaetodermatidae		Chaetoderma sp.	1	325						20	16	48	16	32	32		16	32				16		16	32	17					32						
MOLL	MOAP	Mollusca	Caudofoveata				Caudofoveata indet.		96																												32	32	16	16		
MOLL	MOBI	Mollusca	Bivalvia	Adapedonta	Hiatellidae		Hiatella arctica	1	1,369	72	1															13															4	32
MOLL	MOBI	Mollusca	Bivalvia	Arcida	Arcidae		Bathyarca glacialis	1	77			5						2		16				2					12	2	2		1		17	16		1		1		
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae	Clinocardiinae	Ciliatocardium ciliatum	1	35																																	4
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae	Clinocardiinae	Serripes groenlandicus	1	205																		1														4	
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Cardiidae		Cardiidae indet.		16																																	16
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macoma calcarea	1	1,077	3	6	5	37	38	4	6	24	8	19	16	22	16	3	6	9	2	34	8	6	39	21	1	8	7	21	30	7	24	4	9	43	32
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macoma moesta	1	161	2								2																16						16		16
MOLL	MOBI	Mollusca	Bivalvia	Cardiida	Tellinidae	Macominae	Macominae indet.		1,394				32					16	16			16		16	16	16	16				16					16	16	17	16	16	32	112
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte borealis	1	1,579	85	21															37															49	
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte montagui	1	3,362	115	85	4	2	41	8	36	48	36		20					1	88	5	21	10	1	1		1		1	4					51	96
MOLL	MOBI	Mollusca	Bivalvia	Carditida	Astartidae		Astarte sp.		672	16				16						16																						80
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Axinopsida sp.	1	864		32		32			16																	16			32		64				
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Thyasira sp.	1	1,312		16	32	16			16	16	32		32	64		16	32	48	48	32	48	16	32	32		16	16			16		16	32	32	32
MOLL	MOBI	Mollusca	Bivalvia	Lucinida	Thyasiridae		Thyasiridae indet.		464														16	16	16			16	16			16		16	64	16	64		16			80
MOLL	MOBI	Mollusca	Bivalvia	Myida	Myidae		Mya sp.		64																																	
MOLL	MOBI	Mollusca	Bivalvia	Myida	Myidae		Mya truncata	1	854	8	16															16															34	48
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae	Musculinae	Musculus discors	1	86																																1	
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae	Musculinae	Musculus niger	1	20																																16	4
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Dacrydium vitreum	1	32									16		16																						
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Musculus sp.	1	16	16																																
MOLL	MOBI	Mollusca	Bivalvia	Mytilida	Mytilidae		Mytilidae indet.		64	16																										16						
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana minuta	1	1,219	48	48	16		16		16				16						16																
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana pernula	1	66						16																											48
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Nuculanidae	Nuculaninae	Nuculana sp.		208											16																16						
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Portlandia arctica	1	1																																	
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiella frigida	1	64						16																				48							
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiella sp.		336				64		16	32				32				32					16						32	48		16		32		
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida	Yoldiidae		Yoldiidae indet.		128									16	16		16			48			16	16														
MOLL	MOBI	Mollusca	Bivalvia	Nuculanida			Nuculanoidea indet.		176			112							16																							
MOLL	MOBI	Mollusca	Bivalvia	Nuculida	Nuculidae		Ennucula tenuis	1	1,137		32	80	32	112	32	48	48	16	32	16		16	16	32	32		96	48		16	32		16		16	48	32	80				
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Pectinidae	Pedinae	Chlamys islandica	1	6																																	
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Pectinidae		Pectinidae indet.		1																																	
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Propeamussiidae		Propeamussiidae indet.		96			48										16	32																			
MOLL	MOBI	Mollusca	Bivalvia	Pectinida	Propeamussiidae		Similipecten greenlandicus	1	242		95	16		1		17		16								26		1							16							
MOLL	MOBI	Mollusca	Bivalvia		Cuspidariidae		Cuspidaria sp.	1	64				16				16								16			16														
MOLL	MOBI	Mollusca	Bivalvia		Periplomatidae		Periploma aleuticum	1	19					1																								1				
MOLL	MOBI	Mollusca	Bivalvia		Thraciidae		Thracia myopsis	1	6							1												1														4
MOLL	MOBI	Mollusca	Bivalvia				Bivalvia indet.		304				16																	16											144	32
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Acteonidae		Acteocina sp.	1	112							16																										
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichna alba	1	32																16										16							
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichna sp.		80			16																										16		16		
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichnidae indet.		32																			16										16				
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Cylichnidae		Cylichnoides occultus	1	48				16																													
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Philinidae		Philininae indet.	1	32						16																						16					
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea	Retusidae		Retusa sp.	1	160																																16	
MOLL	MOGA	Mollusca	Gastropoda	Cephalaspidea			Cephalaspidea indet.		160									16		16			16						16		16					16					16	
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Capulidae		Ariadnaria borealis	1	32																																16	
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Naticidae	Polinicinae	Euspira pallida	1	129								16												16													
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Naticidae		Naticidae indet.		16																																	
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Rissoidae		Boreocingula castanea	1	160	16																																32
MOLL	MOGA	Mollusca	Gastropoda	Littorinimorpha	Rissoidae		Rissoidae indet.		144	16																																
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Buccinidae		Buccinum hydrophanum	1	3																																	
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Cancellariidae	Admetinae	Admete viridula	1	32																																	
MOLL	MOGA	Mollusca	Gastropoda	Neogastropoda	Mangeliidae		Mangeliidae indet.	1	144	16					16				16				16													16					32	
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Colloniidae		Moelleria costulata	1	16																																	16
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites helicinus	1	1																																	
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites olivaceus	1	16								16																									
MOLL	MOGA	Mollusca	Gastropoda	Trochida	Margaritidae		Margarites sp.		32								16																				16					
MOLL	MOGA	Mollusca	Gastropoda		Lepetidae		Lepeta caeca	1	263		20	2	21	2		44	28	34	36	4	16				3	25	18	1	2	1	2											4
MOLL	MOGA	Mollusca	Gastropoda				Gastropoda indet.		160	16						16		16																							16	
MOLL	MOGA	Mollusca	Gastropoda				Patellogastropoda indet.		33																			16														
MOLL	MOPO	Mollusca	Polyplacophora	Chitonida	Tonicellidae	Tonicellinae	Tonicella marmorea	1	17																																	16
MOLL	MOSC	Mollusca	Scaphopoda	Gadilida	Gadilidae		Gadilidae indet.		64						16												16						16		16							
MOLL	MOSC	Mollusca	Scaphopoda	Gadilida	Gadilidae		Siphonodentalium lobatum	1	32																													16		16		
							Total Abundance		**237,145**	**7,620**	**2,832**	**2,847**	**3,159**	**1,661**	**2,536**	**1,914**	**2,679**	**2,762**	**1,975**	**2,220**	**1,718**	**960**	**1,251**	**1,850**	**1,791**	**1,957**	**1,349**	**1,775**	**662**	**2,108**	**1,037**	**514**	**1,056**	**1,193**	**2,601**	**2,852**	**2,075**	**2,383**	**1,040**	**1,884**	**7,519**	**7,528**
							Total Unique Taxa (Species Richness)	**265**		**51**	**52**	**45**	**45**	**41**	**46**	**42**	**50**	**52**	**42**	**48**	**36**	**22**	**37**	**36**	**43**	**45**	**36**	**46**	**35**	**42**	**28**	**23**	**34**	**28**	**50**	**50**	**43**	**44**	**21**	**43**	**61**	**63**
							Grab Sampler		**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**	**Van veen**
							# of Composite Grabs		**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
							Total Density (Organisms/m^2)		**790,483**	**25,400**	**9,440**	**9,490**	**10,530**	**5,537**	**8,453**	**6,380**	**8,930**	**9,207**	**6,583**	**7,400**	**5,727**	**3,200**	**4,170**	**6,167**	**5,970**	**6,523**	**4,497**	**5,917**	**2,207**	**7,027**	**3,457**	**1,713**	**3,520**	**3,977**	**8,670**	**9,507**	**6,917**	**7,943**	**3,467**	**6,280**	**25,063**	**25,093**
Freshwater taxa:																																										
MEMO	MEMO	Arthropoda	Arachnida				Acari indet. (freshwater)		64																																	
Incidental Taxa:																																										
MEMO	MEMO	Arthropoda	Hexanauplia				Copepoda indet. (parasitic)		53																	16																
MEMO	MEMO	Arthropoda	Ostracoda				Ostracoda indet. (planktonic)		32																																	
MEMO	MEMO	Arthropoda					Isopoda indet. (parasitic)		1																																	
MEMO	MEMO	Arthropoda					Themisto libellula (planktonic)		16																						16											
MEMO	MEMO	Echinodermata					Apodida indet. (fragments)		16																																	
MEMO	MEMO	Nematoda					Nematoda indet.		64																																	
MEMO	MEMO						Egg/egg mass		417											32					16	1		16														

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Raw abundance data in long format for Golder Baffinland Iron Mine MEEMP, 2020.

Client	Project	Year	Biologica Sample ID	Client Sample ID	Date Sampled	Sampler	Fraction µm	Field Split	Lab Split	Final Split	taxcode	grpcode	Phylum	Class
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	10000	Whole	Whole	Whole	ANNE	POER	Annelida	Polychaeta
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	10000	Whole	Whole	Whole	ANNE	POSE	Annelida	Polychaeta
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	500	1/4	1/4	1/16	ANNE	POSE	Annelida	Polychaeta
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	500	1/4	1/4	1/16	ARTH	CRAM	Arthropoda	Malacostraca
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	10000	Whole	Whole	Whole	ECHI	ECOP	Echinodermata	Ophiuroidea
Golder	Baffinland	2020	mb20-045-002	SW-2	5-Aug-20	Van Veen	10000	Whole	Whole	Whole	MOLL	MOBI	Mollusca	Bivalvia

Order	Family	Subfamily	Taxon	A	Int	J	L	Raw Count	Split Multiplier	Total Abundance	Unique Taxa Count	Comments
Phyllodocida	Phyllodocidae	Phyllodocinae	Phyllodoce groenlandica	1				1	1.0	1	1	
Sabellida	Serpulidae	Spirorbinae	Spirorbinae indet.	1	1			2	1.0	2	1	Attached to molluscs (scallop shell)
	Capitellidae		Capitella capitata complex		1			1	16.0	16	1	
Amphipoda	Tryphosidae		Orchomene sp.	1				1	16.0	16	1	
Ophiurida	Ophiuridae	Ophiurinae	Ophiura sarsii	2				2	1.0	2	1	
Pectinida	Propeamussiidae		Similipecten greenlandicus	2				2	1.0	2	1	

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Benthic report of sorting efficiency quality control and quality assurance for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample ID	Client Sample ID	Sorting Efficiency QA: Random whole resorts
mb20-045-001	SW-1	
mb20-045-002	SW-2	
mb20-045-003	SW-3	
mb20-045-004	SW-4	
mb20-045-005	SW-5	
mb20-045-006	SE-1	
mb20-045-007	SE-2	
mb20-045-008	SE-3	
mb20-045-021	SW-6	
mb20-045-022	SW-7	
mb20-045-023	SW-8	
mb20-045-024	SW-9	
mb20-045-025	SW-10	
mb20-045-026	SW-11	
mb20-045-027	SW-12	
mb20-045-028	SW-13	98.25%
mb20-045-029	SW-14	
mb20-045-030	SW-15	
mb20-045-031	SE-4	
mb20-045-032	SE-5	
mb20-045-033	SE-6	
mb20-045-034	SE-7	
mb20-045-035	SE-8	
mb20-045-036	SE-9	
mb20-045-037	SE-10	
mb20-045-038	SE-11	
mb20-045-039	SE-12	
mb20-045-040	SE-13	
mb20-045-041	SE-14	
mb20-045-042	SE-15	
mb20-045-043	SNW-1	
mb20-045-044	SNW-2	
mb20-045-045	SNW-3	
mb20-045-046	SNW-4	
mb20-045-047	SNW-5	
mb20-045-048	SNW-6	
mb20-045-049	SNW-7	98.25%
mb20-045-050	SNW-8	
mb20-045-051	SNW-9	95.52%
mb20-045-052	SNW-10	
mb20-045-053	SNW-11	
mb20-045-054	SNW-12	
mb20-045-055	SNW-13	
mb20-045-056	SNW-14	98.43%
mb20-045-057	SNW-15	
mb20-045-058	SNE-1	
mb20-045-059	SNE-2	
mb20-045-060	SNE-3	
mb20-045-061	SNE-4	
mb20-045-062	SNE-5	97.89%
mb20-045-063	SNE-6	
mb20-045-064	SNE-7	
mb20-045-065	SNE-8	
mb20-045-066	SNE-9	
mb20-045-067	SNE-10	
mb20-045-068	SNE-11	
mb20-045-069	SNE-12	
mb20-045-070	SNE-13	
mb20-045-071	SNE-14	95.52%
mb20-045-072	SNE-15	
mb20-045-073	BR-1	
mb20-045-074	BR-4	
	Average:	**97.31%**

Quality Control

Sorting efficiency: [(total count – organisms recovered in spot check and/or re-sort) / total count] x 100%

Spot Check: 25-100% of sample debris resorted for 37% of samples

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Description of unique that are undescribed and assigned internal numbers (e.g., sp. 1, sp.2 etc.) for Golder Baffinland Iron Mine MEEMP, 2020.

taxcode	grpcode	TaxonName	Morphological Description	Note
ANNE	POSE	Dialychone sp. 1	Methyl Green staining pattern is similar to Paradialychone harrisae observed in California, but has ventral cleft present on collar which is lacking in California specimens.	Present in 2020
ANNE	POSE	Dialychone sp. 2	There is a well-defined circular unstained area in the middle of the ventral collar. There is no ventral cleft present. Likely not described.	Present historically
ANNE	POSE	Dialychone sp. 3	Similar to Chone duneri, with a simple depression on posterior. Thoracic chaete with long macron, prostomium not covered, with oval shaped unstained area on collar. Posterior segments with a reddish brown pigmentation in a striped pattern.	Present in 2020
ANNE	POSE	Sabellidae sp. 2	Specimens do not have companion chaete. Eyespots present from setiger 4. Collar similar to Parasabella pallida	Present historically
ANNE	POSE	Sabellidae sp. 3	cf Chone, but has only capillary setae on the thorax. There is a semicircular unstained section on the collar (Methyl Green). Does not appear to be described in literature.	Present in 2020
ANNE	POSE	Sabellidae sp. 4	Specimens with rectangular staining pattern on the ventral collar. Thorax has long handled seate, with no white glandular ring, vetral cleft present, and a lateral and dorsal incision on collar	Present in 2020
ANNE	POSE	Euchone sp. 1	Staining pattern on abdominal segments similar to Euchone analis and with a recutangular glandular area on each side and on the anterior and posterior portion of each segment. Both dorsal and ventral sides of the collar have a large divergent lobe, and there is narrow white glandular area beneath collar on the ventral side.	Present in 2020

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Taxonomic updates for historical data considerations and verification purposes for Golder Baffinland Iron Mine MEEMP, 2020.

Taxon	Biologica Comment	Referenced specimens
Marenzelleria viridis	Verified and agreed in 2019 by U. Laval.	Additional specimens referenced in 2020
Caudofoveata indet.	Name change. Previously Aplacophora indet.	
Amphitrite cirrata	ID corrected from historical ID of Neoamphitrite affinis	Speciemens referenced
Sosane wireni	Historically Sosane sp. nr. wireni. Verified and agreed to Sosane wireni by the University of Laval in 2019.	
Pholoe longa	Historically Pholoe minuta. Pholoe longa - With facial tubercles, bare midorsum, unpigmented elytra, relatively large species. Located along the west coast of Greenland; Canada, in Bay of Fundy, Hudson Bay, and Resolute Bay , based on molecular data (MEIßNER).	Speciemens referenced from 2017, 2018, 2019 and 2020
Pholoe minuta	Historically Pholoe tecta. Pholoe minuta - No facial tubercles, dorsum covered, pigmented elytra, smaller species than Pholoe longa.	Speciemens referenced from 2017, 2018, 2019 and 2020

APPENDIX 4D

BIC Summary Stats

Table 4D: Summary Statistics for Benthic Invertebrate Community Indicators, Baffinland Iron Ore Mine MEEMP, 2020

Transect	Station	Total Density (org/m^2)	Richness (taxa/station)	Simpson's Diversity Index	Simpson's Evenness Index
	SE-1	9302	44	0.83	0.13
	SE-2	11828	47	0.88	0.18
	SE-3	25298	56	0.88	0.15
	SE-4	14503	46	0.91	0.25
	SE-5	24650	61	0.90	0.16
	SE-6	37898	70	0.93	0.20
	SE-7	23989	61	0.92	0.21
East	SE-8	17409	54	0.90	0.19
	SE-9	27899	64	0.91	0.17
	SE-10	35129	67	0.89	0.14
	SE-11	29999	55	0.74	0.07
	SE-12	18228	60	0.90	0.17
	SE-13	36022	77	0.94	0.21
	SE-14	64981	70	0.91	0.15
	SE-15	25393	52	0.88	0.16
Mean		26,835	59	0.89	0.17
Median		25,298	60	0.90	0.17
Minimum		9,302	44	0.74	0.07
Maximum		64,981	77	0.94	0.25
Count		15	15	15.00	15.00
SD		13,645	10	0.05	0.04
SE		3,523	2	0.01	0.01
	SW-1	10,781	43	0.93	0.33
	SW-2	130	6	0.66	0.49
	SW-3	9,597	39	0.90	0.26
	SW-4	8,629	47	0.91	0.23
	SW-5	11,554	48	0.93	0.30
	SW-6	13,809	49	0.90	0.21
	SW-7	18,715	65	0.85	0.10
West	SW-8	16,100	62	0.89	0.14
	SW-9	14,456	48	0.87	0.16
	SW-10	10,530	40	0.92	0.31
	SW-11	7,785	30	0.91	0.39
	SW-12	3,819	24	0.87	0.32
	SW-13	5,652	27	0.87	0.30
	SW-14	6,632	31	0.90	0.33
	SW-15	10,136	39	0.93	0.35
Mean		9,888	40	0.88	0.28
Median		10,136	40	0.90	0.30
Minimum		130	6	0.66	0.10
Maximum		18,715	65	0.93	0.49
Count		15	15	15.00	15.00
SD		4,807	15	0.07	0.10
SE		1,241	4	0.02	0.03
	SNW-1	9,434	52	0.94	0.32
	SNW-2	9,488	45	0.92	0.26
	SNW-3	10,525	45	0.91	0.26
	SNW-4	5,529	41	0.94	0.42
	SNW-5	8,451	45	0.91	0.25
	SNW-6	6,373	42	0.94	0.42
	SNW-7	8,923	50	0.94	0.34
Northwest	SNW-8	9,202	52	0.94	0.32
	SNW-9	6,577	43	0.93	0.32
	SNW-10	7,396	48	0.94	0.35
	SNW-11	5,718	36	0.92	0.36
	SNW-12	3,195	22	0.90	0.45
	SNW-13	4,165	37	0.94	0.48
	SNW-14	6,165	36	0.93	0.38
	SNW-15	5,961	43	0.92	0.28
Mean		7,140	42	0.93	0.35
Median		6,577	43	0.93	0.34
Minimum		3,195	22	0.90	0.25
Maximum		10,525	52	0.94	0.48
Count		15	15	15.00	15.00
SD		2,134	8	0.01	0.07
SE		551	2	0.004	0.02
	SNE-1	6,518	45	0.94	0.36
	SNE-2	4,490	36	0.92	0.37
	SNE-3	5,910	46	0.93	0.32
	SNE-4	2,202	35	0.94	0.51
	SNE-5	7,025	42	0.92	0.30
	SNE-6	3,455	28	0.91	0.39
	SNE-7	1,708	23	0.94	0.70
Northeast	SNE-8	3,515	34	0.88	0.24
	SNE-9	3,972	28	0.88	0.29
	SNE-10	8,664	51	0.94	0.31
	SNE-11	9,504	50	0.95	0.42
	SNE-12	6,911	43	0.92	0.30
	SNE-13	7,940	44	0.94	0.39
	SNE-14	3,462	21	0.87	0.36
	SNE-15	6,274	43	0.94	0.40
Mean		5,437	38	0.92	0.38
Median		5,910	42	0.93	0.36
Minimum		1,708	21	0.87	0.24
Maximum		9,504	51	0.95	0.70
Count		15	15	15.00	15.00
SD		2,375	10	0.03	0.11
SE		613	2	0.01	0.03

Notes: m^2 = meters squared; org = organisms; SD = standard deviation; SE = standard error

Chapter 5.0 Substrate, Macroflora, and Benthic Epifauna

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

Submitted to:

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1663724-281d-R-Rev1-34000

18 August 2021

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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
AIS/NIS	Aquatic Invasive Species/ Non-Indigenous Species
BACI	Before-After-Control-Impact
EEM	Environmental Effects Monitoring
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
m	meter
mm	millimeter
MANOVA	Multivariate Analysis of Variance
MEEMP	Marine Environmental Effects Monitoring Program
MFEAP	Marine Foreshore Environment Assessment Procedure
No.	Number
NIRB	Nunavut Impact Review Board
PC	Project Certificate
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SDI	Simpson's Diversity Index
ZOI	Zone of Influence

5.0 SUBSTRATE, MACROFLORA AND BENTHIC EPIFAUNA

5.1 Introduction

This chapter presents the results of the substrate, macroflora and benthic epifauna monitoring program, a component of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted at Milne Port and in Milne Inlet during the 2020 open-water season. This component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS, Baffinland 2012) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the PC Conditions described in in Chapter 1.0, Table 1-2. Project Certificate (PC) Conditions related to the monitoring of substrate, macroflora, and benthic epifauna included PC Conditions No. 76, 83 (a), 87, 99 (a), and 99 (c).

5.1.1 Objectives

The MEEMP objectives are outlined in Section 1.3 for the overall program. Objectives specific to the substrate, macroflora, and benthic epifauna component are:

- Collect and interpret data at Milne Port and a nearby Reference Area for the purpose of identifying Project-related effects.
- Verify predictions made in the FEIS regarding effects on Arctic char *(Salvelinus alpinus)* habitat.
- Recommend necessary and appropriate changes to the substrate, macroflora, and benthic epifauna component of the MEEMP for future years.

5.2 Study Design

The 2014 to 2017 MEEMP study design monitored for changes to the benthic community using epifauna[1] and epiflora[2] as indicators using towed underwater video transect surveys. The use of epifauna and epiflora as effect indicators deviated from the standard Environmental Effects Monitoring (EEM) methodology (Environment Canada 2010; 2012) and presented a number of challenges, including 1) high temporal and spatial variability due to the transient nature of many epifaunal species, 2) typical low resolution of video survey data compared to laboratory analysis for species identification, enumeration and substrate classification, and 3) difficulty in distinguishing between live epiflora (e.g., kelp) and dead vegetation debris using video survey methods, which can result in inaccurate data reporting.

In 2018, towed video surveys for benthic epifauna and epiflora were not conducted along the full transect lengths; instead, the study design was changed to follow a Before-After-Control-Impact (BACI) approach with five belt transects (1 m x 5 m plots) permanently installed on the seabed in each of an exposure (impact) area and a reference (control) area. Monitoring was conducted using a remotely operated vehicle (ROV) underwater video system. Taxonomic data was also used to inform the aquatic invasive species and non-indigenous species (AIS/NIS) program (Chapter 8.0). In 2019, underwater video monitoring of benthic epifauna and macroflora communities within permanent belt transects continued for a second year.

[1] benthic invertebrates living on the substrate

[2] marine vegetation attached to the substrate (e.g. kelp)

The belt transects deployed in 2018 were made of two 1-m-long, 5-cm-diameter aluminum pipes filled with concrete connected by two 5-m-long steel chains attached to both ends of the pipes (Figure 5-1). In 2019, it was determined that the flexible design was not suitable for the environment, as five of the ten deployed transects were observed to have been moved, twisted, or become obscured presumably due to ice scour.

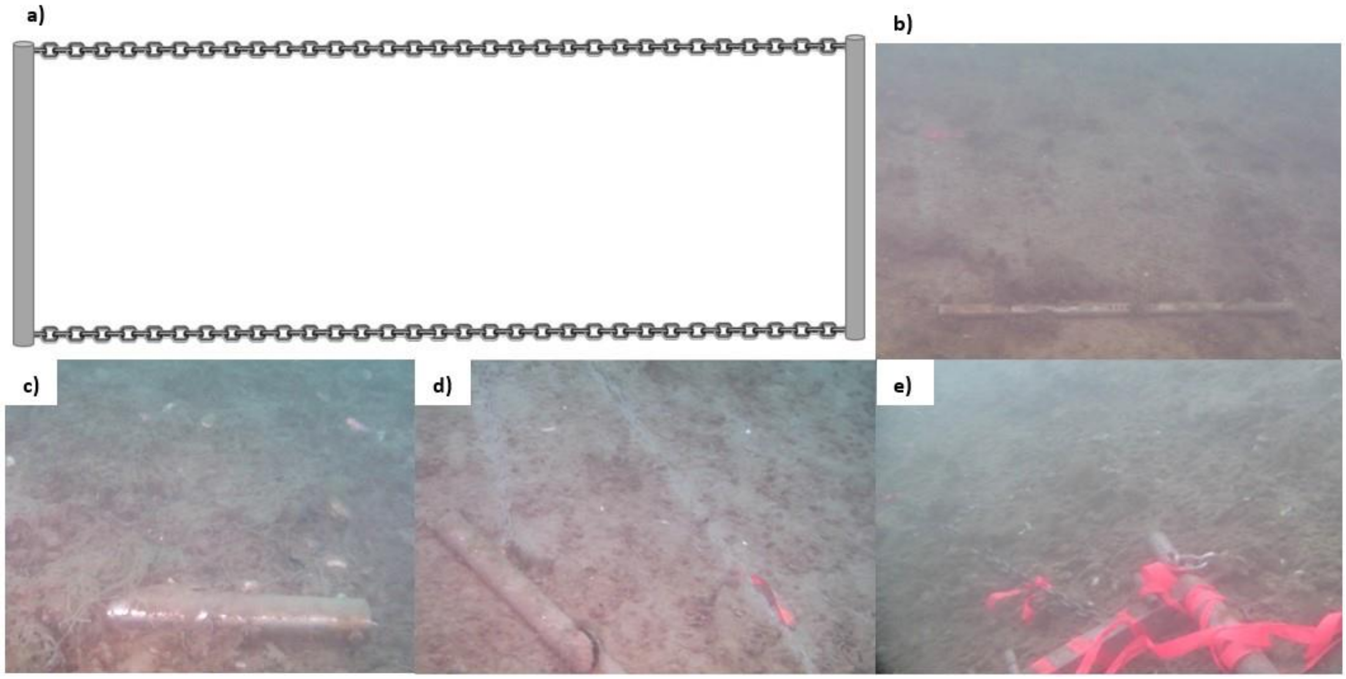


Figure 5-1: a) Illustration of 1 m x 5 m belt transect used in years 2018-2019, b) A deployed belt transect from 2019, and examples of suitability issues with the flexible design including c) Obscured, d) Twisted, and e) Moved belt transects.

5.2.1 Modifications to the Program (2020)

Surveys were modified in 2020 to replace the belt transects described above, which had been determined to be ineffective due to a high proportion becoming twisted, moved, or obscured within one year of deployment, presumably due to ice scour. Modification in 2020 included the use of divers to undertake biophysical surveys of permanent, heavy-duty quadrats to improve the resolution of taxonomic identification including, where necessary, collection of specimens for species confirmation. A total of ten 1 m x 1 m square steel quadrats were fabricated onsite in 2020 and installed on the sea bottom in the Milne Port region, five in the Project exposure area and five in a reference area (Figure 5-2).

LEGEND

STEEL QUADRAT LOCATION

REFERENCE(S)
IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT – YEAR 1 FREIGHT DOCK OFFSET MONITORING

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

TITLE
DEPLOYMENT LOCATIONS FOR THE STEEL QUADRATS FOR MONITORING SUBSTRATE, MACROFLORA AND BENTHIC EPIFAUNA IN MILNE PORT, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	5-2

5.2.2 Indicators

Effect indicators selected for potential Project-induced changes in substrate, macroflora and epifauna include species richness (number of taxa present), relative abundance, Simpson's diversity index, abundance (for motile taxa only) and percent cover (for macroflora and sessile invertebrates only). These indicators are calculated from data collected in both reference and impact areas and analyzed statistically to evaluate Project-related effects within the Milne Inlet study area. The 2020 MEEMP was the first year in which data were collected using steel quadrat sampling, precluding the ability to make quantitative temporal comparisons to previous years.

5.3 Materials and Methods

5.3.1 Field Methodology

Ten 1 m x 1 m square steel quadrats were secured to the sea floor, five in the Project exposure area and five in a reference area (Table 5-1, Figure 5-2). The reference area (R1) was established as part of the MEEMP program in 2013, representing an area of Milne Inlet near the Milne Port but out of the zone of influence (ZOI) of Project activities (SEM 2014). Each quadrat was fabricated on site from steel. The quadrat consisted of a 1 m by 1 m square frame, inset with 0.075 m metal bars to create nine smaller squares (sub-quadrats, approximately 0.22 m x 0.22 m) to allow for accurate and repeatable area measurements and scaling. The quadrats were painted with fluorescent spray paint to aid in locating them in subsequent surveys. A set of four plastic lids were attached on a line to the center of each quadrat, lifted into the water column by a float, to be used as settlement substrate for encrusting epifauna (Figure 5-3).

The quadrats were deployed from the field vessel at the locations of the old belt transects, in water depths of approximately 5 to 15 m. Diver-based and ROV-based video surveys were used to verify that the quadrats were positioned properly and to confirm their deployment depth. Monitoring of benthic epifauna and macroflora communities within the quadrats was conducted using underwater video (i.e., using an ROV) and diver-based surveys. Divers surveyed the quadrats in the reference area, but due to time constraints in the field program, were unable to survey the quadrats in the Project exposure area (these were subsequently completed using ROV-video surveys).

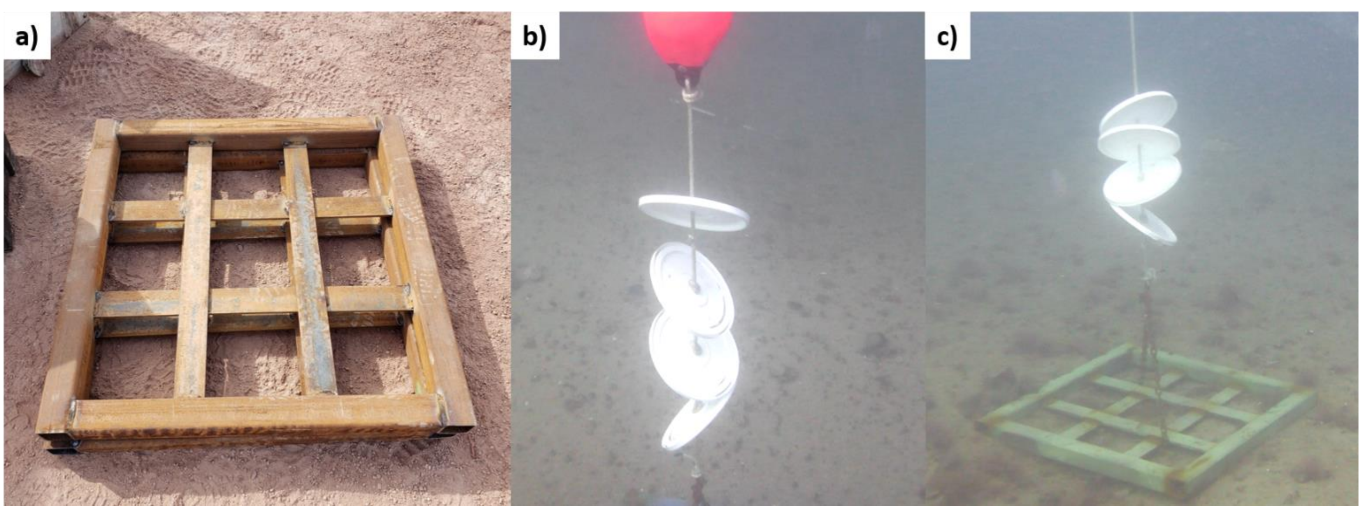


Figure 5-3: a) Example 1 m x 1 m steel quadrat fabricated with a 3x3 inset grid for deployment in 2020, b) A float and settlement plates suspended in the water column above quadrat Q3, c) Painted quadrat deployed at location Q4, with the attached settlement plates.

Table 5-1: Quadrat Locations

Area	Quadrat	UTM Coordinates (17W)		Depth (m below CD)	Deployment Date (2020)	Survey Type	Survey Date (2020)
		Easting (m)	Northing (m)				
Milne Port	Q1	502828	7976382	9.8	12 Aug	ROV	21 Aug
	Q2	503039	7976480	9.8	12 Aug	ROV	21 Aug
	Q3	504208	7976659	12.4	12 Aug	ROV	21 Aug
	Q4	504363	7976611	12.0	12 Aug	ROV	21 Aug
	Q5	504802	7976731	12.1	12 Aug	ROV	21 Aug
Reference Area	Q6	506562	7979114	10.0	13 Aug	Diver	15 Aug
	Q7	506774	7979170	10.9	13 Aug	ROV	21 Aug
	Q8	506957	7979457	11.0	13 Aug	Diver	15 Aug
	Q9	506997	7979599	10.9	13 Aug	Diver	15 Aug
	Q10	506584	7979115	8.0	13 Aug	Diver	15 Aug

Notes: CD = chart datum

5.3.1.1 Diver-based Data Collection

Quadrat data collection was conducted on 15 August 2020 using a four-person biological dive team operated from Baffinland's research vessel. As mentioned above, divers were only able to survey in the quadrats in the reference area (quadrats (Q) 6, 8, 9 and 10), leaving the remaining quadrats to be surveyed by ROV. Biophysical data within each quadrat was recorded by one of the two divers while the other diver collected representative photographs[3]. Observations within the sub-quadrats were recorded in a systematic way, with the top end of the quadrat (sub-quadrat 1,2,3) on the upslope and the bottom of the quadrat (sub-quadrat 7,8,9) on the down slope so the observations by sub-quadrat could be repeatable each year.

5.3.1.2 ROV-based Data Collection

Biophysical data on substrate, benthic macrofloral, and epifaunal communities were collected within each quadrat using an ROV-based underwater video system consisting of a single high resolution video camera (NTSC with 3x optical zoom) capable of recording in standard and high definition, mounted on a lightweight Seamor Chinook 300F industrial-grade inspection ROV equipped with spotlights, integrated pressure/depth sensor and a magnetic compass (Appendix 5A, Photos 1 and 2). The video camera on the ROV was connected via umbilical to a video monitor set-up in the cabin of the research vessel, where video data was recorded on an external hard drive. The ROV was operated by an experienced ROV technician (Andy Clark - Ocean Dynamics Inc. – Golder subcontractor) using manual and automatic thruster, tilt, pitch and heading controls built into a top-side deck-mounted control box.

Quadrat locations (Q1-5 and Q7) were identified using the research vessel's on-board navigational software Navionics+. Using the ROV's magnetic compass, a heading for shore was identified prior to the ROV's deployment in order to maintain the systematic methodology of sub-quadrat observations established by the divers. ROV surveys of each sub-quadrat were conducted, recording the sub-quadrat number and any distinguishing features, as well as an overview survey of the entire quadrat to establish a map of the sub-quadrats for future surveys.

[3] Underwater imagery collected using a SONY RX100 V camera in Fantasea underwater housing and Big Blue video light for all underwater surveys. The camera has high definition video capability and still photography features.

5.3.2 Data Analysis

5.3.2.1 Quadrat Survey

Sub-quadrat data from dive and ROV surveys were recorded according to the following criteria[4]:

- Substrate type was visually estimated according to the size ranges: bedrock; boulder (>256 mm diameter); cobble (64 to 256 mm); gravel (2 to 64 mm); sand (0.0625 to 2 mm); silt/mud/clay (<0.0625 mm) and relative composition (i.e., as a percentage areal coverage).
- Macroalgae was identified to the lowest practical level (LPL) and areal coverage was estimated according to the Fisheries and Oceans Canada (DFO) Marine Foreshore Environment Assessment Procedure (MFEAP) coverage categories (i.e., Sparse <5%; Low 5-25%; Moderate >25-50%; Moderate to Dense >50-75%; and Dense >75 100%).
- Sessile invertebrates, such as clams and mussels, were identified to LPL and areal coverage was estimated (as above).
- Motile invertebrates (e.g., urchins, limpets) and fish were identified to LPL and enumerated. Abundance was estimated if relatively large numbers of motile species were present. Abundances were categorized as rare (1 to 2 individuals), low (3 to 5 individuals), moderate (6 to 10 individuals) and high (>10 individuals).
- Photographs showing representative biological features and aiding in species identification were taken.
- The same biologist diver that undertook the diver-based biophysical survey at Site reviewed the ROV video footage and recorded observations per sub-quadrat to ensure consistency between survey methods. Observations were recorded according to the Quantitative Quadrat Survey methods, as above.

Due to the quadrats being deployed for the first time during the 2020 season, quantitative and statistical analyses were not performed between 2020 and previous survey years. Qualitative comparisons were made where applicable. Results from 2020 surveys will act as a baseline to monitor for changes in subsequent survey years.

5.3.2.2 Simpson's Diversity Index

Diversity of macroflora and benthic invertebrates was calculated using Simpson's Diversity Index (SDI). The SDI measures the proportional distribution of organisms in the community. The SDI takes into account the variety of taxonomic groups and also how evenly the total density is distributed among these groups. Certain conditions may favour one organism over another, resulting in the community being dominated by a few taxa, which is reflected in decreased diversity (Simpson 1949). The SDI values range between zero and one, where lower values indicate a less diverse community and higher values indicate a more diverse community. The SDI was calculated using the formula provided by Krebs (Krebs 1999):

$$SDI = 1 - \sum_{i=1}^{S} (p_i)^2$$

[4] Recorded data were in general accordance with Fisheries and Oceans Canada (DFO) Marine Foreshore Environment Assessment Procedure (MFEAP)

Where:

- SDI = Simpson’s diversity index
- S = the total number of taxa, or total percentage cover of all taxa
- p_i = the proportion of the i^{th} taxon

For categorization of diversity, SDI values <0.250 were considered to have very low diversity, 0.250 to 0.499 had low diversity, 0.500 to 0.750 were moderately diverse and >0.750 were considered to have high diversity (Table 5-2).

Table 5-2: Diversity Categories for Simpson's Diversity Index (SDI) Values

SDI Value	Diversity Category
<0.250	Very Low
0.250 through 0.499	Low
0.500 through 0.750	Moderate
>0.750	High

5.3.2.3 MANOVA

Parameter effects between the experimental and Reference Area quadrats on macroalgae and benthic epifauna were analyzed using a multivariate analysis of variance (MANOVA). The MANOVA seeks to obtain a multivariate F value based on a comparison of error and effect covariances through maximization of group differences (French et al. 2008). Species richness (i.e., taxa present), species diversity, species abundance and percent cover of macroflora and sessile benthic epifauna were used as dependent variables. P-values <0.05 are considered to indicate significance between groups. Analysis was conducted using R statistical software version 1.2.5003 (R Core Team 2013).

5.3.3 Quality Management

5.3.3.1 Field Quality Assurance/Quality Control

Quality assurance and quality control (QA/QC) measures for quantitative and qualitative data collected during quadrat surveys, included:

- Diver-based survey photographs and datasheets were saved to a laptop computer and external hard drive at the end of each field day. Once in the office, the survey data were uploaded to Golder’s SharePoint site.
- Field survey datasheets were checked and validated before leaving the site.
- A qualified marine scientist (Golder) experienced in the identification of Arctic marine biota worked alongside the ROV operator to guide to points and specimens of interest.
- ROV video footage was saved to an external hard drive at the end of each survey and backed up to a second hard drive at the end of each field day.

5.3.3.2 Data Analysis QA/QC

The QA/QC measures for the analysis of the quantitative and qualitative data collected during quadrat surveys, included:

- Taxa common name/species name and recorded observations were verified using references[5].
- Diver-collected data were entered into an excel spreadsheet where a second biologist conducted a data review for transcription errors.

5.4 Results

Data collected from each quadrat is presented in detail in Appendix 5B and summarized below. Due to the full or partial loss of previously installed belt transects, the survey was modified by replacing the belt transects with permanent quadrats designed to be more resilient to the conditions at Milne Port. Although the quadrats were placed in the general locations of the previous belt transects, differences in the design and exact placement prevent a comparison between survey years and results from 2020 represent the first year of this type of effects monitoring.

5.4.1 Substrate

Substrate composition was consistent across the quadrats with silt being the dominant substrate type, ranging from 54.9% to 90.1% of the total surface area (Figure 5-4, Figure 5-5, Figure 5-6). This aligns with previous observations for the same general location made via belt transect surveys. Sand was the second most common substrate type in most quadrats, ranging between 6.4% and 18.3%; exceptions include Q3 and Q10, where shell debris was more prevalent (18.7% vs. 10.8% and 11.0% vs. 6.4%, respectively) and Q9, where boulder was slightly more prevalent (19.4% vs. 18.3%). Other observed substrate types included cobble (0% to 2.8%) and gravel (0% to 1.2%). No significant difference in substrate composition (number of substrate types present within a quadrat) were observed between quadrats in the exposure area and the reference area (Table 5-3).

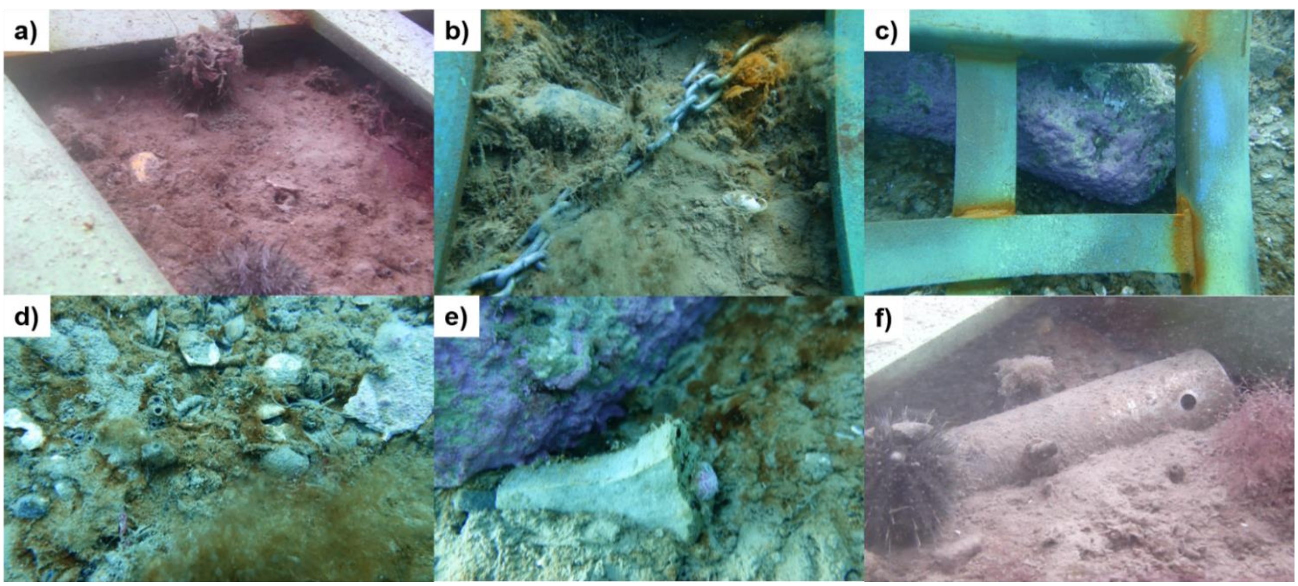
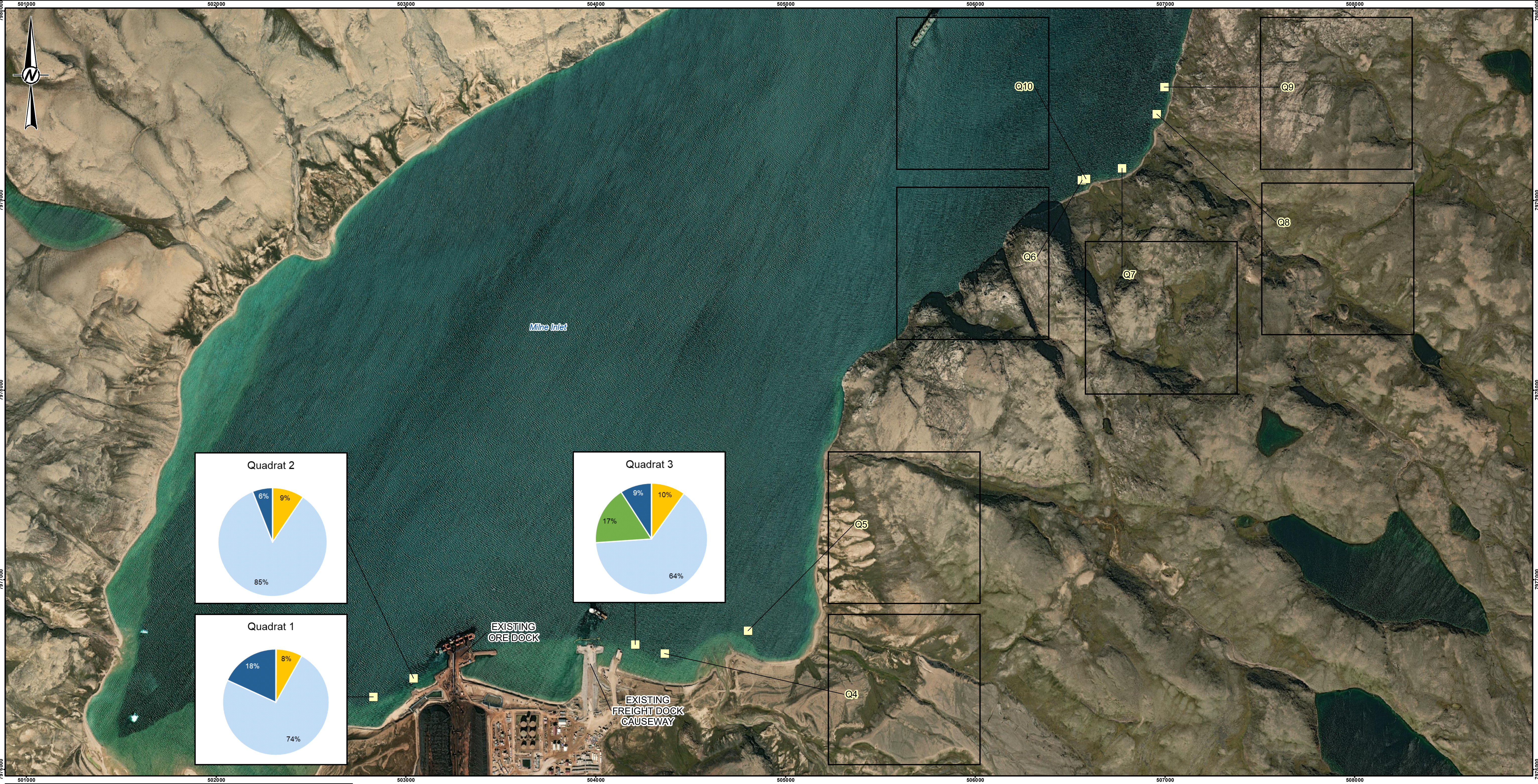


Figure 5-4: Substrate types observed on quadrats at Milne Port, a) silt, b) cobble, c) boulder, d) shell debris, other debris including e) bone and f) metal.

[5] References used during the surveys included: Kupper et al. 2016, Coad and Reist 2018



LEGEND

STEEL QUADRAT LOCATION

SUBSTRATE TYPE

- BOULDER
- COBBLE
- GRAVEL
- SAND
- SILT
- SHELL DEBRIS
- DETRITAL VENEER
- DEBRIS

0 500 1,000

1:20,000 METRES

REFERENCE(S)

PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	NO
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

TITLE
RELATIVE ABUNDANCES (%) OF SUBSTRATE TYPES FOR THE STEEL QUADRATS IN MILNE PORT, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	5-5

The MANOVA analysis data was separated into two categories: raw and proportional, where proportional data includes shells as substrate, not detrital cover (Table 5-3). Significant differences in the percent cover of substrate types between the reference area and exposure area was only found for gravel with a p-value of 0.048 (Table 5-3).

A detrital and debris layer was present on all quadrats. Composition of this layer was calculated separately from substrate composition, as it was present over the existing substrate, resulting in overall percent compositions greater than 100%. The detrital and debris layer ranged in cover from 1.0% to 31.7% of the quadrat and was predominantly comprised of an organic veneer. Other material (e.g., metal piping from the old belt transects, bone) was present in quadrats 5 and quadrats 9, covering 6.7% and 0.6% of the total quadrat, respectively. No significant differences were found between the reference area and the exposure area for overall detrital cover (Table 5-3).

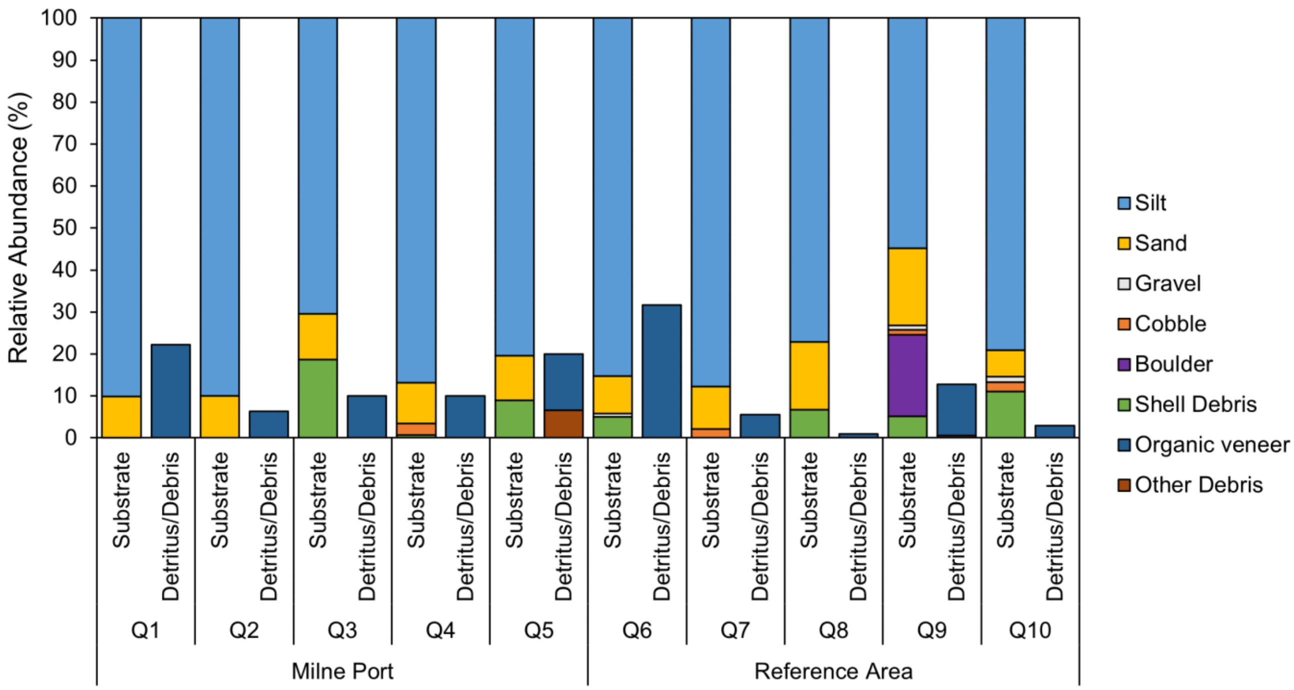


Figure 5-6: Relative abundances of substrate types and detrital cover observed in the deployed quadrats, Milne Port 2020.

Table 5-3: MANOVA results of parameter effects of substrate and detrital type percent covers between reference and Milne Port sites, 2020

Response	Raw Percent (%) Cover		Proportional Percent (%) Cover	
	F-value	Pr(>F)	F-value	Pr(>F)
Substrate Composition	-	-	3.27	0.108
Bedrock	-	-	N/A	N/A
Boulder	-	-	1.000	0.347
Cobble	-	-	0.555	0.478
Gravel	-	-	5.43	0.048
Sand	-	-	0.578	0.469
Silt	-	-	0.949	0.359
Shell	-	-	<0.001	0.990
Detrital Cover				
Percent Cover	-	-	0.210	0.659
Organic veneer	0.076	0.790	0.743	0.414
Debris	0.833	0.388	0.743	0.414

Note: Substrate composition refers to the number of substrate types per quadrat location. Residuals and intercept are not presented in this table. See Appendix 5C for full results. Bold text indicates significant p-value <0.05.

5.4.2 Macroflora

In previous years, taxonomic resolution of macroflora was relatively coarse for belt transects in Milne Port as a result of poor visibility due to suspended particles in the water column and the use of an ROV for monitoring. In 2020, analysis of the quadrats was performed by a combination of divers and ROV. This method allowed for collection of specimens from the quadrats for identification purposes. Despite this advantage, identifications were not able to be made to species level for several collected macroflora taxa based on due to morphological similarities that could not be resolved with available resources.

Algae identified within quadrats belonged to two Phyla, Ochrophyta (brown algae) and Rhodophyta (red algae, Table 5-4, Figure 5-7,); representative taxa from Phylum Chlorophyceae (green algae) were not observed, although this phylum was documented in low abundance in belt transects deployed in previous years. Brown algae were identified to at least six distinct taxa, two of which were defined to species level, *Fucus distichus* (Rockweed) and *Saccharina latissima* (sugar kelp). A filamentous brown algae was identified to genus level (*Pylaiella* sp.); however, morphological similarities shared between species within this genus prevented resolution to species without a microscope. Three other distinct brown algae were identified but could only be resolved to class Phaeophyceae; these were distinguished from one another based on general morphology (brown branching algae, brown filamentous algae, and brown foliose algae).

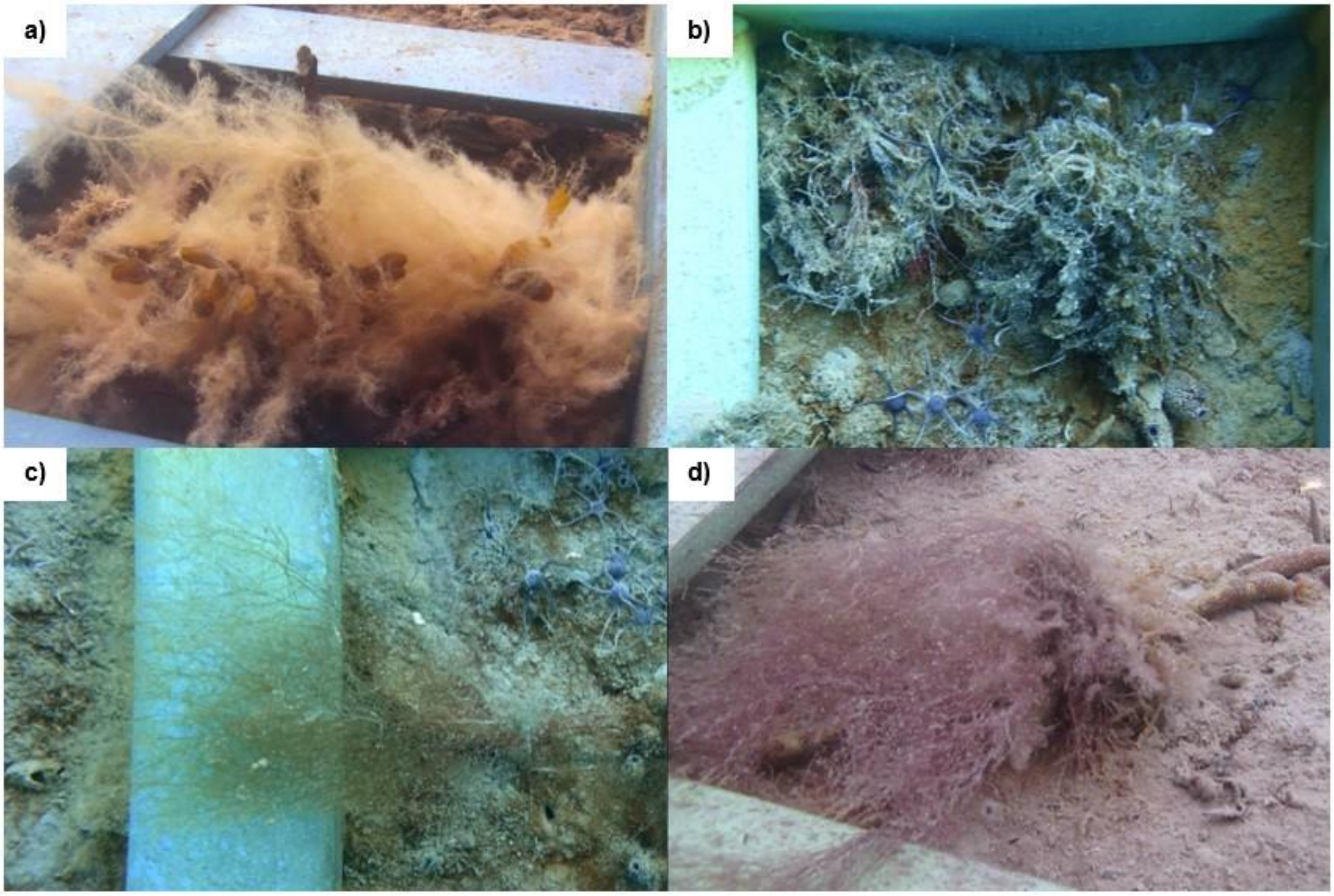


Figure 5-7: Dominant macroalgae types identified during quadrat surveys, a) *Pylaiella* sp. and rockweed (*Fucus distichus*), b) branching brown algae (Phaeophyceae indet.), c) filamentous brown algae (Phaeophyceae indet.), d) filamentous red algae (Rhodophyta indet.).

Red algae were identified to at least four distinct taxa, none of which were defined to species level (Table 5-4). An encrusting coralline red algae was identified to the Order Corallinales, though morphological similarities between taxa within the Order prevented further resolution. Three other red algae were identified but were not able to be resolved past Phylum Rhodophyta; these were distinguished during surveys based on general morphology (red branching algae, red filamentous algae, and red foliose algae).

Table 5-4: Macroflora Taxa Observed in Deployed Quadrats in Milne Port, 2020

Phylum Class/Order	Family	Taxa Common Name	Comments
Ochrophyta			
Phaeophyceae/ Ectocarpales	Acinetosporaceae	*Pylaiella* sp. Filamentous *Pylaiella*	Genus of filamentous brown algae. Globally common and found in most quadrats during surveys in sparse to moderate coverage
Phaeophyceae/ Fucales	Fucaceae	*Fucus distichus* Rockweed	Small tufted brown algae, sparse coverage where present in quadrats during surveys
Phaeophyceae/ Laminariales	Lamanariaceae	*Saccharina latissima* Sugar Kelp	Bladed kelp species. Uncommon, sparsely present on one quadrat (Q7)
Phaeophyceae	---	Phaeophyceae indet. 1 Brown Branching	Unidentified branching brown algae, sparse to low coverage in most quadrats
Phaeophyceae	---	Phaeophyceae indet. 2 Brown Filamentous	Unidentified filamentous brown algae, found in three quadrats in low to moderate coverage
Phaeophyceae	---	Phaeophyceae indet. 1 Brown Foliose	Unidentified foliose brown algae, uncommon and sparse in quadrats
Rhodophyta			
Florideophyceae Corallinales	---	Corallinales indet. Encrusting Coralline Algae	Unidentified encrusting coralline red algae. Found on one quadrat (Q9) in low coverage
---	---	Rhodophyta indet. 1 Red Branching	Unidentified branching red algae. Found on one quadrat (Q9) in sparse coverage
---	---	Rhodophyta indet. 2 Red Filamentous	Unidentified filamentous red algae. Found on four quadrats in sparse to low coverage
---	---	Rhodophyta indet. 3 Red Foliose	Unidentified foliose red algae. Found on four quadrats in sparse coverage

Notes: Taxa identified to the lowest practical taxonomic level.

Macroalgae cover varied between quadrats, ranging from approximately 2% to 44% of the total quadrat cover (Table 5-5, Figure 5-8, Figure 5-9). Brown algae were the dominant macroalga taxa in the majority of the quadrats, representing over 50% (by area) of the existing macroalgal organisms recorded in eight of the ten quadrats (Figure 5-7, Figure 5-8, Figure 5-9). The number of taxa present in the quadrats ranged between two and six, with diversity scores (i.e., SDI, defined in Table 5-2) ranging from very low diversity (<0.250) to moderate diverse (0.500 to 0.750, Table 5-5, Figure 5-8).

Table 5-5: Dominant Taxa, Total Percent Cover and Diversity Metrics for Macroalgae Taxa in Permanent Quadrats in Milne Port, 2020.

Station	Dominant Taxa	Substrate	Cover (%)	Taxa Present	Diversity (SDI)
Q1	Filamentous Brown Algae (Phaeophyceae indet.) / Filamentous *Pylaiella* (*Pylaiella* sp.)	Silt/Sand	19.89	4	0.552
Q2	Filamentous *Pylaiella* (*Pylaiella* sp.) / Brown Branching (Phaeophyceae indet.)	Silt/Sand	10.00	2	0.499
Q3	Branching Brown Algae (Phaeophyceae indet.) / Filamentous *Pylaiella* (*Pylaiella* sp.)	Silt/Sand	2.22	2	0.480
Q4	Filamentous Red Algae (Rhodophyta indet.)	Silt/Sand	7.00	3	0.228
Q5	Filamentous *Pylaiella* (*Pylaiella* sp.)	Silt/Sand	20.11	4	0.664
Q6	Branching Brown Algae (Phaeophyceae indet.)	Silt/Sand	15.89	5	0.573
Q7	Filamentous Brown Algae (Phaeophyceae indet.)	Silt/Sand	43.89	6	0.399
Q8	Filamentous Brown Algae (Phaeophyceae indet.)	Silt/Sand	10.78	4	0.137
Q9	Encrusting Coralline (Corallinales indet.)	Silt/Boulder/Sand	13.89	3	0.422
Q10	Filamentous *Pylaiella* (*Pylaiella* sp.)	Silt/Sand	28.67	4	0.131

Diversity was highest in quadrats 1, 5 and 6, with SDI values of 0.552 (4 taxa), 0.664 (4 taxa) and 0.573 (5 taxa), respectively (Table 5-5,Figure 5-8). Quadrat 1 was dominated by *Pylaiella* sp. and an unidentified filamentous brown algae, with relatively low abundances of rockweed and an unidentified foliose brown algae. Quadrat 5 was dominated by *Pylaiella* sp., with lower abundances of an unidentified red filamentous algae, followed by rockweed and unidentified brown branching algae. Quadrat 6 was dominated by an unidentified branching brown algae, with lower abundances of an unidentified foliose brown algae, followed by rockweed and low abundances of *Pylaiella* sp. and an unidentified filamentous red algae.

Diversity was lowest in quadrats 8 and 10, with SDI values of 0.137 and 0.131 (very low diversity), respectively, despite four distinct taxa being observed within the quadrats. These low SDI values reflect the dominant presence (>90% relative abundance) of a single algae taxon relative to the other present (*Pylaiella* sp.and unidentified brown filamentous algae, respectively; Table 5-5, Figure 5-8, Figure 5-9). Quadrat 4 also had very low diversity with an SDI value of 0.228, and only three taxa present, dominated by an unidentified filamentous red algae (60% relative abundance).

Quadrat 9 differed from the other quadrats in composition of macroalgae species present (Table 5-5, Figure 5-8, Figure 5-9). This quadrat was considered to have low diversity (SDI 0.422), with three taxa present and encrusting coralline algae being the dominant macroalgae present. Quadrat 9 was also the only quadrat where coralline algae and an unidentified branching red algae were observed. Notably, quadrat 9 was unique amongst the quadrats in having boulder as a primary substrate.

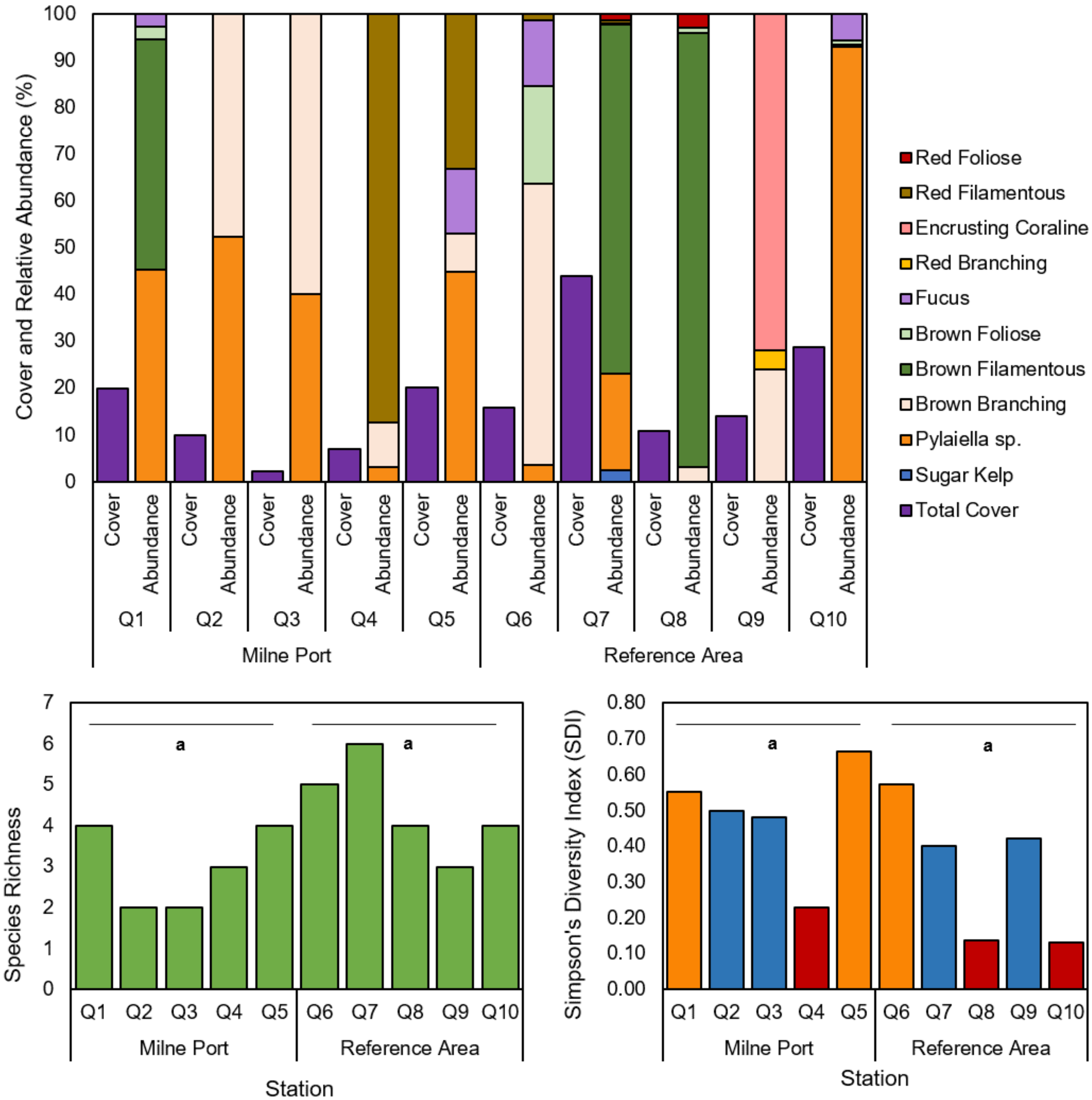
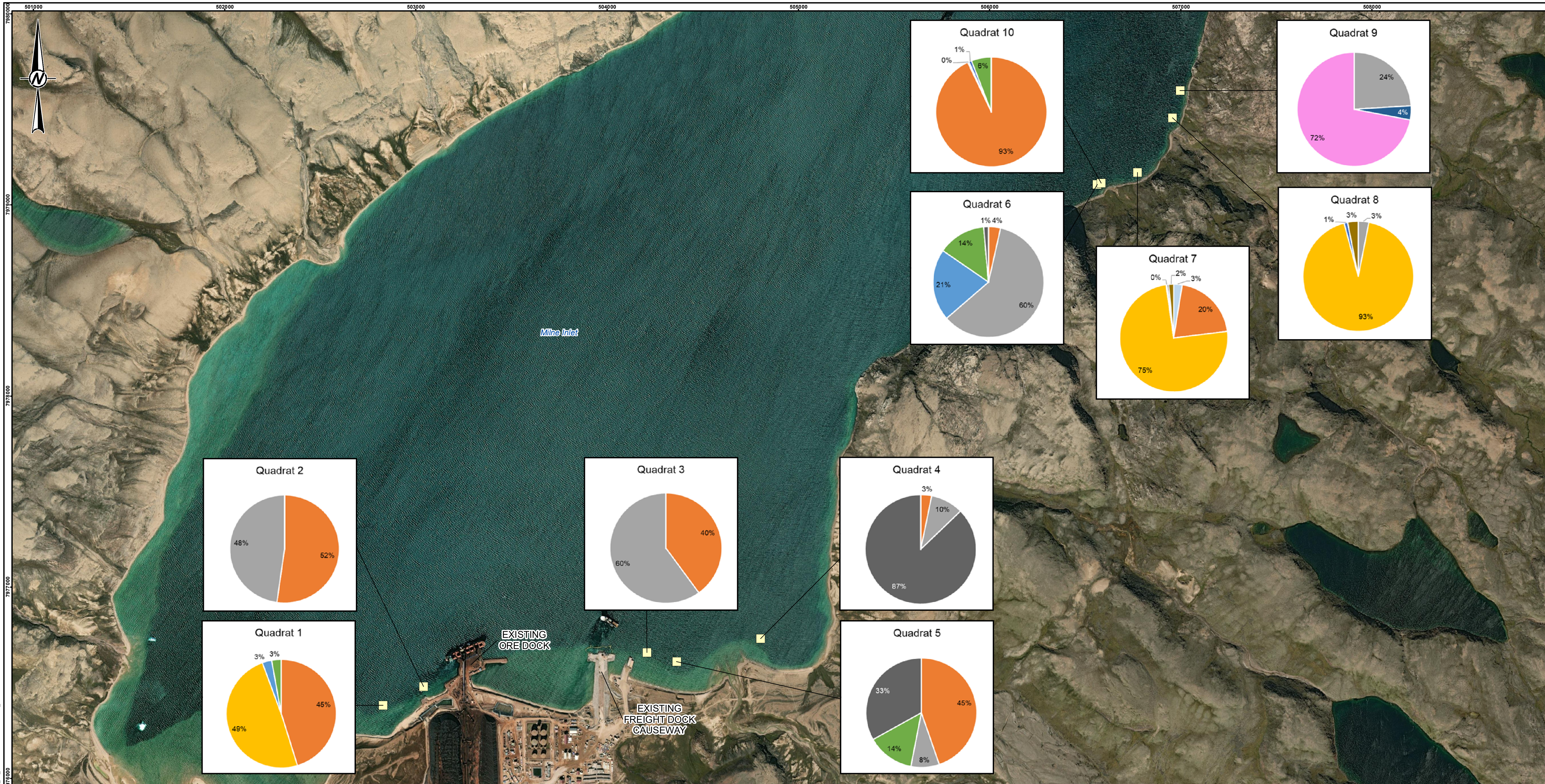


Figure 5-8: Percent cover and relative abundance (%) of macroflora taxonomic groups (top) and species richness (bottom left) and diversity (SDI, bottom right) of macroflora observed in quadrats, Milne Port 2020. Letters indicate statistical significance (p <0.05), with different letters indicating significant differences between groups. For SDI Values: green indicates SDI values >0.750 (high diversity), orange indicates SDI values between 0.500 and 0.750 (moderately diverse), blue indicates values between 0.250 and 0.499 (low diversity), and red indicates values <0.250 (very low diversity).



LEGEND

STEEL QUADRAT LOCATION

MACROFLORA TAXA TYPE

- SUGAR KELP
- *Pylaiella* sp.
- BROWN BRANCHING
- BROWN FILAMENTOUS
- BROWN FOLIOSE
- FUCUS
- RED BRANCHING
- ENCRUSTING CORALINE
- RED FILAMENTOUS
- RED FOLIOSE

0 500 1,000

1:20,000 METRES

REFERENCE(S)
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GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	NO
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

TITLE
RELATIVE ABUNDANCES (%) OF MACROFLORA TAXA FOR THE STEEL QUADRATS IN MILNE PORT, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	5-9

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25mm

0

The highest total cover and highest number of taxa recorded in a single quadrat (6 taxa) was in quadrat 7. Diversity in this quadrat however was determined to be low (SDI 0.399) due to the high relative abundance of unidentified brown filamentous algae within the quadrat. Notably, quadrat 7 was the only quadrat in which sugar kelp was present (Figure 10). No bladed kelp species were present in any other quadrat. Quadrats 2 and 3 also had low diversity (SDI 0.499 and 0.480, respectively), each with only two taxa present (unidentified brown branching and filamentous alga) in relatively similar abundances (Figure 5-8).

No significant differences were detected between the reference and exposure areas for percent cover, species abundance, species richness or species diversity (Table 5-6).

Table 5-6: MANOVA Results of Parameter Effects of Percent Cover, Species Richness, Species Diversity and Species Abundance on Macroflora Between Reference and Milne Port Sites, 2020.

Response		F-value	Pr(>F)
Percent Cover		2.317	0.166
Species Richness		4.261	0.073
Species Diversity		1.839	0.212
Species Abundance			
Taxa Name	Common Name		
Saccharina latissima	Sugar kelp	1.000	0.347
Pylaiella sp.	Filamentous *Pylaiella*	0.478	0.509
Phaeophyceae indet. 1	Brown branching algae	0.208	0.660
Phaeophyceae indet. 2	Brown filamentous algae	1.065	0.332
Phaeophyceae indet. 3	Brown foliose algae	0.928	0.364
Fucus distichus	Rockweed	0.034	0.859
Rhodophyta indet. 1	Red branching algae	1.000	0.347
Corallinales indet.	Encrusting coralline algae	1.000	0.347
Rhodophyta indet. 2	Red filamentous algae	1.931	0.202
Rhodophyta indet. 3	Red foliose algae	2.219	0.175

Note: Residuals and intercept are not presented in this table. See Appendix 5C for full results. Bold text indicates significant p-value <0.05.

5.4.3 Benthic Epifauna

Benthic epifauna identified in the quadrats belonged to five phyla: Annelida (worms), Arthropoda, Chordata, Echinodermata, and Mollusca (Table 5-7). Phylum Annelida was represented by four distinct taxa, one of which was identified to species level (*Cistenides granulate* or ice cream cone worm). Unidentified sabellid worms (Family Sabellidae) and two unidentified types of polychaetes (unidentified tube dwelling worms, and unidentified feather duster worms; Class Polychaeta) were also observed. All epifauna recorded in the belt transect surveys in previous years (2018 and 2019) were observed in the 2020 quadrat surveys, aside from sea spiders, sunstars, anemones and indeterminate jellyfish, all of which had been observed in very low abundance in those years.

A single arthropod was observed in the 2020 quadrat surveys, an unidentified species of shrimp from the genus *Pandalus*. Phylum Chordata was represented by unidentified tunicates (Subphylum Tunicata) and fish from the Family Cottidae (Sculpin). Phylum Echinodermata was the most numerous of the taxa within the quadrats, represented by two species of sea urchin (green sea urchin, *Strongylocentrotus droebachiensis* and an unidentified sea urchin, *Strongylocentrotus* sp.) and unidentified brittle stars (Family Ophiuridae). Most species identified in the quadrat surveys belonged to the phylum Mollusca, with three taxa identified to species level:

Hiatella arctica (wrinkled rock borer), *Similipecten greenlandicus* (mud scallop), and *Clione limacina* (sea angel). Two mollusks were identified only to genus: *Mya* sp. (blunt gaper) and *Tonicella* sp. (unidentified chiton). Other mollusks observed included unidentified mussels (Class Mytilida) and unidentified limpets (Family Lottiidae).

Table 5-7: Benthic Epifauna Taxa Observed in Deployed Quadrats in Milne Port, 2020

Phylum Class/Order	Family	Taxa Common Name	Comments
Annelida			
Polychaeta/ Terebellida	Pectinariidae	*Cistenides granulata** Ice cream Cone Worm	Tube dwelling worm observed in most quadrats with sparse cover.
Polychaeta/ Sabellida	Sabellidae	Sabellidae indet.* Sabellid Worm	Unidentified Sabellid worm, uncommon in quadrats with sparse cover.
Polychaeta	---	Polychaeta indet. 1* Tube Dwelling Worm	Unidentified tube dwelling worms, observed in half the quadrats with sparse cover.
Polychaeta	---	Polychaete indet. 2* Feather Duster Worm	Unidentified feather duster worm, uncommon in quadrats with sparse cover.
Arthropoda			
Malacostraca/ Decapoda	Pandalidae	*Pandalus* sp. Shrimp	Unidentified shrimp species, single specimen observed in one quadrat (Q4).
Chordata			
Actinopterygii/ Scorpaeniformes	Cottidae	Cottidae indet.	Unidentified sculpin species, observed in four quadrats with rare abundances.
---	---	Tunicata indet.*	Unidentified tunicate species, uncommon in quadrats with sparse cover.
Echinodermata			
Echinoidea/ Echinoida	Strongylocentrotidae	*Strongylocentrotus* sp. Unidentified Sea Urchin	Unidentified urchin species, uncommon in quadrats with rare to low abundance.
Echinoidea/ Echinoida	Strongylocentrotidae	*Strongylocentrotus droebachiensis* Green Sea Urchin	Urchin species commonly observed in Milne Port. Uncommon in quadrats with rare to moderate abundance.
Ophiuroidea/ Ophiurida	Ophiuridae	Ophiuridae indet. Brittle Star	Common to Milne Port, observed in most quadrats with rare to high abundances.
Mollusca			
Bivalvia/ Adepedonta	Hiatellidae	*Hiatella arctica** Wrinkled Rock Borer	Common to Milne Port, observed in all quadrats with sparse to moderate cover.
Bivalvia/ Myida	Myidae	*Mya* sp.* Blunt Gaper	Common to Milne Port, observed in most quadrats with sparse cover.
Bivalvia/ Mytilida	---	Mytilida indet.* Mussels	Globally distributed class, present in one quadrat (Q9) with sparse cover.
Bivalvia/ Pectinioida	Propeamussiidae	*Similipecten greenlandicus* Mud Scallop	Scallop species common to Milne Port, uncommon in quadrats with low abundance.
Gastropoda/ Not assigned	Clinonidae	*Clione limacina* Sea Angel	Swimming gastropod species, present in one quadrat (Q9) with rare abundance.
Gastropoda/ Not assigned	Lottiidae	Lottiidae indet. Limpet	Limpet species observed in one quadrat (Q9) with rare abundance.
Polyplacophora/ Chitonida	Tonicellidae	*Tonicella* sp. Chiton	Chiton species observed in one quadrat (Q9) with rare abundance.

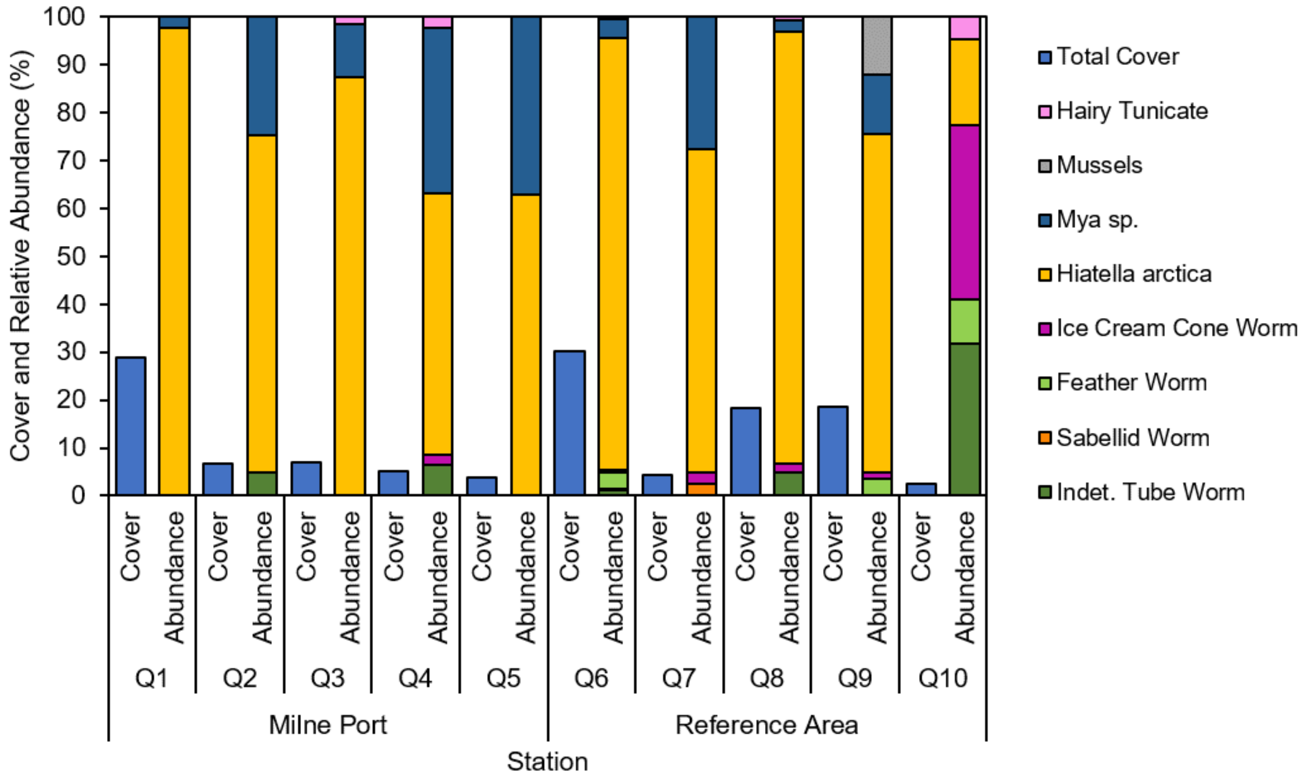
Notes: Taxa identified to the lowest practical taxonomic level. *indicates abundance calculations by percent cover (sessile epifauna).

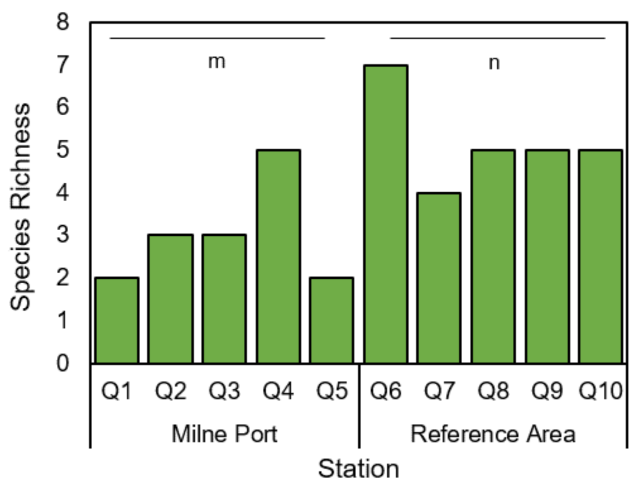
5.4.3.1 Sessile Epifauna

Sessile invertebrates were measured by percent areal cover, rather than by individual, due to the potential for large abundances among these taxa. Total percent cover of sessile epifauna ranged from approximately 2% to 30% of the quadrat (Table 5-8, Figure 5-10). Wrinkled rock borer was the dominant sessile epifauna taxa in the majority of the quadrats, representing over 50% of the existing sessile epifauna by area in all quadrats, aside from quadrat 10 where ice cream cone worms and unidentified tube worms were the most dominant taxa (Figure 5-10, Figure 5-11, Figure 5-12). The number of sessile epifauna taxa present in the quadrats ranged from two to seven, with diversity scores ranging from very low diversity (<0.250) to moderate diversity (0.500 to 0.750, Table 5-8, Figure 5-10).

Table 5-8: Dominant Taxa, Total Percent Cover and Diversity Metrics for Sessile Benthic Epifauna Taxa in the Deployed Permanent Quadrats in Milne Port, 2020

Station	Dominant Taxa	Substrate	Cover (%)	Taxa Present	Diversity (SDI)
Q1	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	29.00	2	0.045
Q2	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	6.78	3	0.440
Q3	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	7.00	3	0.225
Q4	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	5.11	5	0.578
Q5	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	3.89	2	0.467
Q6	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	30.22	7	0.186
Q7	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	4.44	4	0.468
Q8	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Sand	18.44	5	0.180
Q9	Wrinkled Rock Borer (*Hiatella arctica*)	Silt/Boulder/Sand	18.56	5	0.469
Q10	Ice Cream Cone Worm (*Cistenides granulata*) / Unidentified Tube Worms (Polychaeta indet.)	Silt/Sand	2.44	5	0.723





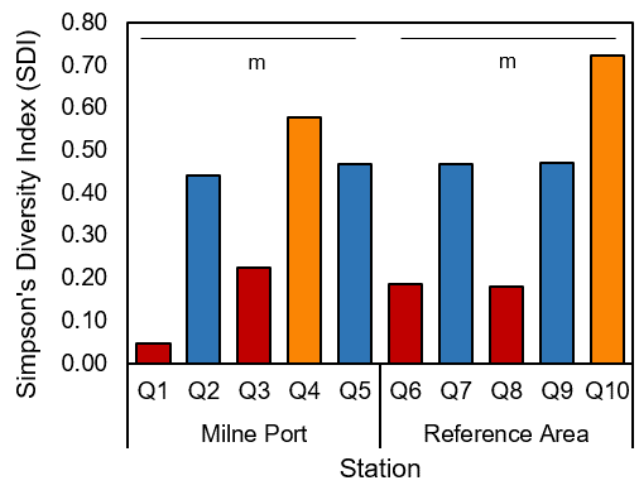
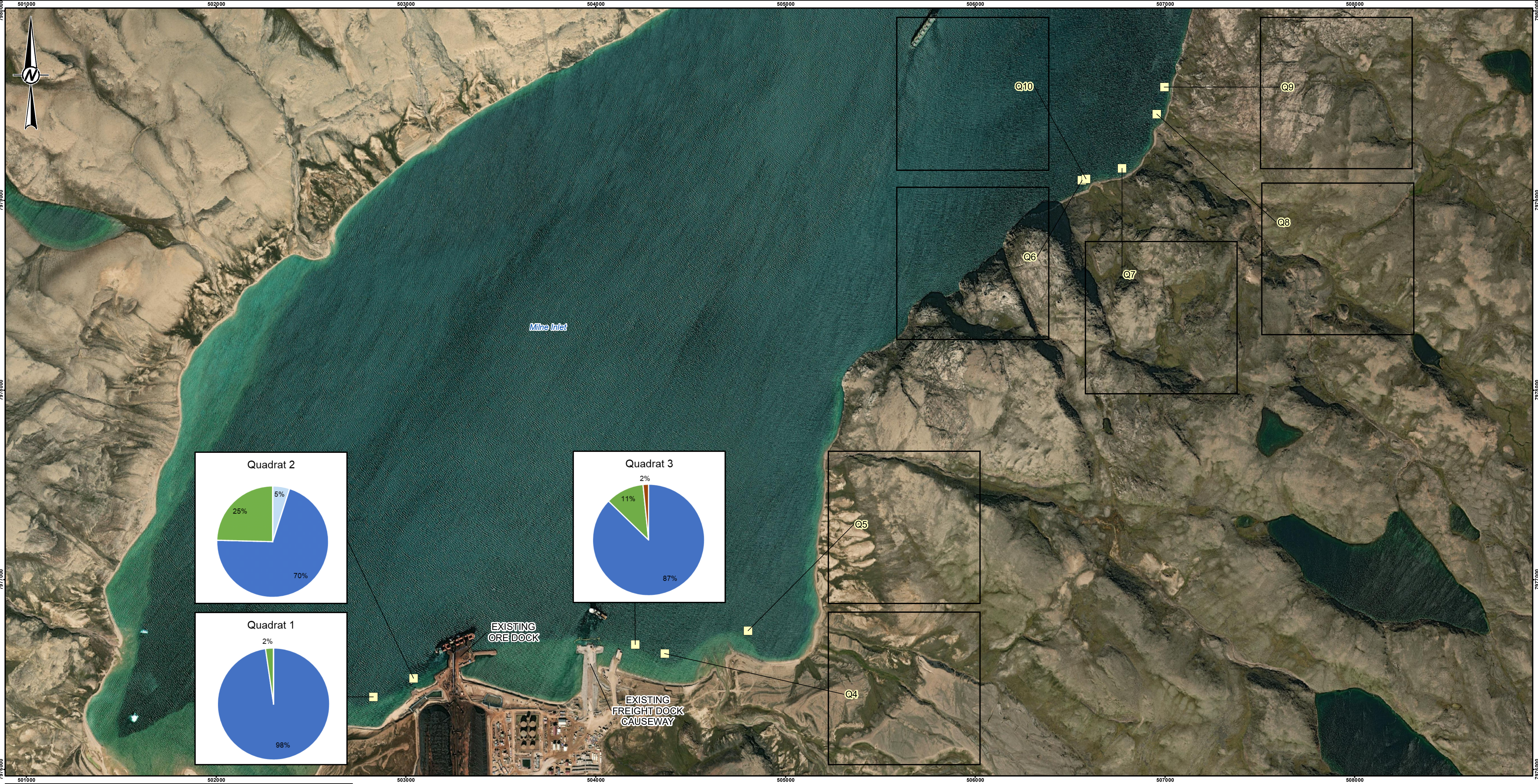


Figure 5-10: Relative abundance (%) of taxonomic groups (top) and species richness (bottom left) and diversity (SDI, bottom right) of sessile epifauna (bottom) in each quadrat, Milne Port 2020. Letters indicate statistical significance ($p < 0.05$), with different letter indicating significant differences between groups. For SDI Values: green indicates SDI values >0.750 (high diversity), orange indicates SDI values between 0.500 and 0.750 (moderately diverse), blue indicates values between 0.250 and 0.499 (low diversity), and red indicates values <0.250 (very low diversity).



LEGEND

STEEL QUADRAT LOCATION

SESSILE EPIFAUNA TAXA TYPE

- INDETERMINATE TUBE WORM
- SEBELLID WORM
- FEATHER WORM
- ICE CREAM CONE WORM
- WRINKLED ROCK BORER
- BLUNT GAPER
- MUSSEL
- HAIRY TUNICATE

0 500 1,000

1:20,000 METRES

REFERENCE(S)

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YYYY-MM-DD	2021-08-03
DESIGNED	NO
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

TITLE
RELATIVE ABUNDANCES (%) OF SESSILE EPIFAUNA TAXA FOR THE STEEL QUADRATS IN MILNE PORT, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	5-11

Figure 5-12: Dominant sessile invertebrate taxa observed during quadrat surveys. a) wrinkled rock borer (*Hiatella arctica*), b) unidentified tube worms (Polychaeta indet.), c) blunt gaper (*Mya* sp.), d) ice cream cone worms (*Cistenides granulata*).

Diversity of sessile epifauna was highest in quadrats 4 and 10, with moderately high SDI values of 0.578 (5 taxa) and 0.723 (5 taxa), respectively (Table 5-8,Figure 5-10). Quadrat 4 was dominated by wrinkled rock borer, followed by another burrowing bivalve, the blunt gaper (*Mya sp.*). The remainder of the taxa observed in quadrat 4 had relatively low percent cover, including unidentified tube dwelling polychaete worms, ice cream cone worms and an unidentified hairy tunicate. The most common taxa in quadrat 10 were ice cream cone worms and unidentified tube dwelling polychaete worms followed by wrinkled rock borer, unidentified feather duster worms and unidentified hairy tunicate (Table 5-8, Figure 5-10, Figure 5-11).

Diversity of sessile epifauna was lowest in quadrat 1 with an SDI value of 0.045 (very low diversity), despite having one of the highest percent coverage (Table 5-8, Figure 5-10). Only two taxa were present, wrinkled rock borer and unidentified tube dwelling polychaete worms, with wrinkled rock borer accounting for 98% of the total percent cover. Very low diversity of sessile epifauna was also observed in quadrat 3 (SDI 0.225), quadrat 6 (SDI 0.186) and quadrat 8 (SDI 0.180). Quadrat 3 was dominated by wrinkled rock borer (87% areal coverage), followed by blunt gaper. Hairy tunicate was also observed in quadrat 3 but accounted for only 1% areal coverage.

Quadrat 6 had a very low diversity score despite having the highest number of identified taxa and one of the highest percent coverage of all quadrats (Table 5-8, Figure 5-10). The low diversity value was largely due to the dominance of wrinkled rock borer within this quadrat (90% areal coverage). Blunt gapers were the next most abundant species, representing 4% areal coverage. The remainder of the percent coverage was represented by several unidentified feather duster worms (all in low abundances), unidentified tube dwelling worms, ice cream cone worms, unidentified sabellid worms and unidentified hairy tunicates. Quadrat 8 was also dominated by wrinkled rock borer (90% relative abundance), followed by unidentified tube dwelling polychaetes (<5% areal coverage). The remaining sessile epifauna taxa were blunt gapers, ice cream cone worms and unidentified hairy tunicates.

A low diversity of sessile epifauna was observed in quadrats 2, 5, 7 and 9 (Table 5-8, Figure 5-10). Wrinkled rock borer was the dominant taxa in all four quadrats, with 70.5%, 62.9%, 67.5%, and 70.7% percent cover, respectively. Quadrat 2 also included blunt gaper, and <5% areal coverage of unidentified tube dwelling polychaetes. Quadrat 5 only contained one other taxa, the blunt gaper. Quadrat 7 also included blunt gaper, as well as ice cream cone worms and unidentified sabellid worms (both in low abundances). Quadrat 9 also included blunt gaper as the second most abundant taxa, followed by mussels, feather duster worms and ice cream cone worms.

Species richness was found to be significantly different between the reference and exposure area quadrats with a p-value of 0.033 (Table 5-9). However, percent cover, species diversity, and species abundances were not demonstrated to be significantly different between the reference and exposure areas.

Table 5-9: MANOVA results of parameter effects of percent cover, species richness, species diversity and species abundance on sessile epifauna between reference and Milne Port sites, 2020

Response		F-value	Pr(>F)
Percent Cover		0.206	0.662
Species Richness		**6.667**	**0.033**
Species Diversity		0.063	0.808
Species Abundance			
Taxa Name	Common Name		
Poychaeta indet.	Tube worm	0.699	0.427
Family Sabellidae	Sabellid worm	1.423	0.267
Annelida indet.	Feather duster worm	3.773	0.088
Cistenides granulata	Ice cream cone worm	1.345	0.280
Hiatella arctic	Wrinkled rock borer	0.241	0.637
Mya sp.	Blunt gaper	2.215	0.175
Mytilida indet.	Mussel	1.000	0.3466
Tunicata indet.	Hairy tunicate	0.120	0.738

Note: Residuals and intercept are not presented in this table. See Appendix 5C for full results. Bold text indicates significant p-value <0.05.

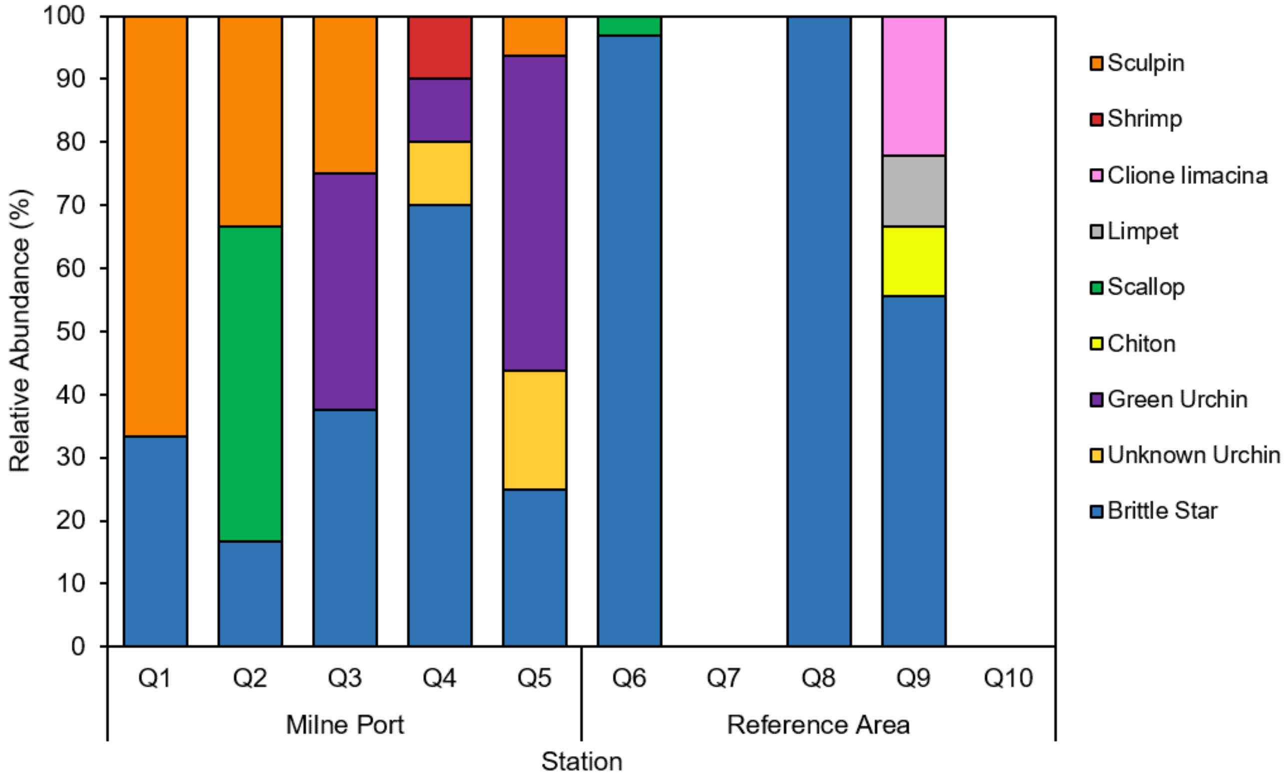
5.4.3.2 Motile Epifauna

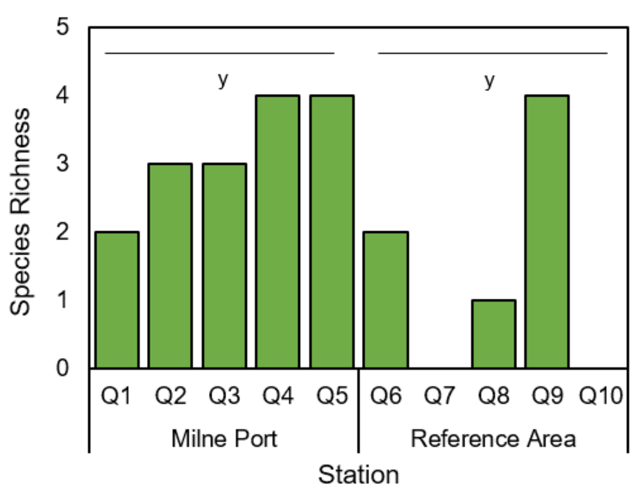
Motile invertebrates were counted individually, rather than recorded by percent coverage, to account for mobility of organisms within the quadrats. Total counts of motile epifauna in the quadrats ranged from zero to 131 individuals (Table 5-10, Figure 5-13). Dominant taxa varied between quadrats and included sculpin, brittle stars, green urchin, mud scallops and urchins, representing between 37.5% and 100% of the recorded motile epifauna (Figure 5-13, Figure 5-14, Figure 5-15).

Table 5-10: Dominant Taxa, Abundance and Diversity Metrics for Motile Benthic Epifauna Taxa in the Deployed Permanent Quadrats in Milne Port, 2020

Station	Dominant Taxa	Substrate	Count	Taxa Present	Diversity (SDI)
Q1	Sculpin/Brittle Star	Silt/Sand	3	2	0.444
Q2	Mud Scallop/Sculpin	Silt/Sand	6	3	0.611
Q3	Brittle Star/Green Urchin	Silt/Sand	8	3	0.656
Q4	Brittle Star	Silt/Sand	10	4	0.480
Q5	Green Urchin	Silt/Sand	16	4	0.648
Q6	Brittle Star	Silt/Sand	131	2	0.059
Q7	No Motile Epifauna Taxa	Silt/Sand	0	0	N/A
Q8	Brittle Star	Silt/Sand	1	1	<0.001
Q9	Brittle Star	Silt/Boulder/Sand	9	4	0.617
Q10	No Motile Epifauna Taxa	Silt/Sand	0	0	N/A

Diversity of motile epifauna was highest in quadrats 2, 3, 5, and 9, with moderately diverse SDI values of 0.611 (three taxa), 0.656 (three taxa), 0.648 (four taxa), and 0.617 (five taxa), respectively (Table 5-10, Figure 5-13). Quadrat 2 was dominated by mud scallop, followed by unidentified sculpin and relatively lower abundances of unidentified brittle stars. The most common taxa in quadrat 3 were unidentified brittle stars and green urchin, found in equal abundance (37.5%). Quadrat 5 was dominated by green urchin, followed by unidentified brittle stars and unknown urchins. Sculpin were also observed in lower abundances in both quadrat 3 and 5. The dominant taxon within quadrat 9 was unidentified brittle stars, followed by sea angel, chiton, and limpets. All taxa recorded in quadrat 9 aside from brittle stars were not observed in other quadrats.





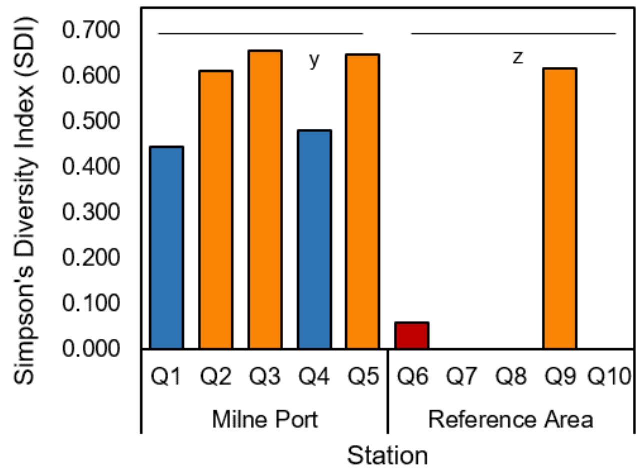


Figure 5-13: Relative abundance (%) of taxonomic groups (top) and species richness (bottom left) and diversity (SDI, bottom right) of motile epifauna in each quadrat, Milne Port 2020. Letters indicate statistical significance ($p < 0.05$), with different letters indicating significant differences between groups. For SDI Values: green indicates SDI values >0.750 (high diversity), orange indicates SDI values between 0.500 and 0.750 (moderately diverse), blue indicates values between 0.250 and 0.499 (low diversity), and red indicates values <0.250 (very low diversity).

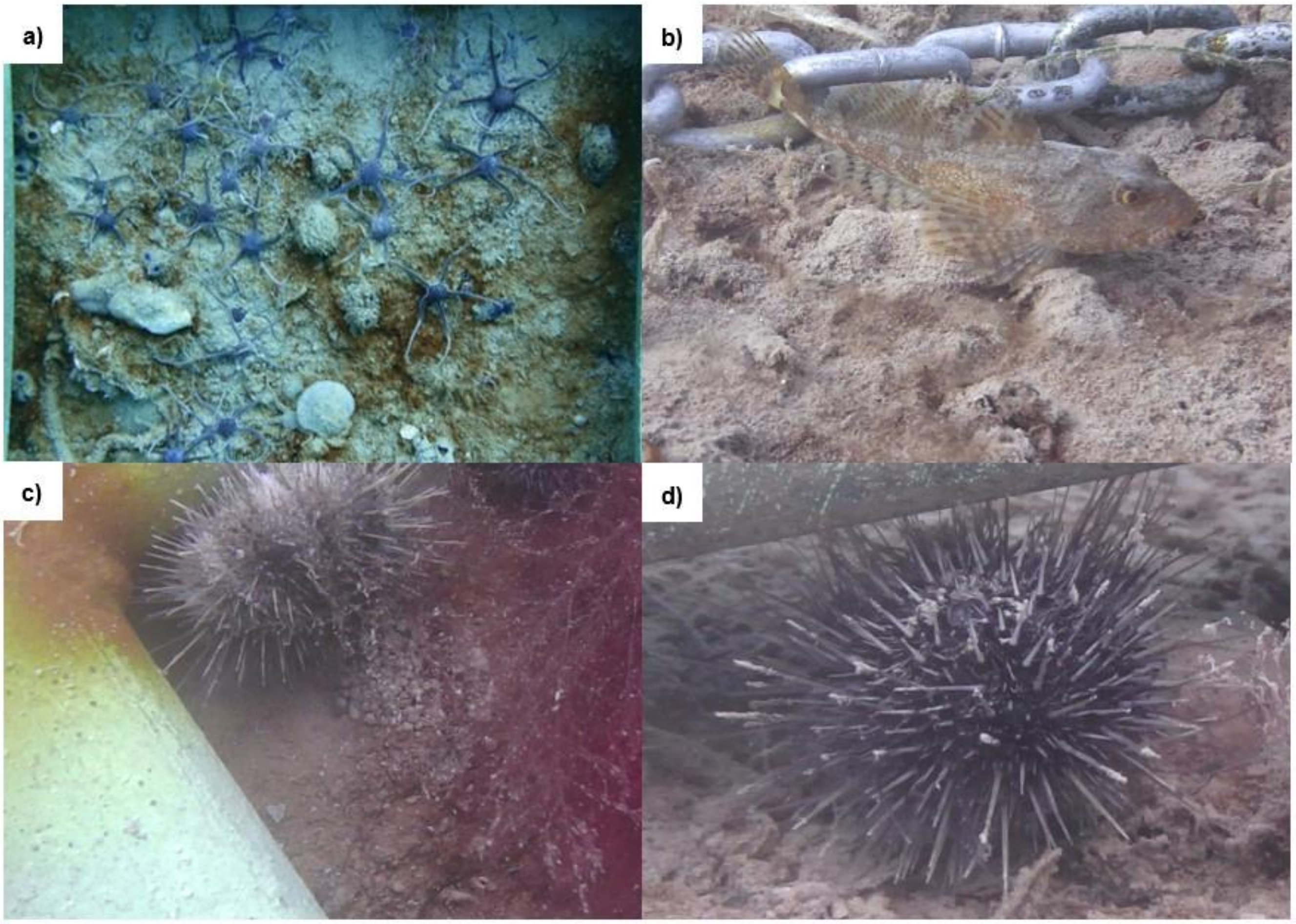
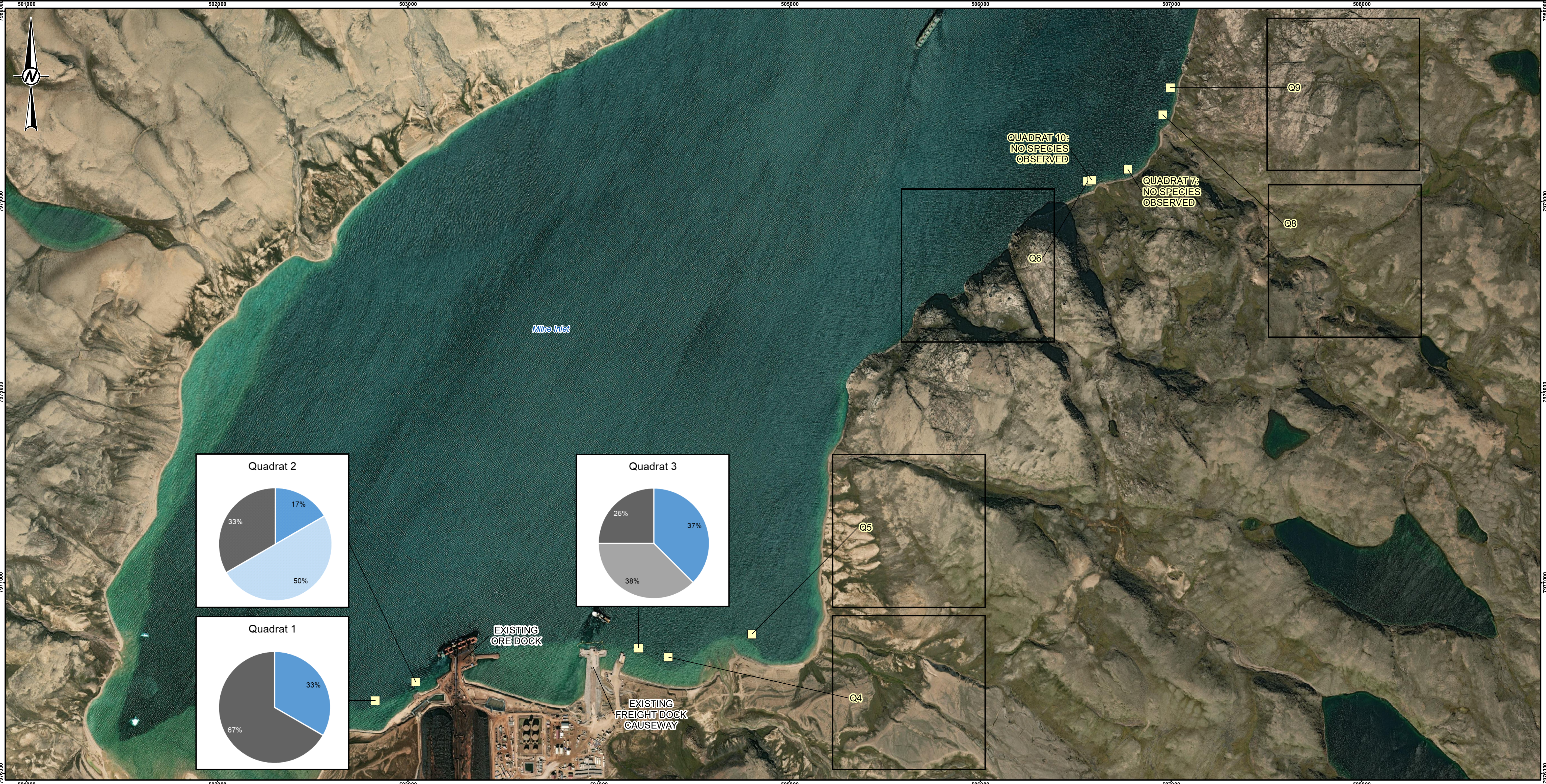


Figure 5-14: Dominant motile invertebrate taxa observed in quadrat surveys: a) brittle stars (*Ophiuridae* indet.) and scallops (*Similipecten greenlandicus*), b) sculpin (Family Cottidae), c) green urchin (*Strongylocentrotus droebachiensis*), d) urchin (*Strongylocentrotus sp.*).



LEGEND

STEEL QUADRAT LOCATION

MOTILE EPIFAUNA TAXA TYPE

- BRITTLE STAR
- UNKNOWN URCHIN
- GREEN URCHIN
- CHITON
- SCALLOP
- LIMPET
- CLIONE LIMACINA
- SHRIMP
- SCULPIN

0 500 1,000

1:20,000 METRES

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CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	NO
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

TITLE
RELATIVE ABUNDANCES (%) OF MOTILE EPIFAUNA TAXA FOR THE STEEL QUADRATS IN MILNE PORT, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	5-15

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Diversity of motile epifauna was lowest in quadrat 8 with an SDI value of <0.001, due to the presence of only a single individual from one taxa (unidentified brittle star; Table 5-10, Figure 5-13). Diversity was also very low in quadrat 6, largely due to a notably large abundance of unidentified brittle stars (127 individuals) and a relatively low abundance of one other species, the mud scallop (four individuals). No motile epifauna were observed in quadrats 7 or 10.

Low diversity of motile epifauna was observed in quadrats 1 and 4 (Table 5-10, Figure 5-13). Total numbers of motile epifauna taxa were low in quadrat 1, with only two sculpin (unidentified sp.) and a single brittle star (unidentified sp.). In quadrat 4, brittle stars were the dominant taxa; all other taxa observed in this quadrat consisted of a single individual (unknown urchin, green urchin and unidentified shrimp).

Species diversity was found to be significantly different between the reference and exposure area quadrats with a p-value of 0.010 (Table 5-11). However, species richness, and species abundances were not detected to be significantly different reference and exposure areas.

Table 5-11: MANOVA Results of Parameter Effects of Species Richness, Species Diversity and Species Abundance on Motile Epifauna between Reference and Experimental Sites in Milne Port, 2020

Response		F-value	Pr(>F)
Species Richness		4.629	0.064
Species Diversity		**11.277**	**0.010**
Species Abundance			
Taxa Name	Common Name		
Ophiuridae indet.	Brittle star	0.344	0.573
Strongylocentrotus sp.	Unknown urchin	2.308	0.167
Strongylocentrotus droebachiensis	Green urchin	3.613	0.094
Tonicella sp.	Chiton	1.000	0.347
Similipecten greenlandicus	Scallop	0.877	0.377
Family Lottidae	Limpet	1.000	0.347
Clione limacina	Sea angel	1.000	0.347
Pandalus sp.	Shrimp	1.000	0.347
Family Cottidae	Sculpin	4.9708	0.05634

Note: Residuals and intercept are not presented in this table. See Appendix 5C for full results. Bold text indicates significant p-value <0.05.

5.4.4 Relative Richness and Diversity

Species richness values varied between and among quadrats (Figure 5-16), with no apparent relation between scores within a quadrat for macroflora, sessile epifauna and motile epifauna. Significant differences in species richness were found between the reference area and exposure area quadrats for sessile epifauna but did not significantly differ for motile epifauna or macroflora. Species richness was greatest in quadrat 6 and lowest in quadrats 1, 2, and 3.

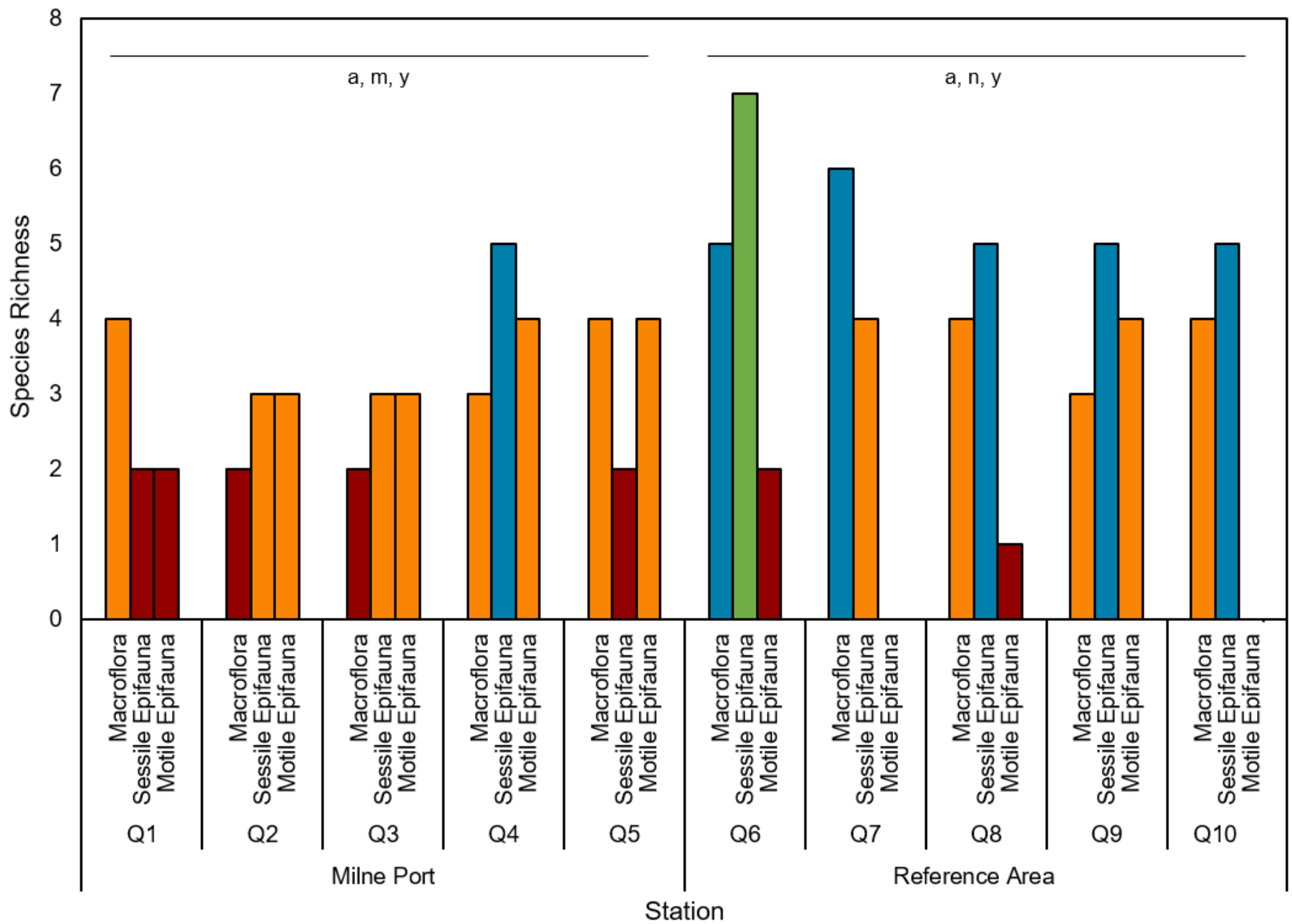


Figure 5-16: Species richness for macroflora, sessile epifauna, and motile epifauna in quadrat surveys - Milne Port, 2020. Colours indicate richness (red: 1-2, orange: 2-4, blue: 5-6 and green: 7-8). Letters (a, b: Macroflora; m, n: Sessile Epifauna, y, z: Motile Epifauna) indicate statistical significance ($p < 0.05$), with different letters indicating significant differences between the Milne Port Area and the Reference Area.

Diversity of macroflora, sessile epifauna and motile epifauna ranged from very low to moderate diversity (described in Table 5-2), with no quadrats exhibiting high diversity for either macroflora, sessile epifauna or motile epifauna (SDI >0.750). Diversity values varied between and among quadrats (Figure 5-17), with no apparent relation between diversity scores within a quadrat for macroflora, sessile epifauna and motile epifauna. Significant differences in diversity were found between the reference and exposure area quadrats for motile epifauna but did not significantly differ for sessile epifauna or macroflora. Overall, quadrat 5 displayed the greatest diversity, with macrofauna and motile epifauna associated with moderate diversity, and sessile epifauna associated with low diversity. This was followed by quadrat 2 and quadrat 9 with motile epifauna associated with moderate diversity, and macroflora and sessile epifauna associated with low diversity scores. Quadrats 7, and 8 were the only quadrats with low or very low diversity scores for macroflora, sessile epifauna, and motile epifauna.

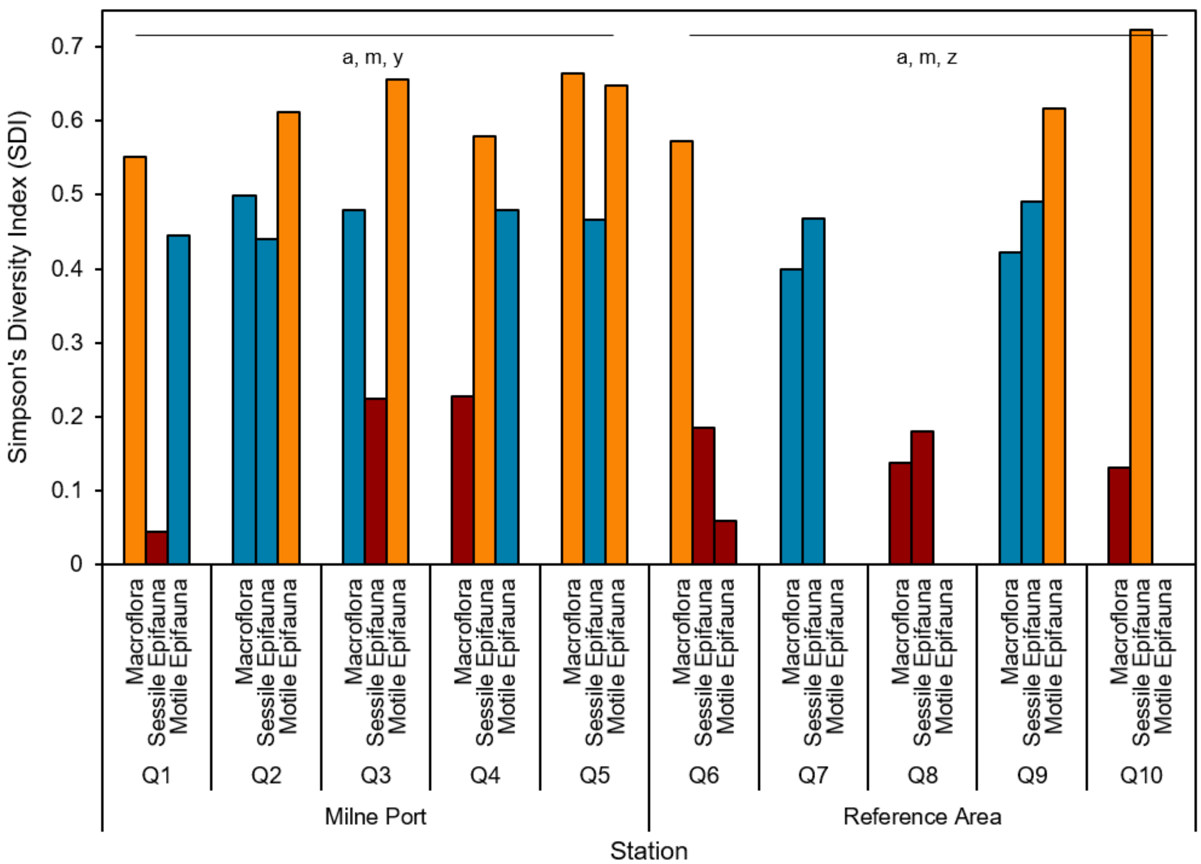


Figure 5-17: Diversity for macroflora, sessile epifauna, and motile epifauna in quadrat surveys - Milne Port, 2020. Green indicates SDI values >0.750 (high diversity), orange indicates SDI values between 0.500 and 0.750 (diverse), blue indicates values between 0.250 and 0.500 (moderately diverse), and red indicates values <0.250 (low diversity). Letters (a, b: Macroflora; m, n: Sessile Epifauna, y, z: Motile Epifauna) indicate statistical significance (p <0.05), with different letters indicating significant differences between groups.

5.5 Discussion

Underwater video surveys were used to monitor for Project effects on epibenthic communities (macroflora and epifauna) for the third consecutive year. Diver-based surveys were added in 2020 to assist in better taxonomic resolution through in situ observation and specimen collection. Given the change in survey design in 2020, a quantitative comparison between 2020 surveys and previous years was not possible (a qualitative comparison has been provided). The 2020 quadrat survey results will serve as a baseline for quantitative comparisons to future survey years.

Substrate type was similar between quadrats and between the exposure and reference areas. A detrital layer was present in all quadrats, comprised of organic detritus and other debris; the extent and relative composition of the detrital layer was variable with no significant difference between reference and exposure areas. Substrate within the quadrats was dominated by soft silt and sand, consistent with what has been previously documented at Milne Port. No significant difference was observed in the number of substrate types present in the exposure site quadrats compared to the reference area quadrats. However, a significant difference was noted for gravel content ($p = 0.048$), with gravel only occurring in quadrats in the reference area, although in amounts. The reference area is located northwest of a rocky slope which may contribute to differences observed in substrate conditions in this area.

Quadrat 9 was dominated by hard substrate (boulder) and supported different ecological communities relative to the soft substrate quadrats. For example, all motile epifauna observed within Quadrat 9 were not documented in any other quadrat. It is therefore recommended that either 1) an additional hard substrate quadrat sampling site be added to the exposure area for comparative purposes, or 2) effort be made in 2021 to relocate Quadrat 9 to nearby comparable (i.e., soft) substrate. Otherwise, Quadrat 9 should be dropped from future comparisons, given it represents an outlier in terms of substrate and community composition and is therefore not useful for comparative purposes.

Most macrofloral and benthic epifaunal taxa observed in previous years (2018 and 2019) were also observed in 2020. Indicators (i.e., percent cover, species richness, diversity, and abundance) were shown to be variable within and between quadrats and between the reference and exposure areas. While there were some statistically significant differences in indicators between the exposure and reference areas, these were often isolated to one indicator and not suggestive of a general trend. For example, species richness of motile epifauna was significantly higher in the reference area, but no significant differences were reported for the other indicators (i.e. diversity, richness or evenness). This result is expected given the dynamic estuarine nature of Milne Port and likely reflects the fine-scale spatial variation in substrate characteristics due to internal mixing and sediment redistribution processes as well as the influence of features such as Phillips Creek. Overall, results of this survey suggest macrofloral and epibenthic community assemblages and associated indicators are comparable between the Project exposure and reference areas with no obvious evidence of Project-related influence or impairment.

5.6 Conclusions and Recommendations

Due to schedule limitations in 2020, quadrats had to be surveyed using a mixture of diver-based and ROV-based surveys. Divers improve the accuracy of counts and the overall taxonomic resolution of observed organisms as vegetation can be moved aside to view the substrate and specimens of uncertain taxa may be collected for subsequent identification. However, the different survey methods could lead to differences in the observed results for substrate, macroflora and epifauna. It is recommended that divers continue to be used as a standardized approach for surveying all quadrats.

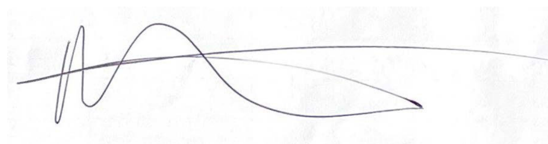
Overall, macrofloral and epifaunal community assemblages are largely similar between the Milne Port exposure area and the reference area. Statistical differences in individual indicators observed between the exposure and reference areas were often one-off and likely attributable to natural variability. Observations reveal no evidence of spatial or temporal trends that might be associated with Project-induced effects from construction or operational activities at Milne Port.

5.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

Golder Associates Ltd.

Christine Bylenga, PhD
Marine Scientist



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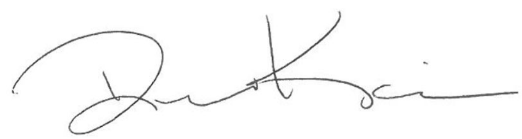

Drew Kaiser, BSc, RPBio, PBiol
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CB/NOB/MW/DK/asd

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APPENDIX 5A

Photos

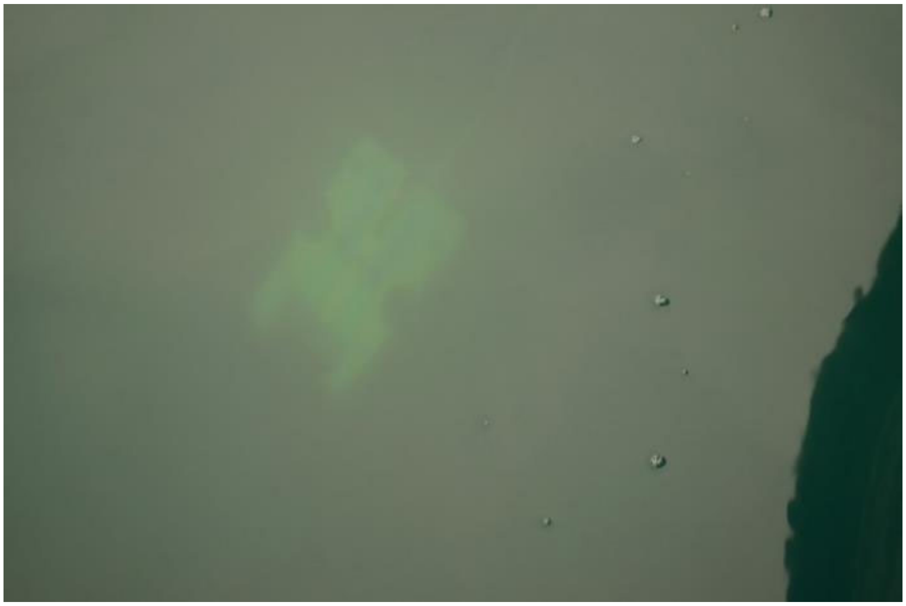

Photo 1: ROV Unit in the water during survey of offset habitat.

Photo 2: ROV operator reviewing the live feed from the ROV during surveys.

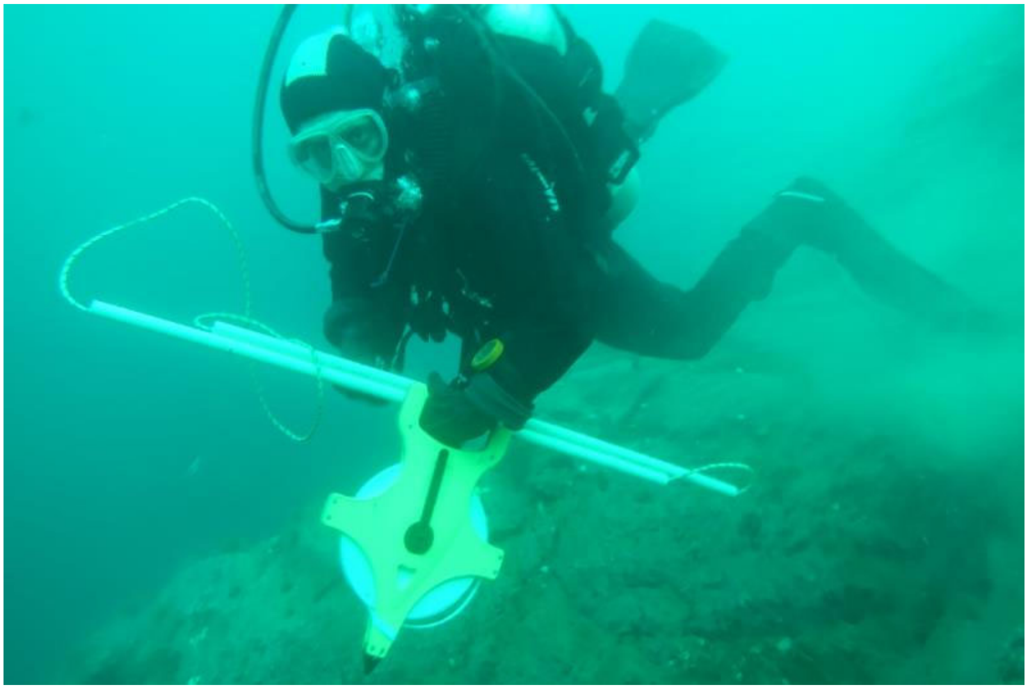

Photo 3: Golder diver surveying the benthos of the reference area of Milne Port.

Photo 4: Overview of quadrat 1 in the reference area of Milne Port surveyed by ROV.

Photo 5: Overview of quadrat 2 in the reference area of Milne Port surveyed by ROV.

Photo 6: Overview of quadrat 3 in the reference area of Milne Port surveyed by ROV.

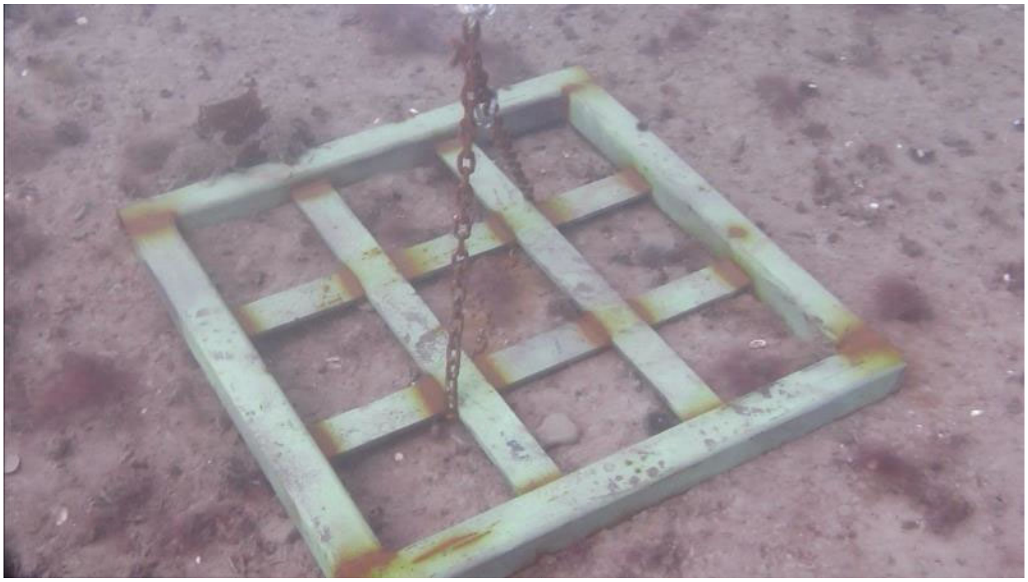

Photo 7: Overview of quadrat 4 in the reference area of Milne Port surveyed by ROV.

Photo 8: Overview of quadrat 5 in the reference area of Milne Port surveyed by ROV.

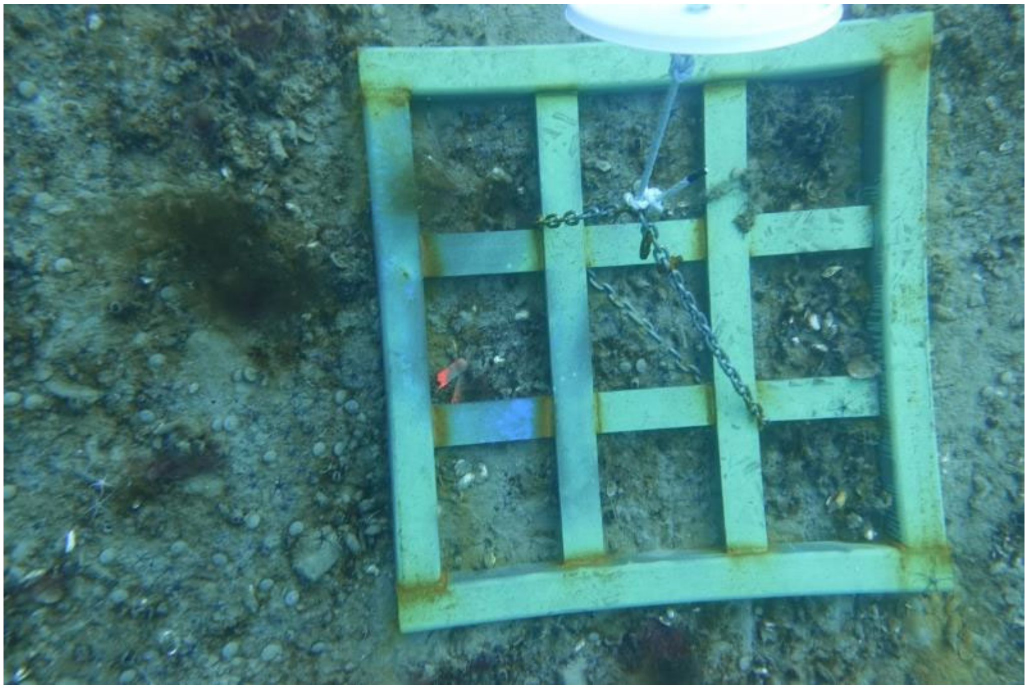

Photo 9: Overview of quadrat 6 in the reference area of Milne Port surveyed by divers.

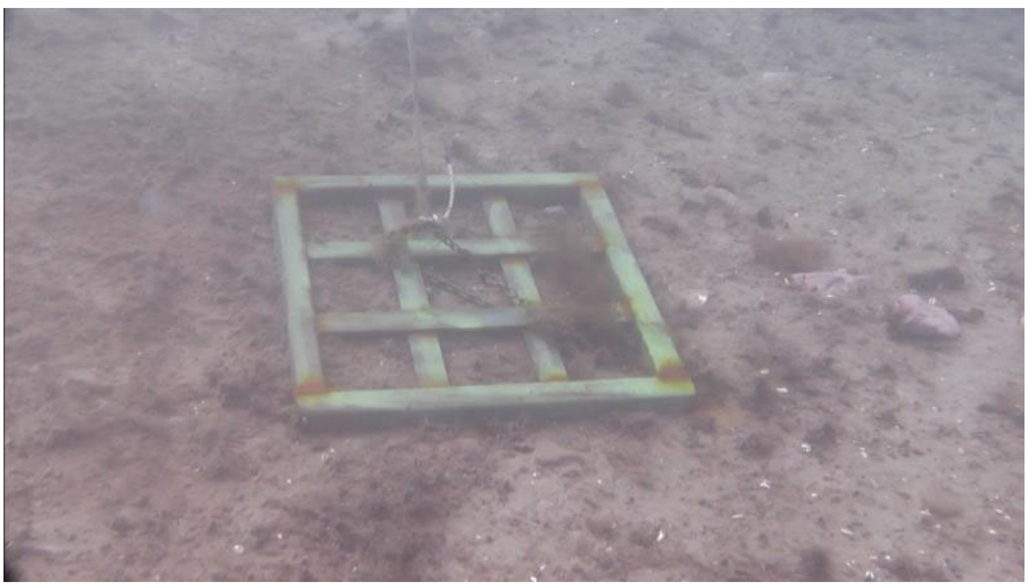

Photo 10: Overview of quadrat 7 in the reference area of Milne Port surveyed by ROV.

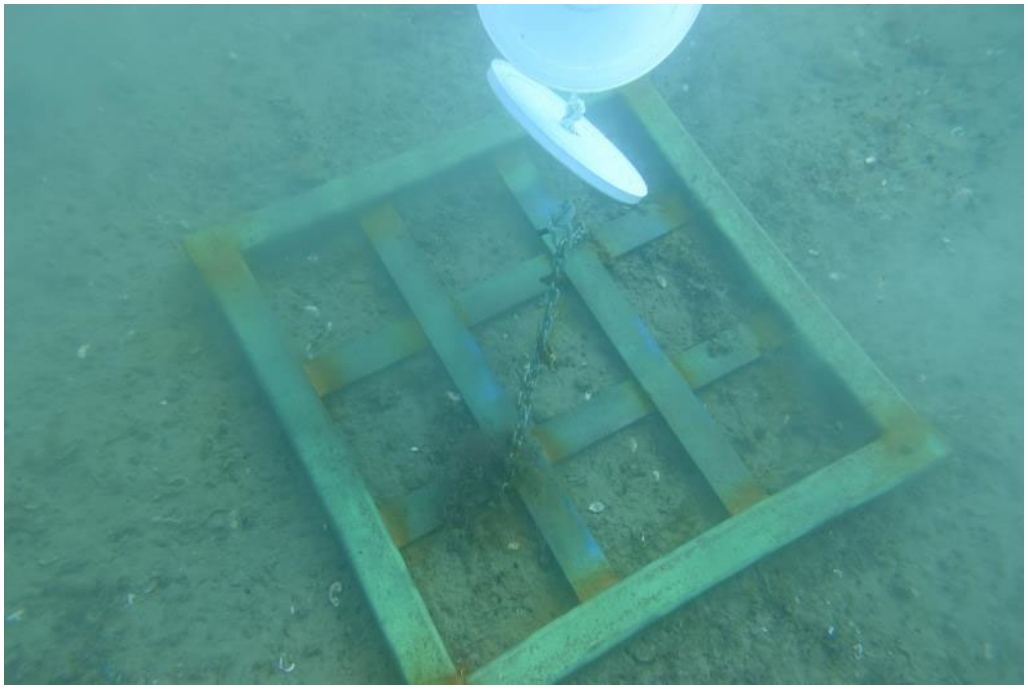

Photo 11: Overview of quadrat 8 in the reference area of Milne Port surveyed by divers.

Photo 12: Overview of quadrat 9 in the reference area of Milne Port surveyed by divers.

Photo 13: Overview of quadrat 10 in the reference area of Milne Port surveyed by divers.

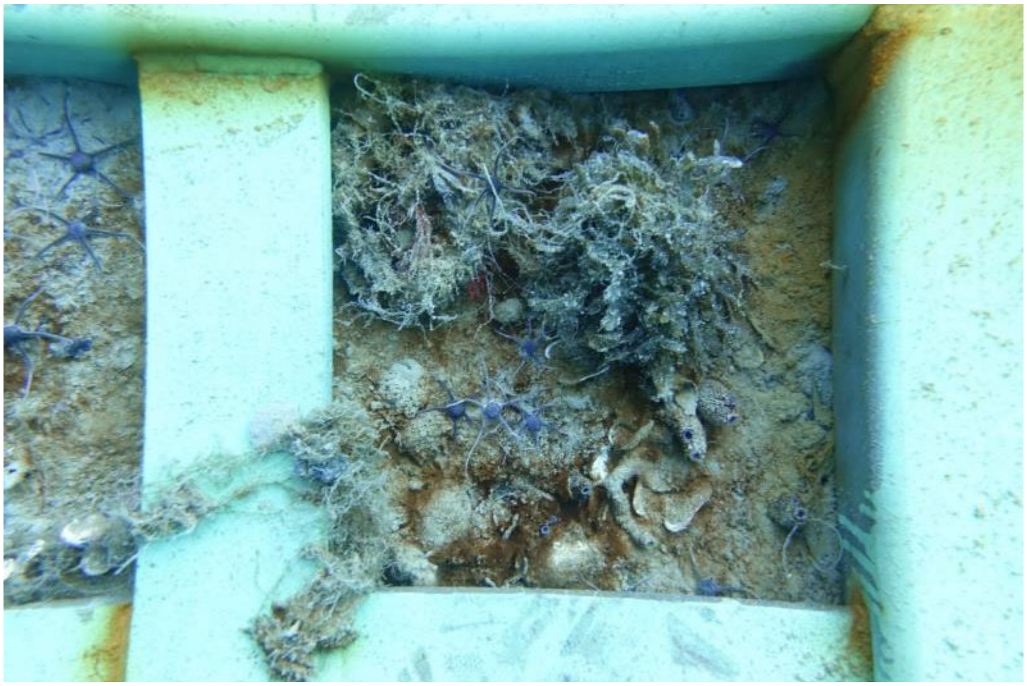

Photo 14: Brown branching algae (Phaeophyceae indet.) observed on quadrat 6 during dive surveys (15 August 2020)

Photo 15: Brown filamentous algae (Phaeophyceae indet.) observed on quadrat 6 during dive surveys (15 August 2020)

Photo 16: *Pylaiella* sp. and rockweed (*Fucus distichus*) observed on quadrat 1 during ROV surveys (21 August 2020)

Photo 17: Red filamentous algae (Rhodophyta indet.) observed on quadrat 4 during ROV surveys (21 August 2020)

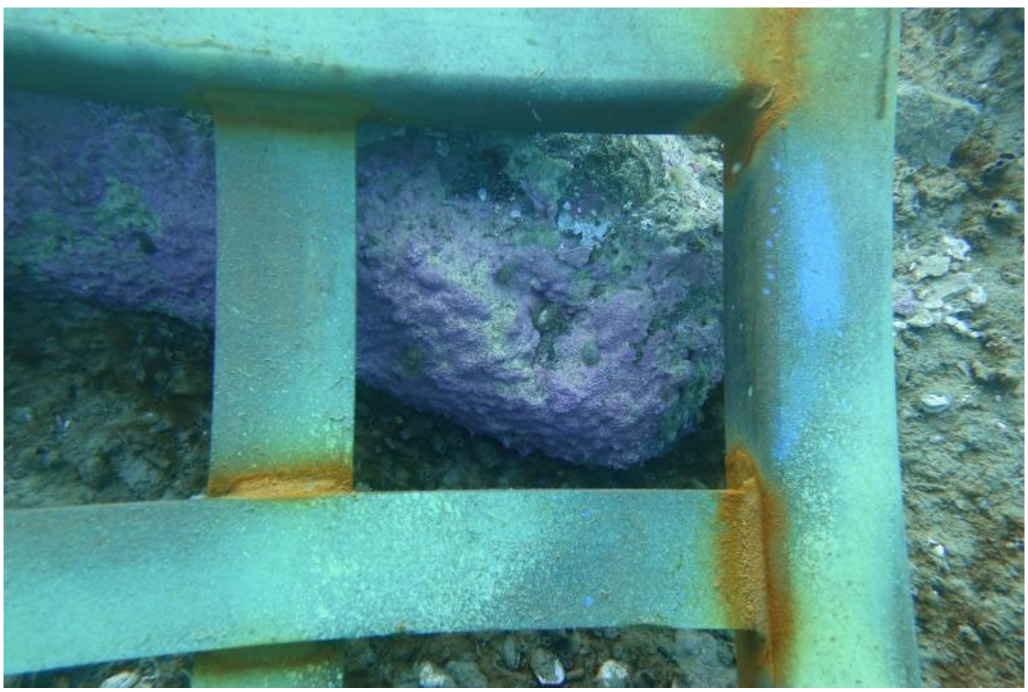

Photo 18: Encrusting coralline algae (Corallinales indet.) observed on quadrat 9 during dive surveys (15 August 2020)

Photo 19: Blunt gapers (*Mya* sp.) observed on quadrat 2 during ROV surveys (21 August 2020)

Photo 20: Unidentified mussels (Mytilida indet., red arrows) observed on quadrat 6 during dive surveys (15 August 2020)

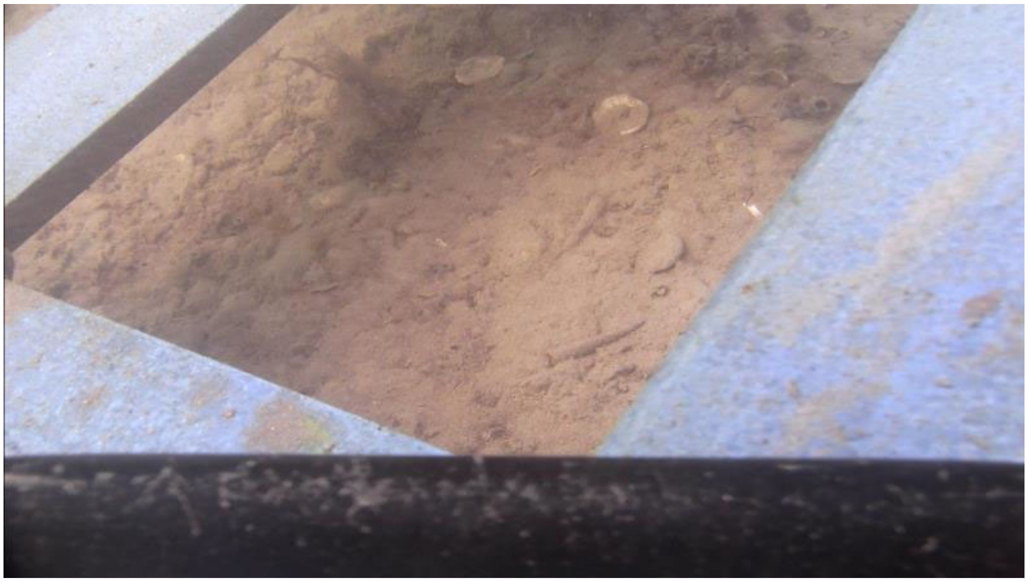

Photo 21: Ice cream cone worms (*Cistenides granulata*) observed on quadrat 3 during ROV surveys (21 August 2020)

Photo 22: Brittle stars (Ophiuridae indet.), mud scallops (*Similipecten greenlandicus*), and an unidentified tube worm (Polychaeta indet.) observed on quadrat 6 during dive surveys (15 August 2020)

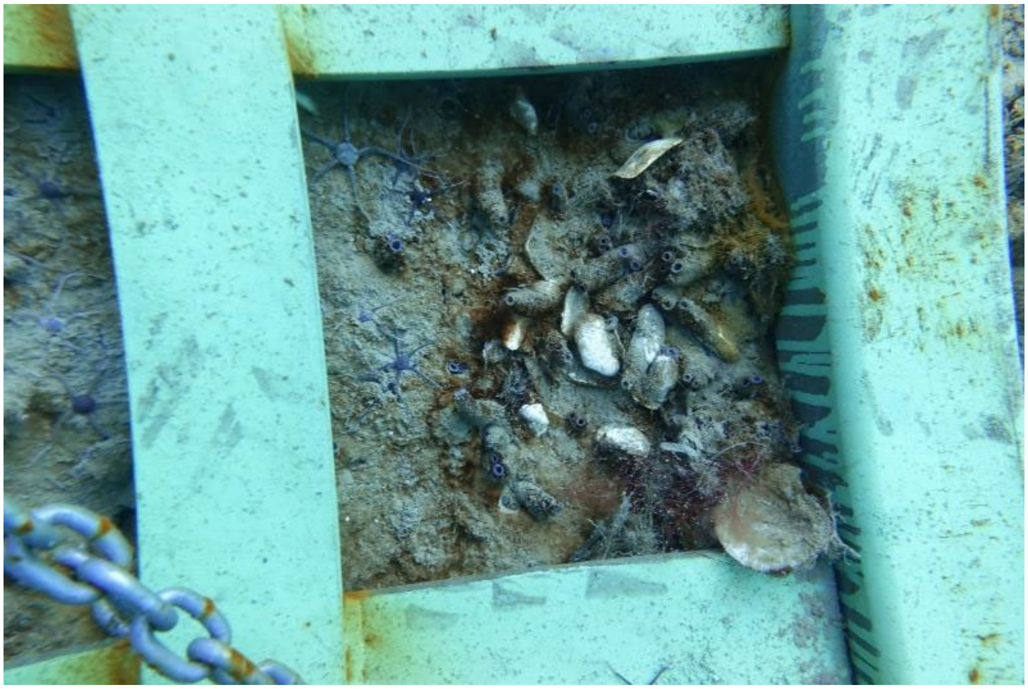

Photo 23: Wrinkled rock borers (*Hiatella arctica*) observed on quadrat 6 during dive surveys (15 August 2020)

Photo 24: Unidentified sculpin (Family Cottidae) observed on quadrat 1 during ROV surveys (21 August 2020)

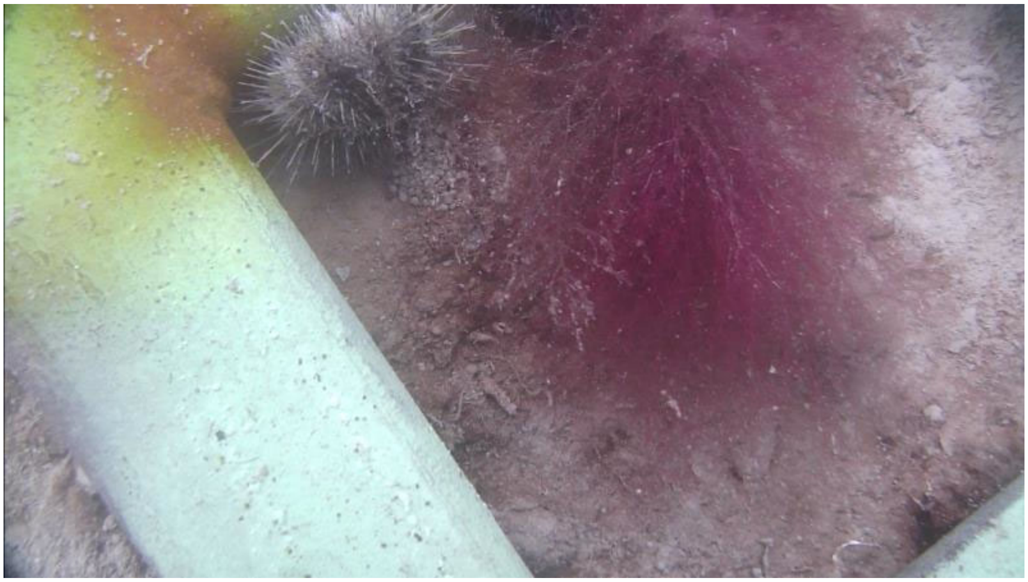

Photo 25: Green sea urchin (*Strongylocentrotus droebachiensis*) observed on quadrat 5 during ROV surveys (21 August 2020)

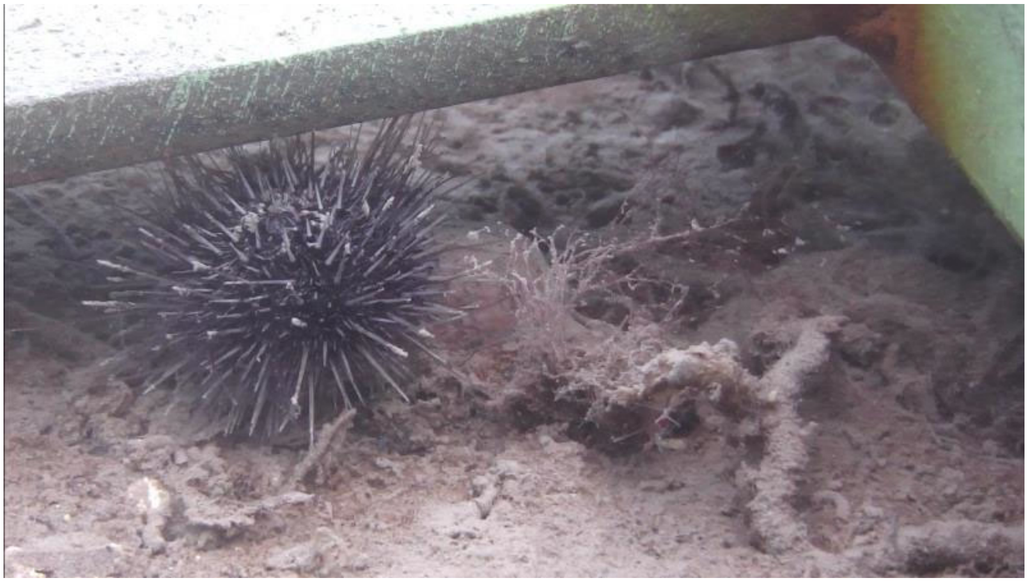

Photo 26: Red sea urchin (*Strongylocentrotus* sp.) observed on quadrat 5 during ROV surveys (21 August 2020)

APPENDIX 5B

Survey Data

Appendix 5B: Biophysical Transect Survey
CFSA Waterlot Habitat Assessment, Esquimalt, BC

Location/Quadrat Number	UTM (17W) Easting (m)	UTM (17W) Northing (m)	Survey Type	Survey Date	Quadrat Sub-number	Depth (m) Chart Datum	Boulder	Bedrock	Cobble	Gravel	Sand	Silt	Shell -whole/crushed	Detrital veneer	Debris (e.g., metal, wood, bone)	Sugar kelp *Saccharina latissima*	Filamentous *Pylaiella* *Pylaiella* spp.	Brown branching algae Phaeophyceae indet. 1	Brown Filamentous Phaeophyceae indet. 2	Brown foliose Phaeophyceae indet. 3	Fucus *Fucus distichus*	Red branching algae Rhodophyta indet. 1	Encrusting coralline Corallinales indet.	Red filamentous Rhodophyta indet. 2	Red foliose Rhodophyta indet. 3	tubes[1] Polychaeta indet. 1	Sabellid worm Sabellidae indet.	Feather worm Polychaeta indet. 2	Brittle star Ophiuridae indet.	Red urchin *Strongylocentrotus*sp.	Green urchin *Strongylocentrotus droebachiensis*	Chiton *Tonicella* sp.	Ice cream cone snail *Cistenides granulata*	Arctic hiatella *Hiatella arctica*	Scallop *Similipecten greenlandicus*	Gaper clam *Mya* sp.	Limpet Lottiidae indet.	Clione *Clione limacina*	Mussel Mytilida indet.	Shrimp *Pandalus* sp.	Hairy tunicate Tunicata indet.	Sculpin Cottidae indet.
							Substrate (% cover)									Macroalgae (% cover)										Invertebrates (Sessile: % cover; Motile: number of Individuals)																Fish
																Kelp	Brown					Red				Annelid			Echinoderm				Mollusc							Crustacean	Ascidian	Fish
Q1	502828	7976382	ROV	21-Aug-20	1	8.0	-	-	-	-	10	90	-	30	-	-	10	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-
					2	8.0	-	-	-	-	10	90	-	25	-	-	5	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	-
					3	8.0	-	-	-	-	10	90	-	20	-	-	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-
					4	8.2	-	-	-	-	10	90	-	20	-	-	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-
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					7	8.3	-	-	-	-	10	90	-	20	-	-	5	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-
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Q2	503039	7976480	ROV	21-Aug-20	1	10.0	-	-	-	-	10	90	-	5	-	-	10	<5	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	1
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Q3	504208	7976659	ROV	21-Aug-20	1	9.9	-	-	-	-	10	80	10	10	-	-	<5	5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	10	-	<5	-	-	-	-	-	-
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Q4	504363	7976611	ROV	21-Aug-20	1	10.9	-	-	-	-	10	90	-	10	-	-	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	<5	-	-	-	-	-	-
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Q5	504802	7976731	ROV	21-Aug-20	1	11.0	-	-	-	-	10	90	-	10	-	-	-	-	-	-	-	-	-	40	-	-	-	-	2	-	2	-	-	<5	-	<5	-	-	-	-	-	-
					2	11.0	-	-	-	-	10	70	20	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	5	-	5	-	-	-	-	-	-
					3	11.0	-	-	-	-	10	60	10	10	20	-	-	10	-	-	-	-	-	15	-	-	-	-	-	-	1	-	-	<5	-	<5	-	-	-	-	-	-
					4	11.0	-	-	-	-	10	70	20	10	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	-	2	-	-	<5	-	<5	-	-	-	-	-	-
					5	11.0	-	-	-	-	10	70	-	10	20	-	<5	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	<5	-	<5	-	-	-	-	-	1
					6	11.3	-	-	-	-	10	90	-	20	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	10	-	<5	-	-	-	-	-	-
					7	11.4	-	-	-	-	10	80	10	20	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	<5	-	<5	-	-	-	-	-	-
					8	11.4	-	-	-	-	10	70	-	10	20	-	50	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
					9	11.4	-	-	-	-	10	75	15	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	<5	-	<5	-	-	-	-	-	-

Appendix 5B: Biophysical Transect Survey
CFSA Waterlot Habitat Assessment, Esquimalt, BC

							Substrate (% cover)									Macroalgae (% cover)										Invertebrates (Sessile: % cover; Motile: number of Individuals)																Fish
																Kelp	Brown					Red				Annelid			Echinoderm				Mollusc							Crustacean	Ascidian	Fish
Location/Quadrat Number	UTM (17W) Easting (m)	UTM (17W) Northing (m)	Survey Type	Survey Date	Quadrat Sub-number	Depth (m) Chart Datum	Boulder	Bedrock	Cobble	Gravel	Sand	Silt	Shell -whole/crushed	Detrital veneer	Debris (e.g., metal, wood, bone)	Sugar kelp *Saccharina latissima*	Filamentous *Pylaiella* *Pylaiella* spp.	Brown branching algae Phaeophyceae indet. 1	Brown Filamentous Phaeophyceae indet. 2	Brown foliose Phaeophyceae indet. 3	Fucus *Fucus distichus*	Red branching algae Rhodophyta indet. 1	Encrusting coralline Corallinales indet.	Red filamentous Rhodophyta indet. 2	Red foliose Rhodophyta indet. 3	tubes[1] Polychaeta indet. 1	Sabellid worm Sabellidae indet.	Feather worm Polychaeta indet. 2	Brittle star Ophiuridae indet.	Red urchin *Strongylocentrotus*sp.	Green urchin *Strongylocentrotus droebachiensis*	Chiton *Tonicella* sp.	Ice cream cone snail *Cistenides granulata*	Arctic hiatella *Hiatella arctica*	Scallop *Similipecten greenlandicus*	Gaper clam *Mya* sp.	Limpet Lottiidae indet.	Clione *Clione limacina*	Mussel Mytilida indet.	Shrimp *Pandalus* sp.	Hairy tunicate Tunicata indet.	Sculpin Cottidae indet.
Q6	506562	7979114	Diver	15-Aug-20	1	15.1	-	-	-	-	10	90	<5	20	-	-	-	15	-	-	-	-	-	-	-	<5	-	-	19	-	-	-	-	20	-	-	-	-	-	-	-	-
					2	15.1	-	-	-	-	10	90	5	30	-	-	5	15	-	-	-	-	-	-	-	<5	-	<5	32	-	-	-	-	15	2	-	-	-	-	-	<5	-
					3	15.1	-	-	-	<5	10	90	<5	40	-	-	-	30	-	30	20	-	-	-	-	<5	-	<5	10	-	-	-	-	15	-	<5	-	-	-	-	-	-
					4	15.4	-	-	-	<5	10	90	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	5	15	-	-	-	<5	10	-	5	-	-	-	-	-	-
					5	15.4	-	-	-	-	10	90	10	40	-	-	-	-	-	-	-	-	-	-	-	-	<5	-	21	-	-	-	-	25	1	<5	-	-	-	-	-	-
					6	15.4	-	-	-	-	10	90	10	40	-	-	-	5	-	-	-	-	-	<5	-	-	-	-	11	-	-	-	<5	80	1	<5	-	-	-	-	-	-
					7	15.4	-	-	-	-	10	90	5	20	-	-	-	<5	-	-	-	-	-	-	-	-	-	<5	6	-	-	-	-	35	-	<5	-	-	-	-	-	-
					8	15.5	-	-	-	-	10	90	<5	30	-	-	-	15	-	-	-	-	-	<5	-	-	-	-	6	-	-	-	-	15	-	<5	-	-	-	-	-	-
					9	15.4	-	-	-	5	5	90	5	25	-	-	-	5	-	-	-	-	-	-	-	-	-	<5	7	-	-	-	-	30	-	<5	-	-	-	-	-	-
Q7	506774	7979170	ROV	21-Aug-20	1	9.4	-	-	-	-	10	90	-	10	-	10	10	-	30	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	5	-	5	-	-	-	-	-	-
					2	9.4	-	-	-	-	10	90	-	5	-	-	10	-	80	-	<5	-	-	<5	-	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
					3	9.4	-	-	-	0	10	90	-	5	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
					4	9.4	-	-	-	0	10	90	-	5	-	-	10	-	40	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
					5	9.4	-	-	-	-	10	90	-	5	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	<5	-	0	-	-	-	-	-	-
					6	9.4	-	-	-	-	10	90	-	5	-	-	10	-	30	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-	15	-	<5	-	-	-	-	-	-
					7	9.5	-	-	-	-	10	90	-	5	-	-	<5	-	70	-	-	-	-	<5	<5	-	-	-	-	-	-	-	-	<5	-	0	-	-	-	-	-	-
					8	9.5	-	-	-	-	10	90	-	5	-	-	10	-	30	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
					9	9.5	-	-	20	0	10	70	-	5	-	-	15	-	15	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	<5	-	<5	-	-	-	-	-	-
Q8	506957	7979457	Diver	15-Aug-20	1	10.1	-	-	-	-	20	70	10	<5	-	-	-	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-
					2	10.1	-	-	-	-	20	70	10	<5	-	-	-	-	10	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-
					3	10.1	-	-	-	-	20	70	10	<5	-	-	-	-	40	-	-	-	-	-	<5	<5	-	-	-	-	-	-	-	40	-	<5	-	-	-	-	-	-
					4	10.1	-	-	-	-	20	70	10	<5	-	-	-	-	40	-	-	-	-	-	<5	<5	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-
					5	10.1	-	-	-	-	20	80	<5	<5	-	-	-	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	10	-	-	-	-	-	-	<5	-
					6	10.1	-	-	-	-	15	80	5	<5	-	-	-	-	-	-	-	-	-	-	<5	<5	-	-	-	-	-	-	-	10	-	<5	-	-	-	-	-	-
					7	10.1	-	-	-	-	10	85	5	<5	-	-	-	<5	-	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	<5	-	-	-	-	-	-
					8	10.1	-	-	-	-	10	85	5	<5	-	-	-	<5	-	-				-	-	<5	-	-	1	-	-	-	3	25	-	-	-	-	-	-	-	-
					9	10.1	-	-	-	-	10	85	5	<5	-	-	-	<5	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	10	-	<5	-	-	-	-	-	-
Q9	506997	7979599	Diver	15-Aug-20	1	10.8	40	-	-	-	20	30	10	10	-	-	-	-	-	-	-	-	10	-	-	-	-	-	1	-	-	-	-	5	-	-	-	-	-	-	-	-
					2	10.8	40	-	-	-	20	30	5	20	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	5	-	-	-	-	-	-	-	-
					3	10.8	80	-	-	-	10	10	-	5	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	10	-	-	1	-	-	-	-	-
					4	10.8	-	-	-	-	30	70	-	20	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	20	-	5	-	1	-	-	-	-
					5	10.8	10	-	-	-	10	70	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	35	-	5	-	-	15	-	-	-
					6	10.8	-	-	-	-	10	70	10	40	-	-	-	20	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	15	-	-	-	-	-	-	-	-
					7	10.8	-	-	-	-	20	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	15	-	<5	-	1	-	-	-	-
					8	11.1	-	-	10	-	20	60	10	-	-	-	-	-	-	-	-	-	10	-	-	-	-	<5	-	-	-	-	-	5	-	5	-	-	-	-	-	-
					9	11.1	-	-	-	10	20	60	10	-	-	-	-	5	-	-	-	5		-	-	-		-	3			-	-	8	-	5	-	-	5		-	
Q10	506584	7979115	Diver	15-Aug-20	1	5.9	-	-	-	-	10	75	15	10	-	-	50	-	-	<5	-	-	-	-	-	<5	-	<5	-	-	-	-	<5	-	-	-	-	-	-	-	-	-
					2	6.0	-	-	-	-	10	75	15	5	-	-	50	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	-
					3	6.0	-	-	-	-	10	75	15	5	-	-	40	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	-
					4	6.0	-	-	-	-	10	75	15	5	-	-	5	<5	-	<5	-	-	-	-	-	<5	-	-	-	-	-	-	<5	<5	-	-	-	-	-	-	-	-
					5	6.0	-	-	20	-	5	70	5	-	-	-	30	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	<5	<5	-	-	-	-	-	-	-	-
					6	6.0	-	-	-	<1	10	80	10	-	-	-	25	-	-	-	15	-	-	-	-	<5	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	-
					7	6.0	-	-	-	-	-	80	5	<5	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	1	-
					8	6.0	-	-	-	-	-	80	5	-	-	-	20	-	-	-	-	-	-	-	-	<5	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	-
					9	6.0	-	-	-	10	-	70	10	-	-	-	10	-	-	-	-	-	-	-	-	-	-	<5	-	-	-	-	<5	<5	-	-	-	-	-	-	-	-

Notes: (1) Tubes: likely sabellid worm, though animal inside tube was not observed during survey. Grey highlighting indicates sessile invertebrates.

APPENDIX 5C

MANOVA Analysis Data

Macroflora_Stats

1663724-34000

MANOVA

Substrate

```
types.substrate <- cbind(my_data$boulder, my_data$bedrock, my_data$cobble,
my_data$gravel, my_data$sand, my_data$silt, my_data$shell)
res.man.substrate <- manova(cbind(sub_rich,types.substrate) ~ site,data =
my_data)
summary.aov(res.man.substrate, intercept = T)
```

```
##  Response sub_rich :
##             Df Sum Sq Mean Sq  F value    Pr(>F)
## (Intercept)  1  129.6   129.6 117.8182 4.588e-06 ***
## site         1    3.6     3.6   3.2727     0.108
## Residuals    8    8.8     1.1
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 2 :
##             Df  Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  35.683  35.683       1 0.3466
## site         1  35.683  35.683       1 0.3466
## Residuals    8 285.466  35.683
##
##  Response 3 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1      0       0
## site         1      0       0
## Residuals    8      0       0
##
##  Response 4 :
##             Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1  7.1234  7.1234  5.1813 0.05238 .
## site         1  0.7076  0.7076  0.5147 0.49354
## Residuals    8 10.9985  1.3748
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 5 :
##             Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 0.93636 0.93636  5.6041 0.04544 *
## site         1 0.93636 0.93636  5.6041 0.04544 *
## Residuals    8 1.33668 0.16708
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 6 :
##             Df  Sum Sq Mean Sq F value    Pr(>F)
## (Intercept)  1 1188.10 1188.10 99.4834 8.654e-06 ***
## site         1    9.76    9.76  0.8174    0.3924
## Residuals    8   95.54   11.94
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 7 :
##             Df Sum Sq Mean Sq  F value    Pr(>F)
## (Intercept)  1  62499   62499 375.1006 5.244e-08 ***
## site         1     52      52   0.3114    0.5921
## Residuals    8   1333     167
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 8 :
##             Df Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 290.41 290.413  8.1055 0.02158 *
## site         1   0.21   0.210  0.0059 0.94082
## Residuals    8 286.63  35.829
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Detritus/Debris

```
types.sub.dd <- cbind(my_data$detrital_veneer, my_data$debris)
types.p.sub.dd <- cbind(my_data$p.detrital_veneer, my_data$p.debris)
res.man.sub.dd <- manova(cbind(dd_percov,types.sub.dd,types.p.sub.dd) ~
site,data = my_data)
summary.aov(res.man.sub.dd, intercept = T)
```

```
##  Response dd_percov :
##             Df  Sum Sq Mean Sq F value   Pr(>F)
## (Intercept)  1 1499.40 1499.40 14.6369 0.005048 **
## site         1   21.46   21.46  0.2095 0.659326
## Residuals    8  819.52  102.44
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 2 :
##             Df  Sum Sq Mean Sq F value   Pr(>F)
## (Intercept)  1 1327.56 1327.56 13.8070 0.005907 **
## site         1    7.29    7.29  0.0759 0.789981
## Residuals    8  769.21   96.15
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 3 :
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)   1  5.227  5.2273  1.1667 0.3116
## site          1  3.733  3.7332  0.8333 0.3880
## Residuals     8 35.842  4.4802
##
##  Response 4 :
##              Df Sum Sq Mean Sq  F value    Pr(>F)
## (Intercept)   1  92606   92606 819.6587 2.396e-09 ***
## site          1     84      84   0.7433    0.4137
## Residuals     8    904     113
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 5 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)   1 141.98 141.978  1.2567 0.2948
## site          1  83.98  83.984  0.7433 0.4137
## Residuals     8 903.85 112.981
```

Macroflora

```
species.macro <- cbind(my_data$kelp, my_data$angel_hair, my_data$bbra,
my_data$bfil, my_data$bfol, my_data$fucus, my_data$rbra, my_data$cca,
my_data$rfil, my_data$rfol)
res.man.macro <- manova(cbind(f_percov,f_spprich,f_sdi, species.macro) ~
site,data = my_data)
summary.aov(res.man.macro, intercept = T)

##  Response f_percov :
##              Df  Sum Sq Mean Sq F value   Pr(>F)
## (Intercept)   1 2970.11 2970.11 23.6837 0.001245 **
## site          1  290.52  290.52  2.3166 0.166495
## Residuals     8 1003.26  125.41
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response f_spprich :
##              Df Sum Sq Mean Sq  F value    Pr(>F)
## (Intercept)   1  136.9  136.90 119.0435 4.412e-06 ***
## site          1    4.9    4.90   4.2609   0.07288 .
## Residuals     8    9.2    1.15
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response f_sdi :
##              Df  Sum Sq Mean Sq F value    Pr(>F)
## (Intercept)   1 1.66872 1.66872 52.9975 8.553e-05 ***
## site          1 0.05791 0.05791  1.8393    0.2121
## Residuals     8 0.25189 0.03149
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
##  Response 4 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  0.625   0.625       1 0.3466
## site         1  0.625   0.625       1 0.3466
## Residuals    8  5.000   0.625
##
##  Response 5 :
##             Df Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 9150.6  9150.6  9.3185 0.01576 *
## site         1  469.2   469.2  0.4778 0.50896
## Residuals    8 7855.9   982.0
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 6 :
##             Df Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 4545.4  4545.4  6.5497 0.03369 *
## site         1  144.4   144.4  0.2081 0.66041
## Residuals    8 5551.9   694.0
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 7 :
##             Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1  4695.9  4695.9  3.5720 0.09543 .
## site         1  1399.5  1399.5  1.0645 0.33236
## Residuals    8 10517.2  1314.6
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 8 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  65.54  65.536  1.5199 0.2526
## site         1  40.00  40.000  0.9277 0.3637
## Residuals    8 344.94  43.118
##
##  Response 9 :
##             Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 134.689 134.689  3.6889 0.09102 .
## site         1   1.225   1.225  0.0336 0.85922
## Residuals    8 292.096  36.512
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 10 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1    1.6     1.6       1 0.3466
## site         1    1.6     1.6       1 0.3466
## Residuals    8   12.8     1.6
```

```
##
##  Response 11 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  518.4   518.4       1 0.3466
## site         1  518.4   518.4       1 0.3466
## Residuals    8 4147.2   518.4
##
##  Response 12 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1 1495.7 1495.73  2.0563 0.1895
## site         1 1404.2 1404.22  1.9305 0.2022
## Residuals    8 5819.2  727.39
##
##  Response 13 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  2.116  2.1160  2.2192 0.1746
## site         1  2.116  2.1160  2.2192 0.1746
## Residuals    8  7.628  0.9535
```

Sessile Invertebrates

```
species.sessile <- cbind(my_data$tube, my_data$sabellidae,
my_data$feather_worm, my_data$cone_worm, my_data$hiatella, my_data$mya,
my_data$mussel, my_data$tunicate)
res.man.sessile <- manova(cbind(s_percov,s_spprich,s_sdi,species.sessile) ~
site,data = my_data)
summary.aov(res.man.sessile, intercept = T)
```

```
##  Response s_percov :
##              Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 1421.10 1421.10 11.9428 0.00862 **
## site         1   24.49   24.49  0.2058 0.66211
## Residuals    8  951.94  118.99
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response s_spprich :
##              Df Sum Sq Mean Sq  F value    Pr(>F)
## (Intercept)  1    160   160.0 106.6667 6.668e-06 ***
## site         1     10    10.0   6.6667   0.03252 *
## Residuals    8     12     1.5
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response s_sdi :
##              Df  Sum Sq Mean Sq F value    Pr(>F)
## (Intercept)  1 1.35719 1.35719 28.1762 0.0007213 ***
## site         1 0.00303 0.00303  0.0629 0.8083577
## Residuals    8 0.38534 0.04817
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
##  Response 4 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1 241.08 241.081  2.4367 0.1571
## site         1  69.17  69.169  0.6991 0.4273
## Residuals    8 791.50  98.938
##
##  Response 5 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  0.841   0.841   1.423 0.2671
## site         1  0.841   0.841   1.423 0.2671
## Residuals    8  4.728   0.591
##
##  Response 6 :
##              Df Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 26.244 26.2440  3.7726 0.08803 .
## site         1 26.244 26.2440  3.7726 0.08803 .
## Residuals    8 55.652  6.9565
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 7 :
##              Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1 201.60  201.60  1.6527 0.2346
## site         1 164.03  164.03  1.3447 0.2796
## Residuals    8 975.84  121.98
##
##  Response 8 :
##              Df Sum Sq Mean Sq F value    Pr(>F)
## (Intercept)  1  50084   50084 84.7664 1.568e-05 ***
## site         1    142     142  0.2406     0.637
## Residuals    8   4727     591
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 9 :
##              Df  Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 2471.18 2471.18 13.9652 0.00573 **
## site         1  391.88  391.88  2.2146 0.17503
## Residuals    8 1415.62  176.95
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 10 :
##              Df  Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  16.129  16.129       1 0.3466
## site         1  16.129  16.129       1 0.3466
## Residuals    8 129.032  16.129
##
##  Response 11 :
```

```
##             Df Sum Sq Mean Sq F value  Pr(>F)  
## (Intercept)  1  8.649   8.649  3.5978 0.09444 .
## site         1  0.289   0.289  0.1202 0.73774  
## Residuals    8 19.232   2.404                  
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Motile Invertebrates

```
species.motile <- cbind(my_data$brittle_star, my_data$red_urchin, 
my_data$green_urchin, my_data$chiton,
                        my_data$scallop, my_data$limpet, my_data$sea_angel, 
my_data$shrimp, my_data$sculpin)
res.man.motile <- manova(cbind(m_spprich,m_sdi, species.motile) ~ site,data = 
my_data)
summary.aov(res.man.motile, intercept = T)
```

```
##  Response m_spprich :
##             Df Sum Sq Mean Sq F value    Pr(>F)    
## (Intercept)  1   52.9   52.90 30.2286 0.0005751 ***
## site         1    8.1    8.10  4.6286 0.0636352 .  
## Residuals    8   14.0    1.75                      
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
##  Response m_sdi :
##             Df  Sum Sq Mean Sq F value    Pr(>F)    
## (Intercept)  1 1.23552 1.23552  29.782 0.0006035 ***
## site         1 0.46786 0.46786  11.277 0.0099584 ** 
## Residuals    8 0.33189 0.04149                      
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
##  Response 3 :
##             Df Sum Sq Mean Sq F value   Pr(>F)   
## (Intercept)  1  18923 18922.5 13.2935 0.006532 **
## site         1    490   490.0  0.3442 0.573573   
## Residuals    8  11388  1423.4                    
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
##  Response 4 :
##             Df  Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  82.944  82.944  2.3076 0.1672
## site         1  82.944  82.944  2.3076 0.1672
## Residuals    8 287.552  35.944               
## 
##  Response 5 :
##             Df  Sum Sq Mean Sq F value  Pr(>F)  
## (Intercept)  1  950.63  950.63  3.6128 0.09386 .
## site         1  950.62  950.62  3.6128 0.09386 .
```

```
## Residuals    8 2105.00  263.12
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Response 6 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1 12.321  12.321       1 0.3466
## site         1 12.321  12.321       1 0.3466
## Residuals    8 98.568  12.321
##
##  Response 7 :
##             Df  Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  281.96  281.96  1.1235 0.3201
## site         1  219.96  219.96  0.8765 0.3766
## Residuals    8 2007.69  250.96
##
##  Response 8 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1 12.321  12.321       1 0.3466
## site         1 12.321  12.321       1 0.3466
## Residuals    8 98.568  12.321
##
##  Response 9 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1  49.28  49.284       1 0.3466
## site         1  49.28  49.284       1 0.3466
## Residuals    8 394.27  49.284
##
##  Response 10 :
##             Df Sum Sq Mean Sq F value Pr(>F)
## (Intercept)  1     10      10       1 0.3466
## site         1     10      10       1 0.3466
## Residuals    8     80      10
##
##  Response 11 :
##             Df Sum Sq Mean Sq F value  Pr(>F)
## (Intercept)  1 1724.0 1723.97  4.9708 0.05634 .
## site         1 1724.0 1723.97  4.9708 0.05634 .
## Residuals    8 2774.5  346.82
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

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Chapter 6.0 – Fishing Efforts and Catch Data

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

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1663724-281e-R-Rev1

18 August 2021

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FIGURES

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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
AIS	Aquatic Invasive Species
CPUE	Catch Per Unit Effort
DFO	Fisheries and Oceans Canada
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
h	hour
LSA	Local Study Area
m	meter
mm	millimeter
min	minute
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environmental Working Group
NIS	Non-Indigenous Species
PC	Project Certificate
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SEM	Sikumiut Environmental Management Ltd.
SD	Standard Deviation
UTM	Universal Transverse Mercator

6.0 FISHING EFFORTS AND CATCH DATA

6.1 Introduction

This chapter presents the results of the fishing efforts and catch data collected during the 2020 open-water season as part of the larger Marine Environmental Effects Monitoring Program (MEEMP). This component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the Project Certificate (PC) Conditions described in Chapter 1.0, Table 1-2. PC Conditions related to the monitoring of fish presence and species composition included PC Conditions No. 99 (b)(ii), 99 (c), 113, and 114.

6.1.1 Objectives

The objectives of this component are to:

- Summarize catch data in terms of number of fish and taxa caught.
- Qualitatively compare 2020 catch data (Arctic Char (*Salvelinus arcticus*) presence, species relative abundances and catch per unit effort, CPUE) to previous years.
- Qualitatively compare efficacy of the different fishing methods employed.

6.2 Study Design

The study design for fishing efforts and catch remained largely unaltered between 2014 to 2017. During this time period, sampling was completed over a two-week period in August, which was not thought to be an accurate representation of fish presence over the course of the entire open-water shipping season (late July to mid-October). Accordingly, in 2018, sampling duration was expanded to cover 4 weeks of the open-water instead of 2 weeks. This expanded sampling length was also accompanied by the addition of beach seining and angling as fishing methods.

The 2019 MEEMP program remained unaltered from 2018 aside from the addition of hoop nets to the fish sampling program in order to determine the capture efficiency of the method in Milne Port and assess its potential as a replacement for Fukui trapping, following input from the Marine Environmental Working Group (MEWG) regarding low capture efficiency in Fukui traps.

6.2.1 Modifications to the Program (2020)

The 2020 MEEMP included the addition of trawling to the fish sampling program to determine the capture efficiency of that method within Milne Port. Both Fukui trap and hoop net methods were used again in 2020 despite the plan to move forward with the higher efficiency sampling method (hoop nets) based on a 2019 trial. Overlap of the two methods was implemented to meet commitments to MEWG for continuing to sample at previous locations for a minimum of three years to facilitate comparison of old and new methods / results. Angling effort was also modified for the 2020 MEEMP program in order to target specific species of interest. Other components of the 2020 MEEMP program remained unchanged from previous years (2014-2019).

Compared to 2019, the 2020 MEEMP fish sampling program included a more robust effort (total hours fished, and total fishing efforts) and an increase in sample locations for all methods, expanding coverage within Milne Port. Figures 6-1 through 6-3 illustrate the 2020 deployment locations for each fishing method.

LEGEND

- BATHYMETRIC CONTOUR (25 m INTERVAL)
- GILLNET SAMPLING LOCATION
- SEINE NET SAMPLING LOCATION
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500

1:10,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	SH
PREPARED	AA
REVIEWED	MW
APPROVED	PR

TITLE
GILL NET AND SEINE NET DEPLOYMENT LOCATIONS IN MILNE PORT; MEEMP 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	6-1

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig6_1_FishSampling_Gillnets_Seine_RevB.mxd PRINTED ON: 2021-08-03 AT 1:45:30 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

LEGEND

- ANGLING (JIGGING) SAMPLING LOCATION
- TRAWLING SAMPLE LOCATION
- ANGLING (TROLLING) SAMPLING LOCATION
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500

1:15,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	SH
PREPARED	AA
REVIEWED	MW
APPROVED	PR

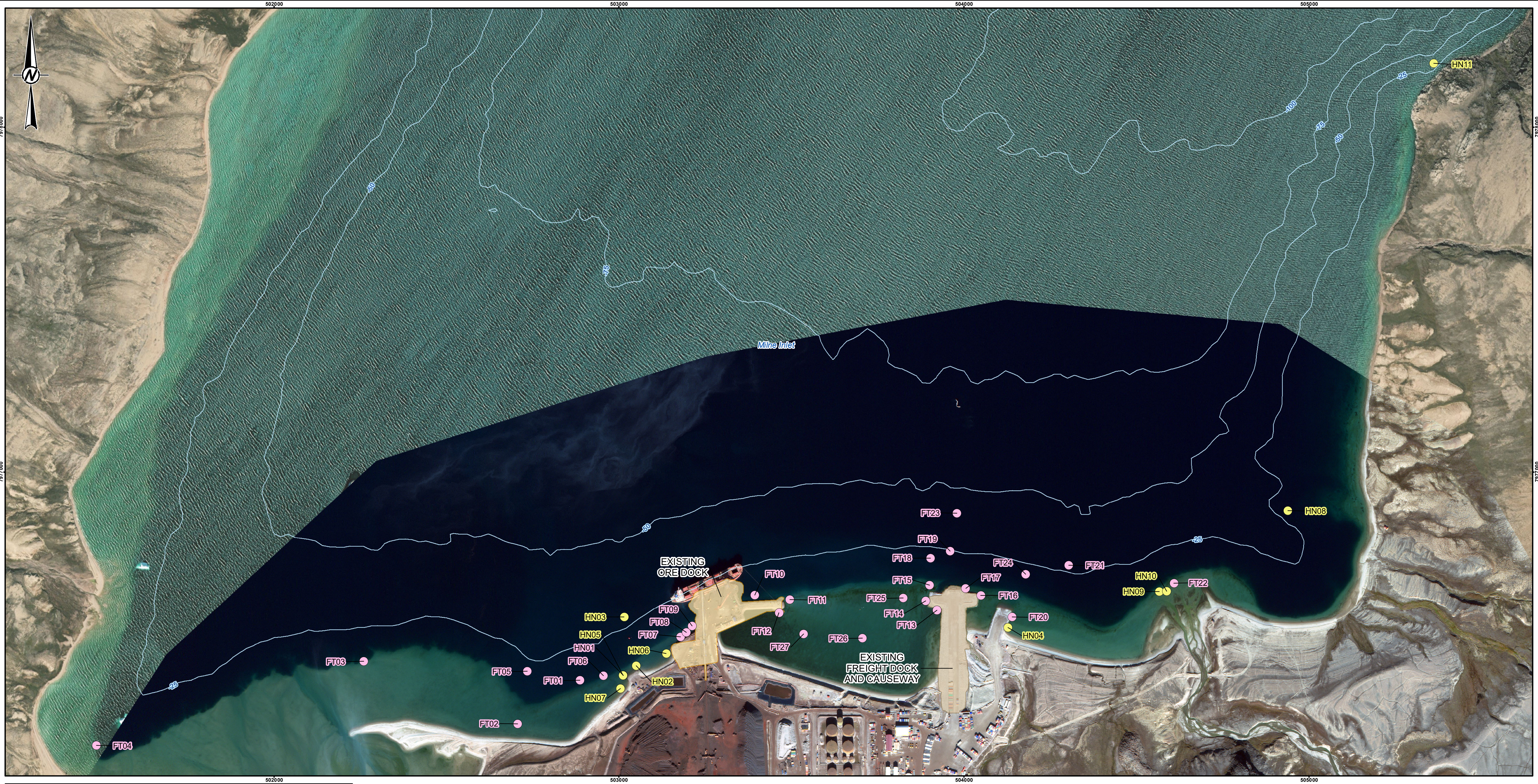
TITLE
ANGLING AND TRAWLING SAMPLE LOCATIONS IN MILNE PORT; MEEMP 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	6-2

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig6_2_FishSampling_Angling_Trawling_RevB.mxd PRINTED ON: 2021-08-03 AT: 1:46:53 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



LEGEND

- FUKUI TRAP SAMPLING LOCATION
- HOOP NET SAMPLING LOCATION
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500

1:11,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	SH
PREPARED	AA
REVIEWED	MW
APPROVED	PR

TITLE
HOOP NET AND FUKUI TRAP DEPLOYMENT LOCATIONS IN MILNE PORT; MEEMP 2020

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	6-3

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig6_3_FishSampling_HoopNets_FukuiTraps_RevB.mxd PRINTED ON: 2021-08-03 AT: 1:48:17 PM

25mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

6.2.2 Indicators

A number of indicators are measured for this component, including number of fish and taxa caught, species relative abundance, and CPUE. However, statistical comparison of these indicators is not possible under current methodologies due to inter-annual variation in total fishing effort and sampling locations; rather, comparisons are descriptive and qualitative. This chapter is closely linked to Chapter 7 (Fish Health and Tissue Chemistry), and indicators for that component are outlined in Section 7.2.2.

6.3 Materials and Methods

6.3.1 Field Methodology

Fish sampling was conducted in the Milne Port area from 24 July 2020 to 15 August 2020 using both active (angling, gill netting, beach seine, trawling) and passive (Fukui traps, hoop nets) capture methods (Figure 6-1, Figure 6-2, and Figure 6-3). Fish sampling locations and methods were consistent with those in previous years, with the addition of a test trawling effort in 2020. The effort was spread over six weeks to capture as much of the open-water season conditions as possible (between late July and mid-August). All incidental mortalities were retained and processed as described in Chapter 7.0.

6.3.1.1 Permitting

The following scientific data collection permits were obtained prior to the start of the 2020 fish sampling program:

- Fisheries and Oceans Canada (DFO) Licence to Fish for Scientific Purposes Permit # S-20/21-1006-NU
- DFO Animal Use Protocol Permit # FWI-ACC-2020-41
- Nunavut Research Institute Scientific Research Licence # 02 065 20R-M

Copies of the permits are provided in Appendix 6A.

6.3.1.2 Gill Nets

Standardized monofilament floating gill nets were used to sample shallow (i.e., up to 15 m deep) subtidal areas for characterization of pelagic fish communities present in the Milne Port area. A total of 25 gill net sets occurred from 27 July to 15 August 2020 (Table 6-1). Each gill net consisted of six panels with each panel measuring 15.2 m in length and 2.4 m in width, with mesh sizes of each panel of 2.5 cm, 3.8 cm, 5.1 cm, 6.4 cm, 7.6 cm and 10.2 cm. The gill nets were deployed in a shore-perpendicular orientation (smallest mesh size closest to shore) and were either suspended just below the water surface or were weighted to run along the seabed. Nets were checked at least every two hours for fish presence over the duration of deployment. Sampling locations were recorded using a Garmin GPS and logged in a field notebook. Total soak durations ranged from approximately 0.5 hours to 7 hours and 27 minutes, with an average soak time of 3 hours and 43 minutes. Total sampling effort for gill net sampling was 92 hours and 59 minutes.

Table 6-1: Summary of 2020 Fish Sampling Efforts in Milne Port - Gill Nets

Station Name	Date (2020)	UTM Coordinates (Zone 17 W)				Total Duration (h:min)	Number of Checks[1]
		Start		End			
		Easting	Northing	Easting	Northing		
GN01	27 July	502979	7976335	502938	7976419	2:00	0
GN02	27 July	502717	7976229	502740	7976321	2:00	0
GN03	28 July	501830	7976071	501894	7976184	3:07	1
GN04	28 July	502787	7976222	502808	7976340	6:34	3
GN05	28 July	502495	7976268	502565	7976342	6:38	3
GN06	28 July	502999	7976400	502971	7976482	3:14	1
GN07	29 July	503889	7976639	503833	7976711	4:44	1
GN08	29 July	503722	7976368	503761	7976464	4:44	1
GN09	29 July	503564	7976407	503587	7976502	1:59	1
GN10	29 July	504085	7976589	504115	7976677	6:32	3
GN11	30 July	503026	7976388	502918	7976365	7:27	3
GN12	30 July	503055	7976426	502979	7976504	3:53	1
GN13	1 August	503147	7976494	503061	7976545	5:30	2
GN14	2 August	504832	7976584	504815	7976671	1:17	0
GN15	2 August	504675	7976589	504589	7976625	2:58	1
GN16	6 August	505229	7977692	505108	7977629	1:36	0
GN17	8 August	504355	7976465	504370	7976566	4:05	2
GN18	8 August	504520	7976478	504467	7976557	3:56	2
GN19	9 August	505308	7977985	505247	7977912	0:35	2
GN20	11 August	504052	7976620	504077	7976705	2:28	1
GN21	13 August	503931	7976573	503844	7976573	2:25	1
GN22	14 August	504764	7976620	504777	7976709	4:17	2
GN23A	14 August	505158	7976925	505078	7976930	4:20	2
GN23B	15 August	503501	7976433	503500	7976516	3:20	1
GN24	15 August	503291	7976526	503373	7976516	3:20	1
Total Effort						**92:59**	

[1]Number of checks represents the number of times the field team checked the net and sampled fish with the net remaining in the same location.

6.3.1.3 Angling

Angling (jigging and trolling) was conducted over six days between 26 July and 27 August to characterize bottom and demersal fish communities in Milne Port (Table 6-2) with a total effort of 20 hours and 3 minutes. The duration of sampling was activity-dependent; with a trolling events occurring between 10 minutes and 77 minutes (n=7), and jigging occurring between 10 and 100 minutes (n=24). Sampling start and end positions were recorded using a Garmin GPS and logged in a field notebook. Jigging occurred from a stationary position with two to five rods and lines deployed from the field vessel. Hooks or spoon lures (flashers) were allowed to hit the bottom, then flicked upward to attract bottom fish. Trolling occurred along a pre-determined depth contour where lines with flashers were cast over the side of the field vessel and spooled in towards the field vessel at a known depth to attract pelagic fish.

Changes to the fish health program (Chapter 7.0) required the capture of up to 50 large bodied Fourhorn Sculpin for tissue sampling. Due to the noted high abundances of these fish around coarse rock substrates, angling efforts targeted these areas, contrasting the methodology in previous MEEMP surveys where angling efforts were distributed throughout the Port.

Table 6-2: Summary of 2020 Fish Sampling Efforts in Milne Port - Angling (Jigging and Trolling)

Station Name	Angling Type	Date (2020)	UTM Coordinates (Zone 17W)		Duration (h:min)
			Easting	Northing	
AN01	Trolling (Start)	29 July	504151	7976631	0:13
	Trolling (End)		504559	7976658	
AN02	Jigging	31 July	503193	7976574	1:09
AN03	Jigging	31 July	503207	7976619	0:51
AN04	Jigging	31 July	503215	7976583	1:40
AN05	Jigging	31 July	503210	7976586	0:55
AN06	Jigging	1 August	503220	7976562	0:30
AN07	Jigging	1 August	503342	7976668	0:27
AN08	Jigging	2 August	504872	7976647	0:12
AN09	Jigging	2 August	503978	7976676	0:21
AN10	Trolling (Start)	2 August	504606	7976681	0:33
	Trolling (End)		505320	7977499	
AN11	Jigging	2 August	503185	7976522	0:41
AN12	Jigging	3 August	503213	7976562	1:14
AN13	Jigging	5 August	503213	7976610	1:32
AN14	Trolling (Start)	5 August	503214	7976573	0:10
	Trolling (End)		502775	7976251	
AN15	Jigging	5 August	503391	7976593	0:55

Station Name	Angling Type	Date (2020)	UTM Coordinates (Zone 17W)		Duration (h:min)
			Easting	Northing	
AN16	Jigging	6 August	505726	7978486	0:35
AN17	Jigging	7 August	505710	7978466	0:34
AN18	Jigging	8 August	503210	7976609	0:30
AN19	Trolling (Start)	8 August	504197	7976632	1:17
	Trolling (End)		505054	7976893	
AN20	Jigging	9 August	506244	7978922	1:24
AN21	Jigging	9 August	505263	7978077	0:16
AN22	Trolling (Start)	9 August	505316	7978102	0:41
	Trolling (End)		505140	7977163	
AN23	Jigging	9 August	504040	7976628	0:20
AN24	Trolling (Start)	9 August	504123	7976633	0:21
	Trolling (End)		505138	7977193	
AN25	Jigging	11 August	503072	7976373	0:10
AN26	Jigging	11 August	503207	7976594	0:14
AN27A	Trolling (Start)	11 August	504059	7976674	0:14
	Trolling (End)		504545	7976652	
AN27B	Jigging	14 August	505301	7978060	0:28
AN28	Jigging	14 August	503955	7976671	0:20
AN29	Jigging	14 August	505036	7976854	0:33
AN30	Jigging	15 August	503364	7976586	0:35
Total Effort					**20:03**

6.3.1.4 Beach Seines

Seine nets were used to sample fish in nearshore habitat in Milne Port between 24 July and 29 July over three sampling events (Table 6-3). Sampling was conducted using a 1.2 m by 10 m seine net with a 10 mm mesh. Sampling effort took a total of 1 hour and 47 minutes to sample areas ranging from 480 m^2 to 800 m^2 and occurred within shoreline locations at an approximate average depth of 1 m. Sampling locations were recorded using a Garmin GPS and logged in a field notebook.

Table 6-3: Summary of 2020 Fish Sampling Efforts in Milne Port – Beach Seine Nets

Station Name	Date (2020)	UTM Coordinates (Zone 17 W)				Total Duration (h:min)	Total Sample Area (m²)
		Start		End			
		Easting	Northing	Easting	Northing		
SN01	24 July	503009	7976382	502986	7976340	0:09	480
SN02	24 July	502974	7976348	502937	7976296	0:09	640
SN03	24 July	502923	7976300	502896	7976256	0:06	520
SN04	24 July	502885	7976257	502841	7976218	0:05	600
SN05	24 July	502829	7976228	502775	7976222	0:05	600
SN06	24 July	502769	7976233	502716	7976225	0:05	530
SN07	24 July	503058	7976461	503137	7976466	0:09	700
SN08	25 July	503007	7976428	503041	7976434	0:11	600
SN09	26 July	504126	7976538	504165	7976515	0:04	400
SN10	26 July	504173	7976520	504223	7976496	0:03	450
SN11	26 July	504224	7976499	504277	7976480	0:04	500
SN12	26 July	504064	7976542	504006	7976560	0:04	500
SN13	29 July	503930	7976441	503889	7976374	0:05	500
SN14	29 July	503883	7976374	503815	7976343	0:04	600
SN15	29 July	503807	7976346	503729	7976350	0:06	550
SN16	29 July	503716	7976364	503647	7976378	0:04	600
SN17	29 July	503640	7976387	503569	7976405	0:05	550
SN18	29 July	503568	7976404	503470	7976434	0:09	800
Total Effort						**1:47**	

6.3.1.5 Fukui Traps

Fukui traps were used to sample demersal fish in the Milne Port area from 27 July to 20 August (Table 6-4). Sampling was conducted with sets consisting of three traps connected with a line, each trap measuring 61 cm x 46 cm x 20 cm, with 1.25 cm stretch mesh, and equipped with a bait container. Fukui traps were modified in 2019 using the ‘sinker’ method described in Bergshoeff et al. (2019). Traps were baited with Arctic Char and Fourhorn Sculpin (*Myoxocephalus quadricornis*) and deployed for several days at each station. Deployment time ranged from 22 hours and 11 minutes to 145 hours and 49 minutes, with a mean deployment time of 106 hours and 13 minutes. Traps were periodically checked (normally once per day) and bait containers were refilled if necessary, prior to redeployment. There were 27 Fukui trap stations in total. Fishing locations were recorded using a Garmin GPS and logged in a field notebook. Due to historically low CPUE in Fukui traps observed in Milne Port, hoop nets (Section 6.3.1.6) were brought in as a replacement method. Use of Fukui traps was continued in 2020 to meet commitments to the MEWG to continue using former methodologies for a minimum of three years to facilitate comparison of old and new methods and results.

Table 6-4: Summary of 2020 Fish Sampling Efforts in Milne Port - Fukui Traps

Station	Date (2020)		UTM Coordinates (Zone 17W)		Duration (h:min)	Deployment Depth (m)
	Set	Pull	Easting	Northing		
FT01	27 July	1 August	502887	7976396	114:51	10
FT02	28 July	1 August	502706	7976270	95:10	8
FT03	28 July	1 August	502260	7976451	93:56	5
FT04	28 July	1 August	501485	7976207	94:14	10
FT05	28 July	1 August	502734	7976422	93:43	20
FT06	28 July	1 August	502955	7976409	93:50	20
FT07	1 August	5 August	503178	7976522	94:57	2
FT08	1 August	5 August	503195	7976535	95:59	2
FT09	1 August	5 August	503212	7976554	95:01	2
FT10	1 August	2 August	503394	7976643	22:11	3
FT11	1 August	5 August	503495	7976630	95:00	3
FT12	1 August	5 August	503464	7976592	95:01	3
FT13	5 August	11 August	503922	7976599	121:32	5
FT14	5 August	11 August	503889	7976626	145:40	5
FT15	5 August	11 August	503900	7976672	145:49	5
FT16	5 August	11 August	504049	7976642	145:29	5
FT17	5 August	11 August	504005	7976663	145:32	5
FT18	11 August	15 August	503903	7976750	100:55	20
FT19	11 August	15 August	503960	7976771	100:58	20
FT20	11 August	15 August	504140	7976580	101:01	5
FT21	11 August	15 August	504304	7976730	101:04	20
FT22	11 August	15 August	504609	7976678	100:46	2
FT23	15 August	20 August	503980	7976881	112:00	50
FT24	15 August	20 August	504179	7976704	112:03	20
FT25	15 August	20 August	503824	7976635	117:22	2
FT26	15 August	20 August	503706	7976518	117:00	2
FT27	15 August	20 August	503535	7976530	116:50	2
Total Effort					**2867:54**	

6.3.1.6 Hoop Nets

In 2020, hoop nets were used to sample fish in nearshore habitat in Milne Port from 24 July to 20 August (eleven sampling events in total). Total sampling effort was 1692 hours and 5 minutes (Table 6-5). Sampling was conducted using a 5 m two-chamber hoop net consisting of 25 mm mesh. Orientation of the hoop nets varied with deployment type. Fishing locations were recorded using a Garmin GPS and logged in a field notebook.

Shore-based nets were set in nearshore habitat in the subtidal area during low tide with the wing panels running from a minimum water depth of 0.2 m to a maximum of 1.5 m. Nets were checked daily during low tide. Shore-based deployments had a north, south, east or west orientation. West and East orientated nets were placed so the 1.0 m diameter mouth was perpendicular to the shore and the 10 m length wing panels were oriented in a wide V-shape extending outwards from the net opening, targeting fish moving through the subtidal. North and south orientated nets were placed so the mouth was parallel to shore either facing shore (south orientation) or open water (north orientation), targeting fish moving in and out of sources of freshwater input.

Deep deployments were set with both ends of the hoop net left open to allow fish to swim into the trap. Deep deployments were baited with Arctic Char and Fourhorn Sculpin and deployed for several days at each station. Nets were periodically checked (normally once per day) and, bait containers were refilled if necessary, prior to redeployment. The hoop net was held in an open position using wooden rods and weighted on both ends to lay flat on the seabed, targeting demersal species.

Table 6-5: Summary of 2020 Fish Sampling Efforts in Milne Port – Hoop Nets

Station	Date (2020)		UTM Coordinates (Zone 17W)		Duration (h:min)	Placement
	Set	Pull	Easting	Northing		
HN01	24 July	28 July	503013	7976410	97:14	Shore based (West)
HN02	24 July	28 July	503050	7976438	97:00	Shore based (East)
HN03	28 July	31 July	503015	7976580	71:04	Shore based (South)
HN04	28 July	31 July	504128	7976549	70:43	Shore based (North)
HN05	31 July	4 August	503012	7976410	89:14	Shore based (West)
HN06	31 July	4 August	503137	7976474	89:00	Shore based (East)
HN07	1 August	4 August	503004	7976372	70:31	Shore based (West)
HN08	2 August	11 August	504939	7976888	215:11	Deep set (30 m)
HN09	6 August	20 August	504566	7976653	339:53	Shore based (South)
HN10	6 August	20 August	504588	7976654	339:35	Shore based (South)
HN11	11 August	20 August	505362	7978186	212:40	Deep set (30 m)
Total Effort					**1692:05**	

6.3.1.7 Trawling

In 2020, a single trawling effort was performed on 13 August to test the efficacy of the method for targeting species of fish in Milne Port not typically caught by other methods. In total, the effort lasted 16 minutes and covered 445 m of habitat. Start and end waypoints for otter trawl efforts were recorded using the onboard navigation system on the Research Vessel (Raymarine Axiom Hybrid Touch Pro with Navionics+ Bundle) and logged in a field notebook (Table 6-6).

The otter trawl, sourced from Memphis Net and Twine, is a cone shaped net composed of a 4.9 m wide mouth spread open by two wooden doors on either side of the opening. The front section of the net is composed of 38 mm stretched nylon mesh with a 32 mm stretched mesh cod-end at the back of the net where catch accumulates. The net was deployed near bottom to target demersal species rather than pelagic species.

The sample site was chosen based on depth using bathymetric charts. A 25 m depth contour was selected between the ore dock and Philips Creek and the otter trawl was deployed from the research vessels A-frame using the winch line while the vessel slowly reversed at a speed of 1 knot. Once the net reached bottom, the effort was started. The sample depths ranged from 23 m to 27 m over a sand bottom.

Table 6-6: Summary of 2020 Fish Sampling Efforts in Milne Port – Otter Trawl

Station Name	Date (2020)	UTM Coordinates (Zone 17 W)				Total Duration (h:min)
		Start		End		
		Easting	Northing	Easting	Northing	
TRL01	13 August	501962	7976503	502402	7976580	0:16

6.3.2 Data Analysis

Summary statistics (mean, standard deviation, CPUE) were used to compare between species, method, survey year, and abundance. Due to a lack of standardization in fishing methodology (fishing location, method used, time at each location), as well as lack of details on fishing gear in earlier survey years, statistical comparison of CPUE, relative species composition, and fish captured between survey years is not feasible. Graphical representations of data were used to visually compare data through the used of stacked bar graphs showing cumulative number of fish species captured by method. Examples can be found within section 6.4 below. Potential impacts of Project operations on fish populations in Milne Port are considered statistically through metrics of fish health, described in Chapter 7.0.

6.3.3 Quality Management

6.3.3.1 Field QA/QC

Quality assurance and quality control (QA/QC) measures for quantitative and qualitative data collected during quadrat surveys, included:

- Prior to fishing activities, all field members were briefed on sampling protocol/methods and made aware of their role in data collection. Fishing methodologies were standardized to minimize the introduction of sampling error during sample collection.
- Nets and traps were cleaned between efforts and checked for breakages or failures to ensure consistency in efforts.

- Field notes were taken during all surveys to ensure a consistent record of sampling effort using pre-prepared field sheets to ensure a complete and accurate data collection process. Data from field sheets were reviewed and entered into a spreadsheet at the end of each day and checked for inconsistencies or missing information. The data entry was verified accurate and complete by a second team member.
- Survey photographs, scans of the field datasheets, and GPS waypoints were saved to a laptop computer and external hard drive at the end of each day.
- Fish identification was recorded to species. Any identification that was questionable in the field was verified using fish field guides. Where there was uncertainty in the identification of an incidental mortality, the specimen was preserved and sent for identification by Biologica Environmental Services Ltd.

6.4 Results

6.4.1 Catch Data

6.4.1.1 Overall

A total of 852 fish belonging to eleven Arctic taxa were captured during active fish sampling undertaken in 2020 (Table 6-7). Fish species captured in the Milne Port area for all fishing methods are shown in Figure 6-4. As in previous survey years (SEM 2016a; SEM 2017a; Golder 2018, Golder 2019), Arctic Char (17.4%), Fourhorn Sculpin (45.5%) and Shorthorn Sculpin (*Myoxocephalus Scorpius,* 8.69%) were the most abundant fish species caught, comprising 71.60% of the total catch in 2020. The remaining 29.4% of fish species captured comprised: Polar Cod (*Arctogadus glacialis*, 8.22%), Greenland Cod (*Gadus ogac*, 6.69%), Arctic Sculpin (*Myoxocephalus scorpioides*, 1.53%), Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*, 1.29%), *Triglops* sculpin (*Triglops* sp., 1.05%), Sandlance (*Ammodytes* spp., 0.70%), and a single Fourline Snakeblenny (*Eumesogrammus parecisus*, 0.11%). The remaining 8.80% of fish species observed were unidentified sculpin (Cottidae indet.) (Appendix 6C, Photos 10-18).

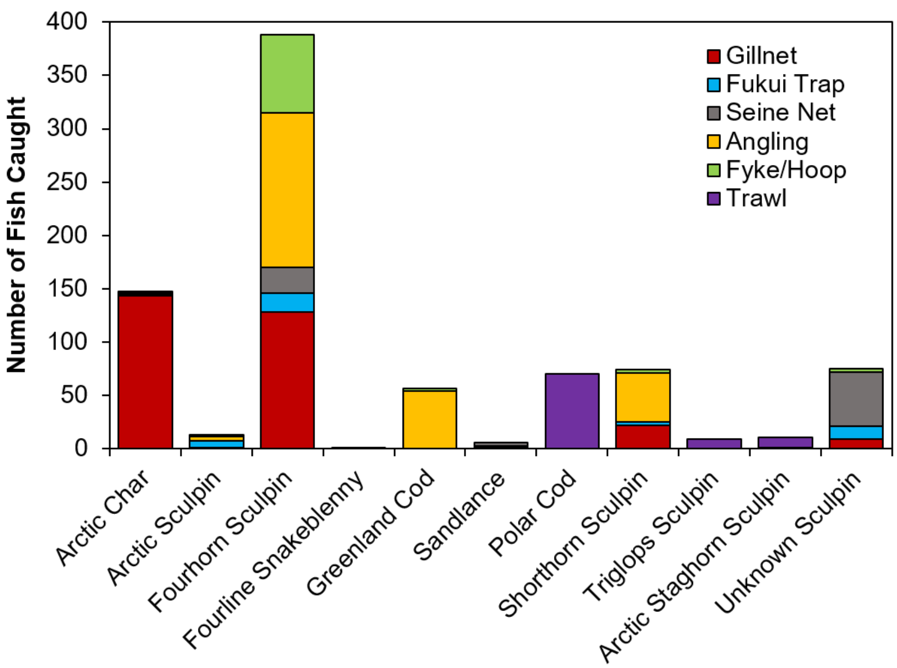


Figure 6-4: Fish species captured by method in the Milne Port area during 2020 fish sampling.

Species captured in previous sampling years, for all sampling methods combined, is presented in Table 6-7. Most species captured during the 2020 fish surveys were captured in previous years aside from Polar Cod (n = 70) and *Triglops* sculpin (*Triglops* sp., n = 9) — both of these species have not been observed previously at Milne Port. Species that have been caught in previous survey years but not encountered in 2020 include Longhorn Sculpin (*Myoxocephalus octodecemspinosus)*, Fishdoctor (*Gymnelis viridis*), and Atlantic Hookear Sculpin (*Artediellus atlanticus).* Elevated capture numbers were recorded for Fourhorn Sculpin (n = 388) and Greenland Cod (n = 57) in 2020.

Table 6-8 presents Catch Per Unit Effort for all species of fish captured and all methods used in 2020. Beach seine sampling obtained the highest CPUE (38.81 fish/h ± 42.93 SD) and Fukui traps the lowest (0.0184 fish/h ± 0.0277 SD), as observed in previous years. Gill nets were found to be the most successful sampling method in terms of fish captured in 2020 (n = 306) as they were in 2019 (N = 252) and 2018 (N = 376). Gill netting captured the highest diversity of species (n = 7), while trawling (n = 3) had the lowest of the sampling methods. Hoop net (n = 6) and Fukui trap (n = 6) sampling methods showed a high amount of species diversity while angling (n = 5) and beach seine (n = 4) were comparatively less.

Table 6-7: Total Fish Catch Data by Species for all Sampling Methods Combined (not corrected for effort) in Milne Port, 2010-2020

Family/ Common Name	Taxonomic ID	2010	2013	2014	2015	2016	2017	2018	2019	2020
Ammodytidae										
Sandlance	*Ammodytes* spp.	0	0	0	0	0	1	1	1	6
Cottidae										
Arctic Sculpin	*Myoxocephalus scorpioides*	0	0	4	1	0	9	3	0	13
Shorthorn Sculpin	*Myoxocephalus scorpius*	50	4	9	8	18	45	78	66	74
Fourhorn Sculpin	*Myoxocephalus quadricornis*	7	3	39	13	18	40	147	106	388
Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	3	0	0	2	0	0	0	0	11
Longhorn Sculpin	*Myoxocephalus octodecemspinosus*	0	2	4	2	2	0	0	0	0
Atlantic Hookear Sculpin	*Artediellus atlanticus*	0	0	5	1	0	0	0	0	0
Triglops Sculpin	*Triglops* sp.	0	0	0	0	0	0	0	0	9
Unidentified Sculpin	Cottidae indet.	0	0	0	12	0	0	3	0	75
Cyclopteridae										
Common Lumpfish	*Cyclopterus lumpus*	0	0	1	0	0	0	0	0	0
Gadidae										
Greenland Cod	*Gadus ogac*	4	0	1	0	0	0	0	0	57
Polar Cod	*Arctogadus glacialis*	0	0	0	0	0	0	0	0	70
Artic Cod*	*Boreogadus saida*	0	0	0	0	0	0	1	0	0
Gasterosteidae										
Ninespine Stickleback	*Pungitius pungitius*	0	0	0	0	0	0	0	1	0
Salmonidae										
Arctic Char	*Salvelinus alpinus*	11	6	3	67	157	23	169	105	148

Family/ Common Name	Taxonomic ID	2010	2013	2014	2015	2016	2017	2018	2019	2020
Stichaeidae										
Fourline Snakeblenny	*Eumesogrammus parecisus*	0	0	1	2	2	0	0	0	1
Zoarcidae										
Fishdoctor	*Gymnelis viridis*	0	1	0	3	0	0	0	0	0
Indeterminate										
Unidentified Species	-	0	0	0	0	0	0	1	0	0
Total species caught		**5**	**5**	**9**	**10**	**5**	**5**	**8**	**5**	**11**
Total fish captures		**75**	**16**	**67**	**111**	**197**	**118**	**403**	**279**	**852**

*Fish species *Arctogadus glacialis* and *Boreogadus saida* both use the common name Arctic Cod. The 2018 report (Golder 2019) indicated an Arctic cod was captured, referred to as the species *A. glacialis*. Review of the catch record and field photographs indicate this was actually *B. saida* and has been corrected here. *Arctogadus glacialis* will be referred to herein by the alternative common name Polar Cod.

Table 6-8: Total Fish Catch Records and Catch Per Unit Effort (CPUE) Presented by Sampling Method in 2020

Species	N (Fish Counts)			CPUE	
	Range	Mean ± SD	Total	Range (Fish/h)	Mean ± SD (Fish/h)
Angling*					
Arctic Char	0 - 1	0.06 ± 0.25	2	0 - 2.14	0.11 ± 0.43
Arctic Sculpin	0 - 2	0.13 ± 0.43	4	0 - 3.43	0.16 ± 0.63
Fourhorn Sculpin	0 - 68	4.68 ± 14.85	145	0 - 55.14	4.98 ± 14.52
Shorthorn Sculpin	0 - 10	1.48 ± 2.32	46	0 - 30.00	3.28 ± 6.34
Greenland Cod	0 - 13	1.74 ± 3.20	54	0 - 15.43	2.07 ± 3.70
All Species	**0 - 73**	**8.10 ± 15.32**	**251**	**0 - 59.19**	**10.59 ± 15.52**
Beach Seine					
Arctic Char	0 - 1	0.06 ± 0.24	1	0 - 15.00	0.83 ± 3.54
Fourhorn Sculpin	0 - 12	1.33 ± 2.93	24	0 - 80.00	9.29 ± 19.47
Unknown Sculpin	0 - 12	2.83 ± 4.12	51	0 - 144.00	27.65 ± 38.44
Sandlance	0 - 2	0.17 ± 0.51	3	0 - 13.33	1.04 ± 3.32
All Species	**0 - 15**	**4.39 ± 5.34**	**79**	**0 - 144.00**	**38.81 ± 42.93**
Fukui Traps					
Arctic Sculpin	0 - 2	0.26 ± 0.53	7	0 - 0.045	0.0037 ± 0.0094
Fourhorn Sculpin	0 - 4	0.67 ± 1.04	18	0 - 0.045	0.0080 ± 0.0131
Shorthorn Sculpin	0 - 1	0.11 ± 0.32	3	0 - 0.011	0.0010 ± 0.0028
Unknown Sculpin	0 - 5	0.44 ± 1.15	12	0 - 0.053	0.0047 ± 0.0122
Fourline Snakeblenny	0 - 1	0.04 ± 0.19	1	0 - 0.010	0.0004 ± 0.0019
Sandlance	0 - 1	0.07 ± 0.27	2	0 - 0.011	0.0007 ± 0.0025
All Species	**0 - 9**	**1.59 ± 2.26**	**43**	**0 - 0.095**	**0.0184 ± 0.0277**
Gill Nets					
Arctic Char	0 - 23	5.76 ± 6.50	144	0 - 39.43	2.89 ± 7.71
Arctic Sculpin	0 - 1	0.04 ± 0.20	1	0 - 0.30	0.01 ± 0.06
Arctic Staghorn Sculpin	0 - 1	0.04 ± 0.20	1	0 - 0.31	0.01 ± 0.06
Fourhorn Sculpin	0 - 25	5.12 ± 6.33	128	0 - 10.29	1.82 ± 2.49
Shorthorn Sculpin	0 - 4	0.88 ± 1.42	22	0 - 3.43	0.33 ± 0.75
Unknown Sculpin	0 - 3	0.36 ±0.81	9	0 - 0.93	0.09 ± 0.22
Sandlance	0 - 1	0.04 ± 0.20	1	0 - 0.13	0.01 ± 0.03
All Species	**0 - 41**	**12.24 ± 11.19**	**306**	**0 - 53.14**	**5.16 ± 10.34**

Species	N (Fish Counts)			CPUE	
	Range	Mean ± SD	Total	Range (Fish/h)	Mean ± SD (Fish/h)
Hoop Nets					
Arctic Char	0 - 1	0.09 ± 0.30	1	0 - 0.003	0.0003 ± 0.0009
Arctic Sculpin	0 - 1	0.09 ± 0.30	1	0 - 0.005	0.0004 ± 0.0014
Fourhorn Sculpin	0 - 39	6.64 ± 12.35	73	0 - 0.401	0.0687 ± 0.1301
Greenland Cod	0 - 1	0.27 ± 0.47	3	0 - 0.011	0.0019 ± 0.0036
Shorthorn Sculpin	0 - 1	0.27 ± 0.47	3	0 - 0.014	0.0035 ± 0.0061
Unknown Sculpin	0 - 3	0.27 ± 0.90	3	0 - 0.031	0.0028 ± 0.0093
All Species	**0 - 43**	**7.64 ± 13.23**	**84**	**0 - 0.442**	**0.0776 ± 0.1400**
Trawling					
Polar Cod	-	-	70	262.50	-
Triglops Sculpin	-	-	9	33.75	-
Arctic Staghorn Sculpin	-	-	10	37.50	-
All Species	**-**	**-**	**89**	**333.75**	**-**

*Note: A subset of angling efforts used more equipment and were targeted to areas with known high abundances of Fourhorn Sculpin as part of collection efforts for fish tissue chemistry (Chapter 7.0), resulting in CPUE being higher than typically observed. SD = Standard Deviation

6.4.1.2 Gill Nets

Throughout all sampling years, including 2020 (n = 306), gill nets have proved to be the most effective method for fish collection and yielded the highest number of fish captured (Table 6-8, Figure 6-5). Arctic Char (n = 144) were the most commonly captured species followed closely by Fourhorn Sculpin (n = 128). Other species captured include Shorthorn Sculpin (n = 22), Sandlance (n = 1), Arctic Staghorn Sculpin (n = 1), and Arctic Sculpin (n=1) with unknown sculpin (n = 9) making up the remaining fish. Mean CPUE for all species (5.16 fish/h ± 10.34 SD) in 2020 was higher than all other sample years in Milne Port. Mean CPUE in 2020 was greatest for Arctic Char (2.89 fish/h ± 7.71 SD) followed by Fourhorn Sculpin (1.82 fish/h ± 2.49 SD) with all other species having a CPUE less than one. Individuals captured in 2020 (n = 306) were the second highest amount after 2018 (n = 376) but greater than 2019 (n = 252).

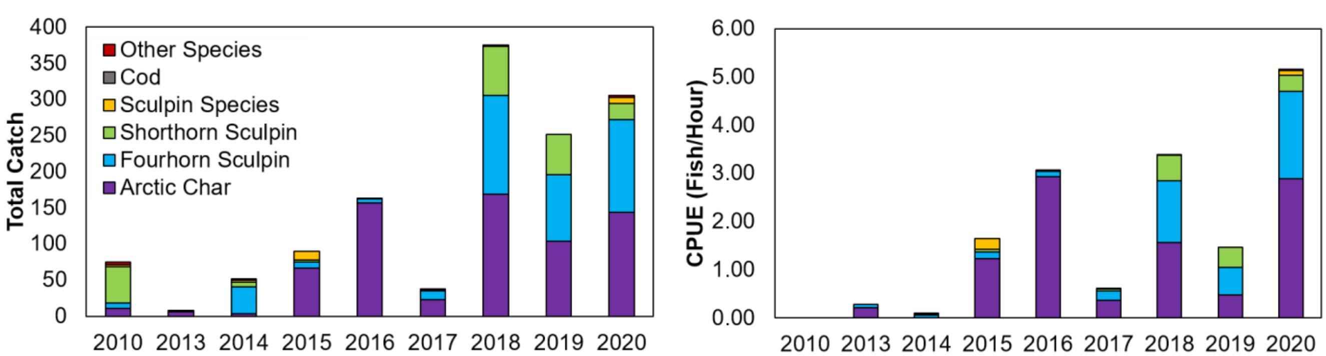


Figure 6-5: Total catch and Catch Per Unit Effort (CPUE) for gill nets in the Milne Port area (2010 to 2020)

6.4.1.3 Angling

A total of 251 fish were captured during angling surveys in 2020 with 58% of the fish collected (n = 145) being Fourhorn Sculpin (Table 6-8). The mean Catch Per Unit Effort (CPUE) for Fourhorn Sculpin was highest among all species caught in 2020 (4.98 fish/h ± 14.52 SD) with Shorthorn Sculpin being the second most abundant species (3.28 fish/h ± 6.34 SD). Prior to 2020, the Shorthorn Sculpin was consistently the most abundant species captured through angling (2019; 0.86 fish/h ± 2.27 SD, 2018; 0.69 fish/h ± 1.25 SD) within the Milne Port Local Study Area (LSA). Other species captured in 2020 include Greenland Cod (n = 54; 2.07 fish/h ± 3.70 SD), Arctic Sculpin (n = 4; 0.16 fish/h ± 0.63 SD), and Arctic Char (n = 2; 0.11fish/h ± 0.43 SD). Figure 6-6 shows total catch and CPUE for angling between 2017 and 2020.

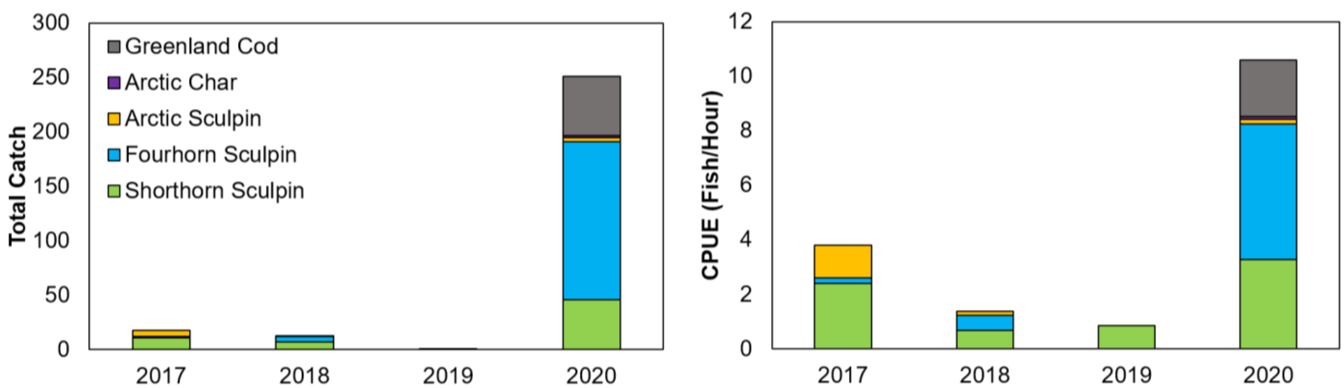


Figure 6-6: Total catch and Catch Per Unit Effort (CPUE) for angling in the Milne Port area (2017 to 2020)

6.4.1.4 Beach Seines

The beach seine sample method, in terms of CPUE, was the most effective fish sampling method during the 2020 fish sampling program with a mean CPUE of 38.81 fish/h ± 42.93 SD (Table 6-8). This method of fish sampling was limited to nearshore subtidal habitats with small substrate (i.e. sand and gravel) and fish that were captured, both in previous sample years and also in 2020, were generally small and often not identifiable to species. A total of 51 unknown sculpin species (27.65 fish/h ± 38.44 SD) were captured in 2020 which makes up 65% of fish captured through this method. A single Arctic Char, 24 Fourhorn Sculpin, and 3 Sandlance made up the other 35% of fish captured. Total fish captured (n = 71) in 2020 was higher than both 2019 (n = 4) and 2018 (n = 10) (Figure 6-7).

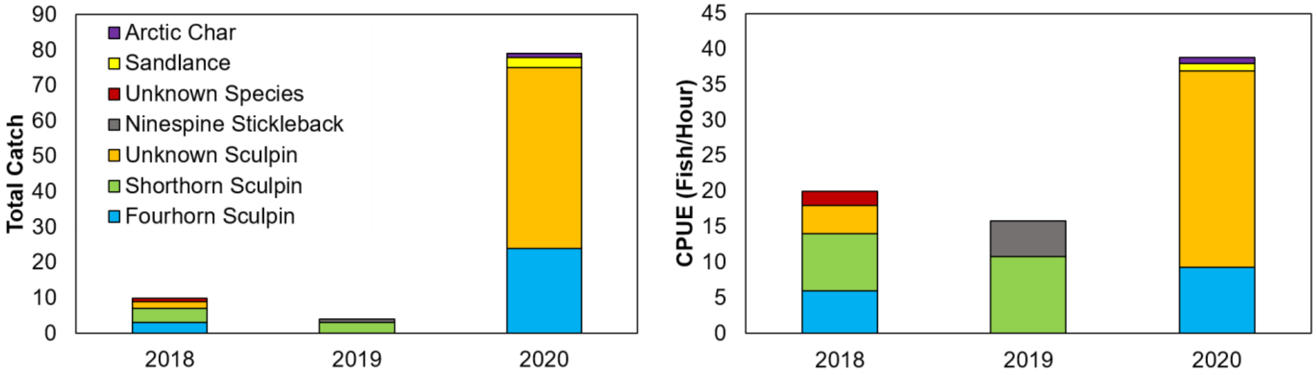


Figure 6-7: Total catch and Catch Per Unit Effort (CPUE) for beach seine in the Milne Port area (2018 to 2020)

6.4.1.5 Fukui Traps

Fukui traps recorded the lowest CPUE (0.0184 fish/h ± 0.0277 SD) of all the sampling methods in 2020 (Table 6-8). A total of 31 fish representing 5 species and 12 fish identified to the sculpin family level (*Cottidae*) were captured. Both mean CPUE and total catch were greater in 2020 compared to 2019, 2018, and 2017 (Figure 6-8). Fourhorn Sculpin was the most abundant[1] species captured in 2020 (n = 18) and was found to have the highest CPUE (0.0080 fish/h ± 0.0131 SD). This was similar to 2019, 2018, and 2017 where Fourhorn Sculpin was also the most abundant species captured and had the highest CPUE. Other species captured were Arctic Sculpin (n = 7), Shorthorn Sculpin (n = 3), Sandlance (n = 2), and a single Fourline Snakeblenny. CPUE for Fukui trap sampling remained low compared to other survey methods in the Milne Port area and species diversity was similar to previous years.

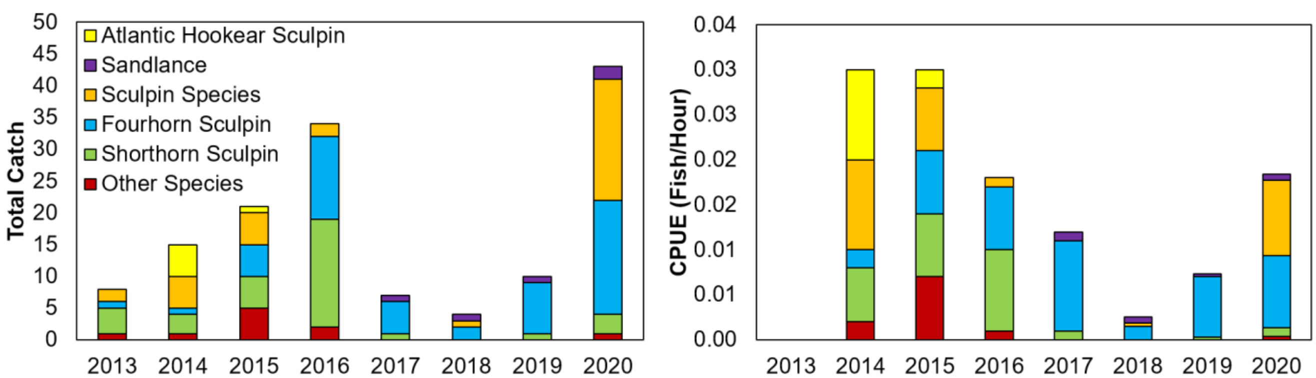


Figure 6-8: Total catch and Catch Per Unit Effort (CPUE) for fukui traps in the Milne Port area (2013[2] to 2020)

[1] The fishing gear may have caught more sculpins but not because they were most abundant but because they were most vulnerable to capture by the fishing gear.

[2] CPUE of 2013 fukui trap results not presented due to a lack of effort data.

6.4.1.6 Hoop Nets

Hoop nets were introduced to the sampling methods in 2019 and kept in 2020 as they were found to be more effective at capturing fish than Fukui traps. Again in 2020, hoop nets were more effective than Fukui traps with a mean CPUE (0.0776 fish/h ± 0.1400 SD) (Table 6-8). A total of 84 fish from 5 identified species were captured during hoop net efforts, with Fourhorn Sculpin (n = 73) found to be the most abundant species making up 87% of the combined catch. The other species captured were Greenland Cod (n = 3), Shorthorn Sculpin (n = 3), Arctic Sculpin (n = 1), and Arctic Char (n = 1). Unknown sculpin (n = 3) made up the remaining count. Fourhorn Sculpin had a mean CPUE of 0.0687 fish/h ± 0.1301 SD which was the highest of all species (Figure 6-9).

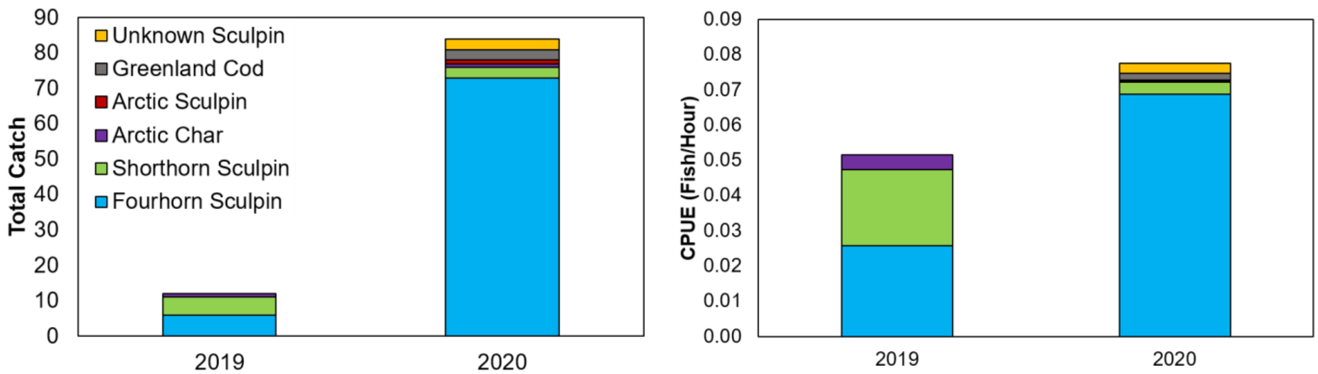


Figure 6-9: Total catch and Catch Per Unit Effort (CPUE) for hoop nets in the Milne Port area (2019 to 2020)

6.4.1.7 Trawling

A single trawling effort was completed in 2020 that collected a total of three species, two of which were not found through any other sampling method this year. The two species were Polar Cod (n = 70) and *Triglops* sculpin (n = 9). Arctic Staghorn Sculpin (n = 10) were also captured through this method. As this was the first year of sampling with this method and there was only one effort, summary stats were not completed and a figure was not produced.

Table 6-9: Bycatch in Trawling Efforts at Milne Port

Common Name	Representative Species[1]	Count
Scallop	*Similipecten Greenlandicus*	>25
Sea Spider	*Nymphon* sp.	42
	Munnopsis typica	
Shrimp	*Sabinea septemcarinata*	21
	Argis dentate	
Brittle Star	-	24
Sponge	-	2
Tunicate	-	1
Unidentified Fish Eggs	Pisces indet.	2
Polychaete Worm	*Paranaitis* sp.	5
	Oceanobdella sp.	
	Phyllodoce groenlandica	

Common Name	Representative Species[1]	Count
Sea Urchin	-	1
Various Jellyfish Species	*Euphysa* sp.	>10
	Ptychogastria polaris	
	Pandeidae indet.	
	Hydrozoa indet.	
Amphipod	*Gammaracanthus loricatus*	2
	Gammarus oceanicus	
Sea Angel	*Clione limacina*	2
Ice Cream Cone Worm	Pectinaria indet.	4

[1] A subset of the bycatch was sent for taxonomic identification; this is not representative of all species present in the bycatch or the specific counts by species.

6.4.1.8 Fish Species Observations

In addition to the fish captured in the active fish sampling described above, incidental observations of fish occurred in other sampling as part of the MEEMP and Aquatic Invasive Species (AIS) programs. A summary of fish collections and observations is presented in Table 6-10. At least one fish was captured or observed in benthic infauna samples (Chapter 4.0), quadrat surveys (Chapter 5.0), fish stomachs (Chapter 7.0) and in zooplankton samples (Chapter 8.0). Fish observations were also made during monitoring of constructed offset habitat along the Ore Dock and Freight Dock (Golder 2020b, Golder 2021). A list of all fish observations by survey year is presented in Appendix 6B-2.

A total of sixteen fish taxa were captured or observed throughout all MEEMP and AIS/Non-Indigenous Species (NIS) surveys. Arctic Char and Fourline Snakeblenny were captured in fish surveys but were not captured or observed in any other method. Benthic infauna samples included a single juvenile fish, an indeterminate sculpin species (Cottidae). A single larval fish in zooplankton samples was identified as an indeterminate sandlance (*Ammodytes* sp.). Stomachs of incidental mortalities contained whole body and parts of unknown sandlance as well as unidentifiable fish tissue.

The greatest number observed fish taxa occurred in offset habitat monitoring. Many fish in these surveys were not resolved to species level due to poor camera angle, camera motion, visibility in the water column and fish behaviour limiting the ability to observe the fish in detail. Two unidentified taxa observed in offset habitat surveys were not observed in any of the other survey methods. Fish species were also collected opportunistically from other methods or found as mortalities along beach areas in Milne Port. In these instances, fish were preserved and sent for identification at Biologica Environmental Services Ltd. (Chapter 8.0 for more detail), which resulted in the identification of two species not captured by other methods (Pacific Sandlance, *Ammodytes hexapterus* and Saddled Eelpout, *Lycodes mucosus*). Non-indigenous species or aquatic invasive species (NIS/AIS) information for fish identified in MEEMP surveys is discussed in Chapter 8.0.

Table 6-10: Summary of Fish Observations by Method During 2020 MEEMP and NIS/AIS Surveys at Milne Port

Order/ Family	Taxa	Common Name	Survey Method						
			Fishing Efforts[1]	Benthic Infauna	Zooplankton	Fish Stomachs	Offset Monitoring[2]	Quadrats	Incidentals
-	Pisces indet.	Unknown Species				X			
Gadiformes									
Gadidae	*Arctogadus glacialis*	Polar Cod	X						X
Gadidae	*Gadus ogac*	Greenland Cod	X				X		
Gadidae	Gadidae indet.	Unknown Cod					X		
Perciformes									
Ammodytidae	*Ammodytes* sp.	Unidentified Sandlance	X		X	X	X		
Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance							X
Stichaeidae	*Eumesogrammus parecisus*	Fourline Snakeblenny	X						
Stichaeidae	Stichaeidae indet.	Unknown Prickleback					X		
Zoarcidae	*Lycodes mucosus*	Saddled Eelpout							X
Salmoniformes									
Salmonidae	*Salvelinus alpinus*	Arctic Char	X						
Scorpaeniformes									
Cottidae	*Myoxocephalus scorpioides*	Arctic Sculpin	X				X		
Cottidae	*Myoxocephalus quadricornis*	Fourhorn Sculpin	X				X		
Cottidae	*Myoxocephalus scorpius*	Shorthorn Sculpin	X				X		
Cottidae	*Gymnocanthus tricuspis*	Arctic Staghorn Sculpin	X						
Cottidae	*Triglops* sp.	*Triglops* Sculpin	X						
Cottidae	Cottidae indet.	Unknown Sculpin	X	X			X	X	X

Notes: [1] Fishing efforts include angling, beach seines, Fukui traps, gill nets, hoop nets and trawling. [2]Offset monitoring includes monitoring of constructed offset fish habitat along the Ore Dock and Freight Dock

6.5 Discussion

Total fish catch in 2020 was greater than recorded during previous sample years, with a total catch of 852 individual fish representing 11 taxa, compared to an average of 6.5 (range 5 to 10) taxa in all previous survey years. Higher catch in 2020 is attributed to a greater diversity of fishing methods employed (e.g., addition of trawl and hoop nets), as well as habitat types sampled (e.g., coarse rock, deep benthic) compared to previous years, in addition to an increase in the number of efforts for each fishing method (e.g., 27 Fukui trap sets in 2020 compared to 11 to 18 in previous years). A change in relative abundance or proportional taxonomic composition of fish catches was apparent in 2020 compared to previous sampling years. In past surveys, Fourhorn Sculpin, Shorthorn Sculpin and Arctic Char generally comprised over 99% of the total catch whereas in 2020, these species comprised only 71% of the total catch. Different levels of fishing effort and methods employed between years, in addition to the expansion of fishing locations to more areas within Milne Port, likely led to higher captures of species that were rare or unobserved in previous years. For example, Greenland Cod were previously caught in 2010 and 2014 in low numbers; however, increased angling efforts targeting coarse rock habitat, as well as the introduction of deep-set hoop nets, increased total catch to 57 individuals in 2020. Further, the addition of the trial trawling effort in 2020 resulted in the capture of a large number of juvenile fish of two previously unobserved species (*Triglops* sp., N = 9 and Polar Cod, N = 70) and one previously uncommon species (Arctic Staghorn Sculpin, N = 11). Other species observed in 2020 included Arctic Sculpin, Fourline Snakeblenny, Sandlance, and unidentified sculpin species.

As in previous years, highest fish captures were achieved using gill nets, yielding a total of 306 fish. However, in previous years, gill netting methods landed 90% of the total catch whereas only 36% of the total catch was caught by gill nets in 2020 (Golder 2020a). This is likely reflective of the increased effort applied to other fishing methods in 2020 rather than a decrease in the efficiency of gill nets, as evidenced by CPUE values for gill net sampling. Similar to previous survey years, Arctic Char were the most common fish caught in gill nets, followed by Fourhorn Sculpin. Gill nets remain the most effective method for capturing Arctic Char, accounting for 97% of all Arctic Char caught in 2020.

Angling efforts in 2020 increased compared to previous survey years and included targeted methods intended to catch Fourhorn Sculpin for the fish health and tissue chemistry component of the MEEMP (sampling in previous years was designed to maximize spatial coverage across a range of representative habitats). This notably increased CPUE relative to previous survey years. Additionally, the relative proportion of the catch for this method differed in 2020, with Fourhorn Sculpin being the most common species caught, followed by Shorthorn Sculpin and Greenland Cod. This is compared to previous years where Shorthorn Sculpin was the most common, followed by Fourhorn or Arctic Sculpin. For angling, the higher total catch, CPUE, and differing species proportion reflects the change in methodology in 2020 to target Fourhorn Sculpin, rather than being indicative of a change in population abundance or structure within Milne Port.

Similar to previous survey years, beach seines yielded the highest CPUE. Beach seining occurs in nearshore areas and in only a few locations in Milne Port, generally capturing small and juvenile fish and excluding larger species that are present in Milne Port, particularly Arctic Char. However, beach seines are currently the most effective method for capturing and monitoring juvenile fish populations among MEEMP fishing efforts.

Fukui traps are among the longest continually used fishing method in MEEMP surveys, used since the 2013 baseline surveys. Fukui traps generally have a low CPUE compared to other methods used in MEEMP fishing surveys, although CPUE in 2020 was the highest among Fukui trapping efforts since 2015. Despite the low CPUE, Fukui traps are advantageous due to being a passive effort that can be deployed at a variety of depths and on a range of substrates, they also consistently capture a range of species, although species captured are not consistent between survey years.

Hoop nets were introduced in 2019 as a potential method to replace Fukui traps because of their low CPUE. Similar to Fukui traps, hoop nets are a passive fishing method, although hoop nets have a more versatile design that allows deployment in shallower areas due to the use of wing panels and a funnel shape that passively directs fish into the trap. Hoop net sampling in 2019 was successful and efforts in 2020 increased. In 2019, CPUE for hoop nets was higher than for Fukui traps (Golder 2020a), although overall number of species caught was lower, so hoop net efforts were increased in number and locations to further test the method as an effective replacement for Fukui traps. In addition to fishing more locations around Milne Port, for two of the deployments, the trap was modified to be deployed in deeper locations to target benthic species such as Greenland Cod, which had been notably absent in MEEMP surveys since 2014.

As in 2019, CPUE was higher for hoop nets compared to Fukui traps, catching 84 fish in approximately 1700 cumulative hours compared to 43 fish in 2900 cumulative hours for Fukui traps, with similar species. Hoop nets were also among the two efforts that were successful in capturing Greenland Cod. It is recommended that hoop nets be employed as a replacement method due to greater efficacy compared to Fukui nets. Both hoop nets and Fukui nets have lower CPUE compared to other methods, however, as they are passive and catch species not caught in other methods, they remain effective monitoring efforts.

Trawling was added to the 2020 MEEMP program as a trial method to test the efficacy of the method for catching demersal fish species that are not typically caught by the other fishing methods employed in the program. In general, trawling was an effective method in terms of total fish caught and CPUE. Trawling had the highest CPUE of all methods for all survey years. However, despite the high CPUE, only three species were caught, two of which had not been observed previously (Polar Cod and *Triglops* sp.) in MEEMP surveys. Close to 80% of the total catch in the trawling effort were juvenile Polar Cod, indicating that the high catch may have been related to local schooling, a behaviour demonstrated by Polar Cod and more generally associated with the relatively well studied Arctic Cod (*Boreogadus saida*), and not necessarily representative of their expected abundance in Milne Port (Mueter et al. 2016; Laidre and Heide-Jørgensen 2005). In the trawling effort, no targeted large bodied demersal fish were caught, injury occurred to small bodied juvenile fish, and a large quantity of other non-target species were caught as bycatch. It is therefore recommended that a different method with less impact to non-target species be implemented in future years.

A total of 16 fish taxa were captured or observed throughout all MEEMP and AIS/NIS surveys in 2020. A total of 24 different fish taxa have been observed in Milne Port survey since 2010. Five of the taxa in 2020 were observed incidentally in components of the MEEMP and AIS/NIS surveys other than fishing efforts, indicating that dedicated fish survey methods are not fully characterizing the fish populations in Milne Port. However, three of these identifications were to higher taxonomic levels that may be represented in captures such as the unknown Stichaeidae (potentially Fourline Snakeblenny) or unknown cod (potentially Greenland or Polar Cod). Additionally, incidental observations included confirmation of the Pacific Sandlance (*Ammodytes hexapterus*), which may be among the Sandlance species observed in fish captures. Arctic Char and Fourline Snakeblenny were captured in fish collection surveys but were not captured or observed in any other method**.**

6.6 Conclusions and Recommendations

To date, construction and operation of Milne Port does not appear to have negatively affected fish community structure in Milne Port. Overall, fish surveys are reliably catching comparable abundances of the dominant species in Milne Port (Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin) and there is no indication that there are Project related impacts on their numbers or relative abundance (i.e, the evenness or distribution of individuals among species in a community). Presence and diversity data collected in 2020 was comparable to previous years, including baseline years. Gill nets remain the most reliable and effective way for monitoring populations of Arctic Char in Milne Port and it is recommended that these efforts continue in 2021. Fishing efforts vary each year in number, location, and type, making comparison of CPUE between survey years difficult; therefore, it is also recommended a repeated survey design be considered for the program, where the same efforts are used every year in the same locations within Milne Port, so that comparisons can be made through time.

6.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

Golder Associates Ltd.

Christine Bylenga, PhD
Marine Scientist

Marina Winterbottom, BSc, MMM, RPBio
Senior Marine Biologist

Shawn Redden, RPBio
Associate, Senior Fisheries Biologist

SH/CHB/MW/SR/asd

https://golderassociates.sharepoint.com/sites/11206g/deliverables (do not use)/issued to client_for wp/200-299/1663724-281-r-rev1-34000/281e/1663724-281e-r-rev1-34000 2020 meemp_6.0 fishing efforts & catch 18aug_21.docx

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APPENDIX 6A

Permits

Canada

Date: October 23rd 2020

To: Phil Rouget, Senior Marine Biologist, Golder Associates Ltd.

Subject: Animal Use Protocol - Letter of Approval

Dear Phil,

Your 2020 Animal Use Protocol (AUP), number FWI-ACC-2020-41, entitled "Baffinland 2020 Marine Ecological Effects Monitoring Program and Marine Habitat Offset Monitoring Program" has been reviewed and approved by the Freshwater Institute Animal Care Committee.

Keep this signed letter of approval as well as the signed AUP application form for your records. Please be advised that should there be a need to revise the protocol you are requested to contact the Freshwater Institute Animal Care Committee and obtain approval prior to proceeding.

The Canadian Council on Animal Care requires post approval monitoring of Animal Use Protocols (AUP). The Freshwater Institute Animal Care Committee will be randomly choosing AUPs and asking for photographs or video that shows the handling or interaction of animals for these projects.

In addition, you are required to submit a brief report within 30 days of completion of the project outlining the unexpected changes to the protocol, the number of animals used and any unanticipated results. If injuries or mortalities occur, an incident report must be provided. A blank copy of these forms will be sent out with your final approval.

Feel free to contact me if you have any questions or concerns.

Sincerely,

Michelle Wetton-Salo

Michelle Wetton-Salo

Chair Person of FWI-ACC

Freshwater Institute Animal Care Committee
Arctic & Aquatic Research
Ontario and Prairie Region / région de l'Ontario et des Prairies
Fisheries and Oceans Canada / Pêches et Océans Canada
501 University Crescent
Winnipeg, Manitoba R3T 2N6
Phone:204-983-5238
xca-fwisl-acc@dfo-mpo.gc.ca

Canada

APPROVAL BY ANIMAL CARE COMMITTEE MEMBERS

Signatures of ACC Members

Andrew Chapelsky	Marc Brandson
Dr. Charlene Berkvens D.V.M., D.V.Sc.	Chantelle Sawatzky
Kerry Wautier	Travis Durhack
Brent Young	

Interim Approval ☐ **Final Approval** ☒

APPROVAL BY THE FWI ANIMAL CARE COMMITTEE IS FOR THE PERIOD STATED ON YOUR ANIMAL USE PROTOCOL.

Nunavummi Qaujisaqtulirijikkut / Nunavut Research Institute
Box 1720, Iqaluit, NU X0A 0H0 phone:(867) 979-7279 fax: (867) 979-7109 e-mail:
mosha.cote@arcticcollege.ca

SCIENTIFIC RESEARCH LICENSE

LICENSE # 02 065 20R-M

ISSUED TO: Megan-Lorde Hoyle
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, Ontario
L6H 0C3 Canada

TEAM MEMBERS: Please see attached

AFFILIATION: Baffinland Iron Mines Corporation

TITLE: Mary River Project

OBJECTIVES OF RESEARCH:
Data collection and analysis for environmental monitoring and management of the Mary River project to assess Project impacts in relation to the approved environmental impact assessment;Compliance to NIRB Certificate No. 005, Amended Type "A" Water License 2AM-MRY1325 and further baseline and operating conditions analysis for future permitting.

TERMS & CONDITIONS:
The holder of the licence will be bound by the terms and conditions of the Nunavut Impact Review Board Screening Decision Report and the Department of Culture & Heritage archaeological sites terms and conditions. The license holder will abide by all special public health protection measures imposed by Nunavut's Chief Medical Officer of Health in response to the Covid-19 Pandemic, including restrictions on non-essential travel to Nunavut. These terms and conditions will form part of this licence.

DATA COLLECTION IN NU:
DATES: January 01, 2020-December 31, 2020
LOCATION: Steensby Port,Mary River,Milne Port/Road

Scientific Research License 02 065 20R-M expires on December 31, 2020
Issued at Iqaluit, NU on July 29, 2020

M E Thomas
Mary Ellen Thomas
Science Advisor

SCIENTIFIC RESEARCH LICENCE

Fisheries and Oceans Canada / Pêches et Océans Canada

Licence #: S-20/21-1006-NU

Philippe Rouget
3795 Carey Road 2nd floor
Victoria, BC, CA   V8Z 6T8

Dear Philippe Rouget,

Enclosed is your Licence to Fish for Scientific Purposes issued pursuant to Section 52 of the Fishery (General) Regulations.

Failure to comply with any of the conditions specified on the attached licence may result in a contravention of the Fishery (General) Regulations.

Please be advised that this licence only permits those activities stated on your licence. Any other activity may require approval under the Fisheries Act or other legislation. It is the Project Authority's responsibility to obtain any other approvals.

Please ensure that you include the licence number and project title in any future correspondence and that you complete the Summary Harvest Report upon completion of activities under this licence.

Yours truly,

Bill, Kevin

Digitally signed by Bill, Kevin
DN: C=CA, O=GC, OU=DFO-MPO, CN="Bill, Kevin"
Reason: I am approving this document
Location: your signing location here
Date: 2020-07-21 16:49:26
Foxit PhantomPDF Version: 9.7.1

Jenna Kayakjuak
License Delivery Officer
Northern Operations
Central and Arctic Region
Fisheries and Oceans Canada

Date

Enclosure

LICENCE TO FISH FOR SCIENTIFIC PURPOSES

S-20/21-1006-NU

Pursuant to Section 52 of the Fishery (General) Regulations, the Minister of Fisheries and Oceans hereby authorizes the individual(s) listed below to fish for scientific purposes, subject to the conditions specified.

Project Authority: Philippe Rouget — Golder Associates Ltd.
3795 Carey Road 2nd floor
Victoria, BC, CA V8Z 6T8

Other Personnel:
Christine Bylenga (Lead)
Daniel Vicente (Lead)
Patricia Tomliens
Niallan O'Brian
Benjamin Widdowson
Robert Hollingshead (Boat Operator)
Erika Grebeldinger
Kristin Westman
Bradley Cox
Therese Chicote
Corby Shurgot
Jeff Reynolds

Objectives: Baffinland Iron Mines Corp. - Mary River Project - 2020 Marine Environmental Effects Monitoring Program (MEEMP) and Marine Habitat Offset Monitoring Program at Milne Port, Nunavut

The Project objectives are to conduct sampling to adhere to the terms and conditions of Baffinland to operate the Mary River Mine and Port Facility in Milne Inlet including:
1. To assess the effectiveness of fish offsetting measures in relation to the construction of the Milne ore dock.
2. To collect marine data for the Marine Ecological Effects Monitoring Program and Marine Habitat Offset Monitoring Program regulatory requirements.

CONDITIONS

Specified Conditions:

GEAR TYPES:
Fukui traps, Fyke nets and minnow traps are a live trap technique. Beach seines are a live capture technique and not anticipated to result in mortality. Gill net sets will be short in duration to limit mortality (2 hour soak time then checked). Angling (jigging and/or trolling) and trawls (beam and/or otter) are not anticipated to result in mortality. Species listed here are based on potential to occur, as well as species observed or captured in previous programs in Milne Inlet. The total number of live samples are estimated, based on species potential in the area. The purpose is to gather information about distribution, relative abundance, size distribution, and other biological characteristics. Biologica Laboratory and BV Labs will be used for aging, body burden analysis and stomach content analysis. Sacrificial dead samples (approximately 50 individuals each of Fourhorn Sculpin and Hiatella arctica) in addition to all incidental mortalities will be submitted to Biologica for sample processing and analysis.

Waters:

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Sculpin, Fourhorn — Gear: 10 MM Mesh Gillnets and Larger

Species:

Gear: Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Sculpin, Arctic

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Sculpin, Shorthorn

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Sculpins Spp.

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Sculpin, Ribbed

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Sculpin, Arctic Staghorn

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Spiny Lumpsucker

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Lumpfish

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Sand Lance

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Fish Doctor

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Cod, Greenland

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine

Species: Gear: Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Cod, Arctic

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Arctic Char (Searun)

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: Milne Inlet
Point A: 72° 20' N, 80° 30' W

Species: Stickleback, Ninespine

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Fourline Snakeblenny

Gear: 10 MM Mesh Gillnets and Larger
Angling
Fish Trap
Fyke Nets
Minnow Trap
Otter Trawl
Seine
Trawl

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			500	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Gastropods/Shellfish

Gear: Ponar dredge
Van Veen Grab

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
			200	100				

Water Body: **Milne Inlet**
Point A: 72° 20' N, 80° 30' W

Species: Benthos

Gear: Ponar dredge
Van Veen Grab

Total Weight	Weight Live	Weight Dead	Number Alive	Number Dead	Number Tows	Number Sets	Hours	Minutes
300.00								

Fishing Period: July 21, 2020 to September 30, 2020

A copy of this licence must be available at the study site and produced at the request of a fishery officer.

Live fish may not be retained unless specified in the conditions of this licence.

The licence holder shall immediately cease fishing when the total fish killed or live sampled reaches any of the maximums set for any of the species listed.

Transportation:

Other approvals/permits may be necessary to collect or transport certain species, such as Marine Mammal Transportation Permits. For marine mammal parts, products and derivatives a Marine Mammal Transportation Licence is required for domestic transport and, for international transport a Canadian CITES Export Permit is also required.

Report on Activities:

The Project Authority will submit to the License Delivery Officer, Department of Fisheries and Oceans, within one month of the expiry date, a report stating:

i) whether or not the field work was conducted; and if conducted

ii) waterbody location, fishing coordinates, gear types used at each coordinate, numbers or amount of fish (by species) collected and/or marked and the date or period of collection.

A Summary Harvest Report template is provided by the License Delivery Officer at time of issuance of this licence.

The Project Authority also will provide a copy of any published or public access documents which result from the project. Information supplied will be used for population management purposes by the Department of Fisheries and Oceans and becomes part of the public record.

All documents should be sent to:

Fisheries and Oceans Canada
Northern Operations
Central and Arctic Region
P.O. Box 358
Iqaluit, NU X0A 0H0

Attention: Licence Delivery Officer

Telephone: (867) 979-8005
Fax: (867) 979-8039
E-mail: XCNA-NT-NUpermit@dfo-mpo.gc.ca

Bill, Kevin

Digitally signed by Bill, Kevin
DN: C=CA, O=GC, OU=DFO-MPO, CN="Bill, Kevin"
Reason: I am approving this document
Location: your signing location here
Date: 2020-07-21 16:51:53
Foxit PhantomPDF Version: 9.7.1

Kevin Bill
A/Regional Director, Arctic Operations
Arctic Region
Fisheries and Oceans Canada

Date

For the Minister of Fisheries and Oceans.

Pursuant to Section 52 of the Fishery (General) Regulations.

APPENDIX 6B

Fish Catch Summary

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
29-Jul-20	Angling	AN01	No fish Caught	-	-	-
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	456.0	1130.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	468.0	1220.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	455.0	1180.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	440.0	1000.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	478.0	1390.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	398.0	670.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	454.0	1180.0
31-Jul-20	Angling	AN02	Greenland Cod	*Gadus ogac*	450.0	980.0
31-Jul-20	Angling	AN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	45.0
31-Jul-20	Angling	AN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	45.5
31-Jul-20	Angling	AN03	Greenland Cod	*Gadus ogac*	621.0	2570.0
31-Jul-20	Angling	AN03	Greenland Cod	*Gadus ogac*	434.0	940.0
31-Jul-20	Angling	AN03	Greenland Cod	*Gadus ogac*	434.0	970.0
31-Jul-20	Angling	AN03	Shorthorn Sculpin	*Myoxocephalus scorpius*	412.0	930.0
31-Jul-20	Angling	AN03	Shorthorn Sculpin	*Myoxocephalus scorpius*	169.0	80.0
31-Jul-20	Angling	AN03	Shorthorn Sculpin	*Myoxocephalus scorpius*	241.0	150.0
31-Jul-20	Angling	AN03	Arctic Char	*Salvelinus alpinus*	400.0	260.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	498.0	1320.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	518.0	1790.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	480.0	1230.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	440.0	990.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	534.0	1540.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	518.0	1490.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	408.0	690.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	636.0	3060.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	482.0	1410.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	564.0	1930.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	442.0	1020.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	504.0	1580.0
31-Jul-20	Angling	AN04	Greenland Cod	*Gadus ogac*	569.0	2900.0
31-Jul-20	Angling	AN05	Greenland Cod	*Gadus ogac*	670.0	3700.0
31-Jul-20	Angling	AN05	Greenland Cod	*Gadus ogac*	446.0	1100.0
31-Jul-20	Angling	AN05	Shorthorn Sculpin	*Myoxocephalus scorpius*	366.0	680.0
31-Jul-20	Angling	AN05	Shorthorn Sculpin	*Myoxocephalus scorpius*	374.0	730.0
01-Aug-20	Angling	AN06	Greenland Cod	*Gadus ogac*	484.0	1170.0
01-Aug-20	Angling	AN06	Greenland Cod	*Gadus ogac*	520.0	1700.0
01-Aug-20	Angling	AN07	Shorthorn Sculpin	*Myoxocephalus scorpius*	185.0	93.2
02-Aug-20	Angling	AN08	Shorthorn Sculpin	*Myoxocephalus scorpius*	189.0	110.0
02-Aug-20	Angling	AN08	Shorthorn Sculpin	*Myoxocephalus scorpius*	377.0	700.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	396.0	1020.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	327.0	440.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	232.0	180.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	261.0	280.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	186.0	80.0
02-Aug-20	Angling	AN09	Shorthorn Sculpin	*Myoxocephalus scorpius*	218.0	160.0
02-Aug-20	Angling	AN10	No fish Caught	-	-	-
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	144.0	24.0
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	60.0
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	64.2
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	64.8
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	195.0	70.4
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	40.4
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	167.0	38.1
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	183.0	59.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	56.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	55.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	54.4
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	156.0	32.3
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	39.3
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	177.0	46.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	148.0	29.8
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	179.0	49.4
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	215.0	109.3
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	203.0	66.8
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	203.0	82.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	115.5
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	98.6
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	74.0
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	242.0	110.0
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	99.2
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	221.0	114.3
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	64.1
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	220.0	116.7
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	215.0	81.8
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	205.0	75.4
02-Aug-20	Angling	AN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	197.0	85.0
02-Aug-20	Angling	AN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	159.0	38.3
02-Aug-20	Angling	AN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	142.0	25.1
02-Aug-20	Angling	AN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	164.0	44.7
02-Aug-20	Angling	AN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	122.0	13.5
02-Aug-20	Angling	AN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	140.0	21.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	173.0	48.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	174.0	51.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	176.0	54.9
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	191.0	78.6
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	44.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	179.0	52.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	43.0

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	204.0	75.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	130.0	19.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	156.0	31.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	38.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	185.0	53.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	157.0	30.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	213.0	97.2
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	228.0	113.9
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	207.0	95.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	38.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	234.0	120.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	34.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	182.0	62.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	167.0	45.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	70.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	169.0	40.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	150.0	29.5
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	48.8
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	165.0	38.9
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	43.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	169.0	37.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	38.6
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	173.0	46.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	164.0	37.2
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	140.0	21.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	47.6
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	150.0	26.6
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	157.0	37.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	140.0	21.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	159.0	35.2
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	36.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	136.0	17.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	148.0	30.2
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	127.0	19.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	129.0	15.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	134.0	18.9
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	310.0	380.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	236.0	147.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	212.0	78.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	226.0	103.8
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	190.0	65.5
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	220.0	104.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	250.0	150.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	70.6
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	197.0	70.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	235.0	118.8
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	86.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	276.0	230.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	244.0	140.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	263.0	200.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	263.0	160.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	200.0	68.4
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	229.0	120.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	191.0	60.0
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	90.9
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	204.0	74.8
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	200.0	74.7
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	196.0	72.1
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	196.0	71.5
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	54.3
03-Aug-20	Angling	AN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	81.6
03-Aug-20	Angling	AN12	Arctic Sculpin	*Myoxocephalus scorpioides*	145.0	36.3
03-Aug-20	Angling	AN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	190.0	71.1
03-Aug-20	Angling	AN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	174.0	53.3
03-Aug-20	Angling	AN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	219.0	102.5
03-Aug-20	Angling	AN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	200.0	73.1
05-Aug-20	Angling	AN13	Greenland Cod	*Gadus ogac*	378.0	710.0
05-Aug-20	Angling	AN13	Greenland Cod	*Gadus ogac*	436.0	830.0
05-Aug-20	Angling	AN13	Greenland Cod	*Gadus ogac*	636.0	2980.0
05-Aug-20	Angling	AN13	Greenland Cod	*Gadus ogac*	441.0	1100.0
05-Aug-20	Angling	AN13	Greenland Cod	*Gadus ogac*	610.0	2470.0
05-Aug-20	Angling	AN13	Arctic Sculpin	*Myoxocephalus scorpioides*	178.0	60.0
05-Aug-20	Angling	AN13	Shorthorn Sculpin	*Myoxocephalus scorpius*	408.0	740.0
05-Aug-20	Angling	AN14	No fish Caught	-	-	-
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	73.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	236.0	190.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	243.0	130.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	243.0	150.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	272.0	180.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	220.0	95.6
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	213.0	97.2
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	251.0	130.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	203.0	72.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	254.0	190.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	232.0	95.8
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	235.0	130.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	241.0	130.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	233.0	118.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	208.0	83.3

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	217.0	83.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	231.0	130.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	253.0	150.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	205.0	82.7
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	228.0	100.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	200.0	71.9
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	199.0	79.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	197.0	68.5
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	195.0	69.1
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	208.0	78.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	204.0	77.2
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	192.0	64.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	211.0	86.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	207.0	80.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	181.0	56.3
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	86.7
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	191.0	70.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	179.0	48.7
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	88.8
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	219.0	96.3
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	52.4
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	51.8
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	193.0	71.3
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	242.0	120.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	148.0	29.5
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	65.0
05-Aug-20	Angling	AN15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	162.0	37.1
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	598.0	2400.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	414.0	830.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	548.0	1880.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	454.0	1000.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	506.0	1610.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	497.0	1310.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	444.0	480.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	446.0	1010.0
06-Aug-20	Angling	AN16	Greenland Cod	*Gadus ogac*	520.0	1490.0
07-Aug-20	Angling	AN17	Greenland Cod	*Gadus ogac*	474.0	1210.0
07-Aug-20	Angling	AN17	Greenland Cod	*Gadus ogac*	490.0	1370.0
07-Aug-20	Angling	AN17	Greenland Cod	*Gadus ogac*	494.0	1470.0
07-Aug-20	Angling	AN17	Greenland Cod	*Gadus ogac*	628.0	2980.0
07-Aug-20	Angling	AN17	Greenland Cod	*Gadus ogac*	510.0	1420.0
08-Aug-20	Angling	AN18	Greenland Cod	*Gadus ogac*	440.0	1120.0
08-Aug-20	Angling	AN18	Greenland Cod	*Gadus ogac*	470.0	1140.0
08-Aug-20	Angling	AN18	Greenland Cod	*Gadus ogac*	451.0	1040.0
08-Aug-20	Angling	AN18	Greenland Cod	*Gadus ogac*	485.0	1330.0
08-Aug-20	Angling	AN18	Shorthorn Sculpin	*Myoxocephalus scorpius*	375.0	610.0
08-Aug-20	Angling	AN18	Shorthorn Sculpin	*Myoxocephalus scorpius*	421.0	1060.0
08-Aug-20	Angling	AN18	Shorthorn Sculpin	*Myoxocephalus scorpius*	286.0	260.0
08-Aug-20	Angling	AN18	Shorthorn Sculpin	*Myoxocephalus scorpius*	351.0	480.0
08-Aug-20	Angling	AN19	No fish Caught	-	-	-
09-Aug-20	Angling	AN20	Greenland Cod	*Gadus ogac*	513.0	1040.0
09-Aug-20	Angling	AN20	Greenland Cod	*Gadus ogac*	517.0	1710.0
09-Aug-20	Angling	AN20	Shorthorn Sculpin	*Myoxocephalus scorpius*	270.0	330.0
09-Aug-20	Angling	AN21	Shorthorn Sculpin	*Myoxocephalus scorpius*	362.0	640.0
09-Aug-20	Angling	AN21	Shorthorn Sculpin	*Myoxocephalus scorpius*	211.0	110.0
09-Aug-20	Angling	AN22	Shorthorn Sculpin	*Myoxocephalus scorpius*	155.0	60.0
09-Aug-20	Angling	AN23	Fourhorn Sculpin	*Myoxocephalus quadricornis*	192.0	68.9
09-Aug-20	Angling	AN24	No fish Caught	-	-	-
11-Aug-20	Angling	AN25	No fish Caught	-	-	-
11-Aug-20	Angling	AN26	Greenland Cod	*Gadus ogac*	475.0	1240.0
11-Aug-20	Angling	AN27(a)	No fish Caught	-	-	-
14-Aug-20	Angling	AN27(b)	Shorthorn Sculpin	*Myoxocephalus scorpius*	290.0	340.0
14-Aug-20	Angling	AN27(b)	Arctic Char	*Salvelinus alpinus*	325.0	420.0
14-Aug-20	Angling	AN28	Fourhorn Sculpin	*Myoxocephalus quadricornis*	260.0	250.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	344.0	650.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	373.0	760.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	342.0	480.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	289.0	290.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	292.0	360.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	250.0	180.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	278.0	270.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	217.0	100.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	277.0	290.0
14-Aug-20	Angling	AN28	Shorthorn Sculpin	*Myoxocephalus scorpius*	232.0	170.0
14-Aug-20	Angling	AN29	Shorthorn Sculpin	*Myoxocephalus scorpius*	368.0	630.0
14-Aug-20	Angling	AN29	Shorthorn Sculpin	*Myoxocephalus scorpius*	234.0	210.0
14-Aug-20	Angling	AN29	Shorthorn Sculpin	*Myoxocephalus scorpius*	200.0	90.0
15-Aug-20	Angling	AN30	Fourhorn Sculpin	*Myoxocephalus quadricornis*	151.0	31.1
15-Aug-20	Angling	AN30	Arctic Sculpin	*Myoxocephalus scorpioides*	130.0	32.8
15-Aug-20	Angling	AN30	Arctic Sculpin	*Myoxocephalus scorpioides*	131.0	28.5
27-Jul-20	Fukui Traps	FT01	Shorthorn Sculpin	*Myoxocephalus scorpius*	200.0	11.7
28-Jul-20	Fukui Traps	FT02	No fish Caught	-	-	-
28-Jul-20	Fukui Traps	FT03	Unidentified Sculpin	Cottidae indet.	75.0	4.4
28-Jul-20	Fukui Traps	FT03	Unidentified Sculpin	Cottidae indet.	61.0	2.7
28-Jul-20	Fukui Traps	FT03	Unidentified Sculpin	Cottidae indet.	72.0	4.3
28-Jul-20	Fukui Traps	FT03	Unidentified Sculpin	Cottidae indet.	68.0	4.2
28-Jul-20	Fukui Traps	FT03	Unidentified Sculpin	Cottidae indet.	60.0	2.8
28-Jul-20	Fukui Traps	FT03	Fourhorn Sculpin	*Myoxocephalus quadricornis*	217.0	88.9
28-Jul-20	Fukui Traps	FT03	Shorthorn Sculpin	*Myoxocephalus scorpius*	124.0	22.3

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
28-Jul-20	Fukui Traps	FT04	Unidentified Sculpin	Cottidae indet.	65.0	4.1
28-Jul-20	Fukui Traps	FT05	No fish Caught	-	-	-
28-Jul-20	Fukui Traps	FT06	No fish Caught	-	-	-
01-Aug-20	Fukui Traps	FT07	Unidentified Sculpin	Cottidae indet.	141.0	21.2
01-Aug-20	Fukui Traps	FT07	Unidentified Sculpin	Cottidae indet.	123.0	12.7
01-Aug-20	Fukui Traps	FT07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	166.0	47.2
01-Aug-20	Fukui Traps	FT07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	168.0	39.9
01-Aug-20	Fukui Traps	FT08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	220.0	92.2
01-Aug-20	Fukui Traps	FT08	Arctic Sculpin	*Myoxocephalus scorpioides*	127.0	26.6
01-Aug-20	Fukui Traps	FT09	Unidentified Sculpin	Cottidae indet.	149.0	29.2
01-Aug-20	Fukui Traps	FT09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	224.0	118.8
01-Aug-20	Fukui Traps	FT09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	223.0	108.1
01-Aug-20	Fukui Traps	FT09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	196.0	66.4
01-Aug-20	Fukui Traps	FT10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	202.0	66.4
01-Aug-20	Fukui Traps	FT10	Arctic Sculpin	*Myoxocephalus scorpioides*	112.0	20.6
01-Aug-20	Fukui Traps	FT11	Sandlance	*Ammodytes* spp.	170.0	16.2
01-Aug-20	Fukui Traps	FT11	Unidentified Sculpin	Cottidae indet.	130.0	18.7
01-Aug-20	Fukui Traps	FT11	Unidentified Sculpin	Cottidae indet.	140.0	21.8
01-Aug-20	Fukui Traps	FT11	Unidentified Sculpin	Cottidae indet.	134.0	19.3
01-Aug-20	Fukui Traps	FT11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	84.5
01-Aug-20	Fukui Traps	FT11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	196.0	67.6
01-Aug-20	Fukui Traps	FT11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	195.0	68.2
01-Aug-20	Fukui Traps	FT11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	186.0	54.2
01-Aug-20	Fukui Traps	FT11	Arctic Sculpin	*Myoxocephalus scorpioides*	119.0	20.7
01-Aug-20	Fukui Traps	FT12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	177.0	47.5
01-Aug-20	Fukui Traps	FT12	Arctic Sculpin	*Myoxocephalus scorpioides*	200.0	117.8
05-Aug-20	Fukui Traps	FT13	Sandlance	*Ammodytes* spp.	168.0	16.8
05-Aug-20	Fukui Traps	FT13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	235.0	111.9
05-Aug-20	Fukui Traps	FT14	Arctic Sculpin	*Myoxocephalus scorpioides*	132.0	30.9
05-Aug-20	Fukui Traps	FT14	Arctic Sculpin	*Myoxocephalus scorpioides*	90.0	8.8
05-Aug-20	Fukui Traps	FT14	Shorthorn Sculpin	*Myoxocephalus scorpius*	181.0	40.0
05-Aug-20	Fukui Traps	FT15	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	20.0
05-Aug-20	Fukui Traps	FT16	No fish Caught	-	-	-
05-Aug-20	Fukui Traps	FT17	No fish Caught	-	-	-
11-Aug-20	Fukui Traps	FT18	Fourline Snakeblenny	*Eumesogrammus parecisus*	280.0	-
11-Aug-20	Fukui Traps	FT19	No fish Caught	-	-	-
11-Aug-20	Fukui Traps	FT20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	55.6
11-Aug-20	Fukui Traps	FT20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	150.0	29.6
11-Aug-20	Fukui Traps	FT20	Arctic Sculpin	*Myoxocephalus scorpioides*	138.0	37.2
11-Aug-20	Fukui Traps	FT21	No fish Caught	-	-	-
11-Aug-20	Fukui Traps	FT22	No fish Caught	-	-	-
15-Aug-20	Fukui Traps	FT23	No fish Caught	-	-	-
15-Aug-20	Fukui Traps	FT24	No fish Caught	-	-	-
15-Aug-20	Fukui Traps	FT25	No fish Caught	-	-	-
15-Aug-20	Fukui Traps	FT26	Fourhorn Sculpin	*Myoxocephalus quadricornis*	159.0	37.8
15-Aug-20	Fukui Traps	FT27	No fish Caught	-	-	-
27-Jul-20	Gill Nets	GN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	216.0	91.2
27-Jul-20	Gill Nets	GN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	61.2
27-Jul-20	Gill Nets	GN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	71.8
27-Jul-20	Gill Nets	GN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	164.0	36.2
27-Jul-20	Gill Nets	GN01	Arctic Char	*Salvelinus alpinus*	505.0	1020.0
27-Jul-20	Gill Nets	GN01	Arctic Char	*Salvelinus alpinus*	599.0	1960.0
27-Jul-20	Gill Nets	GN01	Arctic Char	*Salvelinus alpinus*	441.0	910.0
27-Jul-20	Gill Nets	GN01	Arctic Char	*Salvelinus alpinus*	272.0	120.0
27-Jul-20	Gill Nets	GN02	Unidentified Sculpin	Cottidae indet.	120.0	16.4
27-Jul-20	Gill Nets	GN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	173.0	41.0
27-Jul-20	Gill Nets	GN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	174.0	45.7
27-Jul-20	Gill Nets	GN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	227.0	114.0
27-Jul-20	Gill Nets	GN02	Arctic Char	*Salvelinus alpinus*	602.0	2320.0
27-Jul-20	Gill Nets	GN02	Arctic Char	*Salvelinus alpinus*	512.0	1320.0
28-Jul-20	Gill Nets	GN03	No fish Caught	-	-	-
28-Jul-20	Gill Nets	GN04	Unidentified Sculpin	Cottidae indet.	135.0	19.5
28-Jul-20	Gill Nets	GN04	Unidentified Sculpin	Cottidae indet.	131.0	18.6
28-Jul-20	Gill Nets	GN04	Shorthorn Sculpin	*Myoxocephalus scorpius*	188.0	52.1
28-Jul-20	Gill Nets	GN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	247.0	150.0
28-Jul-20	Gill Nets	GN06	Unidentified Sculpin	Cottidae indet.	150.0	28.7
28-Jul-20	Gill Nets	GN06	Unidentified Sculpin	Cottidae indet.	153.0	28.1
28-Jul-20	Gill Nets	GN06	Unidentified Sculpin	Cottidae indet.	128.0	18.2
28-Jul-20	Gill Nets	GN06	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	168.0	90.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	261.0	240.0
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	192.0	66.6
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	67.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	294.0	310.0
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	243.0	110.0
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	211.0	79.2
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	110.0
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	215.0	86.9
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	93.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	238.0	112.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	193.0	71.8
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	67.0
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	199.0	82.6
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	185.0	65.2
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	191.0	73.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	53.2
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	65.8
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	59.6
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	166.0	43.5
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	196.0	57.1

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	46.4
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	149.0	25.7
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	157.0	35.6
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	166.0	39.9
28-Jul-20	Gill Nets	GN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	187.0	56.5
28-Jul-20	Gill Nets	GN06	Shorthorn Sculpin	*Myoxocephalus scorpius*	152.0	27.7
28-Jul-20	Gill Nets	GN06	Shorthorn Sculpin	*Myoxocephalus scorpius*	188.0	62.9
28-Jul-20	Gill Nets	GN06	Shorthorn Sculpin	*Myoxocephalus scorpius*	153.0	29.5
28-Jul-20	Gill Nets	GN06	Shorthorn Sculpin	*Myoxocephalus scorpius*	130.0	19.2
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	640.0	2980.0
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	395.0	610.0
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	348.0	480.0
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	558.0	1980.0
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	491.0	1300.0
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	139.0	24.9
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	134.0	21.9
28-Jul-20	Gill Nets	GN06	Arctic Char	*Salvelinus alpinus*	142.0	30.1
29-Jul-20	Gill Nets	GN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	226.0	96.0
29-Jul-20	Gill Nets	GN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	252.0	130.0
29-Jul-20	Gill Nets	GN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	232.0	925.0
29-Jul-20	Gill Nets	GN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	182.0	48.3
29-Jul-20	Gill Nets	GN07	Arctic Char	*Salvelinus alpinus*	652.0	3400.0
29-Jul-20	Gill Nets	GN07	Arctic Char	*Salvelinus alpinus*	542.0	1650.0
29-Jul-20	Gill Nets	GN07	Arctic Char	*Salvelinus alpinus*	528.0	1420.0
29-Jul-20	Gill Nets	GN07	Arctic Char	*Salvelinus alpinus*	516.0	1400.0
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	44.5
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	202.0	77.0
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	42.4
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	35.3
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	36.6
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	162.0	35.9
29-Jul-20	Gill Nets	GN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	118.0	13.2
29-Jul-20	Gill Nets	GN08	Arctic Char	*Salvelinus alpinus*	440.0	900.0
29-Jul-20	Gill Nets	GN08	Arctic Char	*Salvelinus alpinus*	142.0	22.2
29-Jul-20	Gill Nets	GN08	Arctic Char	*Salvelinus alpinus*	368.0	600.0
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	218.0	101.3
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	166.0	41.1
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	59.1
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	156.0	35.7
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	37.2
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	192.0	57.9
29-Jul-20	Gill Nets	GN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	47.2
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	244.0	130.0
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	260.0	180.0
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	268.0	210.0
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	200.0	74.4
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	61.3
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	314.0	400.0
29-Jul-20	Gill Nets	GN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	304.0	310.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	638.0	3260.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	422.0	720.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	338.0	340.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	378.0	460.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	420.0	830.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	352.0	490.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	411.0	860.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	480.0	1380.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	355.0	450.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	412.0	880.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	528.0	1660.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	427.0	870.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	313.0	360.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	314.0	400.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	414.0	890.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	326.0	450.0
29-Jul-20	Gill Nets	GN10	Arctic Char	*Salvelinus alpinus*	326.0	350.0
30-Jul-20	Gill Nets	GN11	Sandlance	*Ammodytes* spp.	168.0	16.7
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	216.0	89.3
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	168.0	37.5
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	52.1
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	86.6
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	199.0	76.1
30-Jul-20	Gill Nets	GN11	Fourhorn Sculpin	*Myoxocephalus quadricornis*	252.0	170.0
30-Jul-20	Gill Nets	GN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	150.0	25.8
30-Jul-20	Gill Nets	GN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	144.0	22.4
30-Jul-20	Gill Nets	GN11	Shorthorn Sculpin	*Myoxocephalus scorpius*	129.0	15.3
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	623.0	2760.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	447.0	1100.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	400.0	740.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	282.0	260.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	512.0	1700.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	430.0	870.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	668.0	4040.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	459.0	1310.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	478.0	1260.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	460.0	1320.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	462.0	1240.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	432.0	1070.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	439.0	940.0

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	409.0	780.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	456.0	1370.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	366.0	690.0
30-Jul-20	Gill Nets	GN11	Arctic Char	*Salvelinus alpinus*	268.0	230.0
30-Jul-20	Gill Nets	GN12	Unidentified Sculpin	Cottidae indet.	134.0	18.1
30-Jul-20	Gill Nets	GN12	Fourhorn Sculpin	*Myoxocephalus quadricornis*	295.0	260.0
30-Jul-20	Gill Nets	GN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	164.0	40.2
30-Jul-20	Gill Nets	GN12	Shorthorn Sculpin	*Myoxocephalus scorpius*	290.0	370.0
30-Jul-20	Gill Nets	GN12	Arctic Char	*Salvelinus alpinus*	636.0	2910.0
01-Aug-20	Gill Nets	GN13	Unidentified Sculpin	Cottidae indet.	122.0	17.6
01-Aug-20	Gill Nets	GN13	Unidentified Sculpin	Cottidae indet.	129.0	17.3
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	47.6
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	125.0	13.6
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	161.0	33.2
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	219.0	102.0
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	199.0	70.9
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	185.0	55.9
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	185.0	55.1
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	51.2
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	35.4
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	64.6
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	188.0	58.3
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	52.9
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	182.0	57.0
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	168.0	36.7
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	161.0	34.8
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	183.0	67.0
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	137.0	23.2
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	65.8
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	69.6
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	79.7
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	223.0	110.8
01-Aug-20	Gill Nets	GN13	Fourhorn Sculpin	*Myoxocephalus quadricornis*	211.0	90.0
01-Aug-20	Gill Nets	GN13	Shorthorn Sculpin	*Myoxocephalus scorpius*	191.0	67.3
01-Aug-20	Gill Nets	GN13	Shorthorn Sculpin	*Myoxocephalus scorpius*	186.0	51.9
01-Aug-20	Gill Nets	GN13	Shorthorn Sculpin	*Myoxocephalus scorpius*	366.0	720.0
01-Aug-20	Gill Nets	GN13	Shorthorn Sculpin	*Myoxocephalus scorpius*	194.0	63.4
01-Aug-20	Gill Nets	GN13	Arctic Char	*Salvelinus alpinus*	302.0	270.0
01-Aug-20	Gill Nets	GN13	Arctic Char	*Salvelinus alpinus*	509.0	1920.0
01-Aug-20	Gill Nets	GN13	Arctic Char	*Salvelinus alpinus*	366.0	610.0
01-Aug-20	Gill Nets	GN13	Arctic Char	*Salvelinus alpinus*	414.0	760.0
01-Aug-20	Gill Nets	GN13	Arctic Char	*Salvelinus alpinus*	374.0	720.0
02-Aug-20	Gill Nets	GN14	Fourhorn Sculpin	*Myoxocephalus quadricornis*	257.0	170.0
02-Aug-20	Gill Nets	GN14	Fourhorn Sculpin	*Myoxocephalus quadricornis*	221.0	104.8
02-Aug-20	Gill Nets	GN14	Arctic Char	*Salvelinus alpinus*	526.0	1620.0
02-Aug-20	Gill Nets	GN14	Arctic Char	*Salvelinus alpinus*	380.0	510.0
02-Aug-20	Gill Nets	GN14	Arctic Char	*Salvelinus alpinus*	850.0	6110.0
02-Aug-20	Gill Nets	GN14	Arctic Char	*Salvelinus alpinus*	425.0	520.0
02-Aug-20	Gill Nets	GN15	Arctic Char	*Salvelinus alpinus*	350.0	300.0
02-Aug-20	Gill Nets	GN15	Arctic Char	*Salvelinus alpinus*	381.0	600.0
02-Aug-20	Gill Nets	GN15	Arctic Char	*Salvelinus alpinus*	342.0	410.0
02-Aug-20	Gill Nets	GN15	Arctic Char	*Salvelinus alpinus*	361.0	520.0
02-Aug-20	Gill Nets	GN15	Arctic Char	*Salvelinus alpinus*	354.0	490.0
06-Aug-20	Gill Nets	GN16	Arctic Char	*Salvelinus alpinus*	424.0	940.0
06-Aug-20	Gill Nets	GN16	Arctic Char	*Salvelinus alpinus*	496.0	1570.0
06-Aug-20	Gill Nets	GN16	Arctic Char	*Salvelinus alpinus*	350.0	460.0
08-Aug-20	Gill Nets	GN17	Fourhorn Sculpin	*Myoxocephalus quadricornis*	184.0	70.6
08-Aug-20	Gill Nets	GN17	Fourhorn Sculpin	*Myoxocephalus quadricornis*	169.0	44.5
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	859.0	6710.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	568.0	2430.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	638.0	3990.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	321.0	380.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	594.0	2550.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	452.0	1240.0
08-Aug-20	Gill Nets	GN17	Arctic Char	*Salvelinus alpinus*	398.0	750.0
08-Aug-20	Gill Nets	GN18	Fourhorn Sculpin	*Myoxocephalus quadricornis*	226.0	80.0
08-Aug-20	Gill Nets	GN18	Fourhorn Sculpin	*Myoxocephalus quadricornis*	219.0	70.0
08-Aug-20	Gill Nets	GN18	Fourhorn Sculpin	*Myoxocephalus quadricornis*	211.0	90.0
08-Aug-20	Gill Nets	GN18	Fourhorn Sculpin	*Myoxocephalus quadricornis*	212.0	107.9
08-Aug-20	Gill Nets	GN18	Arctic Char	*Salvelinus alpinus*	674.0	3910.0
08-Aug-20	Gill Nets	GN18	Arctic Char	*Salvelinus alpinus*	453.0	1140.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	228.0	120.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	263.0	210.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	40.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	60.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	30.0
09-Aug-20	Gill Nets	GN19	Fourhorn Sculpin	*Myoxocephalus quadricornis*	212.0	70.0
09-Aug-20	Gill Nets	GN19	Shorthorn Sculpin	*Myoxocephalus scorpius*	234.0	180.0
09-Aug-20	Gill Nets	GN19	Shorthorn Sculpin	*Myoxocephalus scorpius*	209.0	120.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	832.0	3830.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	443.0	1190.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	380.0	590.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	403.0	770.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	414.0	840.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	435.0	950.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	372.0	570.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	581.0	2500.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	348.0	510.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	326.0	320.0

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	410.0	810.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	312.0	340.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	318.0	380.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	287.0	250.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	425.0	740.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	291.0	270.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	319.0	360.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	274.0	260.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	312.0	340.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	320.0	210.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	415.0	900.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	383.0	630.0
09-Aug-20	Gill Nets	GN19	Arctic Char	*Salvelinus alpinus*	342.0	460.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	216.0	110.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	232.0	120.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	291.0	310.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	264.0	210.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	197.0	50.0
11-Aug-20	Gill Nets	GN20	Fourhorn Sculpin	*Myoxocephalus quadricornis*	220.0	110.0
11-Aug-20	Gill Nets	GN20	Shorthorn Sculpin	*Myoxocephalus scorpius*	234.0	170.0
11-Aug-20	Gill Nets	GN20	Shorthorn Sculpin	*Myoxocephalus scorpius*	310.0	400.0
11-Aug-20	Gill Nets	GN20	Shorthorn Sculpin	*Myoxocephalus scorpius*	249.0	200.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	542.0	1780.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	556.0	2060.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	445.0	790.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	310.0	320.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	472.0	1230.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	409.0	740.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	373.0	500.0
11-Aug-20	Gill Nets	GN20	Arctic Char	*Salvelinus alpinus*	387.0	690.0
13-Aug-20	Gill Nets	GN21	Fourhorn Sculpin	*Myoxocephalus quadricornis*	149.0	25.0
13-Aug-20	Gill Nets	GN21	Arctic Char	*Salvelinus alpinus*	314.0	290.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	636.0	3920.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	463.0	1240.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	468.0	1230.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	281.0	280.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	346.0	470.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	309.0	340.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	382.0	530.0
14-Aug-20	Gill Nets	GN22	Arctic Char	*Salvelinus alpinus*	515.0	1680.0
14-Aug-20	Gill Nets	GN23A	Fourhorn Sculpin	*Myoxocephalus quadricornis*	241.0	200.0
14-Aug-20	Gill Nets	GN23A	Fourhorn Sculpin	*Myoxocephalus quadricornis*	245.0	170.0
14-Aug-20	Gill Nets	GN23A	Shorthorn Sculpin	*Myoxocephalus scorpius*	264.0	280.0
14-Aug-20	Gill Nets	GN23A	Shorthorn Sculpin	*Myoxocephalus scorpius*	262.0	280.0
14-Aug-20	Gill Nets	GN23A	Shorthorn Sculpin	*Myoxocephalus scorpius*	126.0	40.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	395.0	760.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	424.0	1100.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	352.0	520.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	436.0	1120.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	587.0	2430.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	359.0	540.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	420.0	1020.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	409.0	820.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	160.0	10.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	449.0	1200.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	266.0	130.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	275.0	110.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	318.0	140.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	340.0	230.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	475.0	1240.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	330.0	420.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	360.0	510.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	308.0	310.0
14-Aug-20	Gill Nets	GN23A	Arctic Char	*Salvelinus alpinus*	298.0	250.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	177.0	40.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	181.0	40.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	257.0	170.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	179.0	40.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	90.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	178.0	40.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	145.0	20.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	224.0	130.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	178.0	40.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	158.0	30.0
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	202.0	89.7
15-Aug-20	Gill Nets	GN23B	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	40.9
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	90.0
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	208.0	90.0
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	162.0	37.1
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	207.0	80.5
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	201.0	73.5
15-Aug-20	Gill Nets	GN24	Fourhorn Sculpin	*Myoxocephalus quadricornis*	146.0	32.7
15-Aug-20	Gill Nets	GN24	Arctic Sculpin	*Myoxocephalus scorpioides*	143.0	39.4
15-Aug-20	Gill Nets	GN24	Arctic Char	*Salvelinus alpinus*	542.0	2120.0
15-Aug-20	Gill Nets	GN24	Arctic Char	*Salvelinus alpinus*	548.0	2160.0
15-Aug-20	Gill Nets	GN24	Arctic Char	*Salvelinus alpinus*	175.0	65.2
24-Jul-20	Hoop Nets	HN01	Unidentified Sculpin	Cottidae indet.	97.0	6.2
24-Jul-20	Hoop Nets	HN01	Unidentified Sculpin	Cottidae indet.	153.0	31.0
24-Jul-20	Hoop Nets	HN01	Unidentified Sculpin	Cottidae indet.	150.0	30.9

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	186.0	52.6
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	190.0	72.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	178.0	49.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	43.8
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	205.0	91.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	100.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	33.4
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	204.0	92.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	235.0	106.7
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	-	340.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	307.0	290.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	268.0	200.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	261.0	130.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	84.9
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	231.0	110.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	190.0	65.3
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	231.0	130.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	174.0	62.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	146.0	26.6
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	54.4
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	139.0	24.4
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	214.0	99.1
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	182.0	58.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	248.0	120.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	178.0	51.7
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	290.0	270.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	120.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	232.0	112.5
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	192.0	67.9
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	270.0	250.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	238.0	130.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	150.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	79.7
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	242.0	140.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	246.0	160.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	284.0	220.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	276.0	250.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	244.0	140.0
24-Jul-20	Hoop Nets	HN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	198.0	66.2
24-Jul-20	Hoop Nets	HN01	Shorthorn Sculpin	*Myoxocephalus scorpius*	184.0	64.1
24-Jul-20	Hoop Nets	HN02	No fish Caught	-	-	-
24-Jul-20	Hoop Nets	HN02	No fish Caught	-	-	-
24-Jul-20	Hoop Nets	HN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	151.0	28.3
24-Jul-20	Hoop Nets	HN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	170.0	42.6
24-Jul-20	Hoop Nets	HN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	160.0	34.4
24-Jul-20	Hoop Nets	HN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	165.0	43.1
24-Jul-20	Hoop Nets	HN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	174.0	67.1
28-Jul-20	Hoop Nets	HN03	Fourhorn Sculpin	*Myoxocephalus quadricornis*	190.0	56.4
28-Jul-20	Hoop Nets	HN03	Shorthorn Sculpin	*Myoxocephalus scorpius*	159.0	32.9
28-Jul-20	Hoop Nets	HN04	Shorthorn Sculpin	*Myoxocephalus scorpius*	177.0	36.1
31-Jul-20	Hoop Nets	HN05	Greenland Cod	*Gadus ogac*	472.0	1260.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	46.9
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	147.0	23.6
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	210.0	81.2
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	175.0	48.7
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	211.0	89.1
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	194.0	65.4
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	209.0	79.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	174.0	42.1
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	182.0	59.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	189.0	80.2
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	276.0	230.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	190.0	70.7
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	230.0	125.9
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	216.0	91.2
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	229.0	120.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	217.0	101.1
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	274.0	190.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	219.0	102.2
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	231.0	130.0
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	166.0	36.5
31-Jul-20	Hoop Nets	HN05	Fourhorn Sculpin	*Myoxocephalus quadricornis*	225.0	107.6
31-Jul-20	Hoop Nets	HN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	172.0	46.5
31-Jul-20	Hoop Nets	HN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	161.0	41.2
31-Jul-20	Hoop Nets	HN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	223.0	113.9
31-Jul-20	Hoop Nets	HN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	179.0	50.2
01-Aug-20	Hoop Nets	HN07	No fish Caught	-	-	-
02-Aug-20	Hoop Nets	HN08	Greenland Cod	*Gadus ogac*	459.0	2300.0
06-Aug-20	Hoop Nets	HN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	180.0	45.3
06-Aug-20	Hoop Nets	HN09	Fourhorn Sculpin	*Myoxocephalus quadricornis*	161.0	38.5
06-Aug-20	Hoop Nets	HN10	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	33.2
06-Aug-20	Hoop Nets	HN10	Arctic Char	*Salvelinus alpinus*	191.0	79.6
11-Aug-20	Hoop Nets	HN11	Greenland Cod	*Gadus ogac*	488.0	1180.0
11-Aug-20	Hoop Nets	HN11	Arctic Sculpin	*Myoxocephalus scorpioides*	274.0	200.0
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	90.0	5.2
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	87.0	5.1
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	91.0	6.0
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	95.0	7.0
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	113.0	9.0

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	95.0	6.2
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	89.0	5.2
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	80.0	3.3
24-Jul-20	Seine Nets	SN01	Unidentified Sculpin	Cottidae indet.	80.0	3.4
24-Jul-20	Seine Nets	SN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	134.0	20.3
24-Jul-20	Seine Nets	SN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	134.0	16.6
24-Jul-20	Seine Nets	SN01	Fourhorn Sculpin	*Myoxocephalus quadricornis*	130.0	18.9
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	135.0	19.6
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	125.0	15.3
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	127.0	17.2
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	81.0	3.9
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	80.0	4.0
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	71.0	2.9
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	78.0	3.1
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	80.0	3.6
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	80.0	3.8
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	81.0	4.0
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	72.0	2.6
24-Jul-20	Seine Nets	SN02	Unidentified Sculpin	Cottidae indet.	65.0	2.4
24-Jul-20	Seine Nets	SN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	187.0	65.0
24-Jul-20	Seine Nets	SN02	Fourhorn Sculpin	*Myoxocephalus quadricornis*	193.0	54.0
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	131.0	17.7
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	94.0	5.9
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	91.0	5.6
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	88.0	4.9
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	106.0	9.3
24-Jul-20	Seine Nets	SN03	Unidentified Sculpin	Cottidae indet.	133.0	17.8
24-Jul-20	Seine Nets	SN03	Fourhorn Sculpin	*Myoxocephalus quadricornis*	177.0	37.9
24-Jul-20	Seine Nets	SN03	Fourhorn Sculpin	*Myoxocephalus quadricornis*	142.0	22.3
24-Jul-20	Seine Nets	SN04	No fish Caught	-	-	-
24-Jul-20	Seine Nets	SN05	Unidentified Sculpin	Cottidae indet.	80.0	3.3
24-Jul-20	Seine Nets	SN05	Unidentified Sculpin	Cottidae indet.	79.0	2.9
24-Jul-20	Seine Nets	SN05	Unidentified Sculpin	Cottidae indet.	71.0	2.6
24-Jul-20	Seine Nets	SN05	Unidentified Sculpin	Cottidae indet.	128.0	16.6
24-Jul-20	Seine Nets	SN06	Unidentified Sculpin	Cottidae indet.	115.0	11.4
24-Jul-20	Seine Nets	SN06	Unidentified Sculpin	Cottidae indet.	84.0	5.4
24-Jul-20	Seine Nets	SN06	Fourhorn Sculpin	*Myoxocephalus quadricornis*	163.0	46.5
24-Jul-20	Seine Nets	SN07	Sandlance	*Ammodytes* spp.	132.0	6.3
24-Jul-20	Seine Nets	SN07	Sandlance	*Ammodytes* spp.	140.0	6.6
24-Jul-20	Seine Nets	SN07	Unidentified Sculpin	Cottidae indet.	80.0	3.8
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	144.0	23.4
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	126.0	15.9
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	92.0	6.0
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	93.0	5.8
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	87.0	5.1
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	85.0	3.9
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	84.0	3.9
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	78.0	3.3
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	84.0	3.7
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	86.0	4.6
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	72.0	2.6
24-Jul-20	Seine Nets	SN07	Fourhorn Sculpin	*Myoxocephalus quadricornis*	73.0	2.8
25-Jul-20	Seine Nets	SN08	Sandlance	*Ammodytes* spp.	-	-
25-Jul-20	Seine Nets	SN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	123.0	14.1
25-Jul-20	Seine Nets	SN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	115.0	11.1
25-Jul-20	Seine Nets	SN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	83.0	4.1
25-Jul-20	Seine Nets	SN08	Fourhorn Sculpin	*Myoxocephalus quadricornis*	87.0	4.8
26-Jul-20	Seine Nets	SN09	No fish Caught	-	-	-
26-Jul-20	Seine Nets	SN10	Unidentified Sculpin	Cottidae indet.	11.0	<0.5
26-Jul-20	Seine Nets	SN11	Arctic Char	*Salvelinus alpinus*	132.0	18.7
26-Jul-20	Seine Nets	SN12	Unidentified Sculpin	Cottidae indet.	118.0	13.0
26-Jul-20	Seine Nets	SN12	Unidentified Sculpin	Cottidae indet.	113.0	11.3
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	31.0	0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	22.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	27.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	30.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	25.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	30.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	23.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	-	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	-	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	27.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	28.0	<0.5
29-Jul-20	Seine Nets	SN13	Unidentified Sculpin	Cottidae indet.	24.0	<0.5
29-Jul-20	Seine Nets	SN14	No fish Caught	-	-	-
29-Jul-20	Seine Nets	SN15	Unidentified Sculpin	Cottidae indet.	80.0	3.4
29-Jul-20	Seine Nets	SN16	Unidentified Sculpin	Cottidae indet.	91.0	6.5
29-Jul-20	Seine Nets	SN17	No fish Caught	-	-	-
29-Jul-20	Seine Nets	SN18	No fish Caught	-	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-

Date	Capture Method	Site	Common Name	Species	Length (mm)	Weight (g)
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
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13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
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13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
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13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Polar Cod	*Arctogadus glacialis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-
13-Aug-20	Trawl	TRL01	Triglops Sculpin	*Triglops* sp.	-	-

Appendix 6B-2
Fish Captures and Incidental Observations by Survey Year

Order Family	Taxon Name	Common Name	Survey Year						
			2014	2015	2016	2017	2018	2019	2020
-	Pisces indet	Unknown Species				x		x	x
Gadiformes									
Gadidae	*Arctogadus glacialis*	Polar Cod							x
Gadidae	*Boreogadus saida*	Arctic Cod	x	x	x		x		
Gadidae	Gadidae indet.	Unknown Cod				x		x	x
Gadidae	*Gadus ogac*	Greenland cod	x						x
Gasterosteiformes									
Gasterosteidae	*Pungitius pungitius*	Ninespine Stickleback						x	
Perciformes									
Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance							x
Ammodytidae	*Ammodytes* sp.	Unidentified Sandlance				x	x	x	x
Stichaeidae	*Eumesogrammus parecisus*	Fourline snakeblenny	x	x	x				x
Stichaeidae	*Lumpenus fabricii*	Slender eelblenny					x	x	
Stichaeidae	Stichaeidae indet.	Unknown Prickleback						x	x
Zoarcidae	Zoarcidae indet.	Unidentified Eelpout						x	
Zoarcidae	*Gymnelus viridis*	Fish Doctor		x	x			x	
Zoarcidae	*Lycodes mucosus*	Saddled Eelpout							x
Salmoniformes									
Salmonidae	*Salvelinus alpinus*	Arctic Char	x	x	x	x	x	x	x
Scorpaeniformes									
Cottidae	*Artediellus atlanticus*	Atlantic hookear sculpin	x	x					
Cottidae	Cottidae indet.	Unknown Sculpin			x	x	x	x	x
Cottidae	*Cyclopterus lumpus*	Common lumpfish	x					x	
Cottidae	*Gymnocanthus tricuspis*	Arctic staghorn sculpin		x					x
Cottidae	*Myoxocephalus octodecemspinosus*	Longhorn Sculpin		x	x				
Cottidae	*Myoxocephalus quadricornis*	Fourhorn Sculpin	x	x	x	x	x	x	x
Cottidae	*Myoxocephalus scorpioides*	Arctic Sculpin	x	x		x	x		x
Cottidae	*Myoxocephalus scorpius*	Shorthorn Sculpin	x	x	x	x	x	x	x
Cottidae	*Triglops* sp.	Triglops sculpin							x

APPENDIX 6C

Photos

Photo 1 – Hoop net deployed at Milne Port (HN01) in July 2020

Photo 2 – Hoop net deployed at Milne Port (HN01) in July 2020

Photo 3 – Hoop net deployed at Milne Port (HN02) in July 2020

Photo 4– Crew member deploying Fukui trap for sampling in Milne Port in July 2020

Photo 5 – Crew member holding a polychaete worm caught while trawl sampling at Milne Port in July 2020

Photo 6 - Seining at the Milne Port West Beach Site (SN07) in July 2020

Photo 7 – Seining at the Milne Port West Beach Site (SN07) in July 2020

Photo 8 – Seining at the Milne Port West Beach Site (SN08) in July 2020

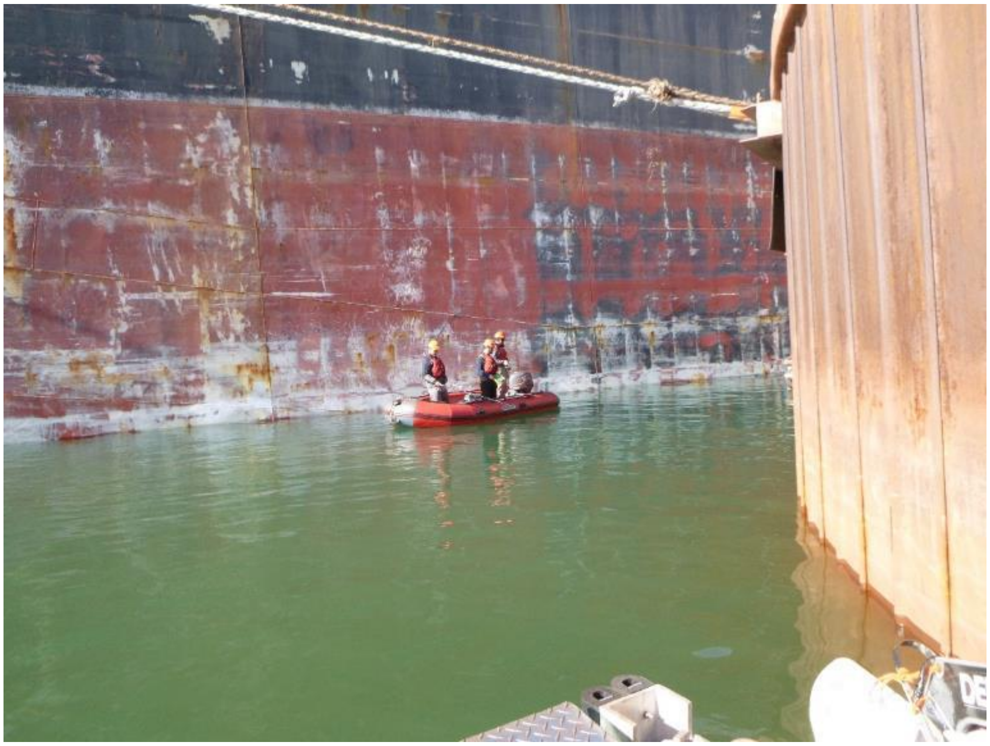

Photo 9 – Crew completing sampling by angling around Milne Port ore dock in July 2020

Photo 10 – Sandlance (*Ammodytes* sp.) caught during sampling efforts at Milne Port in July 2020

Photo 11 – Arctic Sculpin (*Myoxocephalus scorpioides*) captured during Fukui Trap sampling along Milne Port Ore Dock in August 2020

Photo 12 – Shorthorn Sculpin (*Myoxocephalus scorpius*) caught during angling sampling at Milne Port (AN03) in July 2020

Photo 13 – Fourhorn Sculpin (*Myoxocephalus quadricornis*) caught during seine net sampling at Milne Port (SN08) in July 2020

Photo 14 – Arctic Staghorn Sculpin (*Gymnocanthus tricuspis*) caught at Milne Port during trawl sampling in August 2020

Photo 15 - Greenland Cod (*Gadus ogac*) caught during angling sampling at Milne Port (AN03) in July 2020

Photo 16 – Polar Cod (*Arctogadus glacialis)* caught while trawl sampling at Milne Port (TR01) in August 2020

Photo 17 – Fourline Snakeblenny (*Eumesogrammus praecisus*) captured while Fukui Trap sampling at Milne Port (FT18) in August 2020

Photo 18 – Arctic Char (*Salvelinus aplinus*) captured while sampling at Milne Port in July 2020

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Chapter 7.0 Fish Health and Tissue Chemistry

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

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1663724-281f-R-Rev1-34000

18 August 2021

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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
ANCOVA	analysis of covariance
ANOVA	analysis of variance
BC MOE	British Columbia Ministry of Environment
Biologica	Biological Environmental Services Ltd.
BV labs	Bureau Veritas Laboratories
COC	chain of custody
COPC	contaminants of potential concern
CRC ICPMS	collision reaction cell inductively coupled plasma mass spectrometry
DL	detection limit
dw	dry weight
EEM	Environmental Effects Monitoring
ERP	Early Revenue Phase
FEIS	2012 Final Environmental Impact Statement
g	gram
GSI	gonadosomatic index
km	kilometre
KS Test	Kruskal Wallis test
LSI	liver somatic index
MDMER	Metal and Diamond Mining Effluent Regulations
MEEMP	Marine Environmental Effects Monitoring Program
mg/kg	milligrams per kilogram
mm	milligram
min	minimum
max	maximum
n	sample size
PAH	polycyclic aromatic hydrocarbons
PC	Project Certificate
p-value	probability value
QA/QC	quality assurance and quality control
ROV	Remote operated vehicle
RPD	relative percent differences
SD	Standard Deviation
SE	Standard Error
SR	studentized residuals
ww	wet weight
y	year

7.0 FISH HEALTH AND TISSUE CHEMISTRY

7.1 Introduction

This chapter presents the results of the fish health and tissue chemistry monitoring program, a component of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted near Milne Port in Milne Inlet during the 2020 open-water season. The fish health and tissue chemistry component was developed in consideration of the potential Project-related impacts to the marine environment as identified in the 2012 Final Environmental Impact Statement (FEIS) and 2014 Early Revenue Phase (ERP) Addendum, as well as monitoring requirements outlined in the Project Certificate (PC) Conditions described in Chapter 1.0, Table 1-2. Those related to the monitoring of Fish Health include PC Conditions No. 76, 83 (a), 99 (a), 99 (b) (ii), 99 (c), 113, and 114.

7.1.1 Objectives

Objectives for the overall MEEMP program are outlined in Section 1.3. Objectives specific to the fish health and tissue chemistry component are to:

- Better align the MEEMP with the Metal and Diamond Mining Effluent Regulations (MDMER) Environmental Effects Monitoring (EEM) program (Government of Canada 2002) through the selection of sentinel species and measurements of additional health indicators to monitor for effects from the Project.
- Characterize Milne Port fish community in terms of species relative abundance, size, and age.
- Evaluate health of sentinel species Fourhorn Sculpin (*Myoxocephalus quadricornis*) and wrinkled rock-borer (*Hiatella arctica)* hereafter referred to as *(H. arctica)*, via assessment of established endpoints (see Section 7.2.2), length frequency distributions, length-weight relationships, and visual assessment of internal and external abnormalities.
- Compile current and historic tissue chemistry data for Arctic Char (*Salvelinus alpinus*), Fourhorn Sculpin, and *H. arctica* and assess concentrations of contaminants of potential concern (COPCs).

7.2 Study Design

The 2014 to 2019 MEEMP study design monitored for potential Project-related impacts and changes to fish health and communities through collection of fish population data using a combination of active and passive fishing methods, and through analysis of fish health parameters in incidental mortalities. In baseline and early MEEMP surveys, fish tissue sampling was limited to incidental Arctic Char mortalities, the numbers of which fluctuated from year to year and did not always yield adequate samples to support a meaningful statistical analysis.

In 2018, a local shellfish species, *H. arctica,* was added to the MEEMP as an additional effects indicator for the fish sampling program in case finfish species (i.e., Arctic Char or sculpin) were sampled in insufficient numbers to adequately support statistical analyses. *H. arctica* is a resident species in the Project area, easily identifiable and measurable in the field, and are abundant in the study area (Golder 2018). Measurement endpoints for *H. arctica* in 2018 and 2019 included age and tissue chemistry analysis.

7.2.1 Modifications to the Program (2020)

In anticipation of future regulatory requirements under the MDMER that may apply to monitoring under the proposed Phase 2 expansion at Milne Port, changes to the fish health and tissue chemistry program were implemented in 2020 to better align the MEEMP with the MDMER EEM program (Government of Canada 2002). Fourhorn Sculpin and *H. arctica* were selected as sentinel species to monitor for effects from the Project. The effect indicators to be monitored are summarized in Section 7.2.2.

Changes to the fish health and tissue chemistry component of the MEEMP study design occurred in 2020 (described in greater detail in Section 7.2.2), and Fourhorn Sculpin were identified as a target finfish species. Lethal target sample sizes were established as part of the 2020 fish health program for Fourhorn Sculpin; in previous years, fish tissue sampling including a mix of sculpin (*Myoxocephalus)* species.

7.2.2 Indicators

The evolution of the fish health program to better align with the MDMER EEM program means that additional indicators were introduced in 2020. For fish health, Fourhorn Sculpin and *H. arctica* were used as sentinel species and the effect indicators monitored included measures of energy use (i.e., growth, reproduction), energy storage (i.e., condition) and survival, in addition to supporting endpoints (as appropriate for each species) such as length, body weight, external condition, internal condition, organ weights, stomach fullness, parasite presence/absence, sex, life stage and state-of-maturity (Appendix 7B). Many of these proposed indicators were measured for the first time in 2020. Thresholds will be developed once an appropriate reference area is identified, and reference area reconnaissance efforts are planned for summer 2021.

For fish tissue chemistry, concentrations of total metals[1] and polycyclic aromatic hydrocarbons (PAH) were measured (refer to Appendix 7C) for three species (i.e., Arctic Char, Fourhorn Sculpin, and *H. arctica*) and compared to MEEMP data from previous years, where possible. Historic data available for comparison varied for each species, with data extending back for Arctic char intermittently to 2010, and *H. arctica* and Fourhorn Sculpin to 2018.

7.3 Materials and Methods

7.3.1 Field Methods

Fish community sampling was conducted at various locations near the Milne Port in the Milne Inlet, approximately 80 km Northwest of the Mary River Project (17W 503687m E, 7976357m N) from 24 July to 15 August 2020 (Figures 6-1 to 6-3). Fishing effort included both active (i.e., angling, beach seine, trawling) and passive (i.e., Fukui traps, hoop nets and gill netting) capture methods. Captured fish were enumerated and measured for length and weight. A subsample of 40 Fourhorn Sculpin were retained for fish health sampling to meet target sample sizes of 20 adult males and 20 adult females. All other fish were released alive back into Milne Inlet. Incidental mortalities of Arctic Char and Greenland Cod (*Gadus ogac*) were also retained for analysis of age and stomach contents. Capture methods were described in detail in Section 6.3.1 in Chapter 6.0 (Fishing Efforts and Catch Data).

[1] Includes metals, metalloids, and non-metals. Metals are broadly defined as elements which are good conductors of electricity and heat, which form cations by loss of electrons, and which yield basic oxides and hydroxides (Wood et al. 2012). Metalloids share some but not all properties of metals, while non-metals mostly lack characteristics of metals.

The primary method of capture for Fourhorn Sculpin in 2020 was angling. Changes to angling methods in 2020 included targeted fishing efforts along coarse rock substrate at the Ore Dock following observations of high numbers of this species during habitat offset monitoring (Golder 2020b). In Remotely Operated Vehicle (ROV) footage, Fourhorn Sculpin were observed in relatively high abundances along the western and eastern sides in coarse rock habitat at depths between 1 m and 5 m. Angling (i.e., jigging) efforts were focussed on these locations, fishing from a stationary position, with two to five rods and lines deployed from the field vessel anchored adjacent to the riprap. Hooks or spoon lures (i.e., flashers) were lowered into the riprap at the target depth, then flicked upward to attract fish within the coarse rock habitat.

The *H. arctica* specimens were collected opportunistically from benthic infauna samples, with a subsample of 40 individuals retained for fish health and tissue chemistry sampling. Collection methods for benthic infauna are described in Section 4.3.1 in Chapter 4.0—Benthic Infauna. Each benthic sample was checked for the presence of *H. arctica.* Samples to be retained for the fish health and tissue chemistry program were obtained from benthic grab samples collected from the northwestern, western, and eastern transects (Figure 3-1), with the majority of collections occurring from the western and eastern transects. In samples where *H. arctica* numbers were greatest, a maximum of five individuals were selected. Specimens were selected for processing if the shell was greater than 1.5 cm in length, was intact, and had no indications of damage to the umbo or hinge area.

7.3.2 Fish Processing

Fourhorn Sculpin retained for fish health sampling were held live in aerated 70 litre totes containing water from Milne Inlet until they were lethally processed at Milne Port. Both external and internal assessments were completed on lethally sampled fish following standardized procedures consistent with MDMER EEM program requirements (Environment Canada 2012). Total lengths (± 0.01 mm) and total body weights (± 0.001 g) of the fish were documented. External observations of fish features (i.e., body form, eyes, skin, thymus, opercula, gills, pseudobranchs, fins, vent, and parasites) were recorded, and abnormal features (e.g., wounds, tumours, parasites, fin fraying, gill parasites, or lesions) were described in detail and photographed. Fish were sacrificed by a concussive blow to the head followed by cervical dislocation (i.e., cutting the spinal cord behind the head). Each fish was handled using new gloves and dissected on a cutting board covered in a clean sheet of plastic wrap that was changed between fish. Dissecting equipment was washed between fish in phosphate-free soap and rinsed with 10% nitric acid followed by deionized ultrafiltered water. The condition of the internal organs (e.g., liver, spleen, gall bladder, and kidneys) was assessed immediately after opening the body cavity and documented. Any abnormalities in size, shape or colouration of the internal organs were documented. Liver weight and percent mesenteric fat were recorded. The gonads of each fish were removed, weighed (± 0.001 g), and photographed before assigning sex and maturity stage, based on the macroscopic features described in Table 7-1:. Parasite presence and predominance were recorded, and parasite weight was documented if large parasites (e.g., tapeworms) were observed in the body cavity.

Stomachs and ageing structures (i.e., otoliths) were collected from Fourhorn Sculpin and incidental mortalities of Arctic Char and Greenland Cod. Sagittal otoliths were extracted as the primary aging structure, wrapped in parchment paper, and stored dry in individually labelled coin envelopes until aging analysis. Stomach fullness was recorded and the stomachs were removed, placed in individually labelled Nalgene containers and preserved with 10% formalin. For Fourhorn Sculpin and Arctic Char, one muscle sample (> 10 g) without skin was collected from the left dorsal side of each fish using a fillet knife rinsed with 10% nitric acid then deionized ultrafiltered water. The fillets were weighed (± 0.001 g), placed on ice in individually labelled Ziploc bags, and stored frozen until submission for metals analysis. A second muscle sample (> 10 g) without skin was collected from the right dorsal side of each fish using a fillet knife rinsed with acetone then deionized ultrafiltered water. The fillets were weighed

(± 0.001 g) on tared aluminum foil, wrapped in aluminum foil, placed on ice in individually labelled Ziploc bags, and stored frozen until PAH analysis.

The *H. arctica* specimens were selected based on the external condition of the shell (i.e., > 1.5 cm with intact valves and no visible damage to the umbo). Individuals were measured along the largest axis (± 1 mm) and weighed (± 0.001 g), and then placed on ice in individually labelled Ziploc bags, and stored frozen until further processing and tissue chemistry analysis.

Table 7-1: Gonad Maturity Stages for Male and Female Fish Used During the Fish Health Assessment, 2020

Sex	Stage	Code	Macroscopic features
Female	Unknown stage	10	Unable to determine stage.
	Immature	11	Small ovaries, often clear, blood vessels indistinct.
	Early Stage Development	12	Enlarging ovaries, blood vessels more distinct. Granular in appearance.
	Late Stage Development	13	Large ovaries filling the body cavity, prominent blood vessels. Individual oocytes visible.
	Ripe	14	Eggs released with gentle pressure on abdomen.
	Spent	15	Deflated ovaries, blood vessels prominent.
	Reabsorbing	16	Small atretic oocytes throughout the ovaries, which are hard and white.
	Resting	17	Small ovaries, blood vessels reduced but present.
Male	Unknown stage	20	Unable to determine stage.
	Immature	21	Small testes, often clear and threadlike.
	Early Stage Development	22	Small testes, semi-translucent, but easily identified.
	Late Stage Development	23	Testes large, firm and lobate. White to purplish in colour. Granular appearance.
	Ripe	24	Milt released with gentle pressure on abdomen.
	Spent	25	Small and deflated testes. Blood vessels obvious. Violet-pink in colour.
	Reabsorbing	26	Not typically observed in males.
	Resting	27	Small testes, often threadlike.

Notes:
Table modified from Brown-Peterson et al. (2011).

7.3.3 Laboratory Methods

7.3.3.1 Age

Otoliths[2] extracted from Fourhorn Sculpin, Arctic Char and Greenland Cod were examined by North/South Consultants Inc. (Winnipeg, MB) to determine the age of the fish. Whole otoliths from individual fish were mounted on microscope slides to estimate age based on the number of annuli (i.e., growth rings) visible under a dissecting microscope.

[2] Otoliths are a pair of bony structures located behind the eyes in fish. Counting the annual growth rings on the otoliths is a common technique in estimating the age of fish.

Biologica Environmental Services Ltd. (Biologica; Victoria, BC) processed *H. arctica* and measured total length, as well as wet and dry weights of the whole organisms, shells and soft tissues. Age was also determined. It was not possible to determine gonad weight, as gonads were not developed at the time of sampling. For ageing, each shell was sectioned through the umbo-rim axis using a lapidary saw with a diamond-impregnated blade and polished using progressively finer grit sandpaper. Polished shells were etched in a solution of 1% hydrochloric acid for one minute, rinsed with tap water, and dried. An acetate peel of the polished umbo surface was mounted on a slide and examined using a dissecting microscope. Distinct, continuous growth lines were counted to determine the age of the shell. To verify that data quality objectives were met, 10% of age estimates were independently verified by a second qualified biologist.

7.3.3.2 Stomach Content

Enumeration and taxonomic identification of stomach contents for Arctic Char, Fourhorn Sculpin and Greenland Cod were conducted by Biologica. Percent fullness and percent digestion of each stomach was recorded before dissection and identification based on the professional judgement of the taxonomist. Prey items were identified to the lowest practical taxonomic level (e.g., species when possible) using published methods and taxonomic references. Digested and unidentifiable material were categorized (e.g., unidentified insect parts, digested tissue, non-food, and others). The taxonomic composition within each stomach was determined as percentages of major invertebrate groups by abundance.

7.3.3.3 Tissue Chemistry

Tissue samples collected from eight Fourhorn Sculpin (muscle), eight Arctic Char (muscle), and eight *H. arctica* (composite soft tissue samples; Table 7-2:) were submitted to Bureau Veritas Laboratories (BV Labs; Burnaby, BC) for tissue chemistry analyses. Percent moisture content and metals concentrations for fish and *H. arctica* were measured in milligrams per kilogram (mg/kg) wet weight (ww) using collision reaction cell inductively coupled plasma mass spectrometry (CRC ICPMS). Concentrations of PAH for fish and *H. arctica* were measured in mg/kg by gas chromatography mass spectrometry. Achieved detection limits (DL) for fish and *H. arctica* are presented in Tables 7C-1 to 7C-7. Certificate of analysis forms are provided in Appendix 7D.

Table 7-2: Summary of *Hiatella arctica* Samples Sent to Bureau Veritas Laboratory for Tissue Chemistry Analysis, 2020

Fish Identification Number	Composite Samples	Number of Individuals
HTAR_COMP_1	BAFF20UMLNHTAR1902 BAFF20UMLNHTAR1925 BAFF20UMLNHTAR1941 BAFF20UMLNHTAR1942 BAFF20UMLNHTAR1943 BAFF20UMLNHTAR1947 BAFF20UMLNHTAR1950	7
HTAR_COMP_2	BAFF20UMLNHTAR1900 BAFF20UMLNHTAR1907 BAFF20UMLNHTAR1920 BAFF20UMLNHTAR1932 BAFF20UMLNHTAR1939 BAFF20UMLNHTAR1948	6
HTAR_COMP_3	BAFF20UMLNHTAR1905 BAFF20UMLNHTAR1912 BAFF20UMLNHTAR1915 BAFF20UMLNHTAR1922 BAFF20UMLNHTAR1936 BAFF20UMLNHTAR1949	6
HTAR_COMP_4	BAFF20UMLNHTAR1901 BAFF20UMLNHTAR1903 BAFF20UMLNHTAR1914 BAFF20UMLNHTAR1921 BAFF20UMLNHTAR1926 BAFF20UMLNHTAR1938	6
HTAR_COMP_5	BAFF20UMLNHTAR1909 BAFF20UMLNHTAR1913 BAFF20UMLNHTAR1923 BAFF20UMLNHTAR1927 BAFF20UMLNHTAR1931 BAFF20UMLNHTAR1937 BAFF20UMLNHTAR1945	7
HTAR_COMP_6	BAFF20UMLNHTAR1910 BAFF20UMLNHTAR1916 BAFF20UMLNHTAR1917 BAFF20UMLNHTAR1918 BAFF20UMLNHTAR1928 BAFF20UMLNHTAR1940	6
HTAR_COMP_7	BAFF20UMLNHTAR1904 BAFF20UMLNHTAR1906 BAFF20UMLNHTAR1919 BAFF20UMLNHTAR1929 BAFF20UMLNHTAR1930 BAFF20UMLNHTAR1944	6
HTAR_COMP_8	BAFF20UMLNHTAR1911 BAFF20UMLNHTAR1924 BAFF20UMLNHTAR1933 BAFF20UMLNHTAR1934 BAFF20UMLNHTAR1935 BAFF20UMLNHTAR1946	6
Total		**50**

7.3.4 Data Analysis

Descriptive statistics (i.e., sample size, mean, median, standard deviation [SD], standard error [SE], minimum, and maximum values) were calculated for fish community data collected in 2020, as well as fish health endpoints and tissue concentrations of metals and PAH in Arctic Char, Fourhorn Sculpin, and *H. arctica* available from 2018 to 2020. Fish health indices were calculated as follows:

$$Condition\ factor = \left(\frac{body\ weight}{total\ length^3}\right) \times 100{,}000$$

$$Gonadosomatic\ index\ (GSI) = \left(\frac{gonad\ weight}{body\ weight}\right) \times 100$$

$$Liver\ somatic\ index\ (LSI) = \left(\frac{liver\ weight}{body\ weight}\right) \times 100$$

Weight and length measurements were reported in units of grams (g) and millimetres (mm), respectively. Concentrations of metals below DL were substituted with half the value of the DL. Length data were presented visually for fish species with at least 50 individuals captured in 2020 using length-frequency distributions. Length-frequency distributions were not completed for smaller samples sizes, which can be misleading and may not accurately reflect population structure (Weerarathne et al., 2021).

Tissue chemistry data were presented visually using boxplots, where the median value was indicated within each box and the first and third quartiles were represented by the lower and upper bounds of each box, respectively. Lower and upper fences were calculated as 1.5 times the interquartile range beyond the first and third quartile. Observations outside the fences were plotted as individual points. Whiskers were extended to the minimum and maximum values within the data set that fell within the fences. To facilitate comparisons among years and species, tissue concentrations were presented on a $\log_{10}$ scale.

Differences in tissue concentrations of contaminants of potential concern (COPCs), including aluminum, magnesium, iron, mercury and selenium were compared among years (i.e., 2018, 2019, 2020). These COPCs were identified based on the primary constituents of the Project iron ore (i.e., aluminum, magnesium and iron), as well as metals with existing regulatory guidelines for fish tissue (i.e., mercury and selenium). Aluminum, magnesium and iron were compared among years using analysis of variance (ANOVA). Differences in relative body weight and tissue concentrations of mercury and selenium in Arctic Char and Fourhorn Sculpin were compared among years using analysis of covariance (ANCOVA), with length as a covariate. For *H. arctica,* length was not a significant predictor of tissue concentrations of mercury and selenium (i.e., the regression relationship was not significant), therefore, comparisons were made among years using ANOVA. Significant differences between years were determined using an α (alpha) of 0.1. If significant differences were detected based on the ANOVA or ANCOVA models, pairwise comparisons were made among years using a Tukey Honestly Significant Difference Test.

The assumptions of ANOVA and ANCOVA are that the residuals of the data, after being fit to the model, are normally distributed and have equal variance between groups. The assumption of normality was assessed using the Shapiro-Wilk test, while Levene’s test was used to assess equality of variances. Significant differences in assumptions were evaluated using an α of 0.01. If the assumptions of normality and equality of variance were not met, the data were $\log_{10}$-transformed, and the assumptions were re-assessed. When the assumptions of ANOVA could not be met using a $\log_{10}$ transformation, the non-parametric Kruskal-Wallis (K-W) test was used, with pairwise comparisons made using the Mann-Whitney Test. In addition to the assumptions of normality and equality of variance, ANCOVA has the additional assumption that the parameter regression slopes are parallel among sampling areas. To test this assumption, the ANCOVA was conducted by first fitting separate regression models for each sampling area using a general linear model that included an interaction term between the sampling area and covariate:

Full ANCOVA model: $y = \beta_0 + \beta_1(x) + \beta_2(Year) + \beta_3(x) \times (Year) + \varepsilon$

where y is the response variable, x is the covariate, $Year$ is the sampling area indicator variable, and ε is the error term. If the coefficient β_3 of the $(x) \times (Year)$ interaction term was not significant (i.e., $P > 0.05$)[3], then the slopes were considered parallel and the ANCOVA proceeded by testing the significance of the coefficient β_2 of the $(Year)$ term in the reduced ANCOVA model that fits separate regressions for each area, but with a common regression slope:

Reduced ANCOVA model: $y = \beta_0 + \beta_1(x) + \beta_2(Year) + \varepsilon.$

When a significant interaction was observed, the regression slopes were considered significantly different. When the covariate was a strong predictor of the response variable, and the ANCOVA had a high coefficient of determination ($R^2 > 0.8$), the test for parallel slopes had high power to detect a difference that may not be practically significant. In this case, when the interaction term in the full ANCOVA model was significant, the slopes were fixed as parallel by fitting the reduced ANCOVA model (because the reduced model explained almost as much [i.e., within 2%] of the variability in the response variable as the full model). In this case, the ANCOVA proceeded under the assumption that the regression slopes between groups were practically similar (Barrett et al., 2010).

Statistical outliers were evaluated using studentized residuals (SR) from the ANOVA and ANCOVA models. A magnitude of 3.5 for the SR was used to identify unusual observations. When an outlier was detected, the validity of the value was examined. If the outlier was determined to be the result of data entry error, the error was corrected; if the outlier was not the result of data entry error and could not be resolved otherwise, the outlier was removed from the analysis and documented.

The relative percent differences (RPDs) in effect endpoints between years were calculated when significant differences in endpoints were observed, by expressing the difference as a percentage of the mean as follows:

$$Relative\ Percent\ Difference\ (RPD) = \frac{\bar{x}_{Year1} - \bar{x}_{Year2}}{\bar{x}_{(Year1+Year2)}} * 100$$

where $\bar{x}$ is the mean of the endpoint, and $Year_1$ and $Year_2$ refers to the years being compared.

If the statistical comparison was conducted on $\log_{10}$-transformed data, then the RPD was calculated using geometric means. For effect endpoints analyzed using ANCOVA, RPDs were calculated from least squares means. To confirm that differences in tissue concentrations between years were real and less likely to be attributed to low concentrations of target contaminants, analytical variability, and spatial and temporal variation, a RPD of 100% was used to differentiate stochastic differences from those of potential biological importance (Environment Canada 2012).

Power analyses were performed to determine the minimum detectable difference of future tissue chemistry comparisons using the existing 2018 to 2020 dataset with a target sample size of 8. These values were then used to calculate the sensitivity of future comparisons by expressing the minimum detectable difference as a percent change in the mean. Type I (α) and Type II (β) error rates were set to 0.1 (Environment Canada 2012). Power analyses were conducted using the power and sample size function in G*Power 3.1 (Faul et al., 2007).

[3] The p-value for the interaction term is reported as $p_{\beta 3}$ within this report, to clearly distinguish it from the reduced regression model p-value.

7.3.5 Guideline Comparison

Fish tissue concentrations of mercury and selenium for Arctic Char, Fourhorn Sculpin and *H. arctica* sampled from 2018 to 2020 were compared to applicable tissue quality guidelines. Mercury concentrations were compared to Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada 2015). Selenium concentrations were compared to the British Columbia Ministry of Environment (BC MOE) fish tissue guidelines of 4 mg/kg dry weight (dw; BC MOE 2014).

7.3.6 Quality Assurance/Quality Control

The field and laboratory quality assurance and quality control (QA/QC) procedures were implemented at each stage of the fish survey, including sampling, data entry, sample shipment, data analyses, laboratory analyses, and report preparation, to produce technically sound and scientifically defensible results.

7.3.6.1 Field QA/QC Procedures

As part of practices for field operations for this program, the following QA/QC procedures were undertaken:

- Detailed specific work instructions outlining each field task were provided to the field personnel prior to the field programs.
- A pre-field meeting with the field crew and project team lead was conducted to review the specific work instructions so that procedures were understood.
- Samples were collected by experienced personnel and were labelled, preserved and shipped according to laboratory instructions described in Golder TP 8.1-3, Fish Inventory Methods (Golder, unpublished information) and TP 8.16-0, Fish Health Assessment – Metals (Golder, unpublished information).
- Fish identification was recorded to species, where possible, with identifications verified using fish field guides.
- Field equipment (e.g., electronic scales and water quality meters) were regularly calibrated according to manufacturer's recommendations.
- Detailed field notes were recorded in pencil in waterproof field notebooks, on waterproof pre-printed field data sheets, or directly entered electronically into an excel spreadsheet.
- Field data (i.e., datasheets, notebook, and electronic spreadsheets) were checked at the end of each day for completeness and accuracy.

Samples were documented and tracked using chain of custody (COC) forms and receipt of samples by the analytical laboratory was confirmed. Field crews were responsible for managing sample shipment to the analytical laboratories. Prior to sample shipment, field crews confirmed the following:

- Required samples were collected and accounted for.
- COC and analytical request forms were completed and correct.
- Proper sample labelling and documentation procedures were followed.

7.3.6.2 *QA/QC of Field and Laboratory Data*

Field-collected data, datasheets, and field notebooks were reviewed for completeness and unexpected values or trends. At least 10% of the field data entered electronically were verified by a second person to identify transcription errors. Laboratory QA/QC included verification of recommended sample holding times and the analysis of laboratory control samples, laboratory duplicates, and spiked samples to assess precision and accuracy of analytical methods. Laboratory QA/QC reports were reviewed upon receipt of the results to confirm that the laboratory data quality objectives had been met and that the appropriate QA/QC information had been reported. Results of statistical data analyses were reviewed by an independent biologist with appropriate technical qualifications. Tables containing data summaries and statistical results were reviewed and values were verified by a second, independent individual.

7.3.6.2.1 Tissue Chemistry

The fish tissue chemistry dataset was visually assessed for outliers using scatterplots, and erroneous values were corrected, if possible (i.e., if values were identified as data entry errors). Statistical analyses and data summary tables were independently reviewed and verified by a second individual with appropriate technical qualifications. Laboratory QA/QC at BV Labs included analysis of duplicates to evaluate the variance in the measurement, matrix spikes to evaluate sample matrix interference, method blanks to identify laboratory contamination, reagent blanks used to determine any analytical contamination, spiked blanks to evaluate method accuracy, surrogates to evaluate extraction efficiency, and QC standards used as an independent check of method accuracy. Upon receipt of the tissue chemistry data from BV Labs, standard checks were performed to screen for potential data quality issues by:

- Confirming that each requested variable was analyzed.
- Reviewing the units.
- Reviewing any hold time exceedances.
- Reviewing internal laboratory QA/QC results.

Most results met the laboratory quality acceptance criteria for representativeness (e.g., no detected concentrations in procedural blanks) and accuracy (e.g., spiked blanks, containing a known amount of analyte, within acceptable range), with the following exceptions:

- QC standards for chromium, copper, and nickel were outside acceptance criteria due to digestion limitation for Arctic Char.
- Spiked blank for silver was outside acceptance criteria for Arctic Char by 2%.
- QC standard for lead was outside acceptance criteria for Fourhorn Sculpin.
- Spiked blank for zinc was outside acceptance criteria for Fourhorn Sculpin by 65%.
- QC standard for lead was outside acceptance criteria for *H. arctica* by 20%.
- Method blank for copper exceeded acceptance limits for *H. arctica* by 0.002 mg/kg. Sample values for copper were >10× the concentration of the method blank, therefore the blank QC issue was considered irrelevant.

Overall, the fish tissue chemistry data were considered reliable and representative of site conditions at the time of sampling.

7.4 Results

7.4.1 Fish Community

A total of 1989 fishes were processed at the Milne Port area between 2010 and 2020, representing 13 species and at least two additional taxonomic groups that could not be identified to species in the field (i.e., unidentified sand lances and sculpins). Lengths and weights were recorded for 1989 and 1949 individuals, respectively, and ages were determined for 254 individuals since 2010. A summary of available length, weight and age data and associated samples sizes is provided in Appendix 7A-1.

In 2020, a total of 680 fishes comprised of seven species were measured or weighed from the Milne Port Area, as well as 81 unidentified sand lances and sculpins. Catches in 2020 were greater than recent years, with 279 fishes from five species captured in 2019 and 398 fishes from five species captured in 2018, in addition to 4 unidentified sand lances and sculpins (Table 7-3:). Summary statistics for all captured fish from the Milne Port Area from 2018 to 2020 are provided in Table 7-3:. The most abundant species captured during this period were Fourhorn Sculpin (n = 640), Arctic Char (n = 422), and Shorthorn Sculpin (n = 218), which are considered further in the following sections.

7.4.1.1 Size

In 2020, Fourhorn Sculpin, Arctic Char and Shorthorn Sculpin were the dominant species captured during the fish community survey (i.e., n > 60; Table 7-3:). Arctic Char were the largest of these species, ranging in length from 132 mm to 859 mm and ranging in weight from 10 g to 6,710 g, with similar sizes observed in 2018 and 2019. Fourhorn Sculpin ranged in length from 72 mm to 314 mm and ranged in weight from 2.6 g to 925 g, with similar sizes observed in 2018, while smaller fish (< 140 mm) were not captured in 2019. Shorthorn Sculpin ranged in length from 122 mm to 421 mm and ranged in weight from 11.7 g to 1060 g, while smaller Shorthorn Sculpin captured in 2018 and 2019 (i.e., < 120 mm) were not observed in 2020.

Length-frequency distributions for Arctic Char were unimodal among years, suggesting a single size class was present, with median lengths of 440 mm in 2018, 435 mm in 2019 and 409 mm in 2020 (Figure 7-1:; Table 7-3:). Similarly, Fourhorn Sculpin lengths were also unimodal among years, with median lengths of 228 mm in 2018, 211 mm in 2019 and 194 mm in 2020. Shorthorn Sculpin were more variable over time. In 2018, Shorthorn Sculpin exhibited a right-skewed (i.e., more data falling to the right of the middle of the distribution) unimodal distribution, suggesting the population was dominated by larger fish, with a median length of 238 mm. In 2019, Shorthorn Sculpin exhibited a left-skewed unimodal distribution (i.e., more data falling to the left of the middle of the distribution), suggesting the population was dominated by smaller fish, with a median length of 166 mm. In 2020, Shorthorn Sculpin exhibited a left-skewed bimodal (i.e., two modes or peaks) distribution, suggesting two size classes were present with the population dominated by smaller fish, with a median length of 219 mm.

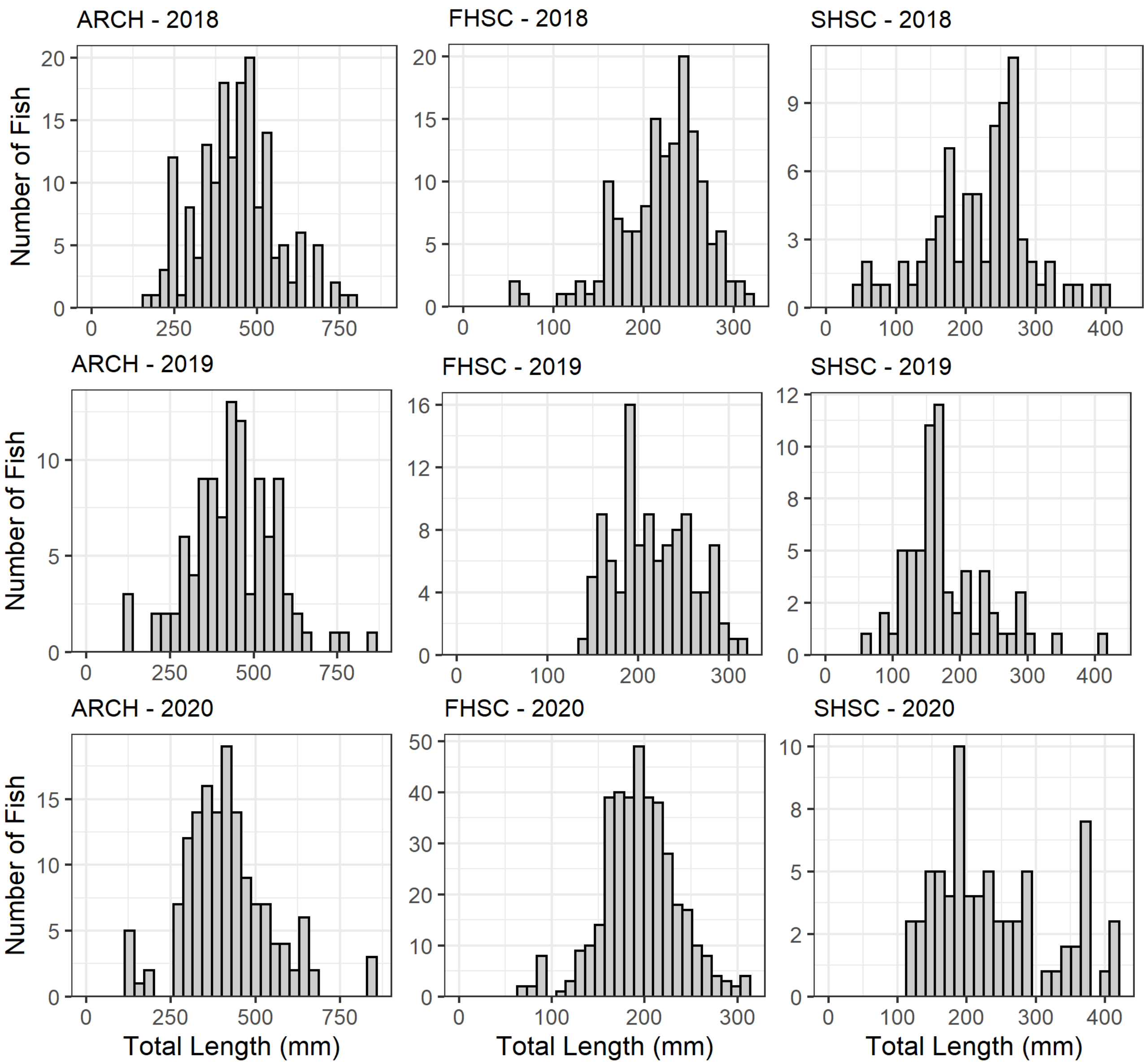
Condition (i.e., relative weight) of Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin were relatively similar for each species over time, despite significant differences among years (Figure 7-2). For Arctic Char, significant differences in condition were observed among years ($p_{\beta 3} = 0.659$; p-value = 0.001), with mean relative weights of 856 g in 2018, 879 g in 2019 and 908 g in 2020. The RPD in relative weight between 2018 and 2020 was 6%, while the RPD between 2019 and 2020 was 3%. For Fourhorn Sculpin, significant differences in condition were also observed among years ($p_{\beta 3} = 0.007$[4]; p-value = 0.018), with mean relative weights of 82 g in 2018, 81 g in 2019 and 79 g in 2020. The RPD between 2018 and 2020 was 4%, while the RPD between 2019 and 2020 was 2%. For Shorthorn Sculpin, significant differences in condition were observed among years ($p_{\beta 3} = 0.261$; p-value = 0.066), with mean relative weights of 115 g in 2018, 109 g in 2019 and 117 g in 2020. The RPD between 2018 and 2020 was 2%, while the RPD between 2019 and 2020 was 10%.

[4] Although a significant interaction was observed, the difference in the R^2 values between the full and reduced models was less than 2%, and the slopes were considered practically similar and suitable for ANCOVA (Barrett et al 2010).

Table 7-3: Descriptive Statistics for Fish Species Captured from the Milne Port Area from 2018 to 2020

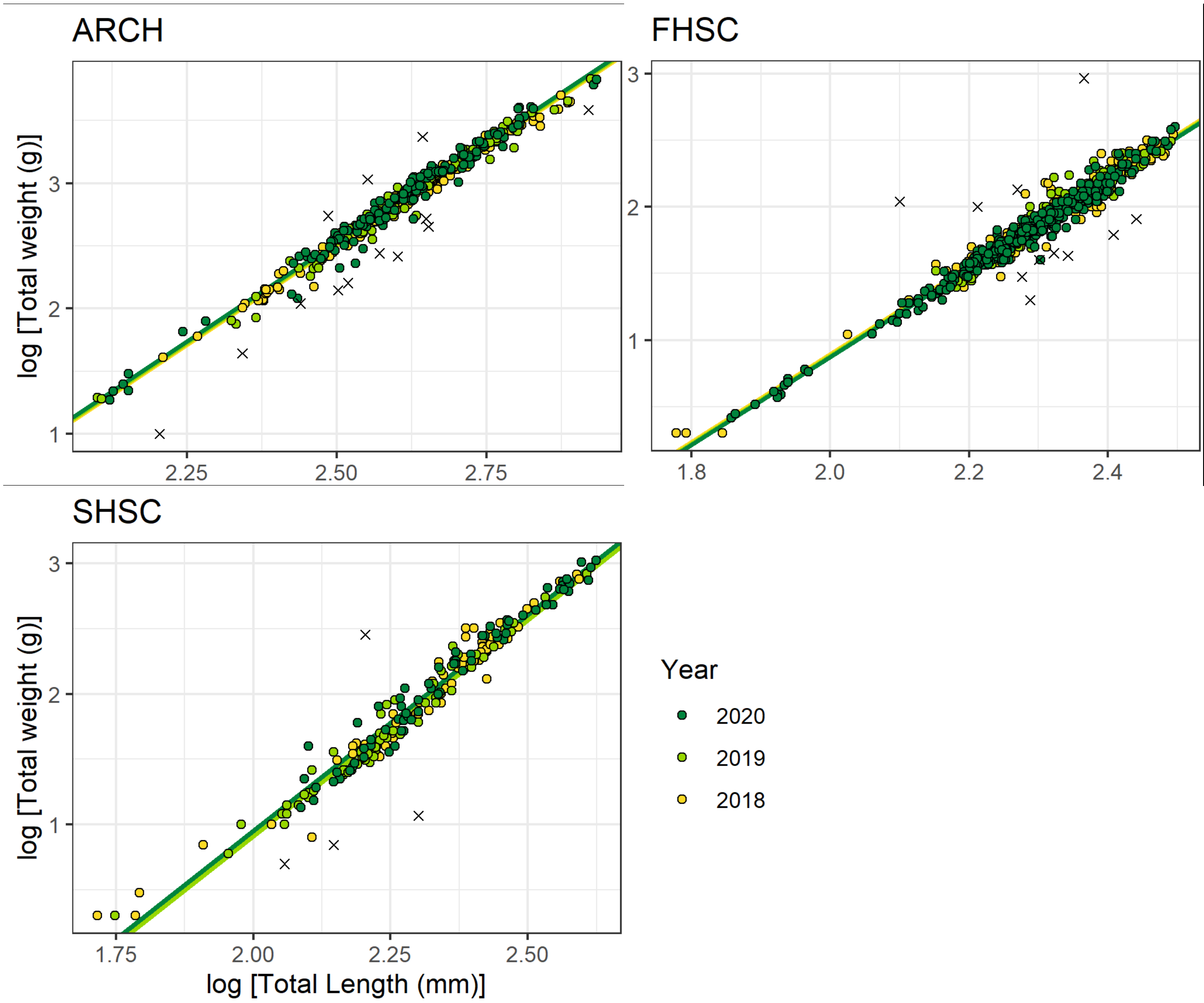
Species	2018							2019							2020						
	n	Min	Max	Median	Mean	SD	SE	n	Min	Max	Median	Mean	SD	SE	n	Min	Max	Median	Mean	SD	SE
Length (mm)																					
Arctic Char	169	162	776	440	439	122	9.4	105	126	840	435	439	128	12.5	148	132	859	409	416	130	10.7
Arctic Cod	1	282	282	282	282	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-
Arctic Sculpin	3	70	400	104	191	182	105	0	-	-	-	-	-	-	13	90	274	132	148	47	13.0
Arctic Staghorn Sculpin	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	168	168	168	168	-	-
Fourhorn Sculpin	147	60	312	228	220	47	3.9	106	142	310	211	217	41.7	4.1	387	72	314	194	194	41	2.1
Fourline Snakeblenny	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	280	280	280	280	-	-
Greenland Cod	0	-	-	-	-	-	-	0	-	-	-	-	-	-	57	378	670	480	493	64	8.5
Ninespine Stickleback	0	-	-	-	-	-	-	1	38	38	38	38	-	-	0	-	-	-	-	-	-
Sand Lance spp.	1	158	158	158	158	-	-	1	168	168	168	168	-	-	5	132	170	168	156	18	8.1
Shorthorn Sculpin	78	52	392	238	222	71	8.0	66	56	405	166	180	63.3	7.8	74	122	421	219	241	84	9.8
Sculpin spp.	3	34	240	39	104	118	68	0	-	-	-	-	-	-	73	11	153	89	91	38	4.4
Total Weight (g)																					
Arctic Char	156	41	5000	885	1125	942	75	105	19	6809	960	1200	1034	101	148	10	6710	755	1076	1092	89.8
Arctic Cod	1	180	180	180	180	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-
Arctic Sculpin	2	16	680	348	348	470	332	0	-	-	-	-	-	-	13	8.8	200	32.8	50.7	52.2	14.5
Arctic Staghorn Sculpin	0	-	-	-	-	-	-	0	-	-	-	-	-	-	1	90.7	90.7	90.7	90.7	-	-
Fourhorn Sculpin	146	2	350	110	122	72	6.0	106	25	310	100	116	73	7.1	388	2.6	925	66.9	82.2	73.5	3.73
Fourline Snakeblenny	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-
Greenland Cod	0	-	-	-	-	-	-	0	-	-	-	-	-	-	57	480	3700	1240	1469	677	89.7
Ninespine Stickleback	0	-	-	-	-	-	-	1	1	1	1	1	-	-	0	-	-	-	-	-	-
Sand Lance spp.	0	-	-	-	-	-	-	1	20	20	20	20	-	-	5	6.3	16.8	16.2	12.5	5.55	2.48
Shorthorn Sculpin	0	-	-	-	-	-	-	0	-	-	-	-	-	-	74	11.7	1060	135	252	271	31.5
Sculpin spp.	0	-	-	-	-	-	-	0	-	-	-	-	-	-	63	0.5	31	6.16	10.6	8.42	1.06
Shorthorn Sculpin	77	2	825	158	178	168	19	66	2	832	38	98	141	17	74	0.15	2.00	1.20	1.18	0.32	0.04
Sculpin spp.	1	210	210	210	210	-	-	0	-	-	-	-	-	-	63	0.59	1.68	0.78	0.83	0.20	0.03
Age (y)																					
Arctic Char	26	5	17	11	10.7	2.6	0.5	46	4	19	12	12.0	3.0	0.4	43	2	16	11	10.4	3.4	0.5
Fourhorn Sculpin	0	-	-	-	-	-	-	30	4	8	6	6.1	1.1	0.2	44	4	9	5	5.5	1.3	0.2
Greenland Cod	0	-	-	-	-	-	-	0	-	-	-	-	-	-	3	7	9	8	8.0	1.0	0.6

n = sample size; SD = Standard deviation; SE = Standard error; - = not calculated



ARCH = Arctic Char, FHSC = Fourhorn Sculpin, GRCD = Greenland Cod, SHSC = Shorthorn Sculpin.

Figure 7-1: Length-frequency distributions for dominant fish species captured from the Milne Port area from 2018 to 2020.



x = outlier; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; SHSC = Shorthorn Sculpin.

Figure 7-2: Length-weight relationships for dominant fish species captured from the Milne Port area from 2017 to 2020.

7.4.1.2 Age

In 2020, Arctic Char ranged in age from two to 16 years (n = 43), with a median age of 11 (Table 7-3:). Ages were similar to fish processed in 2019 (n = 46) and 2018 (n = 26), which ranged in age from four to 19 years with a median age of 12, and five to 17 years with a median age of 11, respectively. In 2020, ages for Fourhorn Sculpin (n = 44) ranged from four to nine years, with a median age of five. These were similar to results observed in 2019 (n=30) for Fourhorn Sculpin which ranged in age from four to eight, with a median age of six. Age data were not available from 2018 for comparison. In 2020, ages were also determined for Greenland Cod (n = 3), which ranged from seven to nine years with a median age of eight. Age data were not available from 2019 or 2018 for Greenland Cod for comparison.

7.4.1.3 Stomach Contents

An analysis of stomach contents for Arctic Char captured from the Milne Port Area in 2020 (n = 45) identified a total of 20 separate taxa (Table 7-4:). Stomach contents were predominantly composed of Sand Lance, accounting for 42% of contents by weight. Other major constituents included indeterminate crustaceans (13%), indeterminate fish (13%), the amphipod *Themisto* sp. (10%), and unidentified tissue (16%). In general, Arctic Char were primarily piscivorous in 2020, supplementing their diet with small crustaceans. These results contrast observations made in 2019, where indeterminate crustaceans were the primary constituent of Arctic Char stomach contents, accounting for 41% of contents by weight, while fish only comprised 4% (Golder 2020a). This suggests that the diet of Arctic Char in the Milne Port Area may be opportunistic and vary over time, potentially influenced by relative prey abundance and catchability.

Stomach contents of Fourhorn Sculpin captured from the Milne Port Area (n = 44) contained a total of 21 separate taxa, primarily consisting of the amphipod *Anonyx* sp., which accounted for 52% of contents by weight (Table 7-4:). Other major constituents included indeterminate polychaetes of the Family Pectinariidae (12%) and unidentified tissue (22%). The diet of Fourhorn Sculpin primarily consisted of crustaceans, with fish comprising less than 1% of stomach contents by weight. These results contrasted observations from 2019, where fishes were the primary constituent of Fourhorn Sculpin stomach contents, accounting for 27% of contents by weight. As with Arctic Char, results suggest the diet of Fourhorn Sculpin in the Milne Port Area may also be opportunistic and vary over time with the relative abundance and catchability of prey species.

In addition to Arctic Char and Fourhorn Sculpin, a small number of Greenland Cod stomach samples were analyzed in 2020 (n = 3). From these samples, a total of 10 separate taxa were identified (Table 7-4:). Stomach contents consisted primarily of indeterminate decapods of the infraorder Caridea, which accounted for 34% of contents by weight (34%). Other major constituents included indeterminate fishes (27%), and *Mysis* sp. (10%).

Table 7-4: Relative Weight of Stomach Contents Observed in Fishes Sampled form the Milne Port Area, 2020

Phylum	Subphylum	Class	Subclass	Order	Family	Taxon	Species		
							Arctic Char (n = 45)	Fourhorn Sculpin (n = 44)	Greenland Cod (n = 3)
Acanthocephala	-	-	-	-	-	Acanthocephala indet	<1%	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	Pectinariidae indet.	-	12%	1%
			-	-	-	Polychaeta indet.	-	<1%	-
Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus glacialis*	<1%	<1%	-
						Calanus hyperboreus	<1%	<1%	-
						Calanus sp.	1%	1%	<1%
					-	Calanoida indet.	<1%	<1%	-
		Malacostraca	Eumalacostraca	Amphipoda	Atylidae	*Atylus carinatus*	-	<1%	-
					Gammaridae	Gammaridae indet.	-	1%	-
						Gammarus sp.	<1%	1%	-
					Hyperiidae	*Themisto libellula*	1%	-	-
						Themisto sp.	10%	-	-
					Oedicerotidae	*Monoporeia affinis*	-	4%	-
					Uristidae	*Anonyx* sp.	-	52%	-
						Onisimus sp.	<1%	-	-
					-	Amphipoda indet.	-	3%	-
						Hyperiidea indet.	1%	-	-
						Lysianassoidea indet.	-	<1%	-
				Decapoda	Thoridae	*Eualus gaimardii*	-	-	6%
					-	Caridea indet.	-	-	34%
				Mysida	Mysidae	*Mysis* sp.	1%	1%	10%
					-	Mysida indet.	<1%	1%	3%
						Mysis litoralis	<1%	-	-
		-	-	-	-	Crustacea indet.	13%	<1%	-
Chaetognatha	-	Sagittoidea	Aphragmophora	-	Sagittidae	*Parasagitta elegans*	<1%	-	-
		-	-	-	-	Cheatognatha indet.	-	<1%	-
Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	42%	-	-
		-	-	-	-	Pisces indet.	13%	<1%	27%
Cnidaria	-	Hydrozoa	-	-	-	Hydrozoa indet.	-	1%	<1%
Mollusca	-	Cephalopoda	-	-	-	Cephalopoda indet.	-	-	2%
		Gastropoda	Heterobranchia	Pteropoda	Clionidae	*Clione* sp.	2%	-	-
Nemertea	-	-	-	-	-	Nemertea indet.	<1%	-	-
Non-food						Plastic	-	<1%	-
						Unidentified tissue	16%	22%	17%

n = sample size; indet = indeterminate; - = not applicable.

7.4.2 Fish Health

In 2020, fish health data were collected for Fourhorn Sculpin and *H. arctica* to supplement the existing baseline dataset for these species in the Milne Port area. A number of additional endpoints were included in the 2020 fish health survey, which were not included in previous sampling years, reducing the number of interannual comparisons that could be considered. Exceptions included length, weight, age and stomach contents of Fourhorn Sculpin (see Section 7.4.1), and age of *H. arctica*, presented in Section 7.5.2.2.

7.4.2.1 Fourhorn Sculpin

A total of 43 Fourhorn Sculpin were processed from the Milne Port area during the 2020 fish health assessment, including 22 females and 21 males. Summary statistics for processed fish are provided in Table 7-5:. Female and male Fourhorn Sculpin were of similar median size at the time of sampling with similar energy and reproductive investment based on comparisons of median liver somatic index (LSI) and gonadosomatic index (GSI). Female Fourhorn Sculpin ranged in length from 194 mm to 310 mm and ranged in weight from 65 g to 380 g. Condition factor ranged from 0.75 to 1.28. The LSI ranged from 1.29 to 5.09 and GSI ranged from 1.33 to 4.99. Male Fourhorn Sculpin ranged in length from 189 mm to 276 mm and ranged in weight from 65 g to 230 g. Condition factor ranged from 0.82 to 1.19. The LSI ranged from 0.86 to 4.09 and GSI ranged from 2.02 to 5.88. Length-frequency distributions for both female and male Fourhorn Sculpin were left-skewed and unimodal (Figure 7-3:), and no significant differences were observed between sexes for relative weight (p-value = 0.605; Figure 7-4:).

Few external or internal abnormalities were observed in Fourhorn Sculpin sampled from the Milne Port area (Table 7-6:). A mild skin aberration was noted on one female and mild fin erosion was observed on one male. With respect to external parasites, cysts were observed attached to the gills of a single individual. Internal abnormalities primarily consisted of variation in liver colour, with light or pale coloured livers observed for 10 female and 15 males. Liver colour, however, is closely tied to perfusion (i.e., fresh circulating blood) and time elapsed between sacrifice and observation; therefore, observations of liver colour are subject to substantial observer bias and considered as less reliable indicators of true changes in fish health and were not considered further herein. No internal parasites were observed during the 2020 fish health assessment.

Table 7-5: Descriptive Statistics for Fourhorn Sculpin Fish Health Endpoints Processed from the Milne Port Area, 2020

Parameter	2020						
	n	Min	Max	Median	Mean	SD	SE
Female							
Total Length (mm)	22	194	310	216	226	32	6.9
Total Weight (g)	22	65.37	380.00	89.42	123.64	77.77	16.58
Carcass Weight (g)	22	54.25	238.92	72.68	94.53	50.09	10.68
Condition Factor	22	0.75	1.28	0.96	0.97	0.12	0.03
Liver Weight (g)	22	0.844	16.366	2.365	4.379	4.080	0.870
LSI	22	1.29	5.09	2.76	3.11	1.16	0.25
Gonad Weight (g)	22	1.057	16.381	3.263	4.526	3.849	0.821
GSI	22	1.33	4.99	3.53	3.38	1.09	0.23
Age (y)	22	4	8	5	5.4	1.1	0.2

Parameter	2020						
	n	Min	Max	Median	Mean	SD	SE
Male							
Total Length (mm)	21	189	276	215	214	21	4.6
Total Weight (g)	21	65.477	230.000	89.103	98.273	37.774	8.243
Carcass Weight (g)	21	54.546	169.343	70.002	78.323	28.044	6.120
Condition Factor	21	0.82	1.19	0.95	0.96	0.10	0.02
Liver Weight (g)	21	0.607	8.082	2.142	2.542	1.678	0.366
LSI	21	0.86	4.09	2.56	2.47	0.87	0.19
Gonad Weight (g)	21	1.428	10.742	3.840	4.068	2.306	0.503
GSI	21	2.02	5.88	4.09	4.03	1.27	0.28
Age (y)	21	4	9	5	5.6	1.5	0.3

n = sample size; SD = standard deviation; SE = standard error; GSI = gonadosomatic index; LSI = liver somatic index

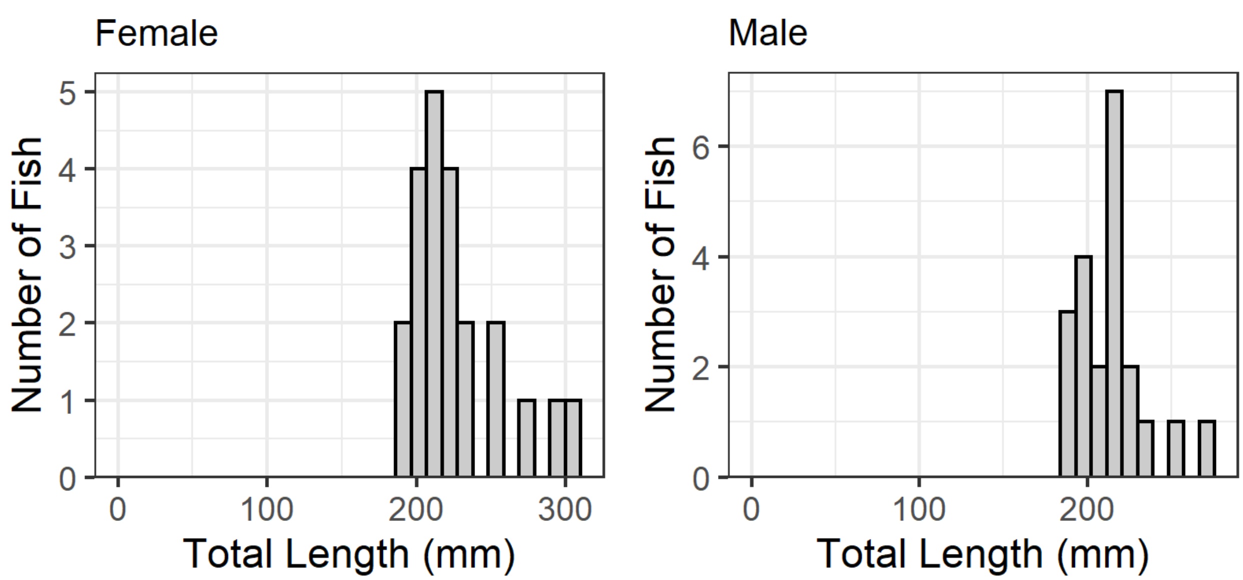
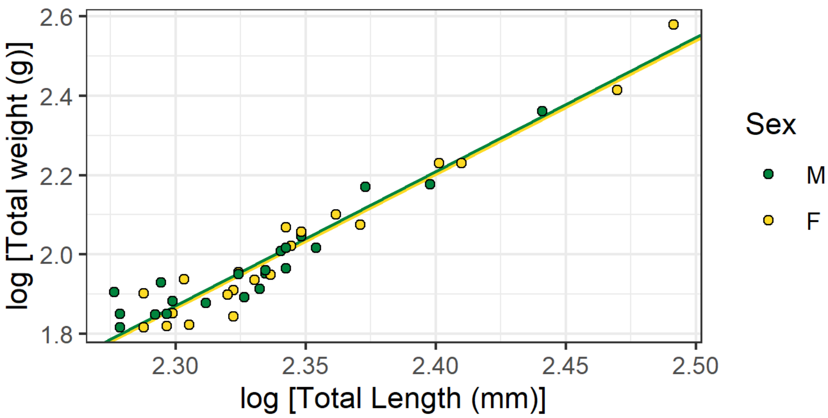


Figure 7-3: Length-frequency distributions of female and male Fourhorn Sculpin sampled from the Milne Port area, 2020



M = male; F = female.

Figure 7-4: Length-weight relationship for female and male Fourhorn Sculpin sampled from the Milne Port area, 2020

Table 7-6: Number and Description of External and Internal Abnormalities Observed in Fourhorn Sculpin Sampled from the Milne Port Area, 2020

Parameter	Female	Male	Description
External			
Body Deformity	0	0	-
Eyes	0	0	-
Skin	1	0	Mild aberration
Thymus	0	0	-
Opercula	0	0	-
Gills	0	0	-
Pseudobranchs	0	0	-
Fins	0	1	Mild erosion
Vent	0	0	-
Internal			
Liver	10	15	Pale colouration[(a)]
Spleen	0	0	-
Gall bladder	0	0	-
Gonad	0	0	-
Kidney	0	0	-

a) Pale liver colouration is typically associated with a lack of perfusion following sacrifice and cessation of the heart beating; pale livers were not considered further.

- = not applicable

7.4.2.2 Hiatella arctica

The *H. arctica* were collected from the Milne Port area in 2018, 2019 and 2020. In 2018 and 2019, samples were submitted for fish tissue chemistry analysis, but biological data were not recorded for individuals (except for age in 2019). In 2020, a total of 50 *H. arctica* were processed for fish health endpoints, including length, weight and age, with a subset of samples submitted for fish tissue analysis (Section 7.4.3.3). Biological data for *H. arctica* are summarized in Table 7-7:. The *H. arctica* ranged in length from 25.36 mm to 34.54 mm and ranged in total weight from 2.758 g to 6.399 g. Length data were unimodal and left skewed (Figure 7-5:), and exhibited a moderate relationship with total weight (p-value < 0.001; R^2 = 0.46). In 2020, *H. arctica* sampled from the Milne Port Area ranged in age from 10 to 49 years, with a median age of 23. Similar results were observed in 2019 (n = 80), with ages ranging from seven to 69 years, and a median age of 26 years.

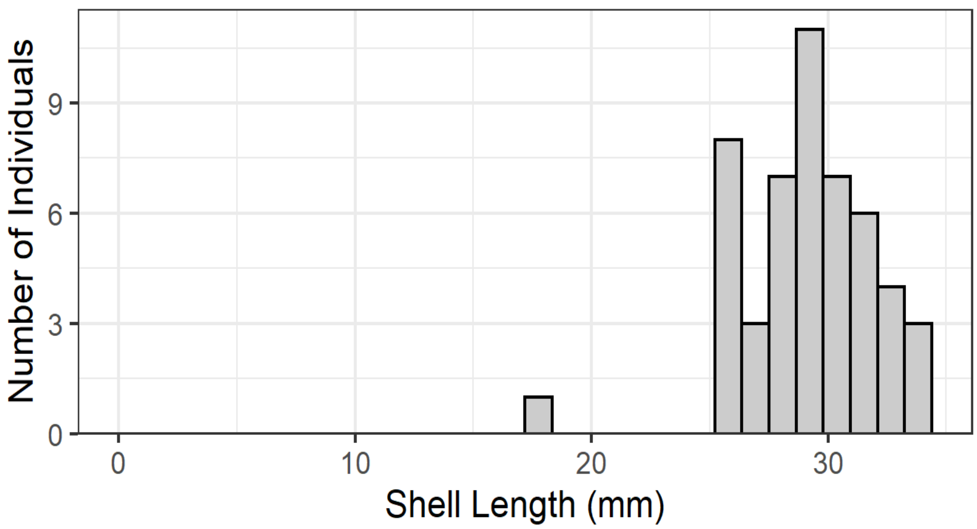


Figure 7-5: Length-frequency distribution for *Hiatella arctica* from the Milne Port area, 2020

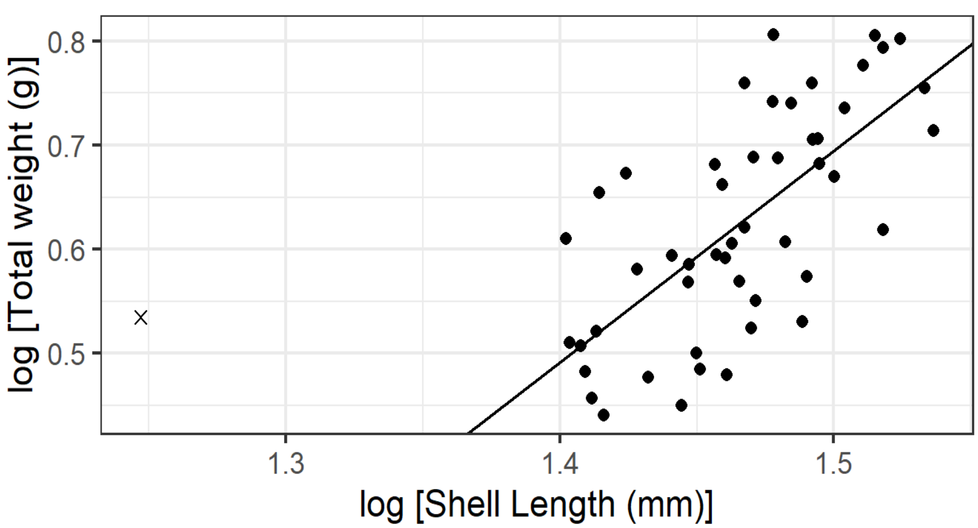


Figure 7-6: Length-weight regression for *Hiatella arctica* captured from the Milne Port area, 2020

Table 7-7: Descriptive Statistics for *Hiatella arctica* Fish Health Endpoints Processed from the Milne Port Area, 2020

Parameter	2020						
	n	Min	Max	Median	Mean	SD	SE
Shell Length (mm)	50	25.36	34.54	29.09	29.20	2.30	0.32
Total Weight (g)	50	2.758	6.399	4.061	4.329	1.071	0.151
Shell ww (g)	50	0.799	3.307	1.523	1.651	0.533	0.075
Shell dw (g)	50	0.747	3.183	1.431	1.564	0.516	0.073
Tissue ww (g)	50	1.217	4.013	2.566	2.677	0.680	0.096
Tissue dw (g)	50	0.243	0.782	0.471	0.497	0.122	0.017
Age (y)	50	10	49	23	25	12	1.6

ww = wet weight; dw = dry weight.

7.4.3 Fish Tissue Chemistry

A total of 333 fish tissue samples were submitted for metals analysis from the Milne Port Area between 2010 and 2020, representing four species and at least two additional taxonomic groups that were not identifiable to species (i.e., indeterminate sculpins and fish). An additional 39 fish tissue samples were submitted for PAH analysis. A summary of sample sizes by species and year are provided in Appendix 7C-1.

A total of 24 samples from three species were submitted for tissue chemistry analysis in 2020, supplementing baseline data collected in 2018 (n = 50) and 2019 (n = 187). These 261 samples (i.e., total samples collected from 2018 to 2020) were analyzed for metals from three species and at least one additional taxonomic group, including Arctic Char (n = 81), Fourhorn Sculpin (n = 38), indeterminate Sculpin (n = 30), and *H. arctica* (n = 112). In addition, 24 samples were analyzed for PAH in 2020, including Arctic Char (n = 8), Fourhorn Sculpin (n = 8), and *H. arctica* (n = 8). Results for individual species are described in the following sections.

Tissue chemistry results were within FEIS predictions, which indicated the potential for non-significant, low magnitude effects on Arctic Char fish health and condition.

7.4.3.1 Arctic Char

From 2010 to 2017, a total of 48 Arctic Char were analyzed for metals from the Milne Port area, with an additional 81 samples collected from 2018 to 2020, including 26 samples in 2018, 47 in 2019 and 8 in 2020. Summary statistics for metals concentrations are provided in Table 7-8: and presented visually in Appendix 7C (Figures 7C-1 to 7C-36). Statistical comparisons for COPCs among years (i.e., 2018 to 2020) are provided in Table 7-9:, and outliers removed from analysis are provided in Table 7-10:.

From 2018 to 2020, concentrations of metals were generally similar among years; however, inter-annual variability was observed for some parameters (e.g., cobalt, copper, iron, selenium and zinc), which have generally decreased in concentration over time since sampling began in 2010 (Appendix 7C; Figures 7C-1 to 7C-36). For COPCs, significant differences were observed among years for aluminum, magnesium and selenium (Table 7-9:). Aluminum concentrations were significantly lower in 2018 when compared to 2019 (82%) and 2020 (72%) but remained below historic concentrations observed from 2010 to 2015 (Figure 7C-1). Similar results were observed for magnesium; which was significantly lower in 2018 when compared to 2019 (-7%) and 2020 (-10%); however, the RPDs among years were comparatively small and concentrations were similar to those observed from 2010 to

2017 (Figure 7C-17). Concentrations of selenium decreased with fish length and were significantly greater in 2019 when compared to 2018 (18%) and 2020 (20%; Figure 7-7:) but appear to have decreased over time in the Milne Port area since 2010 (Figure 7C-25). No significant differences were observed among years for iron or mercury, with mercury concentrations decreasing with fish length (Figure 7-7:). While this pattern was inconsistent when compared to many other piscivorous species, where mercury generally increases with fish size, this pattern has been previously documented for anadromous Arctic Char, with mercury concentrations related to freshwater residency time (i.e., mercury concentrations decrease once fish migrate into the marine environment; Riget and Aastrup 2000). A power analysis for COPCs indicated that target sample sizes of eight fish of mixed sex per sampling area would be sufficient to detect differences in effect sizes ranging from 11% for magnesium to 130% for aluminum. Polycyclic aromatic hydrocarbons were below DL for all parameters analyzed in Arctic Char (Appendix 7C-5).

Mercury concentrations for all Arctic Char sampled from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada 2015). Selenium concentrations for Arctic Char were also below BC MOE fish tissue guidelines of 4 mg/kg dry weight (BC MOE 2014), with tissue concentrations in Arctic Char from the Milne Port area ranging from 0.787 to 2.2 mg/kg dry weight from 2018 to 2020.

Table 7-8: Descriptive Statistics for Arctic Char Tissue Chemistry Data Analyzed from 2018 to 2020

Parameter (mg/kg)	2018 (n = 26)							2019 (n = 47)							2020 (n = 8)						
	>DL(%)	Min	Max	Median	Mean	SD	SE	>DL(%)	Min	Max	Median	Mean	SD	SE	>DL(%)	Min	Max	Median	Mean	SD	SE
Aluminum	31	<0.20	0.81	<0.20	0.20	0.18	0.04	96	<0.20	9.48	0.41	0.66	1.36	0.20	100	0.28	0.62	0.43	0.42	0.11	0.04
Antimony	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	13	<0.0010	0.0094	<0.0010	0.0016	0.0032	0.0011
Arsenic	100	0.305	1.150	0.461	0.527	0.218	0.043	100	0.329	2.85	0.811	0.799	0.374	0.055	100	0.389	33.200	0.830	4.875	11.449	4.048
Barium	4	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	34	<0.010	0.036	<0.010	<0.010	<0.010	<0.010	63	<0.010	0.068	0.017	0.024	0.024	<0.010
Beryllium	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron	4	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium	96	<0.0010	0.0207	0.0030	0.0062	0.0059	0.0012	96	<0.0010	0.0235	0.0052	0.0062	0.0052	<0.0010	100	0.0012	0.0171	0.0032	0.0062	0.0061	0.0021
Calcium	100	42.7	248.0	76.3	87.3	44.6	8.8	100	57	791	147	164	118	17	100	39	506	113	219	193	68
Chromium	50	<0.010	0.050	<0.010	0.014	0.013	<0.010	75	<0.010	0.043	0.012	0.014	<0.010	<0.010	75	<0.010	1.520	0.030	0.217	0.527	0.186
Cobalt	100	0.0030	0.0111	0.0047	0.0049	0.0015	0.0003	100	0.0024	0.0130	0.0043	0.0049	0.0022	0.0003	100	0.0029	0.0057	0.0035	0.0038	0.0010	0.0004
Copper	100	0.347	0.688	0.500	0.508	0.088	0.017	100	0.285	0.739	0.394	0.414	0.090	0.013	100	0.165	0.347	0.326	0.305	0.059	0.021
Iron	100	3.02	5.77	4.36	4.36	0.74	0.14	100	2.30	20.60	3.95	4.49	2.74	0.40	100	2.39	16.80	4.71	5.92	4.50	1.59
Lead	38	<0.0010	0.0026	<0.0010	<0.0010	<0.0010	<0.0010	85	<0.0010	0.0054	0.0016	0.0018	<0.0010	<0.0010	100	0.0012	0.0052	0.0023	0.0024	0.0013	0.0005
Magnesium	100	263	310	285	282	12	2	100	257	366	301	303	22	3	100	219	348	303	300	37	13
Manganese	100	0.067	0.134	0.090	0.093	0.015	0.003	100	0.060	0.316	0.092	0.101	0.038	0.006	100	0.056	0.180	0.125	0.115	0.045	0.016
Mercury	100	0.0271	0.1010	0.0379	0.0431	0.0159	0.0031	100	0.0260	0.1260	0.0423	0.0522	0.0246	0.0036	100	0.0230	0.2970	0.0425	0.0728	0.0916	0.0324
Molybdenum	0	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	13	<0.0040	0.0105	<0.0040	<0.0040	<0.0040	<0.0040
Nickle	81	<0.010	0.037	0.014	0.015	<0.010	<0.010	79	<0.010	0.024	0.013	0.013	<0.010	<0.010	63	<0.010	0.029	0.014	0.014875	0.010	<0.010
Phosphorus	100	2820	3210	3000	2992	105	21	100	2490	3300	2900	2877	187	27	100	2350	3950	3125	3206	471	167
Potassium	100	4030	4660	4390	4411	159	31	100	2960	4920	4060	3978	438	64	100	4190	5360	4655	4696	433	153
Selenium	100	0.295	0.464	0.330	0.338	0.037	0.007	100	0.229	0.638	0.375	0.401	0.080	0.012	100	0.285	0.387	0.315	0.320	0.031	0.011
Silver	8	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium	100	360	796	489	501	96	19	100	313	1240	700	711	233	34	100	242	633	332	367	119	42
Strontium	100	0.079	0.637	0.176	0.196	0.114	0.022	100	0.139	1.720	0.433	0.480	0.264	0.039	100	0.088	1.590	0.344	0.585	0.553	0.196
Thallium	100	0.00211	0.00644	0.00294	0.00311	0.00082	0.00016	100	0.00124	0.00600	0.00216	0.00246	0.00102	0.00015	100	0.00071	0.00324	0.00203	0.00203	0.00071	0.00025
Tin	4	<0.020	0.036	<0.020	<0.020	<0.020	<0.020	9	<0.020	0.032	<0.020	<0.020	<0.020	<0.020	75	<0.020	0.038	0.028	0.026	<0.020	<0.020
Titanium	100	0.085	0.154	0.125	0.125	0.016	0.003	100	0.416	0.574	0.486	0.489	0.034	0.005	100	0.119	0.167	0.143	0.144	0.018	0.007
Uranium	4	<0.00040	0.00058	<0.00040	<0.00040	<0.00040	<0.00040	13	<0.00040	0.00091	<0.00040	<0.00040	<0.00040	<0.00040	25	<0.00040	0.00112	<0.00040	<0.00040	<0.00040	<0.00040
Vanadium	0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc	100	4.50	7.74	5.48	5.66	0.91	0.18	100	4.43	15.10	6.95	7.63	2.84	0.41	100	3.78	5.54	4.62	4.57	0.70	0.25

mg/kg = milligram per kilogram wet weight; > = greater than; DL = detection limit; SD = Standard deviation; SE = standard error.

Table 7-9: Inter-annual Comparison of Chemicals of Potential Concern in Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Samples Collected from the Milne Port Area from 2018 to 2020

Species	Parameter	Test	Sample Size			p-value	Error	LS Mean			Post-hoc			RPD (%)			Power Analysis	
			2018	2019	2020			2018	2019	2020	2018*2019	2019*2020	2018*2020	2018*2019	2019*2020	2018*2020	Min Detectable Difference	Sensitivity
Arctic Char	Aluminum	KW test	26	47	8	**<0.001**	0.295	0.20	0.47	0.42	**<0.001**	1.000	**0.003**	-82	12	-72	0.49	130%
	Iron	$ANOVA_{log}$	26	46	7	0.414	0.114	4.30	3.96	4.24	-	-	-	8	-7	1	1.74	41%
	Magnesium	ANOVA	26	47	7	**<0.001**	19.32	282	303	312	**<0.001**	0.516	**0.002**	-7	-3	-10	34	11%
	Mercury	$ANCOVA_{log}$ (a)	26	47	7	0.163	0.1641	0.0401	0.0469	0.0387	-	-	-	-16	19	3	0.0334	70%
	Selenium	$ANCOVA_{log}$ (a)	26	46	8	**<0.001**	0.062	0.332	0.395	0.323	**<0.001**	**0.001**	0.888	-18	20	3	0.111	30%
Fourhorn Sculpin	Aluminum	$ANOVA_{log}$	0	30	8	**<0.001**	0.32	-	2.16	0.31	-	-	-	-	149	-	3.64	156%
	Iron	ANOVA	0	29	8	**0.053**	3.52	-	9.41	6.59	-	-	-	-	35	-	5.64	64%
	Magnesium	ANOVA	0	29	8	0.330	34.5	-	276	290	-	-	-	-	-5	-	53	19%
	Mercury	ANCOVA(a)	0	30	8	0.540	0.115	-	0.131	0.123	-	-	-	-	7	-	0.0770	57%
	Selenium	ANCOVA(a)	0	30	8	**0.008**	0.057	-	0.503	0.433	-	-	-	-	15	-	0.126	27%
Hiatella arctica	Aluminum	ANOVA	24	79	8	**<0.001**	305.5	516	890	757	**<0.001**	0.472	0.134	-53	16	-38	514	64%
	Iron	$ANOVA_{log}$	24	79	8	**<0.001**	0.183	1233	2169	1909	**<0.001**	0.694	**0.034**	-55	13	-43	1387	67%
	Magnesium	$ANOVA_{log}$	24	80	8	**<0.001**	0.161	2444	3855	3089	**<0.001**	0.246	0.274	-45	22	-23	2263	61%
	Mercury	ANOVA	24	80	8	**0.053**	0.166	0.025	0.031	0.031	**0.047**	0.989	0.296	-21	-2	-23	0.0221	70%
	Selenium	ANOVA	24	79	8	**<0.001**	0.077	1.158	1.379	1.252	**<0.001**	0.311	0.532	-17	10	-8	0.383	29%

Note: Significant differences indicated in **bold**.

a) Length was included as a covariate for ANCOVA.

b) Sensitivity is the minimum detectable difference expressed as a percent change in the least squares mean.

p-value = probability value; LS = Least Squares; RPD = relative percent difference; Min = minimum; KW test = Kruskal Wallis test; ANOVA = analysis of variance; ANCOVA = analysis of covariance.

Table 7-10: Outliers Omitted from Statistical Comparisons

Species	Parameter	Year	Age (y)	Length (mm)	Weight (g)	Concentration (mg/kg ww)	Studentized Residuals
Arctic Char	Aluminum	2019	12	367	610	9.48	30.3
	Iron	2019	12	367	610	20.6	5.5
	Iron	2020	9	512	1700	16.8	4.0
	Magnesium	2020	9	674	3910	219	-4.5
	Mercury	2020	9	674	3910	0.297	5.4
	Selenium	2019	12	332	370	0.229	-4.1
Fourhorn Sculpin	Iron	2019	4	156	2.36	24.4	4.2
	Magnesium	2019	4	156	2.36	414	3.9
Hiatella arctica	Aluminum	2019	-	-	-	2370	4.8
	Iron	2019	21	-	-	374	-4.1
	Selenium	2019	35	-	-	0.738	-3.5

mg/kg ww = milligram per kilogram wet weight.

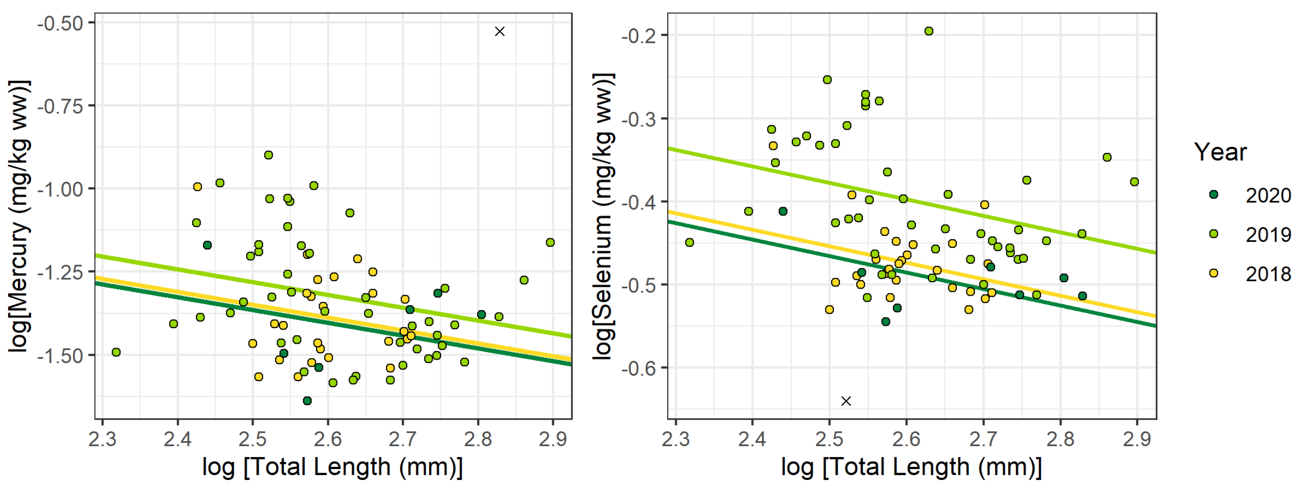


Figure 7-7: Concentrations of mercury and selenium in relation to length for Arctic Char sampled from the Milne Port area, 2018 and 2020

7.4.3.2 Fourhorn Sculpin

A total of 38 Fourhorn Sculpin samples were analyzed for metals from the Milne Port area from 2019 to 2020, including 30 samples in 2019 and eight in 2020. Tissue samples were not collected from Fourhorn Sculpin in 2018. Summary statistics for metals concentrations are provided in Table 7-11: and presented visually in Appendix 7C; Figures 7C-1 to 7C-36. Statistical comparisons for COPCs among years are provided in Table 7-9:, and outliers removed from the analyses are provided in Table 7-10:.

Concentrations of metals in Fourhorn Sculpin were generally more variable relative to Arctic Char. For COPCs, significant differences were observed among years for aluminum, iron, and selenium (Table 7-9:). Aluminum and iron were significantly lower in 2020 when compared to 2019 (149% and 35%, respectively). Concentrations of selenium increased with fish length and was significantly lower in 2020 when compared to 2019 (15%; Figure 7-8:). No significant differences were observed among years for magnesium or mercury concentrations in Fourhorn Sculpin, with mercury concentrations increasing with fish length (Figure 7-8:). A power analysis for COPCs indicated that target sample sizes of eight per sampling area would be sufficient to detect differences in effect sizes ranging from 19% for magnesium to 156% for aluminum. Polycyclic aromatic hydrocarbons were below DL for all parameters analyzed in Fourhorn Sculpin (Appendix 7C-5).

Mercury concentrations for all Fourhorn Sculpin sampled from 2019 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada 2015). Selenium concentrations for Fourhorn Sculpin were also below BC MOE fish tissue guidelines of 4 mg/kg dw (BC MOE 2014), with tissue concentrations in Fourhorn Sculpin from the Milne Port area ranging from 0.345 to 1.87 mg/kg dry weight from 2019 to 2020.

Table 7-11: Descriptive Statistics for Fourhorn Sculpin Tissue Chemistry Data Analyzed from 2018 to 2020

Parameter (mg/kg)	2019 (n = 30)							2020 (n = 8)						
	>DL(%)	Min	Max	Median	Mean	SD	SE	>DL(%)	Min	Max	Median	Mean	SD	SE
Aluminum	100	0.75	11.40	1.92	2.85	2.41	0.44	88	<0.20	1.23	0.29	0.40	0.35	<0.20
Antimony	50	<0.0020	0.003	<0.0020	<0.0020	<0.0020	<0.0020	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic	100	0.51	6.63	1.78	1.80	1.08	0.20	100	1.70	3.31	2.19	2.37	0.62	0.22
Barium	100	0.030	0.400	0.145	0.146	0.087	0.016	100	0.027	0.086	0.057	0.054	0.021	0.007
Beryllium	0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth	87	<0.0013	0.0052	0.0029	0.0027	<0.0013	<0.0013	63	<0.0010	0.0052	0.0014	0.0018	0.0016	<0.0010
Boron	77	<0.20	0.60	0.24	0.23	<0.20	<0.20	0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cadmium	100	0.0055	0.1300	0.0246	0.0367	0.0338	0.0062	88	<0.0010	0.0088	0.0023	0.0028	0.0026	<0.0010
Calcium	100	472	4290	2245	2234	1205	220	100	612	907	708	757	114	40
Chromium	70	<0.025	0.163	0.031	0.040	0.035	<0.025	100	0.023	0.496	0.158	0.202	0.170	0.060
Cobalt	100	0.0045	0.0239	0.0123	0.0122	0.0041	0.0007	100	0.0048	0.0080	0.0062	0.0061	0.0010	0.0004
Copper	100	0.278	1.030	0.557	0.590	0.207	0.038	100	0.315	1.010	0.427	0.496	0.227	0.080
Iron	100	3.56	24.40	8.97	9.91	4.63	0.84	100	3.74	10.20	6.31	6.59	2.05	0.73
Lead	100	0.0055	0.0544	0.0148	0.0185	0.0115	0.0021	100	0.0013	0.0047	0.0018	0.0022	0.0011	0.0004
Magnesium	100	189	414	273	281	45	8	100	263	304	295	290	14	5
Manganese	100	0.149	0.870	0.337	0.365	0.157	0.027	100	0.255	0.409	0.302	0.315	0.049	0.017
Mercury	100	0.055	0.276	0.151	0.143	0.053	0.010	100	0.069	0.152	0.111	0.110	0.029	0.010
Molybdenum	13	<0.0080	0.0124	<0.0080	<0.0080	<0.0080	<0.0080	63	<0.0040	0.0104	0.0053	0.0049	<0.0040	<0.0040
Nickle	100	0.014	0.054	0.030	0.031	0.010	0.002	75	<0.010	0.02	0.0145	0.013125	<0.010	<0.010
Phosphorus	100	1750	4280	2645	2784	698	127	100	2560	2930	2780	2741	130	46
Potassium	100	2210	3640	2900	2860	344	63	100	3860	4260	4055	4034	123	44
Selenium	100	0.344	0.636	0.525	0.510	0.080	0.015	100	0.374	0.477	0.412	0.419	0.037	0.013
Silver	10	<0.0013	0.0023	<0.0013	<0.0013	<0.0013	<0.0013	0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium	100	885	1680	1280	1262	197	36	100	481	736	546	567	89	32
Strontium	100	2.39	30.20	13.80	13.99	8.21	1.50	100	2.40	5.02	3.50	3.65	0.88	0.31
Thallium	97	<0.00040	0.00227	0.00087	0.00095	0.00043	<0.00040	100	0.00063	0.00143	0.00083	0.00090	0.00024	0.00009
Tin	63	<0.020	1.410	0.027	0.101	0.256	0.047	0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Titanium	100	0.270	1.000	0.450	0.480	0.160	0.029	100	0.168	0.223	0.211	0.205	0.018	0.007
Uranium	100	0.00045	0.02010	0.00352	0.00446	0.00405	0.00074	75	<0.00040	0.00142	0.00072	0.00067	<0.00040	<0.00040
Vanadium	0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0	0.01	0.01	0.01	0.01	0	0
Zinc	100	12.20	26.70	16.80	17.99	3.92	0.72	100	9.62	18.40	11.75	12.80	3.27	1.15

mg/kg = milligram per kilogram wet weight; > = greater than; DL = detection limit; SD = Standard deviation; SE = standard error.

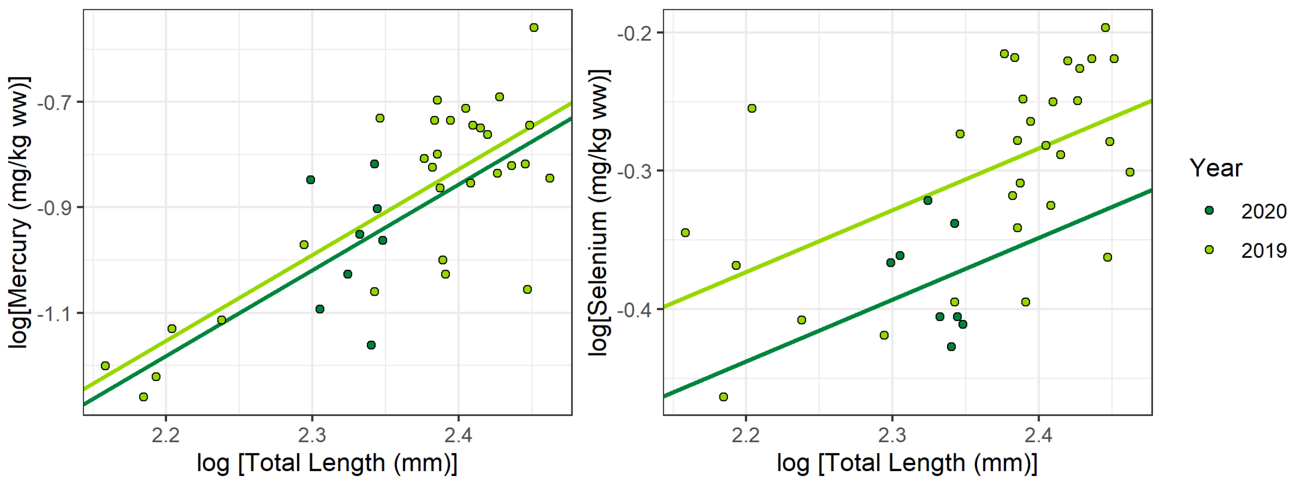


Figure 7-8: Concentrations of mercury and selenium in relation to length for Fourhorn Sculpin sampled from the Milne Port area, 2018 to 2020

7.4.3.3 *Hiatella arctica*

A total of 112 *H. arctica* samples were analyzed for metals from the Milne Port area from 2018 to 2020, including 24 samples in 2018, 80 in 2019 and eight in 2020. Summary statistics for *H. arctica* metals concentrations are provided in Table 7-12: and presented visually in Appendix 7C; Figures 7C-1 to 7C-36. Statistical comparisons for COPCs among years are provided in Table 7-9:, and outliers removed from analysis are provided in Table 7-10:.

Concentrations of metals in *H. arctica* tissue were generally similar among years with a few exceptions, such as chromium, nickel and tin which exhibited more variability. Greater concentrations of most metals were observed for *H. arctica* when compared to Arctic Char and Fourhorn Sculpin (Appendix 7C; Figures 7C-1 to 7C-36). Differences in species-specific bioaccumulation processes (e.g., filter feeder versus non-filter feeder) and tissue type (i.e., whole body versus muscle) likely contributed to the interspecific differences in tissue concentrations observed, with molluscs accumulating greater concentrations of some metals compared to fish (Bonsignore et al. 2018). For contaminants of potential concern, significant differences were observed among years for aluminum, iron, magnesium, mercury and selenium (Table 7-9:). Concentrations of these metals were significantly greater in 2019, when compared to 2018. Differences were not observed between 2018 and 2020 for any COPCs, with the exception of iron, which was significantly greater in 2020 when compared to 2018. No significant differences were observed for COPCs between 2019 and 2020. A power analysis for COPCs indicated that target sample sizes of eight fish per sampling area would be sufficient to detect differences in effect sizes ranging from 29% for selenium to 70% for mercury. Polycyclic aromatic hydrocarbons were below DL for all parameters analyzed in *H. arctica* (Appendix 7C-5).

Mercury concentrations for all *H. arctica* sampled from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada 2015). Selenium concentrations for *H. arctica* exceeded BC MOE fish tissue guidelines of 4 mg/kg dw (BC MOE 2014) in 95% of samples, with tissue concentrations in *H. arctica* from the Milne Port area ranging from 2.236 to 11.24 mg/kg dry weight from 2018 to 2020.

Table 7-12: Descriptive Statistics for *Hiatella arctica* Tissue Chemistry Data Analyzed from 2018 to 2020

Parameter	2018 (n = 24)							2019 (n = 80)							2020 (n = 8)						
(mg/kg)	>DL(%)	Min	Max	Median	Mean	SD	SE	>DL(%)	Min	Max	Median	Mean	SD	SE	>DL(%)	Min	Max	Median	Mean	SD	SE
Aluminum	100	166	920	521	516	196	40	100	109	2370	894	909	355	40	100	333	1750	685.5	757	444	157
Antimony	100	0.0039	0.0094	0.0066	0.0064	0.0016	0.0003	100	0.0043	0.0424	0.0175	0.0180	0.0060	0.0007	100	0.0085	0.0354	0.0198	0.0189	0.0082	0.0029
Arsenic	100	1.42	4.12	2.41	2.44	0.68	0.14	100	1.56	6.31	2.78	2.93	1.03	0.12	100	2.40	3.36	2.56	2.68	0.33	0.12
Barium	100	2.12	20.50	7.87	9.20	5.23	1.07	100	3.32	32.70	8.54	10.71	6.33	0.71	100	5.31	20.10	8.82	10.68	4.97	1.76
Beryllium	100	0.0120	0.0531	0.0328	0.0330	0.0112	0.0023	100	0.0072	0.1460	0.0498	0.0509	0.0199	0.0022	100	0.0213	0.0966	0.0407	0.0442	0.0236	0.0083
Bismuth	100	0.0029	0.0119	0.0068	0.0069	0.0022	0.0004	100	0.0032	0.0248	0.0115	0.0117	0.0035	0.0004	100	0.0050	0.0236	0.0088	0.0099	0.0059	0.0021
Boron	100	3.28	8.95	6.05	5.96	1.44	0.29	100	3.06	16.70	8.45	8.86	2.67	0.30	100	4.36	13.20	6.63	6.97	2.76	0.98
Cadmium	100	0.269	2.490	0.560	0.684	0.474	0.097	100	0.156	1.270	0.448	0.502	0.217	0.024	100	0.432	0.755	0.606	0.617	0.103	0.036
Calcium	100	2010	11800	5065	5570	2544	519	100	1390	27000	6985	7905	4261	476	100	4020	10600	5445	6031	2293	811
Cesium	100	0.0270	0.1650	0.0906	0.0915	0.0355	0.0072	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	100	0.61	2.58	1.49	1.53	0.55	0.11	100	0.41	7.34	2.53	2.66	1.03	0.12	100	5.90	64.00	30.55	27.95	18.03	6.38
Cobalt	100	0.221	1.720	0.708	0.785	0.391	0.080	100	0.291	3.960	0.997	1.222	0.747	0.083	100	0.757	2.460	1.445	1.456	0.536	0.190
Copper	100	1.48	3.29	2.02	2.11	0.40	0.08	100	1.42	4.49	2.23	2.32	0.55	0.06	100	1.76	4.02	2.81	2.89	0.82	0.29
Iron	100	511	2310	1280	1330	512	104	100	374	7000	2210	2338	1034	116	100	904	3910	1985	2101	961	340
Lead	100	0.203	1.840	0.692	0.739	0.349	0.071	100	0.150	3.420	1.220	1.264	0.492	0.055	100	0.429	4.330	0.993	1.361	1.270	0.449
Lithium	100	0.71	3.88	2.27	2.25	0.83	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	100	1190	5500	2565	2640	1073	219	100	1190	11600	3870	4126	1625	182	100	2370	5030	2980	3198	951	336
Manganese	100	4.8	327.0	71.3	89.6	74.8	15.3	100	14.3	634.0	87.8	136.9	136.1	15.2	100	73.9	271.0	141.5	155.6	72.3	25.5
Mercury	100	0.0110	0.0697	0.0227	0.0272	0.0145	0.0030	100	0.0150	0.0780	0.0300	0.0329	0.0138	0.0015	100	0.0220	0.0470	0.0305	0.0321	0.0087	0.0031
Molybdenum	100	0.134	0.518	0.258	0.263	0.104	0.021	100	0.134	1.270	0.293	0.372	0.191	0.021	100	0.282	1.300	0.719	0.708	0.306	0.108
Nickle	100	0.79	2.72	1.45	1.54	0.50	0.10	100	0.74	4.26	2.04	2.13	0.65	0.07	100	3.46	29.90	14.35	13.35	8.17	2.89
Phosphorus	100	726	2020	1190	1195	257	53	100	705	3160	1225	1395	546	61	100	1020	1570	1270	1289	205	72
Potassium	100	799	2120	1415	1432	268	55	100	871	1950	1200	1247	240	27	100	1260	1700	1445	1450	126	45
Rubidium	100	0.95	3.18	2.01	1.97	0.57	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	100	0.65	1.43	1.21	1.17	0.17	0.03	100	0.74	2.01	1.40	1.39	0.27	0.03	100	1.05	1.56	1.24	1.26	0.17	0.06
Silver	-	-	-	-	-	-	-	100	0.0019	0.0219	0.0049	0.0058	0.0036	0.0004	100	0.0035	0.0083	0.0047	0.0048	0.0016	0.0006
Sodium	100	1890	6480	3955	4110	1246	254	100	1680	5660	4205	4159	869	97	100	3250	4490	3785	3771	456	161
Strontium	100	9.23	46.20	19.75	21.54	9.23	1.88	100	7.44	89.90	15.95	19.94	13.36	1.49	100	10.30	30.20	14.85	16.19	6.23	2.20
Tellurium	25	<0.0040	0.0052	<0.0040	<0.0040	<0.0040	<0.0040	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	100	0.0047	0.0377	0.0129	0.0136	0.0075	0.0015	100	0.0037	0.0636	0.0210	0.0228	0.0107	0.0012	100	0.0107	0.0422	0.019	0.0198	0.0101	0.0036
Tin	83	<0.020	0.352	0.033	0.046	0.067	<0.020	100	0.010	0.529	0.060	0.071	0.059	0.007	100	0.086	0.360	0.160	0.184	0.086	0.030
Titanium	-	-	-	-	-	-	-	100	4.6	109.0	33.7	34.4	14.8	1.6	100	13.8	63.2	25.2	27.6	15.7	5.5
Uranium	100	0.082	0.185	0.120	0.125	0.030	0.006	100	0.090	0.435	0.197	0.203	0.072	0.008	100	0.087	0.277	0.142	0.153	0.056	0.020
Vanadium	100	0.80	3.96	2.42	2.41	0.90	0.18	100	0.83	7.54	3.76	3.91	1.32	0.15	100	1.88	6.94	3.38	3.43	1.57	0.55
Zinc	100	7.06	14.40	11.55	11.26	1.83	0.37	100	8.61	20.90	13.65	13.65	2.30	0.56	100	11.50	17.90	12.70	13.30	2.07	0.73
Zirconium	100	0.222	1.190	0.707	0.718	0.271	0.055	-	-	-	-	-	-	-	-	-	-	-	-	-	-

mg/kg = milligram per kilogram wet weight; > = greater than; DL = detection limit; SD = Standard deviation; SE = standard error.

7.5 Discussion

A total of 1989 fish representing at least 13 species were measured, weighed, and/or aged from the Milne Port area between 2010 and 2020. Catches in 2020 were greater than recent years with 680 fish representing at least seven species processed. The fish community sampled from the Milne Port area was dominated by Arctic Char, Fourhorn Sculpin and Shorthorn Sculpin. Size distributions for Arctic Char and Fourhorn Sculpin were relatively consistent from 2018 to 2020, while Shorthorn Sculpin were more variable. Significant differences were observed among years in condition for these species; however, effect sizes were generally small (<10%) and below thresholds typically considered to pose a potential risk to the environment (Environment Canada 2012). For Arctic Char and Shorthorn Sculpin, condition was greater in 2020 than previously observed in 2018 or 2019. Shorthorn Sculpin exhibited greater interannual variability in body size relative to Arctic Char and Fourhorn Sculpin, with greater variation in length-frequency distributions and both significant decreases and increases in condition between 2018 to 2020. Ages of Arctic Char and Fourhorn Sculpin were similar to previous observations in 2018 and/or 2019. The magnitude and direction of differences in length and weight suggest the Project has not affected condition of fish in the Milne Port area.

Stomach contents of Arctic Char and Fourhorn Sculpin were variable from 2019 to 2020, with a considerable shift observed in the dominance of fish as a prey item for both species between years. For Arctic Char, fish accounted for 55% of stomach contents by weight in 2020, compared to 4% in 2019. For Fourhorn Sculpin, fish accounted for <1% of stomach contents by weight in 2020, compared to 27% in 2019. These findings suggest that the diet of Arctic Char and Fourhorn Sculpin in the Milne Port area may be opportunistic and naturally variable, influenced by relative prey abundance and catchability rather than a specific preference for any one prey item.

Detailed fish health data were collected for Fourhorn Sculpin and *H. arctica* for the first time in 2020 and are anticipated to better align the MEEMP and any future monitoring programs with the MDMER EEM program. Based on internal and external examinations, Fourhorn Sculpin from the Milne Port area appeared to be healthy at the time of sampling with few abnormalities observed. Sample timing appeared to be appropriate for future assessments of reproductive endpoints for Fourhorn Sculpin with all individuals assessed observed to be in the late stages of gonadal recrudescence. Sample timing of *H. arctica* may not be optimal for assessing reproductive endpoints, as gonads could not be readily extracted from collected samples. Timing of spawning for *H. arctica* appears to be associated with phytoplankton biomass and varies with geographical location (Brandner et al. 2017). Gonad development for this species may also be asynchronous, with multiple overlapping spawning events occurring throughout the year, potentially leading to a high degree of variability in gonad size regardless of sample timing. As this was the first time fish health data were collected from *H. arctica* for the Milne Port area, further interpretation of the data was limited.

A total of 24 samples were submitted for tissue chemistry analysis of metals and PAH in 2020, which included eight samples each for Arctic Char, Fourhorn Sculpin and *H. arctica*. Tissue concentrations of PAH were below DL for all species analyzed in 2020, while metal concentrations were generally above DLs and more variable among species and years. Tissue concentrations of metals for Arctic Char in 2020 were generally comparable to historic data; however, from 2018 to 2020 significant differences were observed among years for three COPCs: aluminum, magnesium and selenium. Concentrations of aluminum and magnesium increased over this period by 72% and 10%, respectively, while selenium decreased by 3%. Historic data indicated that metal concentrations were variable over time and despite significant increases in aluminum and magnesium from 2018 to 2020, concentrations of these metals remained similar to baseline data.

Tissue concentrations of metals for Fourhorn Sculpin in 2020 were generally comparable to data collected in 2019; however, significant differences were observed among years for three COPCs: aluminum, iron and selenium, all of which were significantly lower in 2020 when compared to 2019. Tissue concentrations of metals for *H. arctica*, were generally comparable to data collected in 2018 and 2019; however, as with the other species examined, significant differences were observed in COPCs. Significant differences were observed among years for aluminum, iron, magnesium, mercury and selenium; however, the RPDs were small, ranging from relative increases of 8% to 43%. To confirm that differences in concentrations between years were real and less likely to be attributed to low concentrations of target contaminants, analytical variability, and spatial and temporal variation, an effect size of 100% was used to differentiate stochastic differences from those of potential biological importance (Environment Canada 2012). Therefore, significant differences in concentrations of COPCs for Arctic Char, Fourhorn Sculpin and *H. arctica* between 2018 and 2020 appeared to reflect natural variability in these metals and were, therefore, not considered to be Project-related.

Tissue metals concentrations in *H. arctica* were consistently greater than those measured in Arctic Char and Fourhorn Sculpin, occasionally by orders of magnitude. This likely reflects species-specific differences in bioaccumulation processes and the tissue types analyzed (i.e., whole body versus muscle). *Hiatella arctica* is a long-lived, sedentary, filter feeding mollusc closely associated with the sediment. These life-history characteristics increase the potential for exposure and accumulation of metals, from both natural and anthropogenic sources, relative to fish; molluscs generally accumulate some metals to greater degree compared to fish (Bonsignore et al. 2018).

All tissue samples for Arctic Char, Fourhorn Sculpin and *H. arctica* collected from 2018 to 2020 were below Health Canada's Maximum Levels for Chemical Contaminants in Foods mercury consumption guideline of 0.5 mg/kg ww (Health Canada 2015) and below BC MOE fish tissue guidelines of 4 mg/kg dw for selenium (BC MOE 2014). Tissue chemistry results were within FEIS predictions, which indicated the potential for non-significant, low magnitude effects on Arctic Char fish health and condition.

7.6 Conclusions and Recommendations

The MEEMP has been designed to meet the objectives of the various conditions associated with PC 005, as well as to evaluate whether Project activities have impacted the marine environment over time. Original FEIS predictions indicated the potential for low magnitude changes in some ecological parameters, such as water quality and Arctic Char tissue chemistry, but characterised these changes as not significant. Overall, monitoring data align with these predictions, as observed changes were typically minor and either within established guidelines or consistent with baseline levels. Thus, monitoring to date suggests that Project mitigation is functioning as intended and that Project activities are being managed in a way that has not adversely affected the marine ecosystem. Moving forward, continued monitoring of proposed MEEMP components is recommended to ensure continuity in established time series (e.g., Arctic Char) or to better characterize baseline data (e.g., sculpin and *H. arctica* tissue chemistry).

7.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-230-7630.

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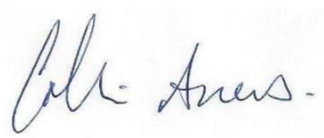

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APPENDIX 7A

Fish Catch Data

Table 7A-1: Sample Counts for Fish Measured, Weighed and Aged from the Milne Port Area, 2010 to 2020

Species	Year	Count of Length	Count of Weight	Count of Age
Arctic Char	2010	11	11	11
	2013	17	5	11
	2014	3	3	0
	2015	67	66	32
	2016	157	156	105
	2017	23	22	1
	2018	169	156	26
	2019	105	105	46
	2020	148	148	43
Arctic Cod	2018	1	1	0
Arctic Sculpin	2014	4	4	0
	2015	1	1	0
	2017	6	6	0
	2018	3	2	0
	2020	13	13	0
Arctic Staghorn Sculpin	2010	3	3	0
	2013	2	2	1
	2015	2	2	0
	2020	1	1	0
Fourhorn Sculpin	2010	6	6	0
	2013	2	2	2
	2014	39	39	0
	2015	13	13	1
	2016	17	17	0
	2017	28	24	0
	2018	147	146	0
	2019	106	106	30
	2020	387	388	44
Fourline Snakeblenny	2014	2	2	0
	2015	1	1	0
	2020	1	0	0
Greenland Cod	2010	2	2	0
	2014	1	1	0
	2020	57	57	3
Atlantic Hookear Sculpin	2014	5	5	0
	2015	1	1	0
Longhorn Sculpin	2014	4	4	0
	2015	2	2	0
	2016	2	2	0
Lumpfish	2014	1	1	0
Ninespine Stickleback	2019	1	1	0

Species	Year	Count of Length	Count of Weight	Count of Age
Indeterminate Sand Lances	2017	1	1	0
	2018	1	0	0
	2019	1	1	0
	2020	5	5	0
Shorthorn Sculpin	2010	50	50	0
	2013	1	1	0
	2014	10	9	0
	2015	8	8	0
	2016	18	18	0
	2017	21	20	0
	2018	78	77	0
	2019	66	66	0
	2020	74	74	0
Twohorn Sculpin	2013	1	0	0
Indeterminate Sculpins	2015	11	11	0
	2018	3	1	0
	2020	73	75	0
Total		1989	1949	254

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
Arctic Char	BAFF2020MLNARCH063	132	19	-
	BAFF2020MLNARCH128	505	1020	-
	BAFF2020MLNARCH129	599	1960	-
	BAFF2020MLNARCH130	441	910	-
	BAFF2020MLNARCH131	272	120	-
	BAFF2020MLNARCH136	602	2320	-
	BAFF2020MLNARCH137	512	1320	-
	BAFF2020MLNARCH146	640	2980	-
	BAFF2020MLNARCH147	395	610	-
	GN06ARCH03	348	480	14
	BAFF20UMILNGNO6ARCH09	558	1980	11
	BAFF2020MLNARCH155	491	1300	-
	BAFF2020MLNARCH156	139	25	-
	BAFF2020MLNARCH157	134	22	-
	BAFF2020MLNARCH158	142	30	-
	BAFF2020MLNARCH187	652	3400	-
	BAFF2020MLNARCH188	542	1650	-
	BAFF2020MLNARCH189	528	1420	-
	BAFF2020MLNARCH190	516	1400	-
	BAFF2020MLNARCH195	440	900	-
	BAFF2020MLNARCH202	142	22	-
	BAFF2020MLNARCH204	368	600	-
	BAFF20UMILNGN10ARCH01	638	3260	-
	BAFF2020MLNARCH213	422	720	-
	BAFF2020MLNARCH214	338	340	-
	BAFF2020MLNARCH215	378	460	-
	BAFF2020MLNARCH216	420	830	-
	BAFF2020MLNARCH217	352	490	-
	BAFF2020MLNARCH218	411	860	-
	BAFF20UMILNGN10ARCH08	480	1380	12
	BAFF20UMILNGN10ARCH12	355	450	16
	BAFF20UMILNGN10ARCH10	412	880	12
	BAFF20UMILNGN10ARCH11	528	1660	14
	BAFF2020MLNARCH223	427	870	-
	BAFF20UMLNGN10ARCH013	313	360	13
	BAFF2020MLNARCH225	314	400	-
	BAFF2020MLNARCH231	414	890	-
	BAFF2020MLNARCH232	326	450	-
	BAFF2020MLNARCH233	326	350	-
	BAFF2020MLNARCH236	623	2760	-
	BAFF2020MLNARCH237	447	1100	-
	BAFF2020MLNARCH238	400	740	-
	GN11ARCH04	282	260	6
	GN11ARCH11	512	1700	9
	GN11ARCH12	430	870	13
	BAFF2020MLNARCH251	668	4040	-
	BAFF2020MLNARCH252	459	1310	-
	BAFF2020MLNARCH253	478	1260	-
	BAFF2020MLNARCH254	460	1320	-
	GN11ARCH20	462	1240	14
	GN11ARCH21	432	1070	13
	GN11ARCH22	439	940	14
	GN11ARCH23	409	780	12
	GN11ARCH24	456	1370	8
	GN11ARCH25	366	690	6
	GN11ARCH26	268	230	4
	BAFF2020MLNARCH263	636	2910	-
	BAFF20UMILNGN13ARCH05	302	270	14
	BAFF2020MLNARCH281	509	1920	-
	BAFF2020MLNARCH282	366	610	-
	BAFF2020MLNARCH283	414	760	-
	BAFF20UMILNGN13ARCH17	374	720	5
	BAFF2020MLNARCH329	400	260	-
	BAFF2020MLNARCH393	526	1620	-
	BAFF2020MLNARCH394	380	510	-
	BAFF2020MLNARCH395	850	6110	-
	BAFF20UMILNGN14ARCH04	425	520	12
	BAFF2020MLNARCH399	350	300	-
	BAFF2020MLNARCH400	381	600	-
	BAFF2020MLNARCH401	342	410	-
	BAFF2020MLNARCH402	361	520	-
	BAFF20UMILNGN15ARCH05	354	490	12
	BAFF2020MLNARCH503	424	940	-
	BAFF2020MLNARCH504	496	1570	-
	BAFF20UMLNGN16ARCH03	350	460	8
	BAFF2020MLNARCH569	859	6710	-
	BAFF2020MLNARCH570	568	2430	-
	BAFF2020MLNARCH571	638	3990	-
	BAFF2020MLNARCH572	321	380	-
	BAFF2020MLNARCH573	594	2550	-
	BAFF20UMLNGN17ARCH008	452	1240	12
	BAFF20UMLNGN17ARCH009	398	750	8
	BAFF20UMLNGN18ARCH003	674	3910	9
	BAFF20UMLNGN18ARCH004	453	1140	14
	BAFF2020MLNARCH620	832	3830	-
	BAFF2020MLNARCH621	443	1190	-
	BAFF2020MLNARCH622	380	590	-
	BAFF2020MLNARCH623	403	770	-
	BAFF2020MLNARCH624	414	840	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF20UMLNGN19ARCH012	435	950	13
	BAFF2020MLNARCH632	372	570	-
	BAFF2020MLNARCH633	581	2500	-
	BAFF2020MLNARCH634	348	510	-
	BAFF2020MLNARCH635	326	320	-
	BAFF2020MLNARCH636	410	810	-
	BAFF2020MLNARCH637	312	340	-
	BAFF2020MLNARCH638	318	380	-
	BAFF2020MLNARCH639	287	250	-
	BAFF2020MLNARCH640	425	740	-
	BAFF2020MLNARCH641	291	270	-
	BAFF2020MLNARCH642	319	360	-
	BAFF2020MLNARCH643	274	260	-
	BAFF2020MLNARCH644	312	340	-
	BAFF2020MLNARCH645	320	210	-
	BAFF20UMLNGN19ARCH029	415	900	11
	BAFF20UMLNGN19ARCH030	383	630	15
	BAFF20UMLNGN19ARCH031	342	460	12
	BAFF2020MLNARCH659	542	1780	-
	BAFF2020MLNARCH660	556	2060	-
	BAFF20UMILNGN20ARCH04	445	790	11
	BAFF20UMILNGN20ARCH05	310	320	10
	BAFF20UMILNGN20ARCH06	472	1230	13
	BAFF20UMILNGN20ARCH15	409	740	11
	BAFF20UMILNGN20ARCH16	373	500	7
	BAFF20UMILNGN20ARCH17	387	690	8
	BAFF2020MLNARCH677	314	290	-
	BAFF2020MLNARCH678	636	3920	-
	BAFF2020MLNARCH679	463	1240	-
	BAFF2020MLNARCH680	468	1230	-
	BAFF2020MLNARCH681	281	280	-
	BAFF2020MLNARCH682	346	470	-
	BAFF2020MLNARCH683	309	340	-
	BAFF2020MLNARCH684	382	530	-
	BAFF2020MLNARCH685	515	1680	-
	BAFF2020MLNARCH686	395	760	-
	BAFF2020MLNARCH687	424	1100	-
	BAFF2020MLNARCH688	352	520	-
	BAFF20UMILNGN23aARCH008	436	1120	13
	BAFF2020MLNARCH694	587	2430	-
	BAFF2020MLNARCH695	359	540	-
	BAFF2020MLNARCH696	420	1020	-
	BAFF2020MLNARCH697	409	820	-
	BAFF2020MLNARCH699	160	10	-
	BAFF20UMILNGN23aARCH015	449	1200	11
	BAFF20UMILNGN23aARCH016	266	130	4
	BAFF20UMILNGN23aARCH017	275	110	7
	BAFF2020MLNARCH703	318	140	-
	BAFF2020MLNARCH704	340	230	-
	BAFF2020MLNARCH705	475	1240	-
	BAFF2020MLNARCH706	330	420	-
	BAFF2020MLNARCH707	360	510	-
	BAFF2020MLNARCH708	308	310	-
	BAFF20UMILNGN23ARCH024	298	250	6
	BAFF2020MLNARCH710	325	420	-
	BAFF2020MLNARCH741	542	2120	-
	BAFF20UMILNGN24ARCH002	548	2160	8
	BAFF2020MLNARCH745	175	65	-
	BAFF20UMILNHN10ARCH001	191	80	2
Arctic sculpin	BAFF2020MLNARSC469	145	36	-
	BAFF2020MLNARSC549	200	118	-
	BAFF2020MLNARSC551	119	21	-
	BAFF2020MLNARSC564	127	27	-
	BAFF2020MLNARSC584	178	60	-
	BAFF2020MLNARSC654	132	31	-
	BAFF2020MLNARSC655	90	9	-
	BAFF2020MLNARSC726	130	33	-
	BAFF2020MLNARSC727	131	29	-
	BAFF2020MLNARSC749	143	39	-
	BAFF2020MLNARSC753	138	37	-
	BAFF2020MLNARSC760	274	200	-
	BAFF2020MLNARSC762	112	21	-
Fourhorn Sculpin	BAFF2020MLNFHSC001	134	20	-
	BAFF2020MLNFHSC002	134	17	-
	BAFF2020MLNFHSC004	130	19	-
	BAFF2020MLNFHSC013	187	65	-
	BAFF2020MLNFHSC014	193	54	-
	BAFF2020MLNFHSC027	177	38	-
	BAFF2020MLNFHSC030	142	22	-
	BAFF2020MLNFHSC039	163	47	-
	BAFF2020MLNFHSC044	144	23	-
	BAFF2020MLNFHSC045	126	16	-
	BAFF2020MLNFHSC046	92	6	-
	BAFF2020MLNFHSC047	93	6	-
	BAFF2020MLNFHSC048	87	5	-
	BAFF2020MLNFHSC050	85	4	-
	BAFF2020MLNFHSC051	84	4	-
	BAFF2020MLNFHSC052	78	3	-
	BAFF2020MLNFHSC053	84	4	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[a]
	BAFF2020MLNFHSC054	86	5	-
	BAFF2020MLNFHSC055	72	3	-
	BAFF2020MLNFHSC056	73	3	-
	BAFF2020MLNFHSC057	123	14	-
	BAFF2020MLNFHSC058	115	11	-
	BAFF2020MLNFHSC059	83	4	-
	BAFF2020MLNFHSC060	87	5	-
	BAFF2020MLNFHSC081	186	53	-
	BAFF2020MLNFHSC082	190	73	-
	BAFF2020MLNFHSC083	178	50	-
	BAFF2020MLNFHSC084	172	44	-
	BAFF2020MLNFHSC085	205	92	-
	BAFF2020MLNFHSC086	230	100	-
	BAFF2020MLNFHSC087	160	33	-
	BAFF2020MLNFHSC088	204	93	-
	BAFF2020MLNFHSC089	235	107	-
	BAFF2020MLNFHSC090	-	340	-
	BAFF2020MLNFHSC091	307	290	-
	BAFF2020MLNFHSC092	268	200	-
	BAFF2020MLNFHSC093	261	130	-
	BAFF2020MLNFHSC094	214	85	-
	BAFF2020MLNFHSC095	231	110	-
	BAFF2020MLNFHSC096	190	65	-
	BAFF2020MLNFHSC097	231	130	-
	BAFF2020MLNFHSC098	174	63	-
	BAFF2020MLNFHSC099	146	27	-
	BAFF2020MLNFHSC100	180	54	-
	BAFF2020MLNFHSC101	139	24	-
	BAFF2020MLNFHSC102	214	99	-
	BAFF2020MLNFHSC104	182	58	-
	BAFF2020MLNFHSC105	248	120	-
	BAFF2020MLNFHSC106	178	52	-
	BAFF2020MLNFHSC107	290	270	-
	BAFF2020MLNFHSC108	230	120	-
	BAFF2020MLNFHSC110	232	113	-
	BAFF2020MLNFHSC111	192	68	-
	BAFF2020MLNFHSC112	270	250	-
	BAFF2020MLNFHSC113	238	130	-
	BAFF2020MLNFHSC114	230	150	-
	BAFF2020MLNFHSC115	198	80	-
	BAFF2020MLNFHSC116	242	140	-
	BAFF2020MLNFHSC117	246	160	-
	BAFF2020MLNFHSC118	284	220	-
	BAFF2020MLNFHSC119	276	250	-
	BAFF2020MLNFHSC120	244	140	-
	BAFF2020MLNFHSC121	198	66	-
	BAFF2020MLNFHSC123	151	28	-
	BAFF2020MLNFHSC124	170	43	-
	BAFF2020MLNFHSC125	160	34	-
	BAFF2020MLNFHSC126	165	43	-
	BAFF2020MLNFHSC127	174	67	-
	BAFF2020MLNFHSC132	216	91	-
	BAFF2020MLNFHSC133	198	61	-
	BAFF2020MLNFHSC134	209	72	-
	BAFF2020MLNFHSC135	164	36	-
	BAFF2020MLNFHSC139	173	41	-
	BAFF2020MLNFHSC140	174	46	-
	BAFF2020MLNFHSC141	227	114	-
	BAFF2020MLNFHSC145	247	150	-
	BAFF2020MLNFHSC149	261	240	-
	BAFF2020MLNFHSC150	192	67	-
	BAFF2020MLNFHSC151	201	68	-
	BAFF2020MLNFHSC160	294	310	-
	BAFF2020MLNFHSC161	243	110	-
	BAFF2020MLNFHSC162	211	79	-
	BAFF2020MLNFHSC163	230	110	-
	BAFF2020MLNFHSC164	215	87	-
	BAFF2020MLNFHSC165	214	94	-
	BAFF2020MLNFHSC166	238	113	-
	BAFF2020MLNFHSC167	193	72	-
	BAFF2020MLNFHSC168	194	67	-
	BAFF2020MLNFHSC169	199	83	-
	BAFF2020MLNFHSC171	185	65	-
	BAFF2020MLNFHSC172	191	74	-
	BAFF2020MLNFHSC173	180	53	-
	BAFF2020MLNFHSC175	189	66	-
	BAFF2020MLNFHSC176	184	60	-
	BAFF2020MLNFHSC177	166	44	-
	BAFF2020MLNFHSC178	196	57	-
	BAFF2020MLNFHSC180	175	46	-
	BAFF2020MLNFHSC181	149	26	-
	BAFF2020MLNFHSC182	157	36	-
	BAFF2020MLNFHSC183	166	40	-
	BAFF2020MLNFHSC186	187	57	-
	BAFF2020MLNFHSC191	226	96	-
	BAFF2020MLNFHSC192	252	130	-
	BAFF2020MLNFHSC193	232	925	-
	BAFF2020MLNFHSC194	182	48	-
	BAFF2020MLNFHSC196	172	45	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF2020MLNFHSC197	202	77	-
	BAFF2020MLNFHSC198	170	42	-
	BAFF2020MLNFHSC199	160	35	-
	BAFF2020MLNFHSC200	160	37	-
	BAFF2020MLNFHSC201	162	36	-
	BAFF2020MLNFHSC203	118	13	-
	BAFF2020MLNFHSC205	218	101	-
	BAFF2020MLNFHSC206	166	41	-
	BAFF2020MLNFHSC207	184	59	-
	BAFF2020MLNFHSC208	156	36	-
	BAFF2020MLNFHSC209	160	37	-
	BAFF2020MLNFHSC210	192	58	-
	BAFF2020MLNFHSC211	170	47	-
	BAFF2020MLNFHSC226	244	130	-
	BAFF2020MLNFHSC227	260	180	-
	BAFF2020MLNFHSC228	268	210	-
	BAFF2020MLNFHSC229	200	74	-
	BAFF2020MLNFHSC230	198	61	-
	BAFF2020MLNFHSC234	314	400	-
	BAFF2020MLNFHSC235	304	310	-
	BAFF20UMLNFHSC1101	216	89	7
	BAFF2020MLNFHSC241	168	38	-
	BAFF2020MLNFHSC242	180	52	-
	BAFF20UMLNFHSC1102	201	87	6
	BAFF20UMLNFHSC1103	199	76	4
	BAFF20UMLNFHSC1104	252	170	7
	BAFF20UMLNFHSC1201	295	260	8
	BAFF2020MLNFHSC268	175	48	-
	BAFF2020MLNFHSC269	125	14	-
	BAFF2020MLNFHSC270	161	33	-
	BAFF20UMLNFHSC1301	219	102	4
	BAFF20UMLNFHSC1302	199	71	5
	BAFF2020MLNFHSC275	185	56	-
	BAFF2020MLNFHSC277	185	55	-
	BAFF2020MLNFHSC279	170	51	-
	BAFF2020MLNFHSC280	160	35	-
	BAFF2020MLNFHSC286	184	65	-
	BAFF2020MLNFHSC287	188	58	-
	BAFF2020MLNFHSC288	175	53	-
	BAFF2020MLNFHSC290	182	57	-
	BAFF2020MLNFHSC291	168	37	-
	BAFF2020MLNFHSC292	161	35	-
	BAFF2020MLNFHSC293	183	67	-
	BAFF2020MLNFHSC295	137	23	-
	BAFF20UMLNFHSC1305	198	66	4
	BAFF20UMLNFHSC1306	210	70	4
	BAFF20UMLNFHSC1307	194	80	4
	BAFF20UMLNFHSC1303	223	111	8
	BAFF20UMLNFHSC1304	211	90	5
	BAFF20UMLNFHSC1002	217	89	5
	BAFF2020MLNFHSC311	190	56	-
	BAFF2020MLNFHSC320	170	45	-
	BAFF2020MLNFHSC321	172	46	-
	BAFF2020MLNFHSC358	144	24	-
	BAFF2020MLNFHSC359	189	60	-
	BAFF2020MLNFHSC360	194	64	-
	BAFF2020MLNFHSC361	201	65	-
	BAFF2020MLNFHSC362	195	70	-
	BAFF2020MLNFHSC364	172	40	-
	BAFF2020MLNFHSC365	167	38	-
	BAFF2020MLNFHSC366	183	60	-
	BAFF2020MLNFHSC367	175	57	-
	BAFF2020MLNFHSC368	180	56	-
	BAFF2020MLNFHSC370	184	54	-
	BAFF2020MLNFHSC371	156	32	-
	BAFF2020MLNFHSC374	170	39	-
	BAFF2020MLNFHSC376	177	47	-
	BAFF2020MLNFHSC377	148	30	-
	BAFF2020MLNFHSC378	179	49	-
	BAFF2020MLNFHSC379	215	109	-
	BAFF2020MLNFHSC380	203	67	-
	BAFF2020MLNFHSC381	203	83	-
	BAFF2020MLNFHSC382	230	116	-
	BAFF2020MLNFHSC383	209	99	-
	BAFF2020MLNFHSC384	210	74	-
	BAFF2020MLNFHSC385	242	110	-
	BAFF2020MLNFHSC386	210	99	-
	BAFF2020MLNFHSC387	221	114	-
	BAFF2020MLNFHSC388	194	64	-
	BAFF20UMLNFHSC1013	220	117	5
	BAFF20UMLNFHSC1014	215	82	6
	BAFF20UMLNFHSC1015	205	75	5
	BAFF20UMLNFHSC1016	197	85	6
	BAFF20UMLNFHSC1011	257	170	7
	BAFF20UMLNFHSC1012	221	105	6
	BAFF2020MLNFHSC404	172	47	-
	BAFF20UMILNHN06PHSC02	161	41	4
	BAFF20UMLNFHSC1017	223	114	5
	BAFF2020MLNFHSC407	179	50	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF2020MLNFHSC408	180	47	-
	BAFF2020MLNFHSC409	147	24	-
	BAFF20UMLNFHSC1005	210	81	5
	BAFF2020MLNFHSC412	175	49	-
	BAFF20UMLNFHSC1006	211	89	5
	BAFF20UMLNFHSC1007	194	65	5
	BAFF20UMLNFHSC1008	209	79	5
	BAFF2020MLNFHSC416	174	42	-
	BAFF2020MLNFHSC417	182	59	-
	BAFF20UMLNFHSC1018	189	80	4
	BAFF20UMLNFHSC1019	276	230	6
	BAFF20UMLNFHSC1020	190	71	4
	BAFF20UMLNFHSC1021	230	126	5
	BAFF20UMLNFHSC1022	216	91	5
	BAFF2020MLNFHSC423	229	120	-
	BAFF2020MLNFHSC424	217	101	-
	BAFF2020MLNFHSC425	274	190	-
	BAFF2020MLNFHSC426	219	102	-
	BAFF2020MLNFHSC427	231	130	-
	BAFF2020MLNFHSC428	166	37	-
	BAFF2020MLNFHSC429	225	108	-
	BAFF2020MLNFHSC434	173	48	-
	BAFF2020MLNFHSC435	174	51	-
	BAFF2020MLNFHSC436	176	55	-
	BAFF2020MLNFHSC437	191	79	-
	BAFF2020MLNFHSC438	172	44	-
	BAFF2020MLNFHSC439	179	53	-
	BAFF2020MLNFHSC440	163	43	-
	BAFF2020MLNFHSC441	204	75	-
	BAFF2020MLNFHSC442	130	19	-
	BAFF2020MLNFHSC443	156	31	-
	BAFF2020MLNFHSC444	160	39	-
	BAFF2020MLNFHSC445	185	53	-
	BAFF2020MLNFHSC446	157	30	-
	BAFF2020MLNFHSC447	213	97	-
	BAFF2020MLNFHSC448	228	114	-
	BAFF2020MLNFHSC449	207	95	-
	BAFF2020MLNFHSC450	170	39	-
	BAFF2020MLNFHSC451	234	120	-
	BAFF2020MLNFHSC452	160	34	-
	BAFF2020MLNFHSC453	182	62	-
	BAFF2020MLNFHSC454	167	45	-
	BAFF2020MLNFHSC455	194	70	-
	BAFF2020MLNFHSC456	169	40	-
	BAFF2020MLNFHSC457	150	30	-
	BAFF2020MLNFHSC458	175	49	-
	BAFF2020MLNFHSC459	165	39	-
	BAFF2020MLNFHSC460	163	43	-
	BAFF2020MLNFHSC461	169	37	-
	BAFF2020MLNFHSC462	163	39	-
	BAFF2020MLNFHSC463	173	47	-
	BAFF2020MLNFHSC464	164	37	-
	BAFF2020MLNFHSC465	140	21	-
	BAFF2020MLNFHSC466	175	48	-
	BAFF2020MLNFHSC467	150	27	-
	BAFF2020MLNFHSC468	157	38	-
	BAFF2020MLNFHSC470	140	22	-
	BAFF2020MLNFHSC471	159	35	-
	BAFF2020MLNFHSC472	163	36	-
	BAFF2020MLNFHSC473	136	18	-
	BAFF2020MLNFHSC474	148	30	-
	BAFF2020MLNFHSC475	127	19	-
	BAFF2020MLNFHSC476	129	16	-
	BAFF2020MLNFHSC477	134	19	-
	BAFF20UMLNFHSC1023	310	380	7
	BAFF20UMLNFHSC1024	236	148	9
	BAFF20UMLNFHSC1025	212	78	5
	BAFF20UMLNFHSC1026	226	104	6
	BAFF20UMLNFHSC1027	190	66	5
	BAFF20UMLNFHSC1028	220	104	5
	BAFF20UMLNFHSC1029	250	150	5
	BAFF20UMLNFHSC1030	198	71	6
	BAFF20UMLNFHSC1031	197	70	5
	BAFF20UMLNFHSC1032	235	119	5
	BAFF20UMLNFHSC1033	214	86	5
	BAFF20UMLNFHSC1034	276	230	9
	BAFF2020MLNFHSC490	244	140	-
	BAFF2020MLNFHSC491	263	200	-
	BAFF2020MLNFHSC492	263	160	-
	BAFF2020MLNFHSC493	200	68	-
	BAFF2020MLNFHSC494	229	120	-
	BAFF2020MLNFHSC495	191	60	-
	BAFF2020MLNFHSC496	209	91	-
	BAFF2020MLNFHSC497	204	75	-
	BAFF2020MLNFHSC498	200	75	-
	BAFF2020MLNFHSC499	196	72	-
	BAFF2020MLNFHSC500	196	72	-
	BAFF2020MLNFHSC501	184	54	-
	BAFF2020MLNFHSC502	210	82	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF2020MLNFHSC506	201	73	-
	BAFF2020MLNFHSC507	236	190	-
	BAFF2020MLNFHSC508	243	130	-
	BAFF2020MLNFHSC509	243	150	-
	BAFF2020MLNFHSC510	272	180	-
	BAFF2020MLNFHSC511	220	96	-
	BAFF2020MLNFHSC512	213	97	-
	BAFF2020MLNFHSC513	251	130	-
	BAFF2020MLNFHSC514	203	72	-
	BAFF2020MLNFHSC515	254	190	-
	BAFF2020MLNFHSC516	232	96	-
	BAFF2020MLNFHSC517	235	130	-
	BAFF2020MLNFHSC518	241	130	-
	BAFF2020MLNFHSC519	233	118	-
	BAFF2020MLNFHSC520	208	83	-
	BAFF2020MLNFHSC521	217	83	-
	BAFF2020MLNFHSC522	231	130	-
	BAFF2020MLNFHSC523	253	150	-
	BAFF2020MLNFHSC524	205	83	-
	BAFF2020MLNFHSC525	228	100	-
	BAFF2020MLNFHSC526	200	72	-
	BAFF2020MLNFHSC527	199	79	-
	BAFF2020MLNFHSC528	197	69	-
	BAFF2020MLNFHSC529	195	69	-
	BAFF2020MLNFHSC530	208	78	-
	BAFF2020MLNFHSC531	204	77	-
	BAFF2020MLNFHSC532	192	64	-
	BAFF2020MLNFHSC533	211	86	-
	BAFF2020MLNFHSC534	207	80	-
	BAFF2020MLNFHSC535	181	56	-
	BAFF2020MLNFHSC536	209	87	-
	BAFF2020MLNFHSC537	191	70	-
	BAFF2020MLNFHSC538	179	49	-
	BAFF2020MLNFHSC539	210	89	-
	BAFF2020MLNFHSC540	219	96	-
	BAFF2020MLNFHSC541	194	52	-
	BAFF2020MLNFHSC542	175	52	-
	BAFF2020MLNFHSC543	193	71	-
	BAFF2020MLNFHSC544	242	120	-
	BAFF2020MLNFHSC545	148	30	-
	BAFF2020MLNFHSC546	189	65	-
	BAFF2020MLNFHSC547	162	37	-
	BAFF2020MLNFHSC548	177	48	-
	BAFF2020MLNFHSC552	214	85	-
	BAFF2020MLNFHSC554	196	68	-
	BAFF2020MLNFHSC555	195	68	-
	BAFF2020MLNFHSC557	186	54	-
	BAFF2020MLNFHSC559	224	119	-
	BAFF2020MLNFHSC560	223	108	-
	BAFF2020MLNFHSC561	196	66	-
	BAFF20UMLNFHSC1009	220	92	4
	BAFF2020MLNFHSC565	166	47	-
	BAFF2020MLNFHSC566	168	40	-
	BAFF2020MLNFHSC574	184	71	-
	BAFF2020MLNFHSC575	169	45	-
	BAFF2020MLNFHSC578	226	80	-
	BAFF2020MLNFHSC579	219	70	-
	BAFF2020MLNFHSC582	211	90	-
	BAFF2020MLNFHSC583	212	108	-
	BAFF2020MLNFHSC619	192	69	-
	BAFF2020MLNFHSC625	228	120	-
	BAFF2020MLNFHSC627	263	210	-
	BAFF2020MLNFHSC628	201	40	-
	BAFF2020MLNFHSC630	209	60	-
	BAFF2020MLNFHSC646	189	30	-
	BAFF2020MLNFHSC647	212	70	-
	BAFF2020MLNFHSC657	235	112	-
	BAFF2020MLNFHSC658	194	20	-
	BAFF2020MLNFHSC661	216	110	-
	BAFF2020MLNFHSC668	232	120	-
	BAFF2020MLNFHSC669	291	310	-
	BAFF2020MLNFHSC670	264	210	-
	BAFF2020MLNFHSC671	197	50	-
	BAFF2020MLNFHSC672	220	110	-
	BAFF2020MLNFHSC676	149	25	-
	BAFF2020MLNFHSC689	241	200	-
	BAFF2020MLNFHSC691	245	170	-
	BAFF2020MLNFHSC720	260	250	-
	BAFF2020MLNFHSC728	151	31	-
	BAFF2020MLNFHSC729	177	40	-
	BAFF2020MLNFHSC730	181	40	-
	BAFF2020MLNFHSC731	257	170	-
	BAFF2020MLNFHSC732	179	40	-
	BAFF2020MLNFHSC733	214	90	-
	BAFF2020MLNFHSC734	178	40	-
	BAFF2020MLNFHSC735	145	20	-
	BAFF2020MLNFHSC736	224	130	-
	BAFF2020MLNFHSC737	178	40	-
	BAFF2020MLNFHSC738	158	30	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF2020MLNFHSC739	202	90	-
	BAFF2020MLNFHSC740	163	41	-
	BAFF2020MLNFHSC743	210	90	-
	BAFF2020MLNFHSC744	208	90	-
	BAFF2020MLNFHSC746	162	37	-
	BAFF2020MLNFHSC747	207	81	-
	BAFF2020MLNFHSC748	201	74	-
	BAFF2020MLNFHSC750	146	33	-
	BAFF2020MLNFHSC752	189	56	-
	BAFF2020MLNFHSC754	150	30	-
	BAFF2020MLNFHSC755	180	45	-
	BAFF2020MLNFHSC756	161	39	-
	BAFF2020MLNFHSC758	163	33	-
	BAFF2020MLNFHSC761	159	38	-
	BAFF20UMLNFHSC1010	202	66	5
Fourline Snakeblenny	BAFF2020MLNFLSB751	280	-	-
Greenland Cod	BAFF2020MLNGRCD313	456	1130	-
	BAFF2020MLNGRCD314	468	1220	-
	BAFF2020MLNGRCD315	455	1180	-
	BAFF2020MLNGRCD316	440	1000	-
	BAFF2020MLNGRCD317	478	1390	-
	BAFF2020MLNGRCD318	398	670	-
	BAFF2020MLNGRCD319	454	1180	-
	BAFF20UMILNAN02GRCD10	450	980	7
	BAFF2020MLNGRCD323	621	2570	-
	BAFF2020MLNGRCD324	434	940	-
	BAFF2020MLNGRCD327	434	970	-
	BAFF2020MLNGRCD330	498	1320	-
	BAFF2020MLNGRCD331	518	1790	-
	BAFF2020MLNGRCD332	480	1230	-
	BAFF2020MLNGRCD333	440	990	-
	BAFF2020MLNGRCD334	534	1540	-
	BAFF2020MLNGRCD335	518	1490	-
	BAFF2020MLNGRCD336	408	690	-
	BAFF2020MLNGRCD337	636	3060	-
	BAFF20UMILNANO4GRCD09	482	1410	8
	BAFF2020MLNGRCD339	564	1930	-
	BAFF2020MLNGRCD340	442	1020	-
	BAFF2020MLNGRCD341	504	1580	-
	BAFF2020MLNGRCD342	569	2900	-
	BAFF2020MLNGRCD343	670	3700	-
	BAFF2020MLNGRCD344	446	1100	-
	BAFF2020MLNGRCD411	472	1260	-
	BAFF2020MLNGRCD347	484	1170	-
	BAFF2020MLNGRCD348	520	1700	-
	BAFF2020MLNGRCD651	459	2300	-
	BAFF2020MLNGRCD585	378	710	-
	BAFF2020MLNGRCD587	436	830	-
	BAFF2020MLNGRCD588	636	2980	-
	BAFF2020MLNGRCD589	441	1100	-
	BAFF2020MLNGRCD590	610	2470	-
	BAFF2020MLNGRCD591	598	2400	-
	BAFF2020MLNGRCD592	414	830	-
	BAFF2020MLNGRCD593	548	1880	-
	BAFF2020MLNGRCD594	454	1000	-
	BAFF2020MLNGRCD595	506	1610	-
	BAFF2020MLNGRCD596	497	1310	-
	BAFF2020MLNGRCD597	444	480	-
	BAFF2020MLNGRCD598	446	1010	-
	BAFF2020MLNGRCD599	520	1490	-
	BAFF2020MLNGRCD600	474	1210	-
	BAFF2020MLNGRCD601	490	1370	-
	BAFF20UMLNAN17GRCD003	494	1470	9
	BAFF2020MLNGRCD603	628	2980	-
	BAFF2020MLNGRCD604	510	1420	-
	BAFF2020MLNGRCD605	440	1120	-
	BAFF2020MLNGRCD606	470	1140	-
	BAFF2020MLNGRCD607	451	1040	-
	BAFF2020MLNGRCD608	485	1330	-
	BAFF2020MLNGRCD613	513	1040	-
	BAFF2020MLNGRCD614	517	1710	-
	BAFF2020MLNGRCD652	475	1240	-
	BAFF2020MLNGRCD759	488	1180	-
Sandlance	BAFF2020MLNNRSL042	132	6	-
	BAFF2020MLNNRSL043	140	7	-
	BAFF2020MLNNRSL061	-	-	-
	BAFF2020MLNNRSL248	168	17	-
	BAFF2020MLNNRSL550	170	16	-
	BAFF2020MLNNRSL656	168	17	-
Shorthorn Sculpin	BAFF2020MLNSHSC109	184	64	-
	BAFF2020MLNSHSC142	188	52	-
	BAFF2020MLNSHSC153	152	28	-
	BAFF2020MLNSHSC174	188	63	-
	BAFF2020MLNSHSC179	153	30	-
	BAFF2020MLNSHSC185	130	19	-
	BAFF2020MLNSHSC244	150	26	-
	BAFF2020MLNSHSC249	144	22	-
	BAFF2020MLNSHSC262	129	15	-
	BAFF2020MLNSHSC264	164	40	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[(a)]
	BAFF2020MLNSHSC267	290	370	-
	BAFF2020MLNSHSC271	191	67	-
	BAFF2020MLNSHSC276	186	52	-
	BAFF2020MLNSHSC285	366	720	-
	BAFF2020MLNSHSC294	194	63	-
	BAFF2020MLNSHSC301	200	12	-
	BAFF2020MLNSHSC302	124	22	-
	BAFF2020MLNSHSC310	159	33	-
	BAFF2020MLNSHSC312	177	36	-
	BAFF2020MLNSHSC325	412	930	-
	BAFF2020MLNSHSC326	169	80	-
	BAFF2020MLNSHSC328	241	150	-
	BAFF2020MLNSHSC345	366	680	-
	BAFF2020MLNSHSC346	374	730	-
	BAFF2020MLNSHSC349	185	93	-
	BAFF2020MLNSHSC350	189	110	-
	BAFF2020MLNSHSC351	377	700	-
	BAFF2020MLNSHSC352	396	1020	-
	BAFF2020MLNSHSC353	327	440	-
	BAFF2020MLNSHSC354	232	180	-
	BAFF2020MLNSHSC355	261	280	-
	BAFF2020MLNSHSC356	186	80	-
	BAFF2020MLNSHSC357	218	160	-
	BAFF2020MLNSHSC363	159	38	-
	BAFF2020MLNSHSC369	142	25	-
	BAFF2020MLNSHSC372	164	45	-
	BAFF2020MLNSHSC373	122	14	-
	BAFF2020MLNSHSC375	140	21	-
	BAFF2020MLNSHSC430	190	71	-
	BAFF2020MLNSHSC431	174	53	-
	BAFF2020MLNSHSC432	219	103	-
	BAFF2020MLNSHSC433	200	73	-
	BAFF2020MLNSHSC586	408	740	-
	BAFF2020MLNSHSC609	375	610	-
	BAFF2020MLNSHSC610	421	1060	-
	BAFF2020MLNSHSC611	286	260	-
	BAFF2020MLNSHSC612	351	480	-
	BAFF2020MLNSHSC615	270	330	-
	BAFF2020MLNSHSC616	362	640	-
	BAFF2020MLNSHSC617	211	110	-
	BAFF2020MLNSHSC618	155	60	-
	BAFF2020MLNSHSC626	234	180	-
	BAFF2020MLNSHSC629	209	120	-
	BAFF2020MLNSHSC653	181	40	-
	BAFF2020MLNSHSC665	234	170	-
	BAFF2020MLNSHSC666	310	400	-
	BAFF2020MLNSHSC667	249	200	-
	BAFF2020MLNSHSC690	264	280	-
	BAFF2020MLNSHSC692	262	280	-
	BAFF2020MLNSHSC698	126	40	-
	BAFF2020MLNSHSC711	290	340	-
	BAFF2020MLNSHSC712	344	650	-
	BAFF2020MLNSHSC713	373	760	-
	BAFF2020MLNSHSC714	342	480	-
	BAFF2020MLNSHSC715	289	290	-
	BAFF2020MLNSHSC716	292	360	-
	BAFF2020MLNSHSC717	250	180	-

Table 7A-2: Fish Catch Data for All Fish Measured, Weighed and Aged from the Milne Port Area, 2020

Species	Fish Identification Number	Total Length (mm)	Total Weight (g)	Age (yr)[a]
	BAFF2020MLNSHSC718	278	270	-
	BAFF2020MLNSHSC719	217	100	-
	BAFF2020MLNSHSC721	277	290	-
	BAFF2020MLNSHSC722	232	170	-
	BAFF2020MLNSHSC723	368	630	-
	BAFF2020MLNSHSC724	234	210	-
	BAFF2020MLNSHSC725	200	90	-
Arctic Staghorn Sculpin	BAFF2020MLNASSC159	168	91	-
Sculpin sp.	BAFF2020MLNUNSC003	90	5	-
	BAFF2020MLNUNSC005	87	5	-
	BAFF2020MLNUNSC006	91	6	-
	BAFF2020MLNUNSC007	95	7	-
	BAFF2020MLNUNSC008	113	9	-
	BAFF2020MLNUNSC009	95	6	-
	BAFF2020MLNUNSC010	89	5	-
	BAFF2020MLNUNSC011	80	3	-
	BAFF2020MLNUNSC012	80	3	-
	BAFF2020MLNUNSC015	135	20	-
	BAFF2020MLNUNSC016	125	15	-
	BAFF2020MLNUNSC017	127	17	-
	BAFF2020MLNUNSC018	81	4	-
	BAFF2020MLNUNSC019	80	4	-
	BAFF2020MLNUNSC020	71	3	-
	BAFF2020MLNUNSC021	78	3	-
	BAFF2020MLNUNSC022	80	4	-
	BAFF2020MLNUNSC023	80	4	-
	BAFF2020MLNUNSC024	81	4	-
	BAFF2020MLNUNSC025	72	3	-
	BAFF2020MLNUNSC026	65	2	-
	BAFF2020MLNUNSC028	131	18	-
	BAFF2020MLNUNSC029	94	6	-
	BAFF2020MLNUNSC031	91	6	-
	BAFF2020MLNUNSC032	88	5	-
	BAFF2020MLNUNSC033	106	9	-
	BAFF2020MLNUNSC034	133	18	-
	BAFF2020MLNUNSC035	80	3	-
	BAFF2020MLNUNSC036	79	3	-
	BAFF2020MLNUNSC037	71	3	-
	BAFF2020MLNUNSC038	128	17	-
	BAFF2020MLNUNSC040	115	11	-
	BAFF2020MLNUNSC041	84	5	-
	BAFF2020MLNUNSC049	80	4	-
	BAFF2020MLNUNSC062	11	<0.5	-
	BAFF2020MLNUNSC064	118	13	-
	BAFF2020MLNUNSC065	113	11	-
	BAFF2020MLNUNSC066	31	1	-
	BAFF2020MLNUNSC067	22	<0.5	-
	BAFF2020MLNUNSC068	27	<0.5	-
	BAFF2020MLNUNSC069	30	<0.5	-
	BAFF2020MLNUNSC070	25	<0.5	-
	BAFF2020MLNUNSC071	30	<0.5	-
	BAFF2020MLNUNSC072	23	<0.5	-
	BAFF2020MLNUNSC073	-	<0.5	-
	BAFF2020MLNUNSC074	-	<0.5	-
	BAFF2020MLNUNSC075	27	<0.5	-
	BAFF2020MLNUNSC076	28	<0.5	-
	BAFF2020MLNUNSC077	24	<0.5	-
	BAFF2020MLNUNSC078	80	3	-
	BAFF2020MLNUNSC079	91	7	-
	BAFF2020MLNUNSC080	97	6	-
	BAFF2020MLNUNSC103	153	31	-
	BAFF2020MLNUNSC122	150	31	-
	BAFF2020MLNUNSC138	120	16	-
	BAFF2020MLNUNSC143	135	20	-
	BAFF2020MLNUNSC144	131	19	-
	BAFF2020MLNUNSC152	150	29	-
	BAFF2020MLNUNSC170	153	28	-
	BAFF2020MLNUNSC184	128	18	-
	BAFF2020MLNUNSC265	134	18	-
	BAFF2020MLNUNSC278	122	18	-
	BAFF2020MLNUNSC289	129	17	-
	BAFF2020MLNUNSC303	75	4	-
	BAFF2020MLNUNSC304	61	3	-
	BAFF2020MLNUNSC305	72	4	-
	BAFF2020MLNUNSC306	68	4	-
	BAFF2020MLNUNSC307	60	3	-
	BAFF2020MLNUNSC309	65	4	-
	BAFF2020MLNUNSC553	130	19	-
	BAFF2020MLNUNSC556	140	22	-
	BAFF2020MLNUNSC558	134	19	-
	BAFF2020MLNUNSC562	149	29	-
	BAFF2020MLNUNSC567	141	21	-
	BAFF2020MLNUNSC568	123	13	-

Notes:

Polar Cod, Arctic Staghorn Sculpin and Triglops Sculpin were excluded from the table because lengths, weights and ages were not available.

(a) Otoliths were read for age determinations.

mm = millimetre; g = gram; yr = year; - = not available.

Table 7A-3: Stomach Contents of All Fish Captured from the Milne Port Area, 2020

Species	Fish Identification Number	Fullness (%)	Digested (%)	Full Stomach Weight (g)	Phylum	Subphylum	Class	Subclass	Order	Family	Taxon	Total Abundance	Total Wet Weight (g)	Wet Weight / Individual (g)
Arctic Char	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus glacialis*	1	0.00	0.00
	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	9	0.06	0.01
	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	2	0.05	0.02
	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	3	1.18	0.39
	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	1	16.53	16.53
	BAFF-20-U-MLN-GN06-ARCH-009	75	75	61	-	-	-	-	-	-	Unidentified tissue	-	5.66	5.66
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	8	1.69	0.21
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	*Onisimus* sp.	4	0.14	0.03
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Hyperiidea indet.*	7	1.00	0.14
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	61	0.22	0.00
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	4	0.35	0.09
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysis litoralis*	1	0.11	0.11
	BAFF-20-U-MLN-GN10-ARCH-010	75	50	12	-	-	-	-	-	-	Unidentified tissue	-	0.09	0.09
	BAFF-20-U-MLN-GN10-ARCH-011	75	50	81	Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	6	23.00	3.83
	BAFF-20-U-MLN-GN10-ARCH-011	75	50	81	-	-	-	-	-	-	Unidentified tissue	-	6.91	6.91
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto libellula*	5	0.98	0.20
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	6	1.53	0.25
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	9	0.27	0.03
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	1	0.01	0.01
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	1	0.09	0.09
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	1.98	1.98
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	1	1.06	1.06
	BAFF-20-U-MLN-GN11-ARCH-011	75	75	33	-	-	-	-	-	-	Unidentified tissue	-	0.42	0.42
	BAFF-20-U-MLN-GN13-ARCH-017	10	100	10	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.07	0.07
	BAFF-20-U-MLN-GN13-ARCH-017	10	100	10	-	-	-	-	-	-	Unidentified tissue	-	0.19	0.19
	BAFF-20-U-MLN-GN14-ARCH-004	10	25	13	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus hyperboreus*	6	0.03	0.01
	BAFF-20-U-MLN-GN14-ARCH-004	10	25	13	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.00	0.00
	BAFF-20-U-MLN-GN14-ARCH-004	10	25	13	-	-	-	-	-	-	Unidentified tissue	-	0.15	0.15
	BAFF-20-U-MLN-GN15-ARCH-005	50	100	9	Acanthocephala	-	-	-	-	-	*Acanthocephala indet.*	2	0.00	0.00
	BAFF-20-U-MLN-GN15-ARCH-005	50	100	9	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda		*Hyperiidea indet.*	-	0.01	0.01
	BAFF-20-U-MLN-GN15-ARCH-005	50	100	9	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.69	0.69
	BAFF-20-U-MLN-GN15-ARCH-005	50	100	9	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	1	0.01	0.01
	BAFF-20-U-MLN-GN15-ARCH-005	50	100	9	-	-	-	-	-	-	Unidentified tissue	-	0.58	0.58
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Chaetognatha	-	Sagittoidea	Aphragmophora	-	Sagittidae	*Parasagitta elegans*	5	0.02	0.00
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Hyperiidea indet.*	-	0.02	0.02
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus hyperboreus*	5	0.04	0.01
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	170	0.66	0.00
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	-	0.34	0.34
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	56	0.66	0.01
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.08	0.08
	BAFF-20-U-MLN-GN16-ARCH-003	100	50	9	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.54	0.54
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	2	0.05	0.02
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	276	11.82	0.04
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	13.68	13.68
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Mollusca	-	Gastropoda	Heterobranchia	Pteropoda	Clionidae	*Clione* sp.	13	2.65	0.20
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Nemertea	-	-	-	-	-	*Nemertea indet.*	20	0.09	0.00
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	12	0.08	0.01
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	-	0.01	0.01
	BAFF-20-U-MLN-GN17-ARCH-008	100	50	48	-	-	-	-	-	-	Unidentified tissue	-	0.31	0.31
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Hyperiidea indet.*	3	0.07	0.02
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	1	0.00	0.00
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.00	0.00
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	1	10.06	10.06
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	4	29.33	7.33
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Chordata	Vertebrata	Actinopterygii	-	-	-	*Ammodytes* sp.	2	0.29	0.14
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	1	1.33	1.33
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	-	0.01	0.01
	BAFF-20-U-MLN-GN18-ARCH-003	100	50	102	-	-	-	-	-	-	Unidentified tissue	-	7.27	7.27
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	3	0.11	0.04
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	115	0.40	0.00
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	1	0.07	0.07
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida		*Mysida indet.*	32	0.27	0.01
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.78	0.78
	BAFF-20-U-MLN-GN19-ARCH-012	50	50	20	-	-	-	-	-	-	Unidentified tissue	-	1.55	1.55
	BAFF-20-U-MLN-GN20-ARCH-006	50	50	13	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Hyperiidea indet.*	-	0.05	0.05
	BAFF-20-U-MLN-GN20-ARCH-006	50	50	13	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	4	0.02	0.01
	BAFF-20-U-MLN-GN20-ARCH-006	50	50	13	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	49	0.50	0.01
	BAFF-20-U-MLN-GN20-ARCH-006	50	50	13	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.03	0.03
	BAFF-20-U-MLN-GN20-ARCH-006	50	50	13	-	-	-	-	-	-	Unidentified tissue	-	1.17	1.17
	BAFF-20-U-MLN-GN23-ARCH-017	50	75	5	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	*Themisto* sp.	17	0.24	0.01
	BAFF-20-U-MLN-GN23-ARCH-017	50	75	5	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	1.20	1.20
	BAFF-20-U-MLN-GN23-ARCH-017	50	75	5	-	-	-	-	-	-	Unidentified tissue	-	0.09	0.09
	BAFF-20-U-MLN-GN24-ARCH-002	10	100	10	-	-	-	-	-	-	Plant material	-	-	-
	BAFF-20-U-MLN-GN24-ARCH-002	10	100	10	-	-	-	-	-	-	Unidentified tissue	-	0.07	0.07
	BAFF-20-U-MLN-HN10-ARCH-001	25	100	1	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.01	0.01
	BAFF-20-U-MLN-HN10-ARCH-001	25	100	1	-	-	-	-	-	-	Unidentified tissue	-	0.11	0.11

Table 7A-3: Stomach Contents of All Fish Captured from the Milne Port Area, 2020

Species	Fish Identification Number	Fullness (%)	Digested (%)	Full Stomach Weight (g)	Phylum	Subphylum	Class	Subclass	Order	Family	Taxon	Total Abundance	Total Wet Weight (g)	Wet Weight / Individual (g)
Fourhorn Sculpin	BAFF-20-U-MLN-FRSC-1002	25	75	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Atylidae	*Atylus carinatus*	1	0.01	0.01
	BAFF-20-U-MLN-FRSC-1002	25	75	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	6	0.13	0.02
	BAFF-20-U-MLN-FRSC-1002	25	75	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Amphipoda indet.*	-	0.14	0.14
	BAFF-20-U-MLN-FRSC-1002	25	75	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Lysianassoidea indet.*	6	0.02	0.00
	BAFF-20-U-MLN-FRSC-1002	25	75	4	-	-	-	-	-	-	Pebble(s)	-	-	-
	BAFF-20-U-MLN-FRSC-1002	25	75	4	-	-	-	-	-	-	Plastic	-	0.01	0.01
	BAFF-20-U-MLN-FRSC-1002	25	75	4	-	-	-	-	-	-	Unidentified tissue	-	0.06	0.06
	BAFF-20-U-MLN-FRSC-1010	50	25	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	*Monoporeia affinis*	44	0.27	0.01
	BAFF-20-U-MLN-FRSC-1010	50	25	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda		*Amphipoda indet.*	-	0.14	0.14
	BAFF-20-U-MLN-FRSC-1010	50	25	3	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1010	50	25	3	-	-	-	-	-	-	Unidentified tissue	-	0.01	0.01
	BAFF-20-U-MLN-FRSC-1011	100	100	15	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	*Anonyx* sp.	25	5.59	0.22
	BAFF-20-U-MLN-FRSC-1011	100	100	15	Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	*Pectinariidae indet.*	3	1.31	1.31
	BAFF-20-U-MLN-FRSC-1011	100	100	15	-	-	-	-	-	-	Unidentified tissue	-	1.15	1.15
	BAFF-20-U-MLN-FRSC-1016	25	50	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	*Monoporeia affinis*	7	0.05	0.01
	BAFF-20-U-MLN-FRSC-1016	25	50	3	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1016	25	50	3	Annelida	-	Polychaeta	-	-	-	*Polychaeta indet.*	-	0.02	0.02
	BAFF-20-U-MLN-FRSC-1016	25	50	3	-	-	-	-	-	-	Unidentified tissue	-	0.01	0.01
	BAFF-20-U-MLN-FRSC-1018	50	50	4	-	-	-	-	-	-	*Cheatognatha indet.*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Cnidaria	-	Hydrozoa	-			*Hydrozoa indet.*	-	0.13	0.13
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus hyperboreus*	2	0.02	0.01
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	25	0.08	0.00
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	2	0.00	0.00
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	3	0.02	0.01
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1018	50	50	4	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1018	50	50	4	Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	*Pectinariidae indet.*	-	0.00	0.00
	BAFF-20-U-MLN-FRSC-1018	50	50	4	-	-	-	-	-	-	Unidentified tissue	-	0.47	0.47
	BAFF-20-U-MLN-FRSC-1020	10	100	2	-	-	-	-	-	-	Unidentified tissue	-	0.04	0.04
	BAFF-20-U-MLN-FRSC-1021	25	50	5	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	*Gammaridae indet.*	1	0.04	0.04
	BAFF-20-U-MLN-FRSC-1021	25	50	5	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	*Monoporeia affinis*	2	0.01	0.01
	BAFF-20-U-MLN-FRSC-1021	25	50	5	Arthropoda	Crustacea	-	-	-	-	*Crustacea indet.*	-	0.00	0.00
	BAFF-20-U-MLN-FRSC-1021	25	50	5	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1021	25	50	5	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	-	0.00	0.00
	BAFF-20-U-MLN-FRSC-1021	25	50	5	-	-	-	-	-	-	Unidentified tissue	-	0.04	0.04
	BAFF-20-U-MLN-FRSC-1022	10	25	3	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus glacialis*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1022	10	25	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	2	0.01	0.00
	BAFF-20-U-MLN-FRSC-1022	10	25	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.01	0.01
	BAFF-20-U-MLN-FRSC-1022	10	25	3	-	-	-	-	-	-	Unidentified tissue	-	0.06	0.06
	BAFF-20-U-MLN-FRSC-1023	10	100	16	Cnidaria	-	Hydrozoa	-	-	-	*Hydrozoa indet.*	1	0.03	0.03
	BAFF-20-U-MLN-FRSC-1023	10	100	16	-	-	-	-	-	-	Unidentified tissue	-	0.18	0.18
	BAFF-20-U-MLN-FRSC-1024	25	75	4	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus glacialis*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1024	25	75	4	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1024	25	75	4	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	4	0.03	0.01
	BAFF-20-U-MLN-FRSC-1024	25	75	4	-	-	-	-	-	-	Unidentified tissue	-	0.20	0.20
	BAFF-20-U-MLN-FRSC-1025	25	75	2	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	*Monoporeia affinis*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1025	25	75	2	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	9	0.03	0.00
	BAFF-20-U-MLN-FRSC-1025	25	75	2	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	6	0.04	0.01
	BAFF-20-U-MLN-FRSC-1025	25	75	2	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.08	0.08
	BAFF-20-U-MLN-FRSC-1025	25	75	2	-	-	-	-	-	-	Unidentified tissue	-	0.05	0.05
	BAFF-20-U-MLN-FRSC-1026	10	75	3	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus glacialis*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1026	10	75	3	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	-	*Calanoida indet.*	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1026	10	75	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	1	0.00	0.00
	BAFF-20-U-MLN-FRSC-1026	10	75	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.02	0.02
	BAFF-20-U-MLN-FRSC-1026	10	75	3	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1026	10	75	3	-	-	-	-	-	-	Unidentified tissue	-	0.04	0.04
	BAFF-20-U-MLN-FRSC-1033	10	100	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.01	0.01
	BAFF-20-U-MLN-FRSC-1102	25	50	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	*Gammaridae indet.*	1	0.02	0.02
	BAFF-20-U-MLN-FRSC-1102	25	50	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	*Monoporeia affinis*	9	0.07	0.01
	BAFF-20-U-MLN-FRSC-1102	25	50	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	*Amphipoda indet.*	-	0.03	0.03
	BAFF-20-U-MLN-FRSC-1102	25	50	3	-	-	-	-	-	-	Sand	-	-	-
	BAFF-20-U-MLN-FRSC-1102	25	50	3	-	-	-	-	-	-	Unidentified tissue	-	0.05	0.05
	BAFF-20-U-MLN-FRSC-1304	10	100	3	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	1	0.03	0.03
	BAFF-20-U-MLN-FRSC-1304	10	100	3	-	-	-	-	-	-	Unidentified tissue	-	0.03	0.03
Greenland Cod	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Cnidaria	-	Hydrozoa	-	-	-	*Hydrozoa indet.*	1	0.01	0.01
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Arthropoda	Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	*Calanus* sp.	6	0.04	0.01
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	25	1.71	0.07
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	1	0.00	0.00
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.56	0.56
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Mollusca	-	Cephalopoda	-	-	-	*Cephalopoda indet.*	2	0.35	0.17
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	-	-	-	-	-	-	Pebble(s)/sand	-	-	-
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	-	-	-	-	-	-	Plant material	-	-	-
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	78	0.32	0.00
	BAFF-20-U-MLN-AN02-GRCD-010	75	50	43	-	-	-	-	-	-	Unidentified tissue	-	2.12	2.12
	BAFF-20-U-MLN-AN04-GRCD-009	100	50	31	-	-	-	-	-	-	Pebble(s)/sand	-	-	-
	BAFF-20-U-MLN-AN04-GRCD-009	100	50	31	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	-	4.33	4.33
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Thoridae	*Eualus gaimardii*	1	1.02	1.02
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	-	*Caridea indet.*	2	6.04	3.02
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	*Mysis* sp.	1	0.05	0.05
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	-	*Mysida indet.*	-	0.01	0.01
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	-	-	-	-	-	-	Pebble(s)	-	-	-
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	-	-	-	-	-	-	Plant material	-	-	-
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Chordata	Vertebrata	-	-	-	-	*Pisces indet.*	-	0.03	0.03
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	Annelida		Polychaeta	Sedentaria	Terebellida	Pectinariidae	*Pectinariidae indet.*	-	0.13	0.13
	BAFF-20-U-MLN-AN17-GRCD-003	75	75	50	-	-	-	-	-	-	Unidentified tissue	-	0.91	0.91

% = percent; g = gram; - = not available.

APPENDIX 7B

Fish Health Data

Table 7B-3: Fish Health Data for *Hiatella Arctica* Lethally Sampled from the Milne Port Area, 2020

Date (d-m-y)	Effort Number	Fish Identification Number	Composite	Total Length (mm)[(a)]	Total Length (mm)[(b)]	Wet Weight + Shell (g)[(b)]	Shell Wet Weight (g)[(a)]	Tissue Wet Weight (g)[(a)]	Shell Dry Weight (g)[(a)]	Tissue Dry Weight (g)[(a)]	Moisture (%)[(a)]	Age (yr)
5-Aug-20	BAFF20FHMLNSW1001	BAFF20UMLNHTAR1900	HTAR_COMP_2	26.55	27.05	3.001	1.073	1.928	1.007	0.386	80	12
5-Aug-20	BAFF20FHMLNSW1001	BAFF20UMLNHTAR1901	HTAR_COMP_4	28.79	28.66	3.930	1.322	2.608	1.237	0.495	81	23
5-Aug-20	BAFF20FHMLNSW1001	BAFF20UMLNHTAR1902	HTAR_COMP_1	25.99	25.80	2.866	1.083	1.783	1.034	0.392	78	39
5-Aug-20	BAFF20FHMLNSW1001	BAFF20UMLNHTAR1903	HTAR_COMP_4	28.24	29.21	3.711	1.271	2.440	1.214	0.464	81	41
5-Aug-20	BAFF20FHMLNSW1001	BAFF20UMLNHTAR1904	HTAR_COMP_7	30.96	31.63	4.677	2.344	2.333	2.248	0.397	83	30
5-Aug-20	BAFF20FHMLNSW1002	BAFF20UMLNHTAR1905	HTAR_COMP_3	28.60	28.27	3.053	1.302	1.751	1.238	0.333	81	15
6-Aug-20	BAFF20FHMLNSW1003	BAFF20UMLNHTAR1906	HTAR_COMP_7	32.98	32.41	5.974	2.133	3.841	2.041	0.653	83	24
6-Aug-20	BAFF20FHMLNSW1003	BAFF20UMLNHTAR1907	HTAR_COMP_2	26.83	27.60	3.925	1.800	2.125	1.709	0.425	80	39
6-Aug-20	BAFF20FHMLNSW1003	BAFF20UMLNHTAR1909	HTAR_COMP_5	29.85	30.06	6.399	2.386	4.013	2.281	0.602	85	40
6-Aug-20	BAFF20FHMLNSW1003	BAFF20UMLNHTAR1910	HTAR_COMP_6	31.10	30.79	3.395	1.092	2.303	1.019	0.415	82	12
6-Aug-20	BAFF20FHMLNSW1003	BAFF20UMLNHTAR1911	HTAR_COMP_8	34.23	34.14	5.690	1.871	3.819	1.735	0.764	80	30
6-Aug-20	BAFF20FHMLNSW1004	BAFF20UMLNHTAR1912	HTAR_COMP_3	28.02	28.18	3.162	1.219	1.943	1.135	0.369	81	28
6-Aug-20	BAFF20FHMLNSW1004	BAFF20UMLNHTAR1913	HTAR_COMP_5	29.88	30.05	5.521	1.921	3.601	1.842	0.540	85	43
6-Aug-20	BAFF20FHMLNSW1004	BAFF20UMLNHTAR1914	HTAR_COMP_4	28.55	28.80	4.589	1.937	2.652	1.810	0.504	81	32
6-Aug-20	BAFF20FHMLNSW1004	BAFF20UMLNHTAR1915	HTAR_COMP_3	27.67	27.98	3.705	1.677	2.028	1.602	0.385	81	32
6-Aug-20	BAFF20FHMLNSW1004	BAFF20UMLNHTAR1916	HTAR_COMP_6	30.41	30.52	5.500	2.223	3.277	2.090	0.590	82	35
6-Aug-20	BAFF20FHMLNSW1005	BAFF20UMLNHTAR1917	HTAR_COMP_6	30.01	30.17	4.873	1.519	3.354	1.423	0.604	82	13
6-Aug-20	BAFF20FHMLNSW1005	BAFF20UMLNHTAR1918	HTAR_COMP_6	30.39	30.36	4.045	1.520	2.525	1.401	0.454	82	16
6-Aug-20	BAFF20FHMLNSW1005	BAFF20UMLNHTAR1919	HTAR_COMP_7	30.83	31.25	4.811	1.839	2.972	1.747	0.505	83	27
6-Aug-20	BAFF20FHMLNSW1005	BAFF20UMLNHTAR1920	HTAR_COMP_2	26.85	26.81	3.807	1.530	2.277	1.427	0.455	80	13
6-Aug-20	BAFF20FHMLNSW1005	BAFF20UMLNHTAR1921	HTAR_COMP_4	29.38	28.86	3.903	1.523	2.380	1.434	0.452	81	15
9-Aug-20	BAFF20FHMLNSE1001	BAFF20UMLNHTAR1922	HTAR_COMP_3	27.66	28.62	4.802	1.891	2.911	1.818	0.553	81	49
9-Aug-20	BAFF20FHMLNSE1001	BAFF20UMLNHTAR1923	HTAR_COMP_5	28.80	29.34	5.753	3.307	2.446	3.183	0.367	85	40
9-Aug-20	BAFF20FHMLNSE1001	BAFF20UMLNHTAR1924	HTAR_COMP_8	31.87	32.96	4.153	1.304	2.849	1.214	0.570	80	15
9-Aug-20	BAFF20FHMLNSE1001	BAFF20UMLNHTAR1925	HTAR_COMP_1	26.01	25.56	3.218	1.128	2.090	1.069	0.460	78	22
9-Aug-20	BAFF20FHMLNSE1001	BAFF20UMLNHTAR1926	HTAR_COMP_4	28.64	28.91	3.017	0.799	2.218	0.747	0.421	81	11
9-Aug-20	BAFF20FHMLNSE1002	BAFF20UMLNHTAR1927	HTAR_COMP_5	28.35	29.33	4.181	1.248	2.933	1.182	0.440	85	35
9-Aug-20	BAFF20FHMLNSE1002	BAFF20UMLNHTAR1928	HTAR_COMP_6	30.12	31.05	5.748	2.780	2.968	2.669	0.534	82	47
9-Aug-20	BAFF20FHMLNSE1002	BAFF20UMLNHTAR1929	HTAR_COMP_7	31.20	31.92	5.445	2.359	3.086	2.262	0.525	83	40
9-Aug-20	BAFF20FHMLNSE1002	BAFF20UMLNHTAR1930	HTAR_COMP_7	31.03	31.21	5.081	1.796	3.285	1.681	0.558	83	23
9-Aug-20	BAFF20FHMLNSE1002	BAFF20UMLNHTAR1931	HTAR_COMP_5	29.41	29.55	4.876	1.748	3.128	1.645	0.469	85	12
9-Aug-20	BAFF20FHMLNSE1003	BAFF20UMLNHTAR1932	HTAR_COMP_2	26.51	26.55	4.712	2.003	2.709	1.935	0.542	80	36
9-Aug-20	BAFF20FHMLNSE1003	BAFF20UMLNHTAR1933	HTAR_COMP_8	33.36	33.44	6.342	2.536	3.806	2.397	0.761	80	21
9-Aug-20	BAFF20FHMLNSE1003	BAFF20UMLNHTAR1934	HTAR_COMP_8	32.66	32.97	6.220	2.308	3.912	2.203	0.782	80	17
9-Aug-20	BAFF20FHMLNSE1003	BAFF20UMLNHTAR1935	HTAR_COMP_8	32.09	32.73	6.392	2.558	3.834	2.445	0.767	80	34
9-Aug-20	BAFF20FHMLNSE1003	BAFF20UMLNHTAR1936	HTAR_COMP_3	28.16	28.00	3.853	1.368	2.485	1.289	0.472	81	12
12-Aug-20	BAFF20FHMLNSW1014	BAFF20UMLNHTAR1937	HTAR_COMP_5	29.80	29.61	3.551	1.414	2.137	1.339	0.321	85	22
12-Aug-20	BAFF20FHMLNSW1014	BAFF20UMLNHTAR1938	HTAR_COMP_4	28.06	29.03	4.035	1.097	2.939	1.029	0.558	81	15
12-Aug-20	BAFF20FHMLNSW1014	BAFF20UMLNHTAR1939	HTAR_COMP_2	26.07	25.96	4.508	1.803	2.705	1.699	0.541	80	12
12-Aug-20	BAFF20FHMLNSW1014	BAFF20UMLNHTAR1940	HTAR_COMP_6	29.88	30.91	3.746	1.523	2.223	1.480	0.400	82	24
12-Aug-20	BAFF20FHMLNSW1014	BAFF20UMLNHTAR1941	HTAR_COMP_1	26.01	25.33	3.239	1.402	1.837	1.333	0.404	78	16
14-Aug-20	BAFF20FHMLNSE1014	BAFF20UMLNHTAR1942	HTAR_COMP_1	30.02	25.25	4.076	1.401	2.675	1.323	0.589	78	12
14-Aug-20	BAFF20FHMLNSE1014	BAFF20UMLNHTAR1943	HTAR_COMP_1	27.89	17.66	3.425	1.123	2.302	1.049	0.506	78	14
14-Aug-20	BAFF20FHMLNSE1014	BAFF20UMLNHTAR1944	HTAR_COMP_7	31.14	31.07	5.075	1.377	3.698	1.297	0.629	83	20
14-Aug-20	BAFF20FHMLNSE1014	BAFF20UMLNHTAR1945	HTAR_COMP_5	29.59	29.51	3.342	1.104	2.238	1.021	0.336	85	10
14-Aug-20	BAFF20FHMLNSE1014	BAFF20UMLNHTAR1946	HTAR_COMP_8	34.54	34.39	5.171	1.860	3.311	1.746	0.662	80	20
14-Aug-20	BAFF20FHMLNSNW1001	BAFF20UMLNHTAR1947	HTAR_COMP_1	25.68	25.66	3.039	1.057	1.982	0.994	0.436	78	12
14-Aug-20	BAFF20FHMLNSNW1001	BAFF20UMLNHTAR1948	HTAR_COMP_2	26.05	26.07	2.758	1.541	1.217	1.487	0.243	80	47
14-Aug-20	BAFF20FHMLNSNW1001	BAFF20UMLNHTAR1949	HTAR_COMP_3	27.81	27.82	2.816	0.895	1.921	0.845	0.365	81	20
14-Aug-20	BAFF20FHMLNSNW1001	BAFF20UMLNHTAR1950	HTAR_COMP_1	25.36	25.90	3.320	1.240	2.080	1.163	0.458	78	24

Notes:

(a) Measured by Biologica Environmental Services Ltd.

(b) Measured in the field.

d = day; m = month; y = year; mm = millimetre; g = gram; percent = %

APPENDIX 7C

Fish Tissue Data

Table 7C-1: Sample Counts for Fish Tissue Chemistry Analyses from the Milne Port Area, 2010 to 2020

Species	Year	Metals	Polycyclic Aromatic Hydrocarbons
Arctic Char	2010	22[(a)]	0
	2013	17	14
	2015	5	0
	2016	13	0
	2017	2	0
	2018	26	0
	2019	47	0
	2020	8	8
Arctic Staghorn Sculpin	2013	1	0
Fourhorn Sculpin	2013	2	1
	2019	30	0
	2020	8	8
Hiatella arctica	2018	24	0
	2019	80	0
	2020	8	8
Indeterminate Sculpin	2019	30	0
Indeterminate Fish	2015	10	0
Total		333	39

a) Includes 11 muscle samples and 11 liver samples.

Table 7C-2 Fish Tissue Chemistry Results (Metals) for Arctic Char from the Milne Port Area, 2020

Parameter	DL	Fish Identification Number							
		GN06ARCH03	BAFF20UMILNGNO6ARCH09	BAFF20UMILNGN10ARCH01	GN11ARCH11	BAFF20UMILNGN13ARCH17	BAFF20UMLNGN18ARCH003	BAFF20UMILNGN20ARCH17	BAFF20UMILNGN23aARCH017
Moisture (%)	0.3	75.0	75.0	72.0	74.0	73.0	83.0	70.0	76.0
Total Metals (mg/kg ww)									
Aluminum	0.2	0.46	0.41	0.31	0.32	0.28	0.44	0.50	0.62
Antimony	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.009	<0.001	<0.001
Arsenic	0.004	0.389	0.894	1.200	1.260	0.565	33.200	0.724	0.766
Barium	0.01	<0.01	<0.01	0.07	<0.01	0.02	0.02	0.02	0.05
Beryllium	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Boron	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	0.001	0.004	0.017	0.002	0.012	0.003	0.001	0.011	0.001
Calcium	2	113	39	112	88	506	74	485	337
Chromium	0.01	0.04	<0.01	<0.01	1.52	0.04	0.02	0.01	0.09
Cobalt	0.0013	0.0041	0.0030	0.0033	0.0057	0.0037	0.0029	0.0029	0.0047
Copper	0.01	0.34	0.35	0.33	0.29	0.33	0.17	0.33	0.31
Iron	0.25	4.61	4.43	3.83	16.80	4.93	2.39	4.80	5.58
Lead	0.001	0.003	0.001	0.001	0.002	0.001	0.005	0.003	0.002
Magnesium	0.4	324	305	297	294	315	219	300	348
Manganese	0.01	0.13	0.06	0.08	0.12	0.18	0.06	0.14	0.16
Mercury	0.002	0.032	0.049	0.042	0.043	0.023	0.297	0.029	0.068
Molybdenum	0.004	<0.004	<0.004	<0.004	0.011	<0.004	<0.004	<0.004	<0.004
Nickel	0.01	0.03	<0.01	<0.01	0.03	0.02	0.02	<0.01	0.01
Phosphorus	2	3510	2990	3080	3090	3520	2350	3160	3950
Potassium	2	5190	4320	4560	4750	4910	4190	4290	5360
Selenium	0.01	0.33	0.31	0.32	0.33	0.29	0.31	0.30	0.39
Silver	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium	2	318	313	242	325	339	633	425	338
Strontium	0.01	0.29	0.09	0.24	0.19	1.28	0.40	1.59	0.61
Thallium	0.0004	0.0020	0.0023	0.0020	0.0024	0.0016	0.0007	0.0021	0.0032
Tin	0.02	0.03	0.03	<0.02	0.04	<0.02	0.03	0.03	0.03
Titanium	0.02	0.16	0.12	0.14	0.13	0.16	0.12	0.14	0.17
Uranium	0.0004	<0.0004	0.0006	<0.0004	<0.0004	0.0011	<0.0004	<0.0004	<0.0004
Vanadium	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	0.04	4.98	3.99	3.79	3.78	4.94	5.28	4.29	5.54

% = percent; mg/kg ww = milligram per killigram wet weight; DL = Detection Limit; < = less than.

Table 7C-3 Fish Tissue Chemistry Results (Metals) for Fourhorn Sculpin from the Milne Port Area, 2020

Parameter	DL	Fish Identification Number							
		BAFF20UMLNFHSC1301	BAFF20UMLNFHSC1302	BAFF20UMLNFHSC1303	BAFF20UMLNFHSC1006	BAFF20UMLNFHSC1009	BAFF20UMLNFHSC1010	BAFF20UMLNFHSC1012	BAFF20UMLNFHSC1014
Moisture (%)	0.3	80.0	82.0	82.0	77.0	81.0	81.0	80.0	80.0
Total Metals (mg/kg ww)									
Aluminum	0.2	<0.2	0.3	1.2	0.3	0.4	0.5	0.3	0.2
Antimony	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.004	1.950	3.310	1.760	1.950	2.430	2.820	3.040	1.700
Barium	0.01	0.06	0.03	0.03	0.09	0.08	0.06	0.06	0.04
Beryllium	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	0.001	<0.001	0.002	<0.001	0.001	<0.001	0.005	0.003	0.002
Boron	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	0.001	0.001	0.002	0.003	0.003	0.009	<0.001	0.001	0.003
Calcium	2	612	707	674	687	907	895	867	708
Chromium	0.01	0.50	0.20	0.42	0.19	0.13	0.11	0.05	0.02
Cobalt	0.0013	0.0063	0.0080	0.0049	0.0060	0.0057	0.0066	0.0048	0.0066
Copper	0.01	0.34	0.47	0.49	0.39	0.37	1.01	0.59	0.32
Iron	0.25	7.42	8.32	10.20	5.69	6.67	5.94	4.75	3.74
Lead	0.001	0.001	0.001	0.005	0.002	0.002	0.003	0.003	0.001
Magnesium	0.4	295	263	300	296	287	295	304	277
Manganese	0.01	0.364	0.255	0.296	0.307	0.409	0.292	0.313	0.286
Mercury	0.002	0.069	0.142	0.109	0.094	0.152	0.081	0.125	0.112
Molybdenum	0.004	0.01	0.01	0.01	0.01	0.00	<0.004	<0.004	<0.004
Nickel	0.01	0.02	0.02	0.02	0.01	0.02	0.01	<0.01	<0.01
Phosphorus	2	2620	2800	2610	2760	2840	2930	2810	2560
Potassium	2	4070	3860	3910	4060	4050	4260	4090	3970
Selenium	0.01	0.37	0.43	0.39	0.48	0.46	0.44	0.39	0.39
Silver	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium	2	551	481	669	543	549	519	736	491
Strontium	0.01	2.40	3.75	2.90	3.24	4.49	4.21	5.02	3.18
Thallium	0.0004	0.0009	0.0011	0.0006	0.0008	0.0008	0.0014	0.0008	0.0008
Tin	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Titanium	0.02	0.22	0.21	0.19	0.21	0.21	0.22	0.21	0.17
Uranium	0.0004	0.0005	0.0008	0.0007	0.0007	0.0008	<0.00040	0.0014	<0.00040
Vanadium	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc	0.04	11.20	18.40	10.50	12.30	17.20	12.80	9.62	10.40

% = percent; mg/kg ww = milligram per killigram wet weight; DL = Detection Limit; < = less than

Table 7C-4 Fish Tissue Chemistry Results (Metals) for *Hiatella Arctica* from the Milne Port Area, 2020

Parameter	DL	Fish Identification Number							
		HTAR_COMP_1	HTAR_COMP_2	HTAR_COMP_3	HTAR_COMP_4	HTAR_COMP_5	HTAR_COMP_6	HTAR_COMP_7	HTAR_COMP_8
Moisture (%)	0.3	78	80	81	81	85	82	83	80
Total Metals (mg/kg ww)									
Aluminum	0.5	1750.0	705.0	666.0	894.0	367.0	333.0	771.0	573.0
Antimony	0.002	0.035	0.021	0.021	0.021	0.009	0.011	0.019	0.014
Arsenic	0.005	3.360	2.400	2.960	2.450	2.470	2.670	2.620	2.500
Barium	0.01	8.98	8.31	16.50	7.93	20.10	9.64	8.66	5.31
Beryllium	0.002	0.097	0.037	0.041	0.051	0.021	0.022	0.041	0.045
Bismuth	0.0013	0.0236	0.0085	0.0091	0.0103	0.0056	0.0050	0.0106	0.0064
Boron	0.2	13.2	6.5	7.0	7.7	4.4	5.0	6.8	5.2
Cadmium	0.0013	0.7550	0.5950	0.7340	0.5480	0.5990	0.6130	0.4320	0.6600
Calcium	4	10600	6080	5910	8140	4430	4020	4980	4090
Chromium	0.025	31.800	64.000	31.600	33.900	5.900	12.000	14.900	29.500
Cobalt	0.0013	2.4600	1.5000	1.8800	1.3900	0.7570	1.0500	1.5500	1.0600
Copper	0.013	4.020	4.020	2.830	3.150	1.760	2.200	2.310	2.790
Iron	0.25	3910.00	2450.00	2110.00	2750.00	904.00	1090.00	1860.00	1730.00
Lead	0.0013	4.3300	0.8650	1.2300	1.1200	0.5090	0.4290	1.7100	0.6960
Magnesium	0.4	5030.0	2960.0	3160.0	4200.0	2390.0	2370.0	3000.0	2470.0
Manganese	0.01	250.00	132.00	271.00	151.00	73.90	108.00	171.00	88.00
Mercury	0.013	0.024	0.029	0.032	0.036	0.041	0.047	0.022	0.026
Molybdenum	0.008	0.817	1.300	0.809	0.805	0.282	0.453	0.563	0.633
Nickel	0.01	15.20	29.90	14.80	15.70	3.46	6.18	7.64	13.90
Phosphorus	2	1300	1570	1220	1020	1050	1240	1350	1560
Potassium	2.5	1700.0	1440.0	1380.0	1510.0	1260.0	1390.0	1470.0	1450.0
Selenium	0.01	1.05	1.28	1.26	1.15	1.43	1.56	1.14	1.22
Silver	0.0013	0.0083	0.0055	0.0047	0.0046	0.0035	0.0036	0.0037	0.0048
Sodium	2.5	3600.0	3250.0	4490.0	3310.0	3990.0	3970.0	3370.0	4190.0
Strontium	0.013	30.200	16.300	17.400	13.400	12.100	10.300	17.300	12.500
Thallium	0.0004	0.0422	0.0169	0.0217	0.0211	0.0107	0.0120	0.0214	0.0122
Tin	0.02	0.36	0.25	0.16	0.16	0.09	0.13	0.13	0.19
Titanium	0.13	63.20	25.90	24.50	31.90	14.70	13.80	27.50	19.30
Uranium	0.0004	0.2770	0.1620	0.1430	0.1670	0.1210	0.0868	0.1280	0.1410
Vanadium	0.02	6.94	3.26	3.50	3.64	1.88	2.14	3.53	2.55
Zinc	0.2	17.9	14.0	13.1	12.3	13.8	11.8	12.0	11.5

% = percent; mg/kg ww = milligram per killigram wet weight; DL = Detection Limit.

Table 7C-5 Fish Tissue Chemistry Results (Polycyclic Aromatic Hydrocarbons) for Arctic Char from the Milne Port Area, 2020

Parameter	DL	Fish Identification Number								
		GN06ARCH03	GN06ARCH03-Dup	BAFF20UMILNGNO6ARCH09	BAFF20UMILNGN10ARCH01	GN11ARCH11	BAFF20UMILNGN13ARCH17	BAFF20UMLNGN18ARCH003	BAFF20UMILNGN20ARCH17	BAFF20UMILNGN23aARCH017
Polycyclic Aromatic Hydrocarbon (mg/kg)										
1-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate Recovery (%)										
D10-Anthracene	-	99	98	96	92	92	95	102	90	91
D14-Terphenyl	-	102	98	98	94	95	95	103	93	95
D8-Acenaphthylene	-	97	95	95	91	92	95	100	89	90

mg/kg = milligram per killigram; % = percent; > = greater than; < = less than; DL = Detection Limit; Dup = laboratory duplicate; - = not available.

Table 7C-6 Fish Tissue Chemistry Results (Polycyclic Aromatic Hydrocarbons) for Fourhorn Sculpin from the Milne Port Area, 2020

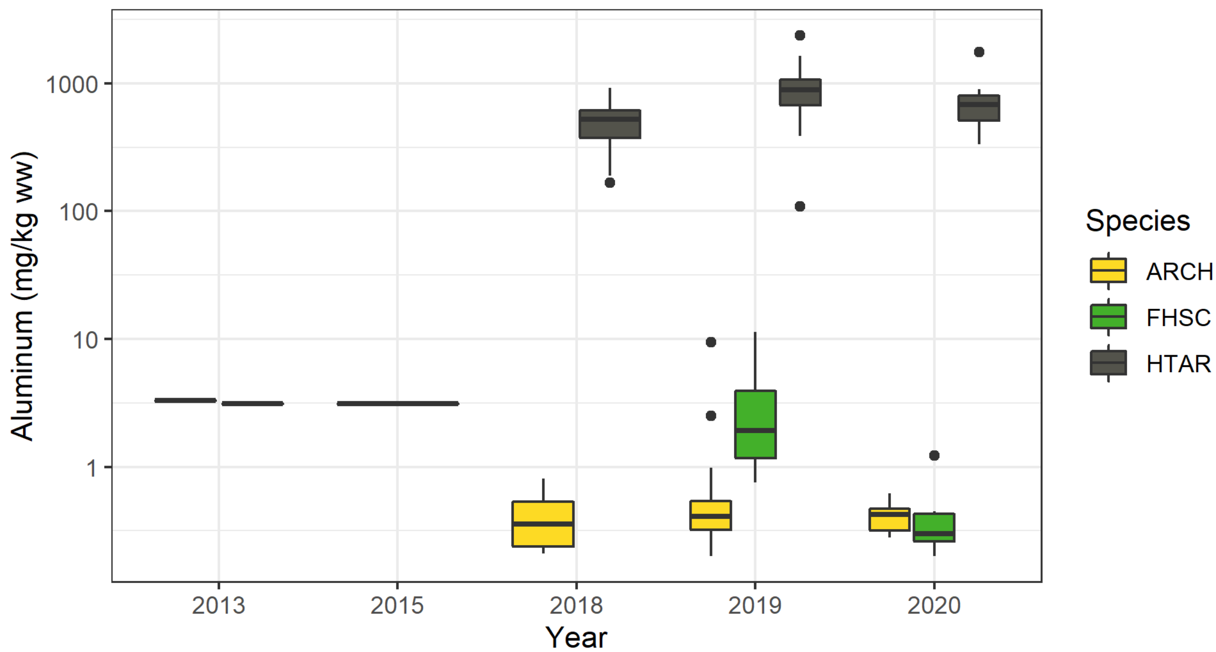
Parameter	DL	Fish Identification Number							
		BAFF20UMLNFHSC1301	BAFF20UMLNFHSC1302	BAFF20UMLNFHSC1303	BAFF20UMLNFHSC1006	BAFF20UMLNFHSC1009	BAFF20UMLNFHSC1010	BAFF20UMLNFHSC1012	BAFF20UMLNFHSC1014
Polycyclic Aromatic Hydrocarbon (mg/kg)									
1-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate Recovery (%)									
D10-Anthracene	-	99	97	106	99	101	105	100	96
D14-Terphenyl	-	99	99	99	99	101	103	108	93
D8-Acenaphthylene	-	99	96	86	100	87	96	100	91

mg/kg = milligram per killigram; % = percent; > = greater than; < = less than; DL = Detection Limit.

Table 7C-7 Fish Tissue Chemistry Results (Polycyclic Aromatic Hydrocarbons) for *Hiatella Arctica* from the Milne Port Area, 2020

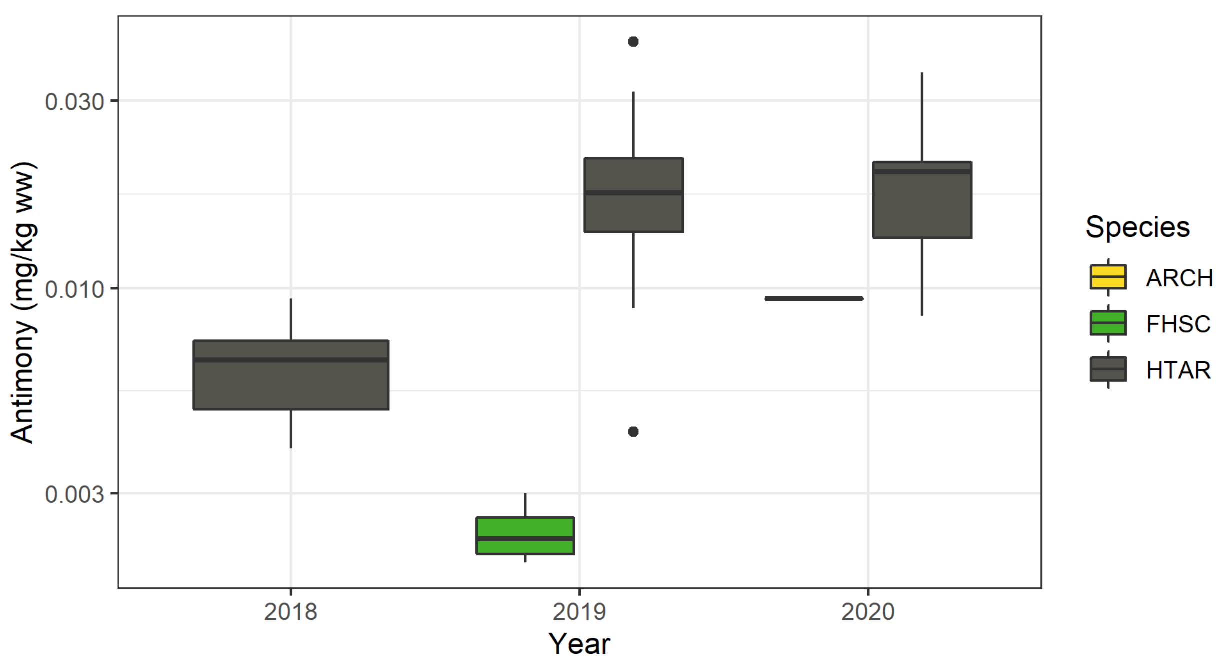
Parameter	DL	Fish Identification Number							
		HTAR_COMP_1	HTAR_COMP_2	HTAR_COMP_3	HTAR_COMP_4	HTAR_COMP_5	HTAR_COMP_6	HTAR_COMP_7	HTAR_COMP_8
Polycyclic Aromatic Hydrocarbon (mg/kg)									
1-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perylene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate Recovery (%)									
D10-Anthracene	-	92	95	91	92	94	86	85	102
D14-Terphenyl	-	96	94	92	90	92	84	83	100
D8-Acenaphthylene	-	90	94	94	91	93	84	82	99

mg/kg = milligram per killigram; % = percent; > = greater than; < = less than; DL = Detection Limit.



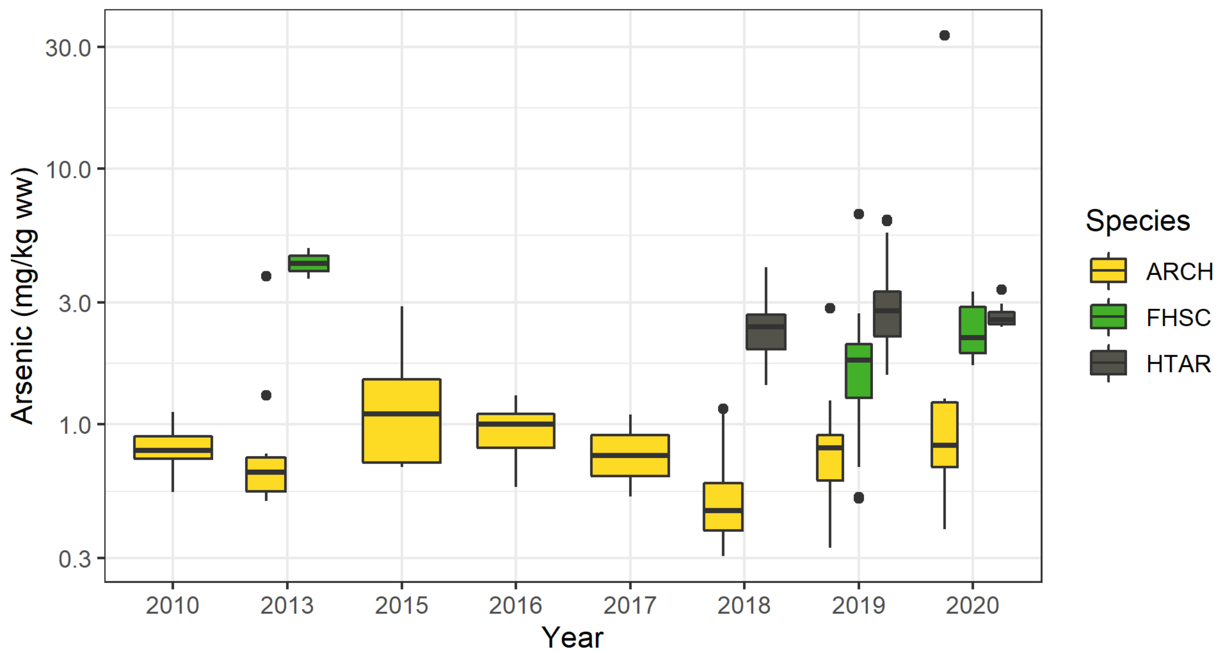
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-1: Detected Concentrations of Aluminum for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



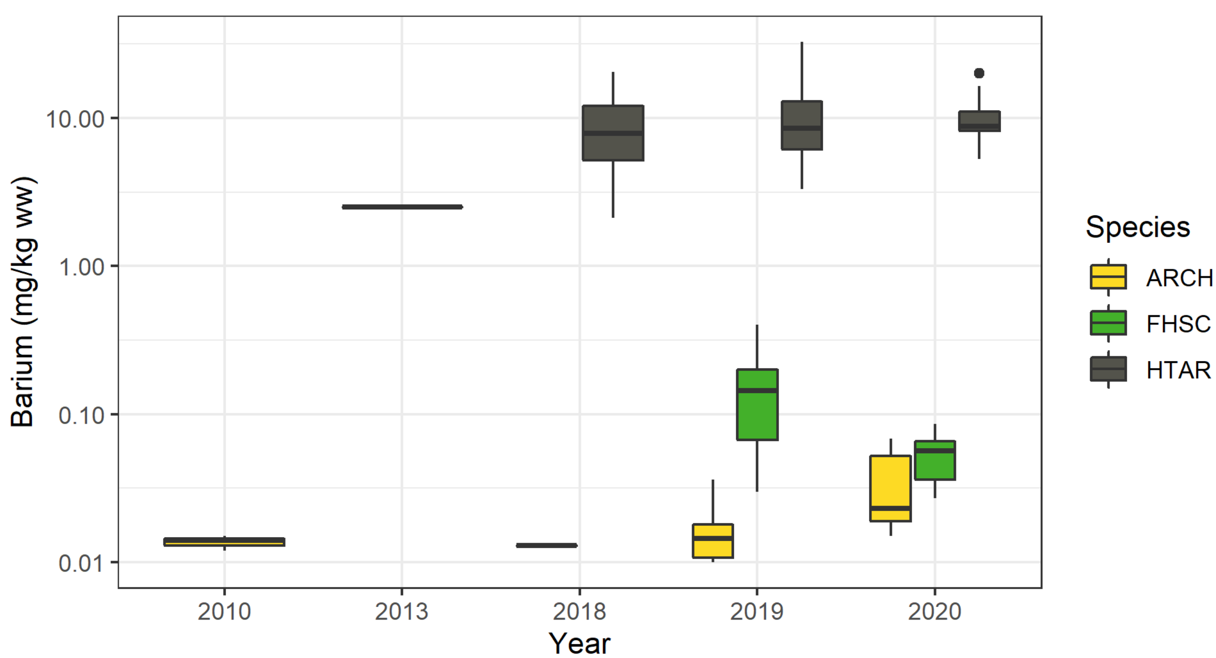
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-2: Detected Concentrations of Antimony for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



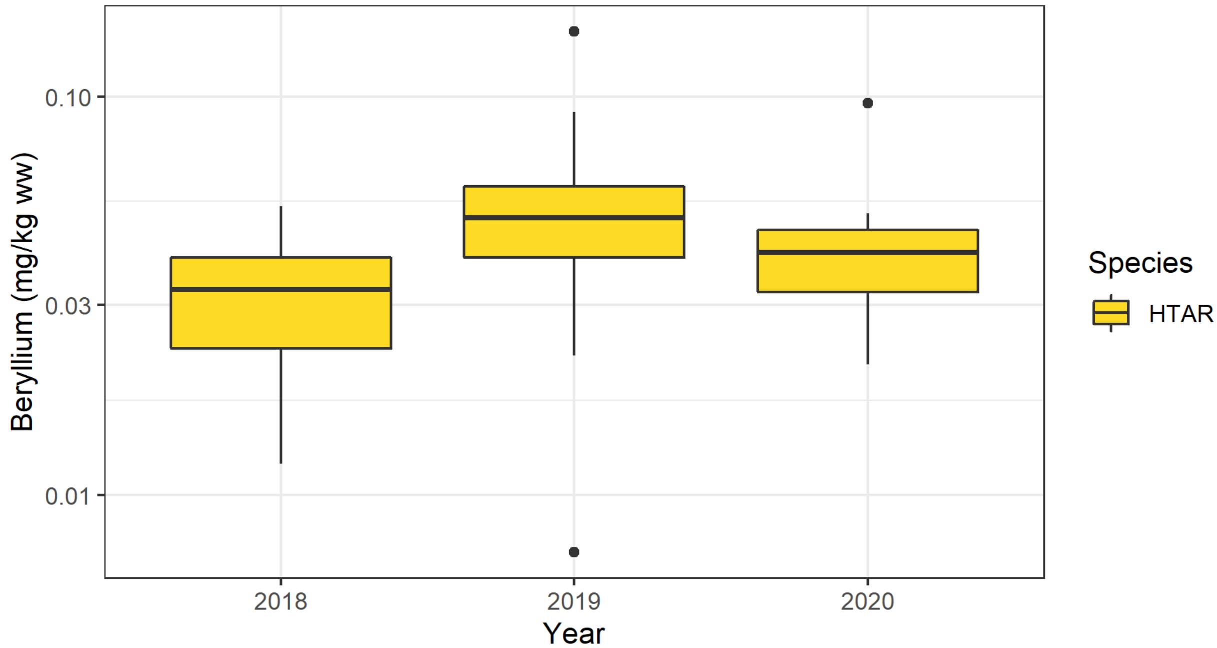
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-3: Detected Concentrations of Arsenic for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



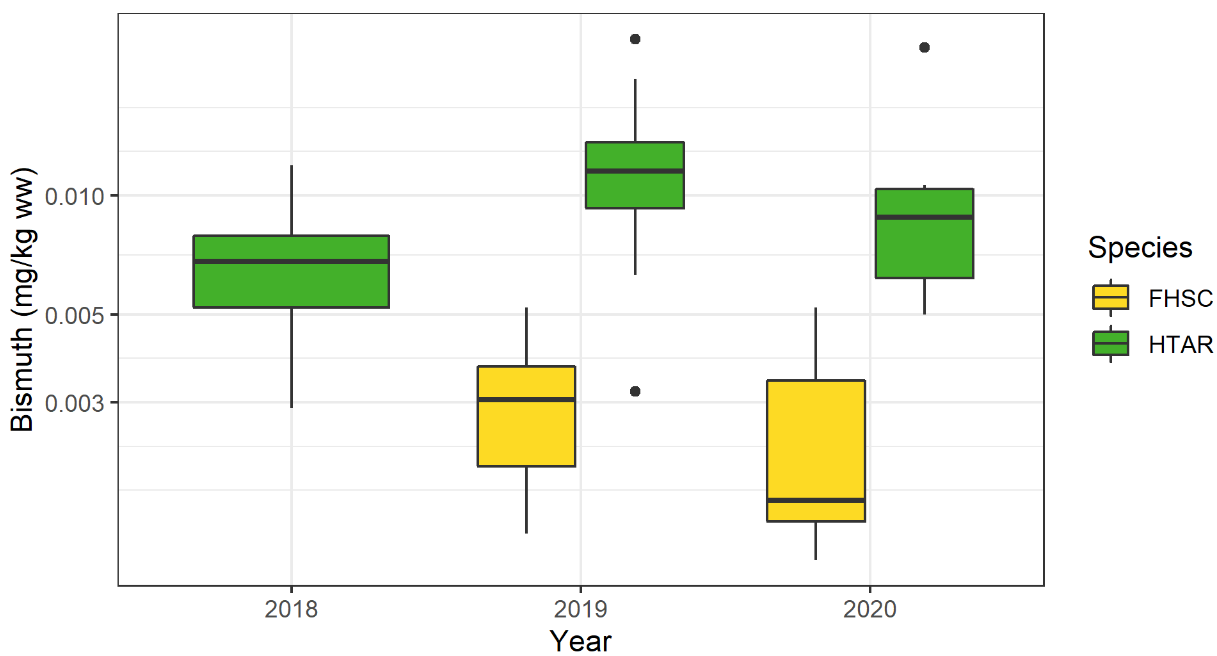
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-4: Detected Concentrations of Barium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



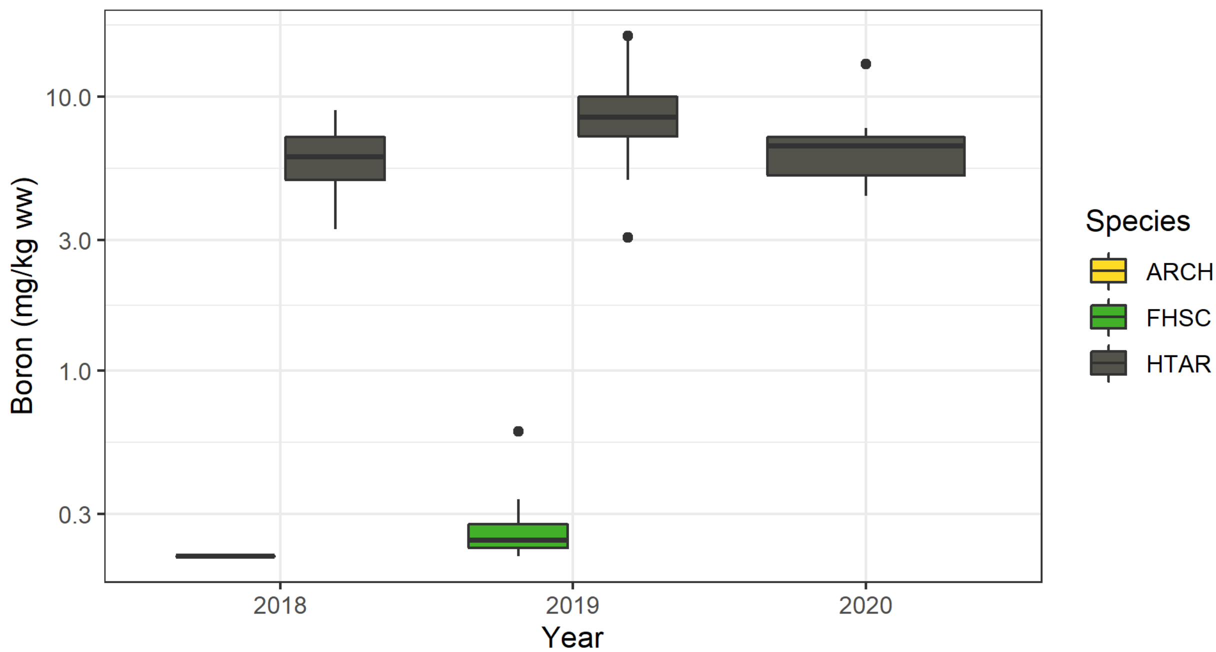
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-5: Detected Concentrations of Beryllium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



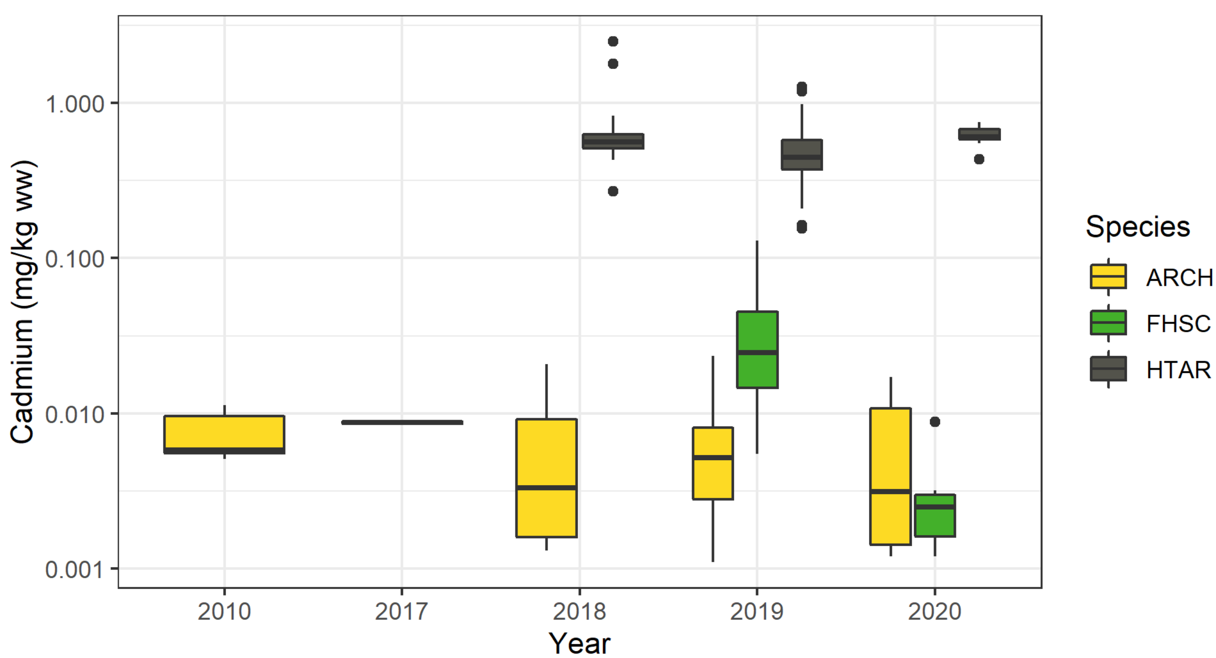
ww= wet weight; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-6: Detected Concentrations of Bismuth for Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



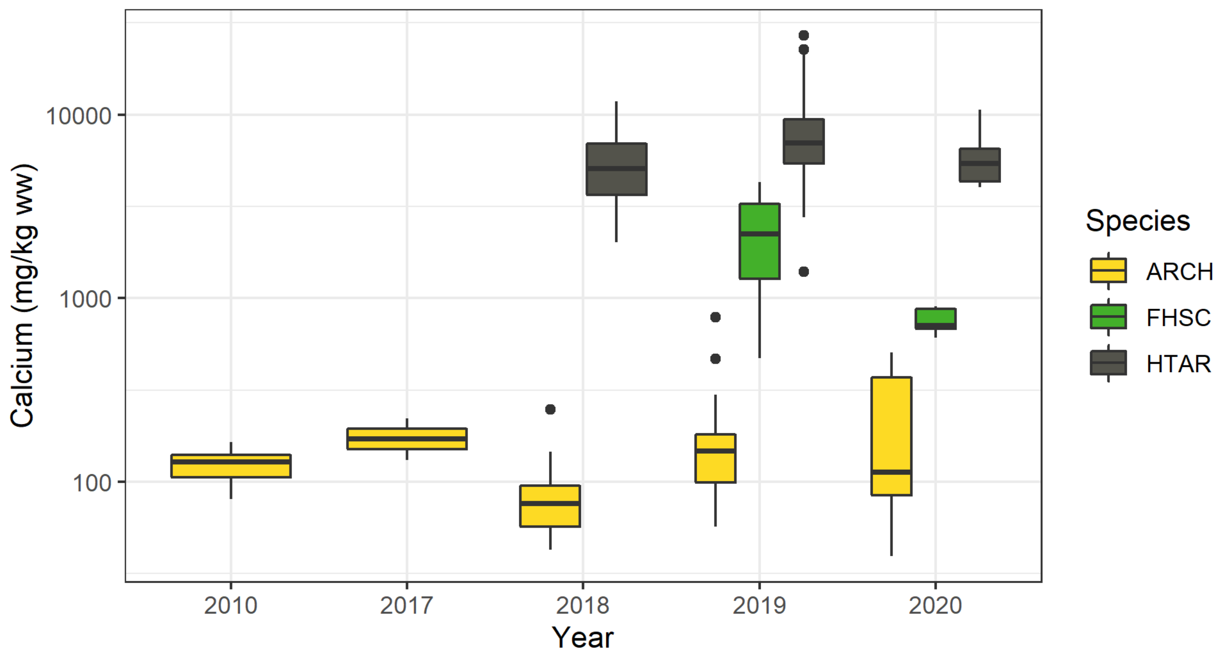
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-7: Detected Concentrations of Boron for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



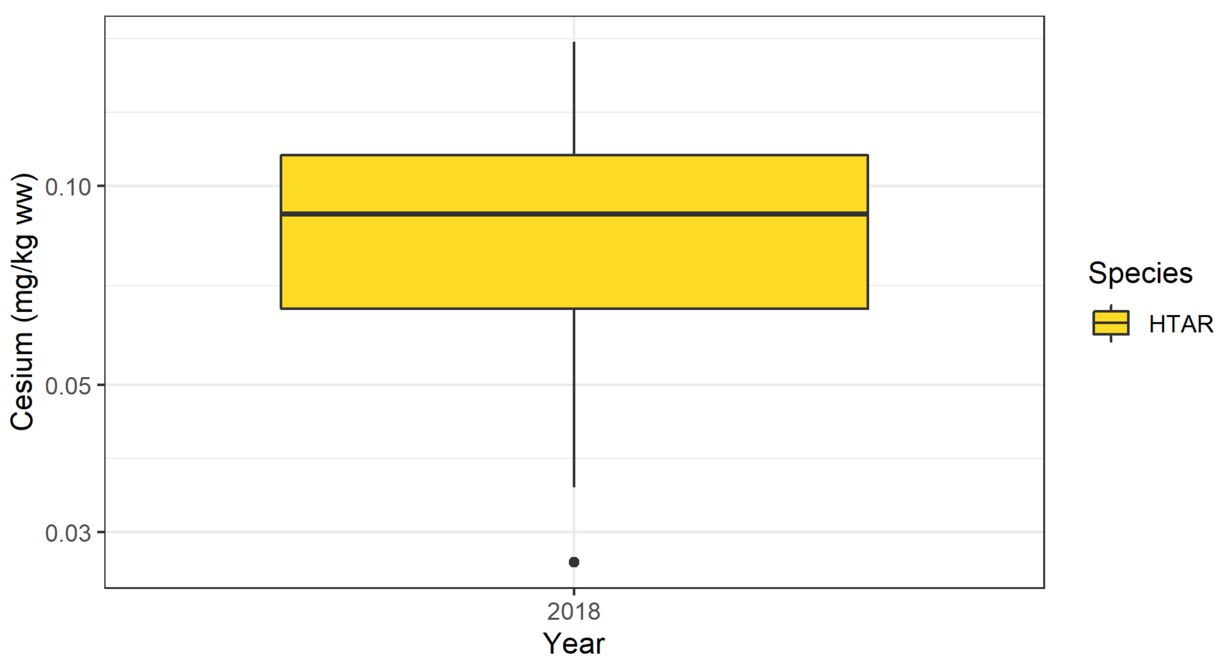
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-8: Detected Concentrations of Cadmium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



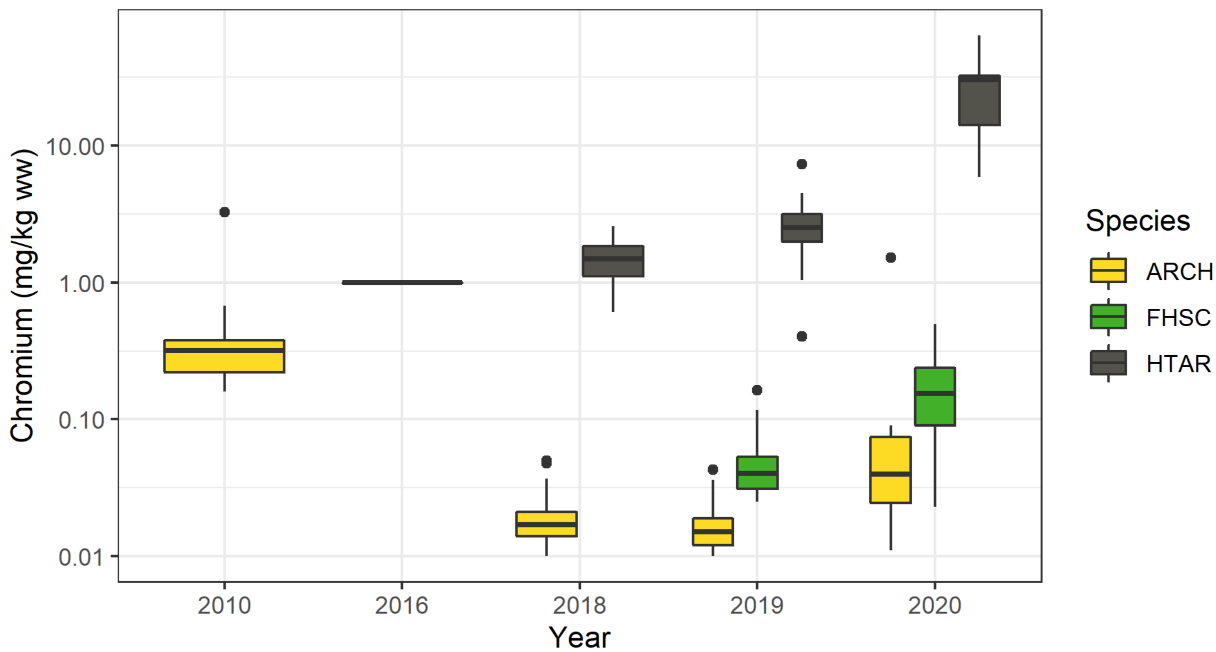
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-9: Detected Concentrations of Calcium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



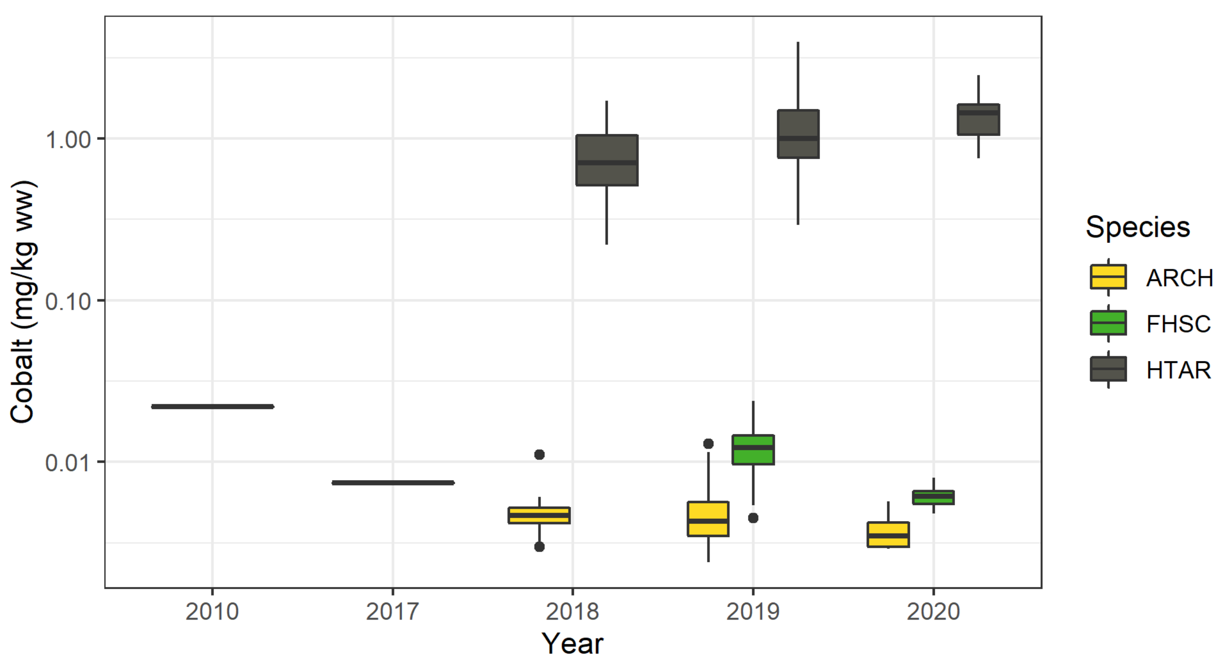
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-10: Detected Concentrations of Cesium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



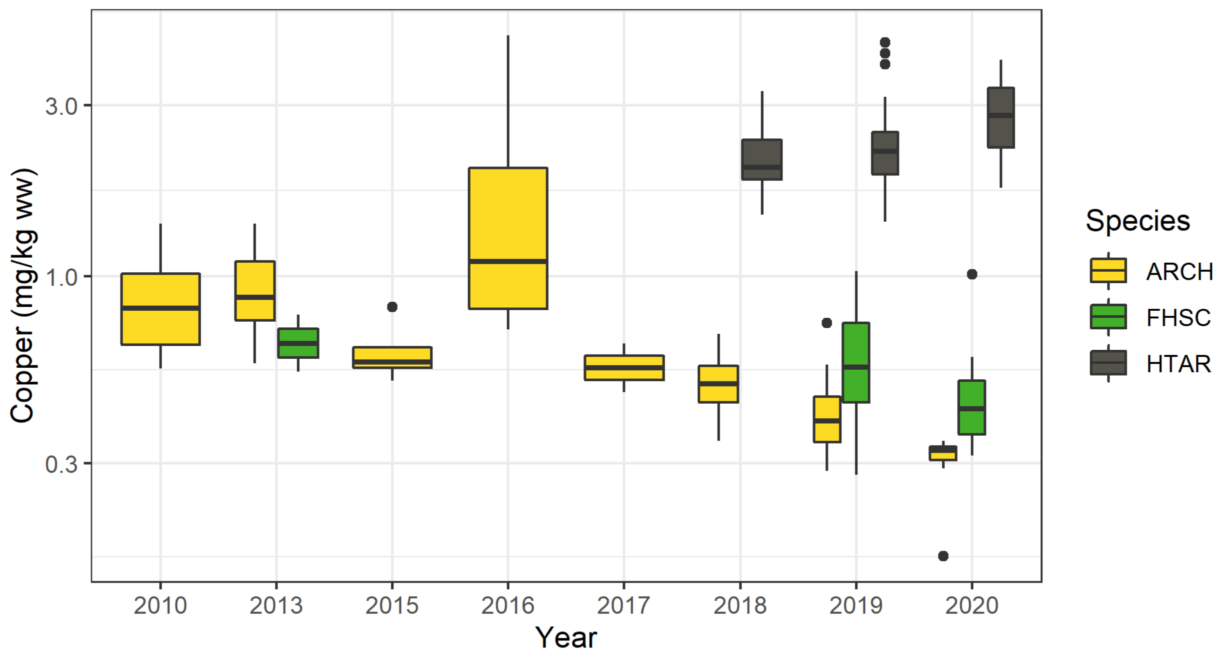
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-11: Detected Concentrations of Chromium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



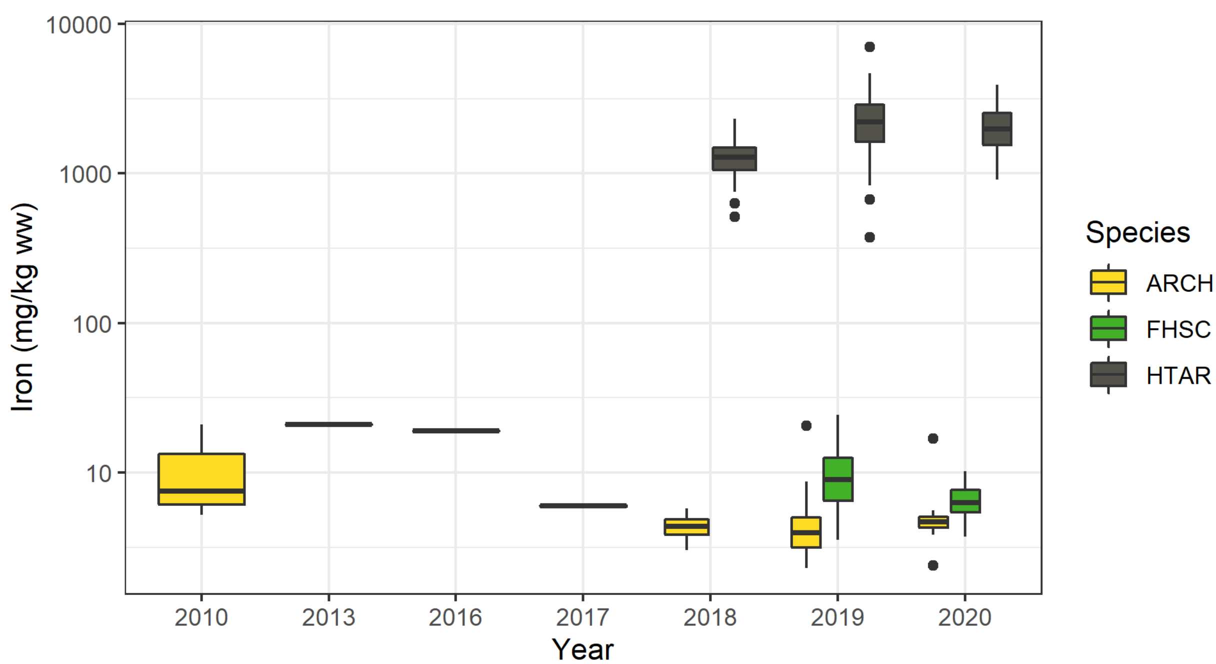
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-12: Detected Concentrations of Cobalt for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



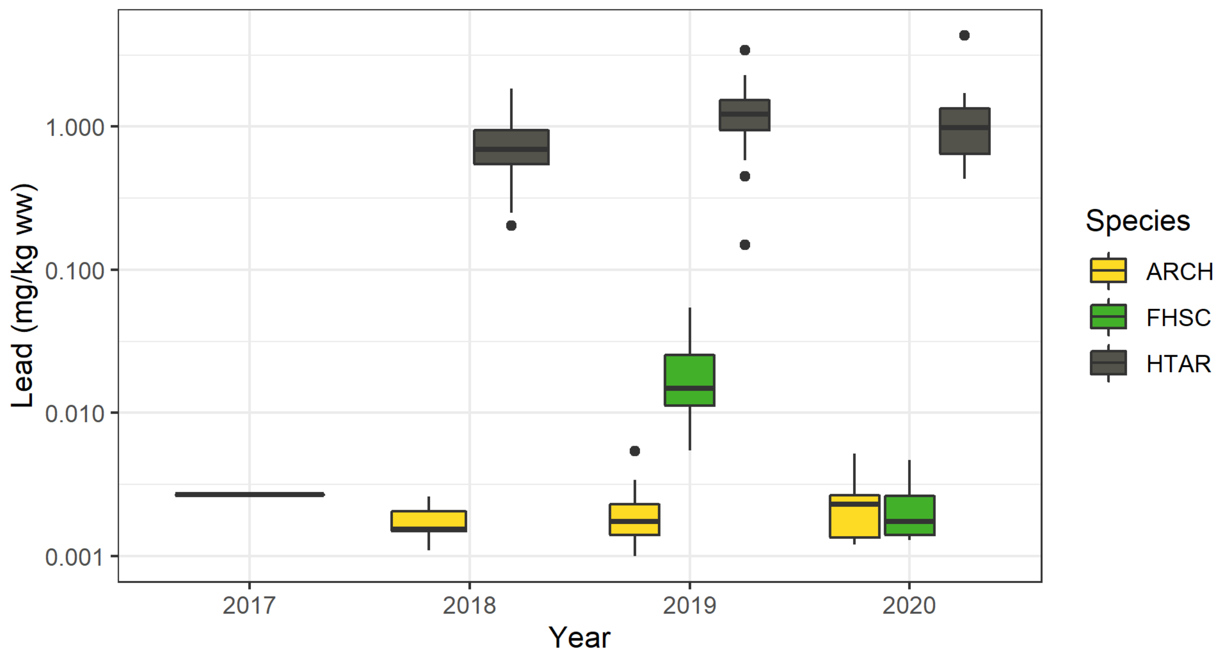
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-13: Detected Concentrations of Copper for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



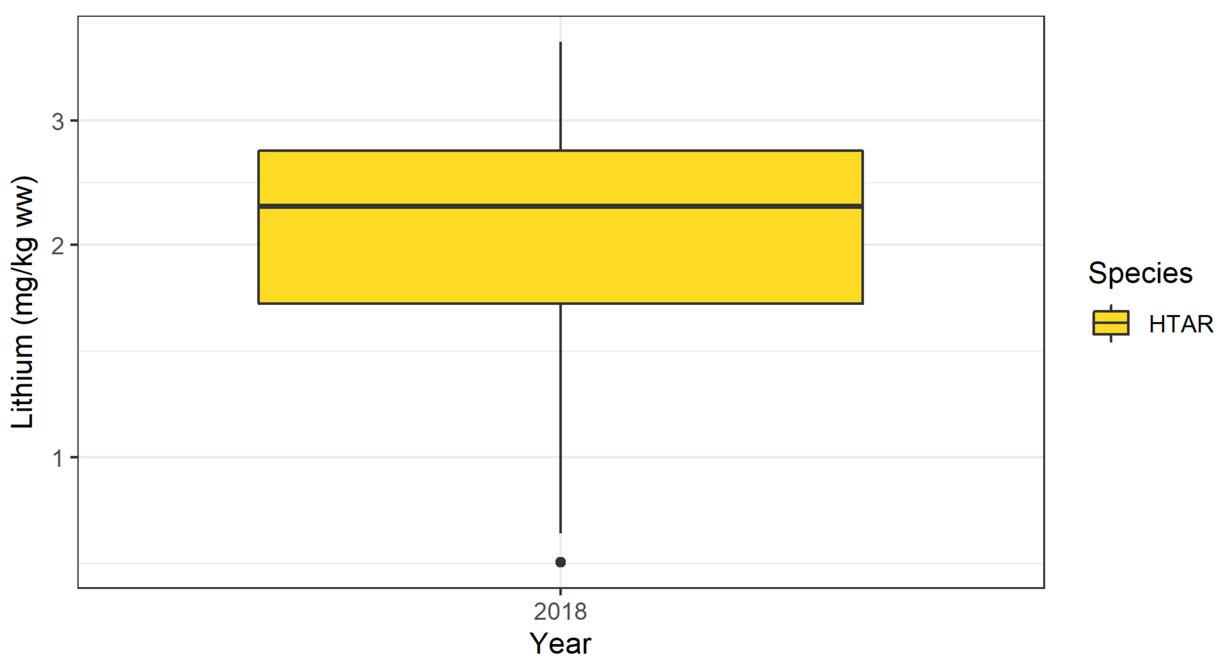
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-14: Detected Concentrations of Iron for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



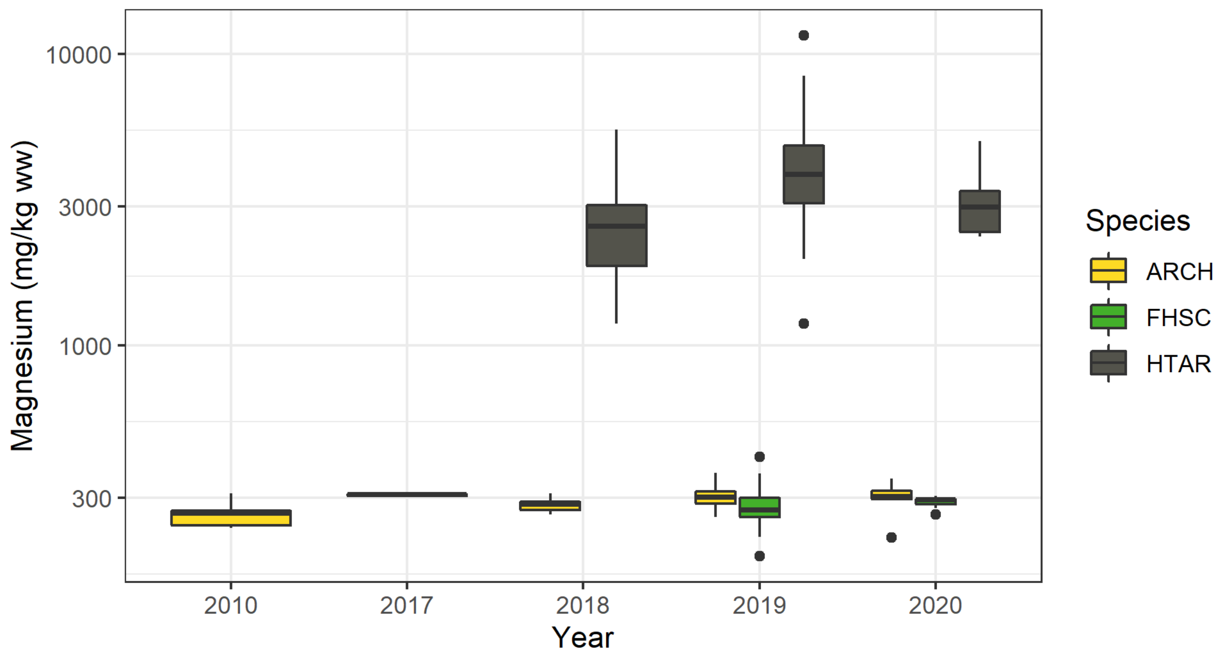
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-15: Detected Concentrations of Lead for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



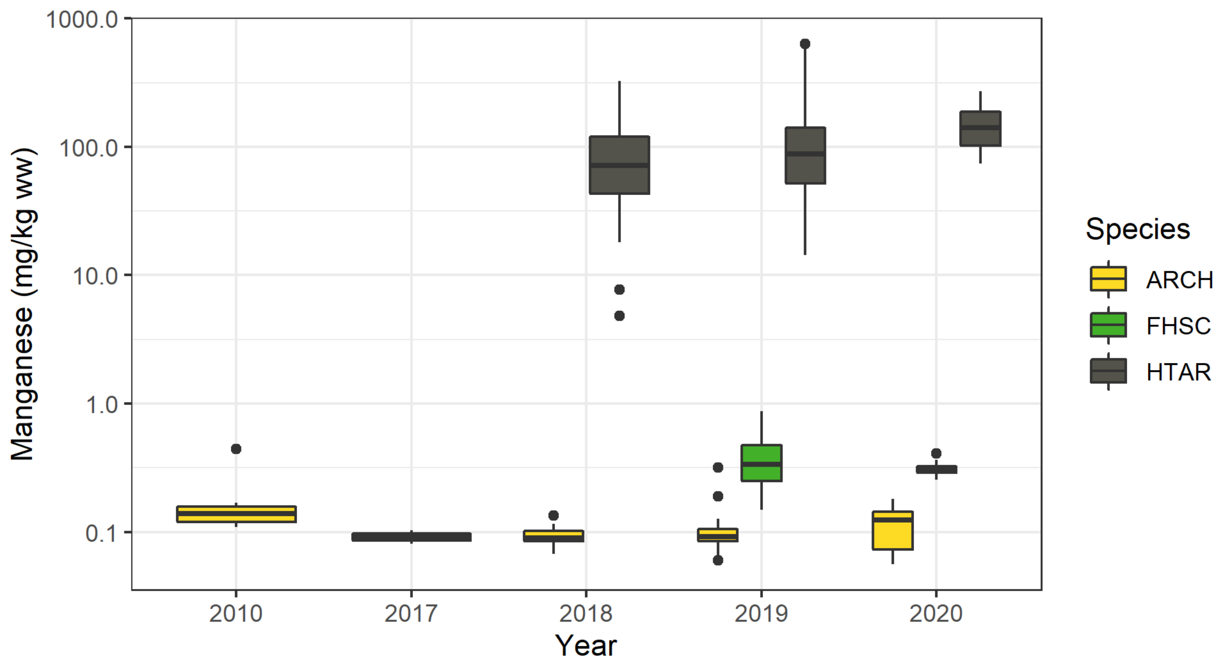
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-16: Detected Concentrations of Lithium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



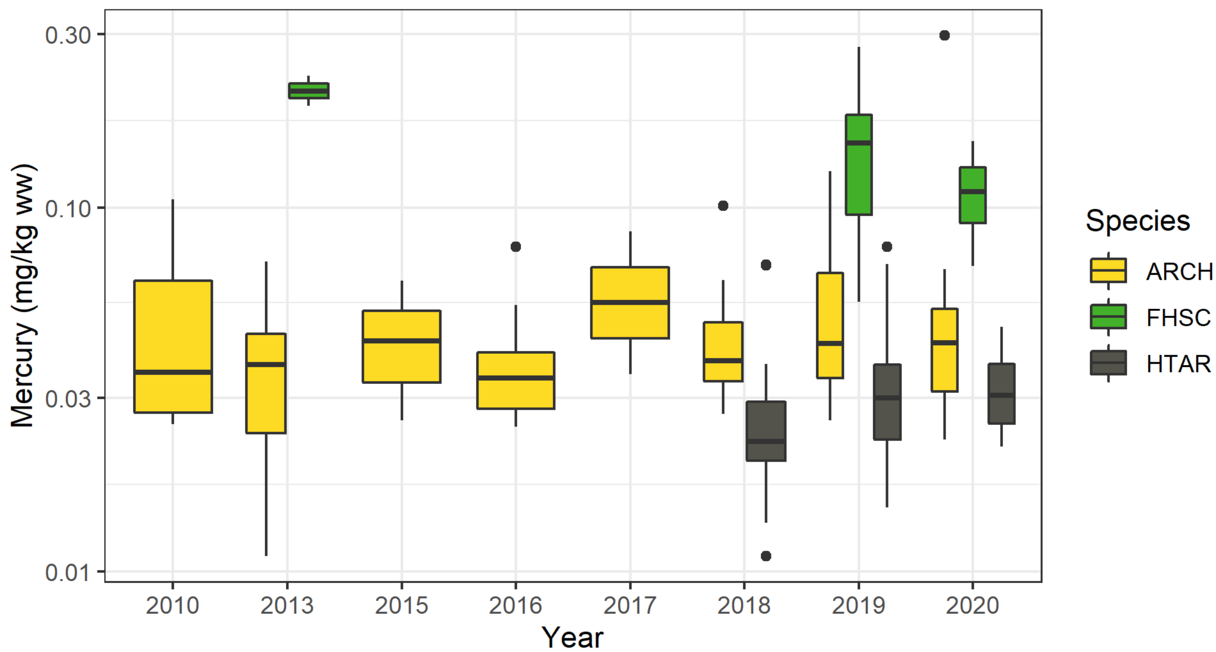
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-17: Detected Concentrations of Magnesium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



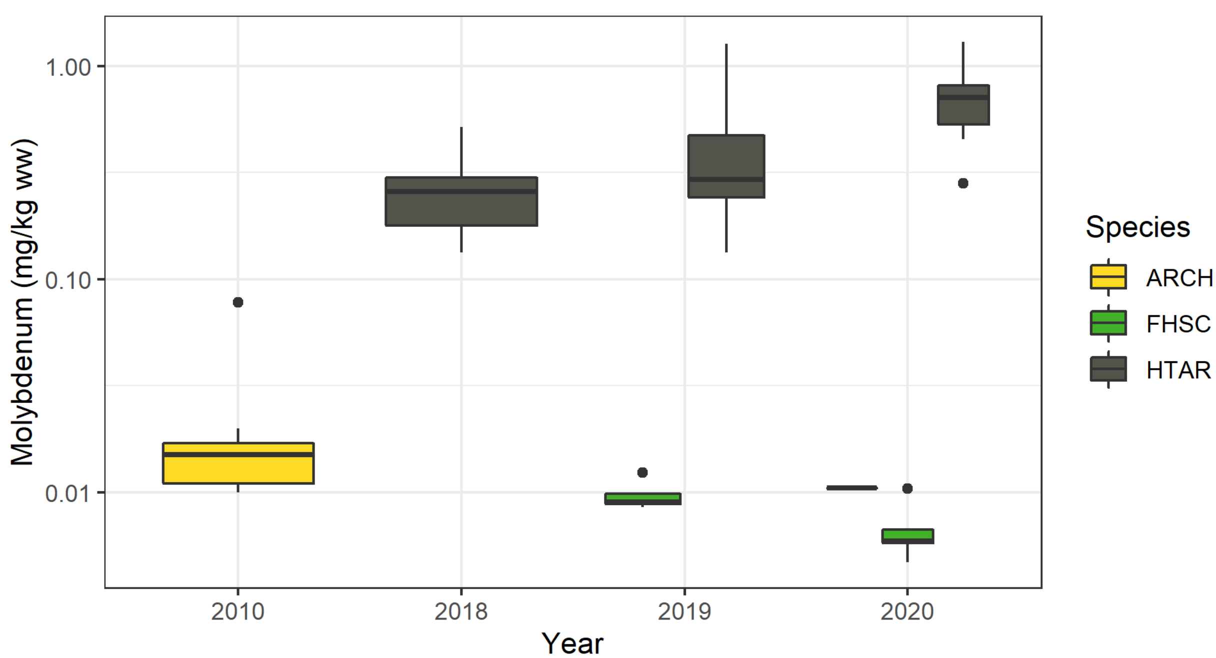
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-18: Detected Concentrations of Manganese for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



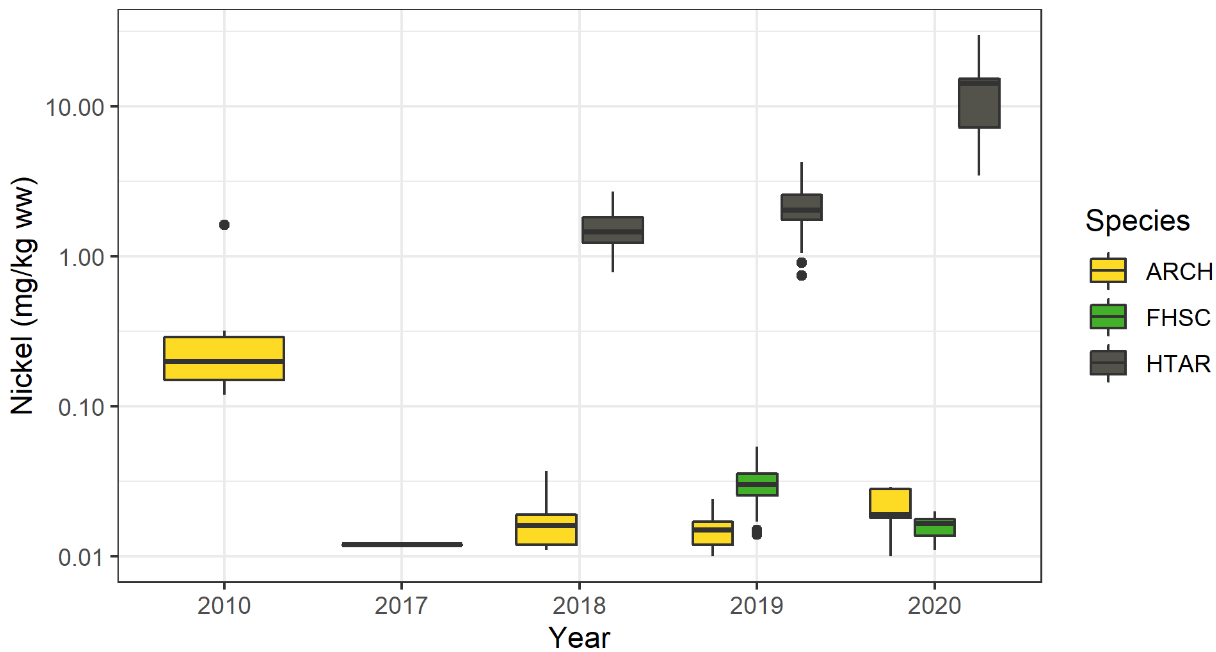
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-19: Detected Concentrations of Manganese for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



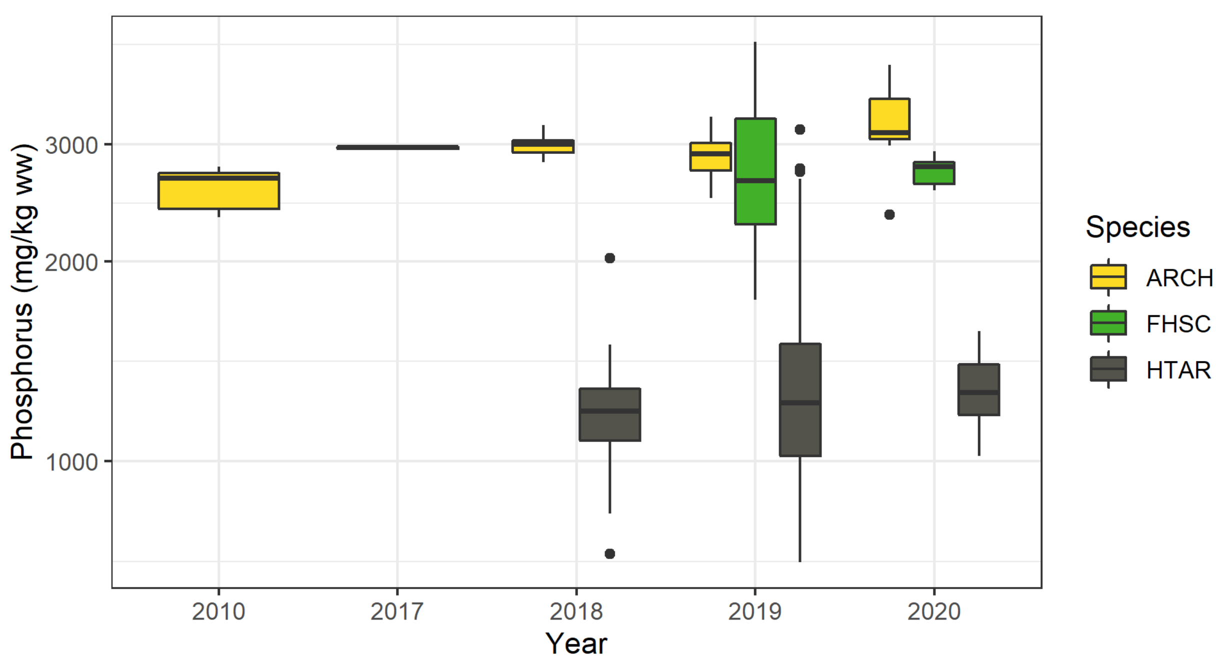
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-20: Detected Concentrations of Molybdenum for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



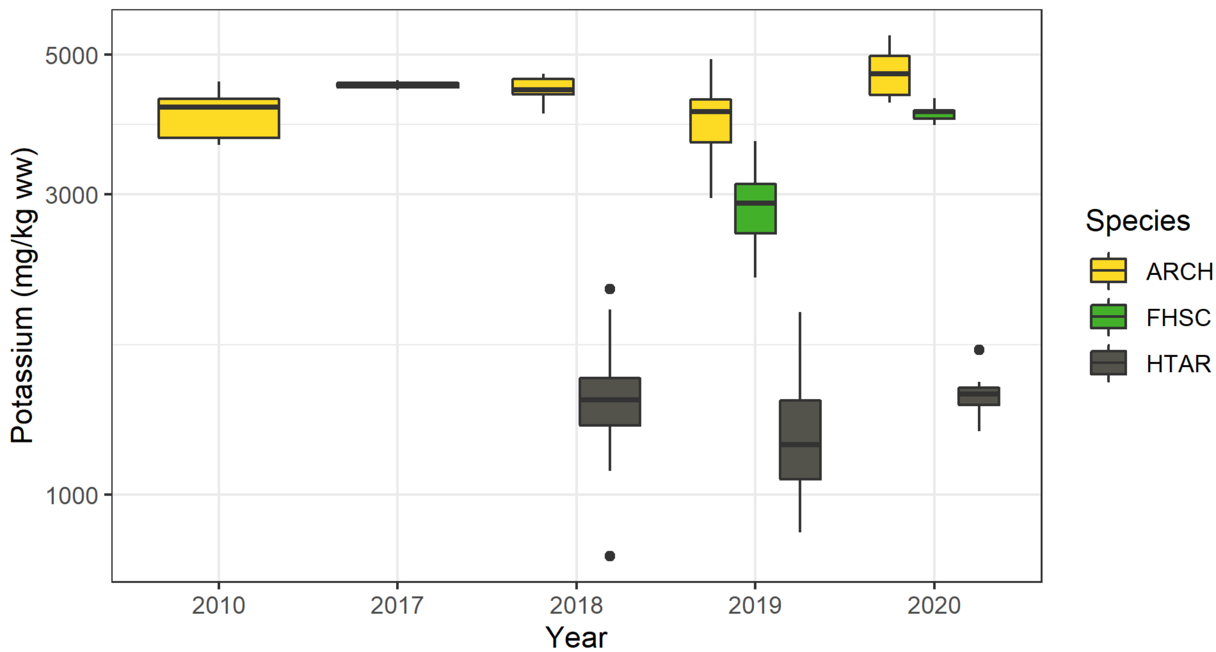
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-21: Detected Concentrations of Nickel for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



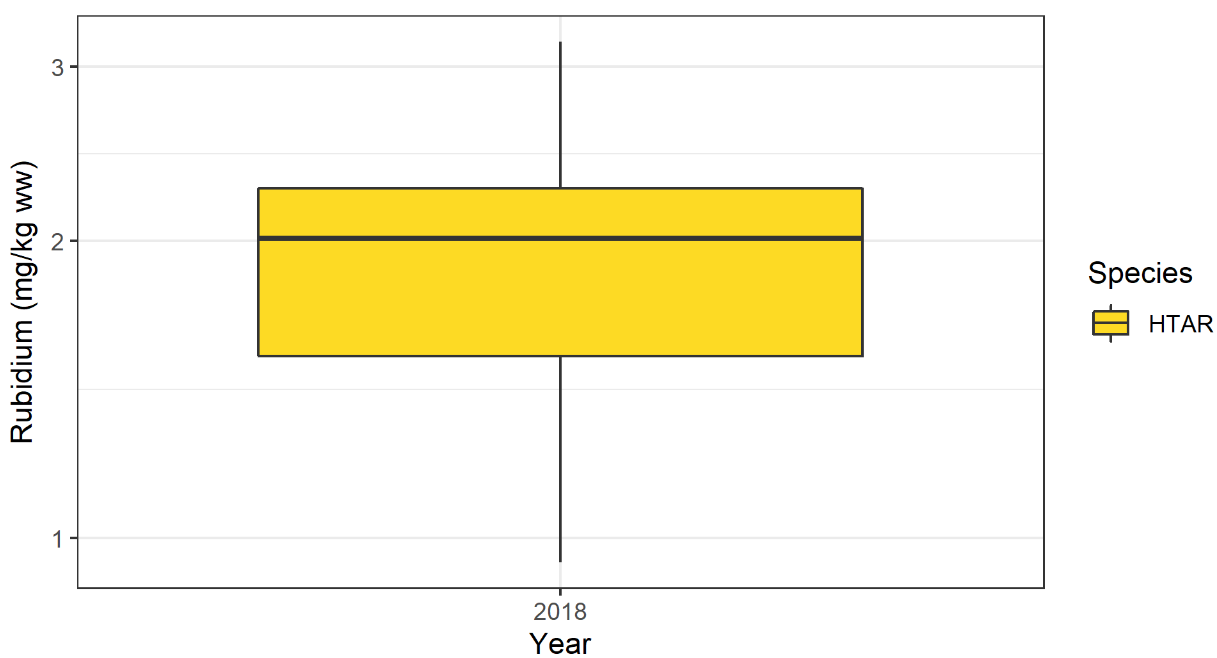
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-22: Detected Concentrations of Phosphorus for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



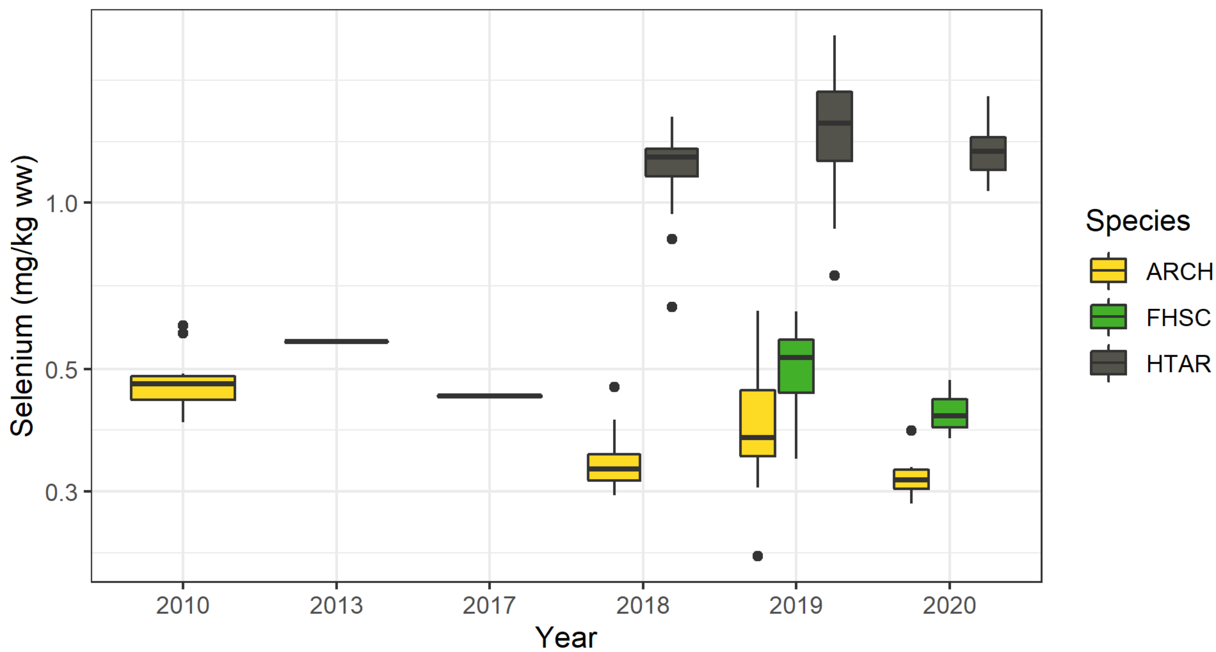
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-23: Detected Concentrations of Potassium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



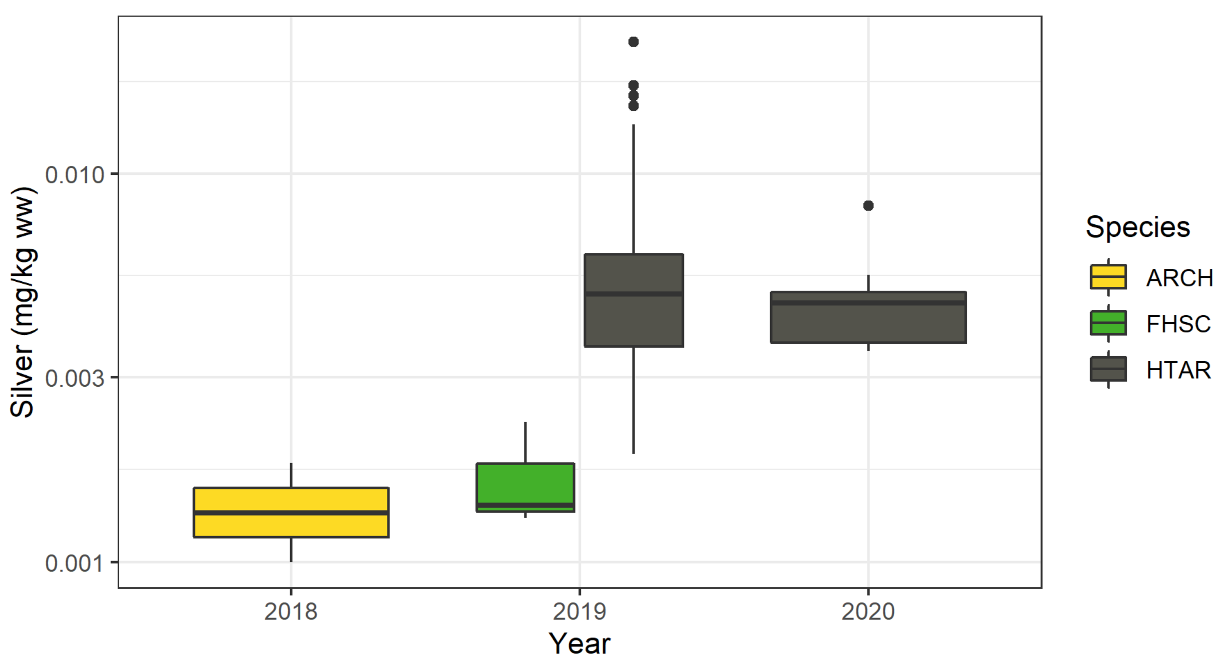
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-24: Detected Concentrations of Rubidium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



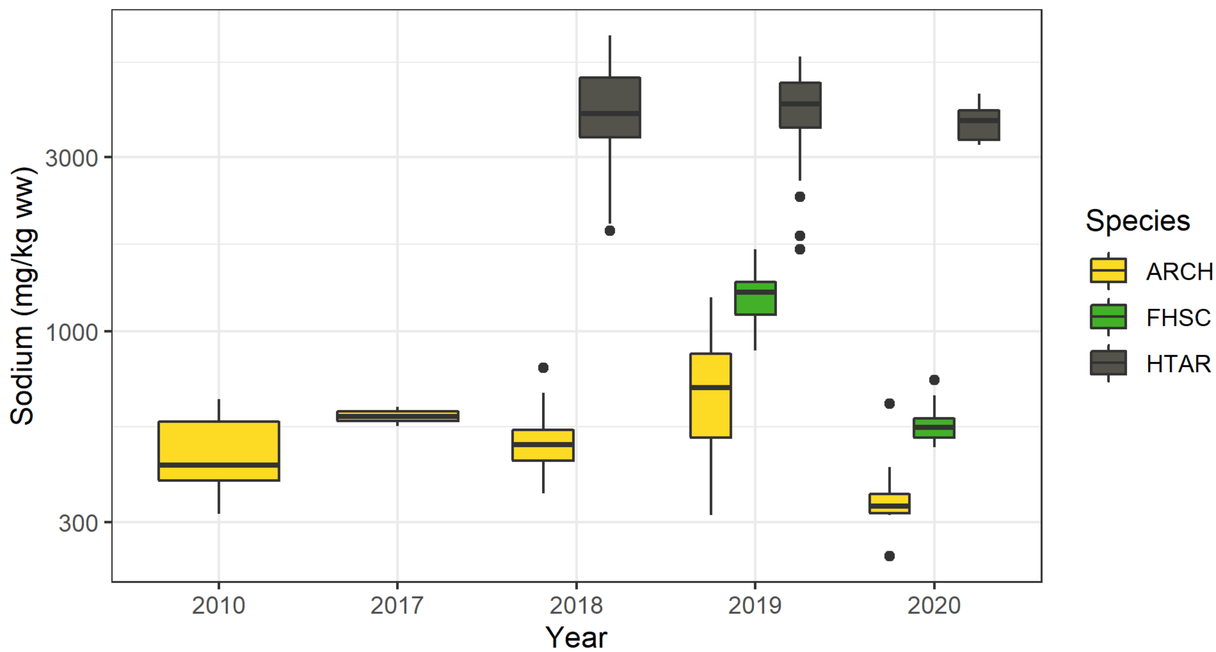
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-25: Detected Concentrations of Selenium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



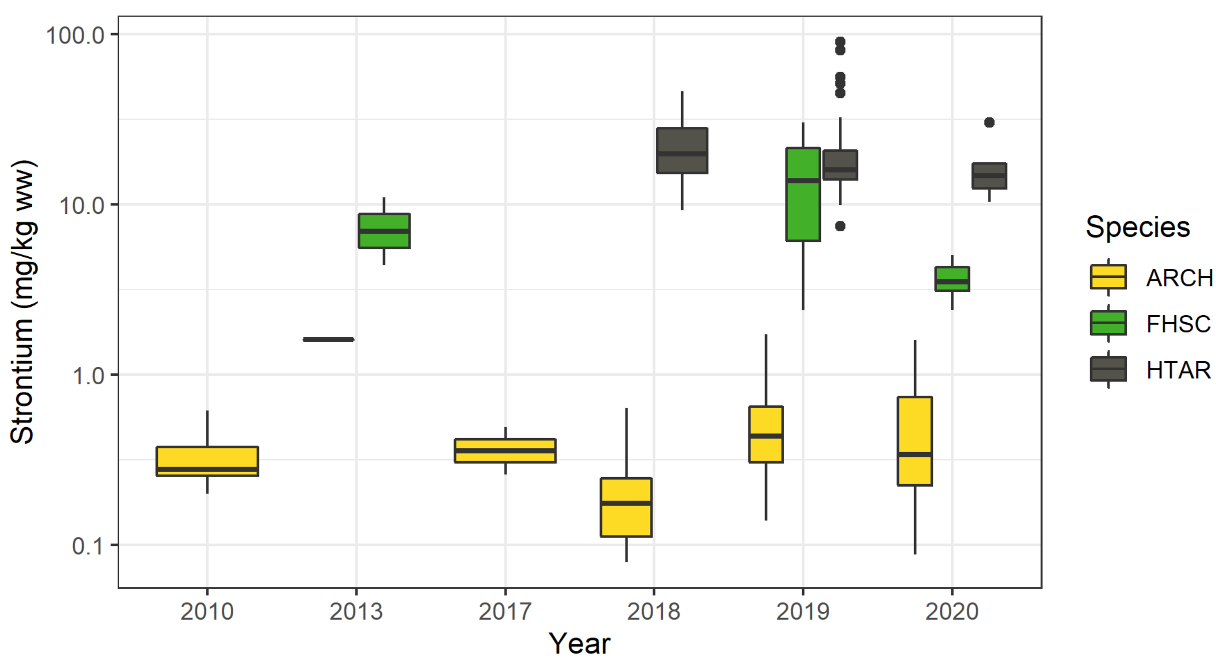
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-26: Detected Concentrations of Silver for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



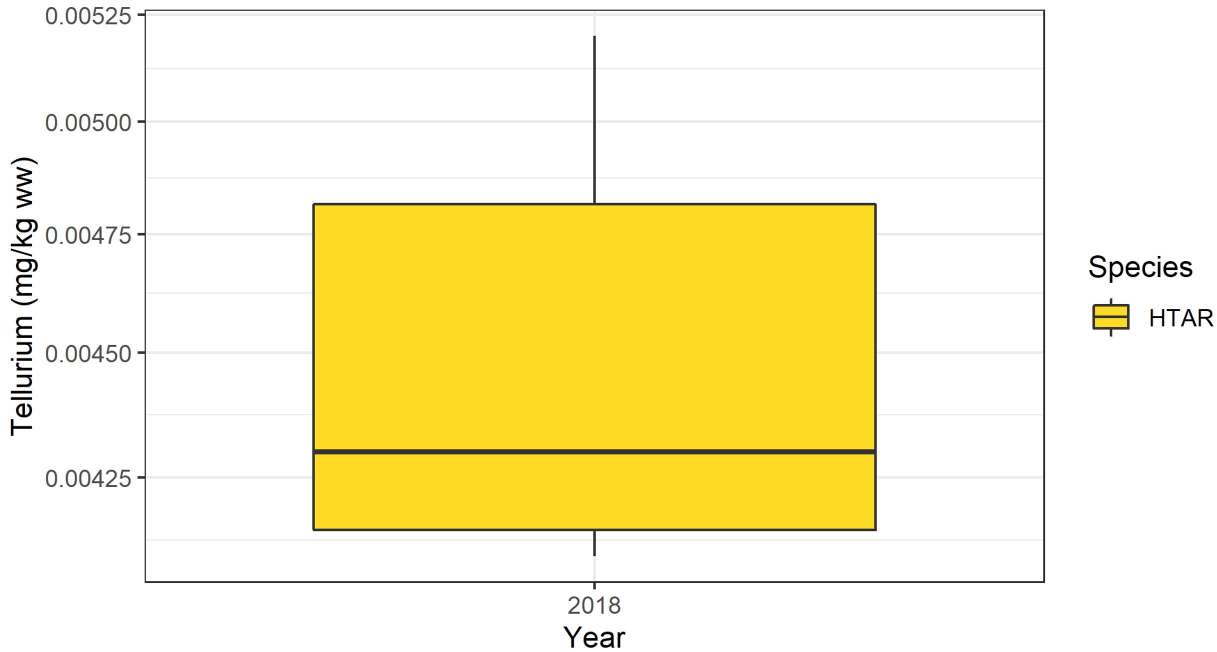
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-27: Detected Concentrations of Sodium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



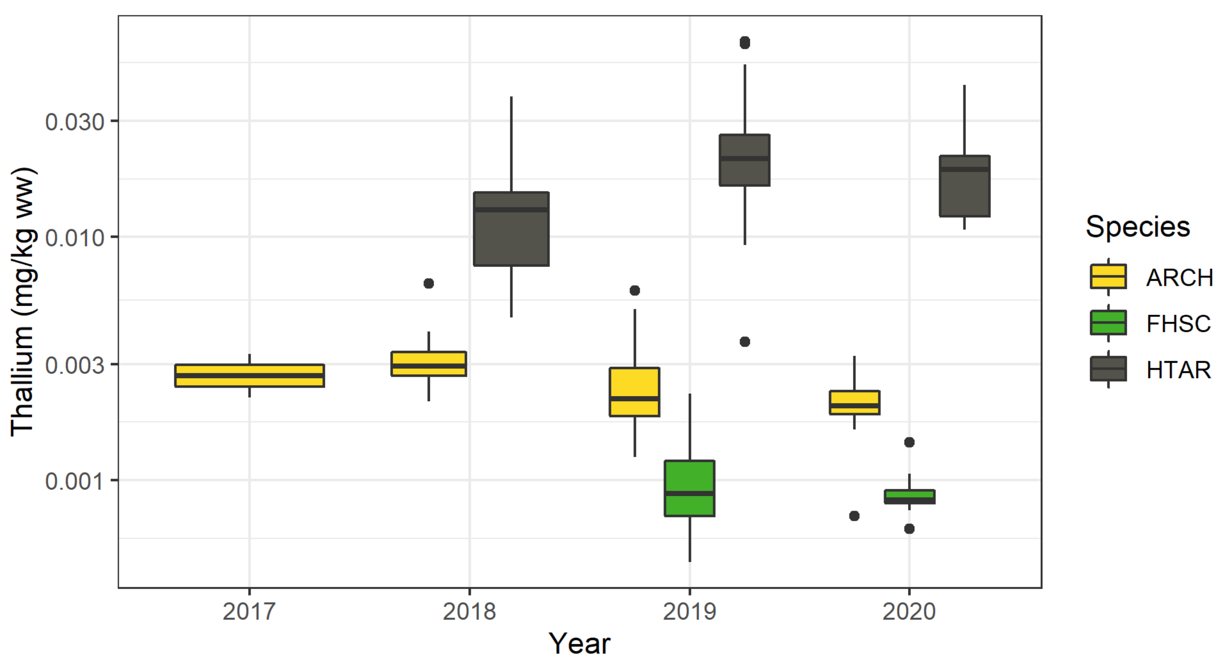
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-28: Detected Concentrations of Strontium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



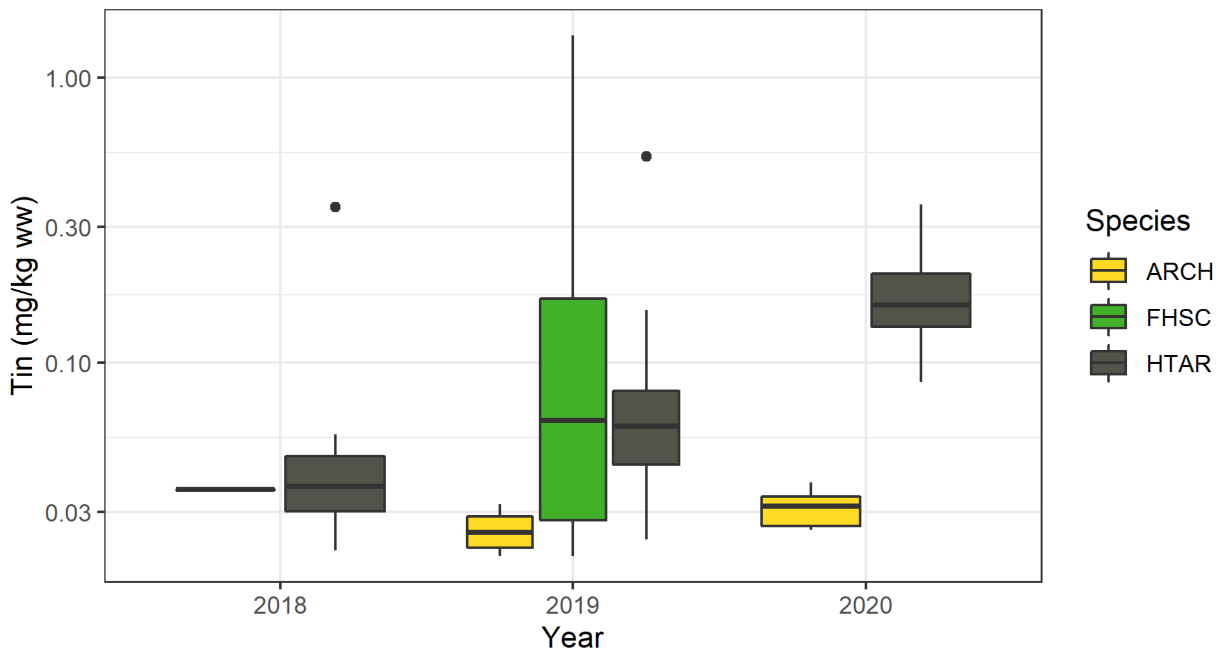
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-29: Detected Concentrations of Tellurium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



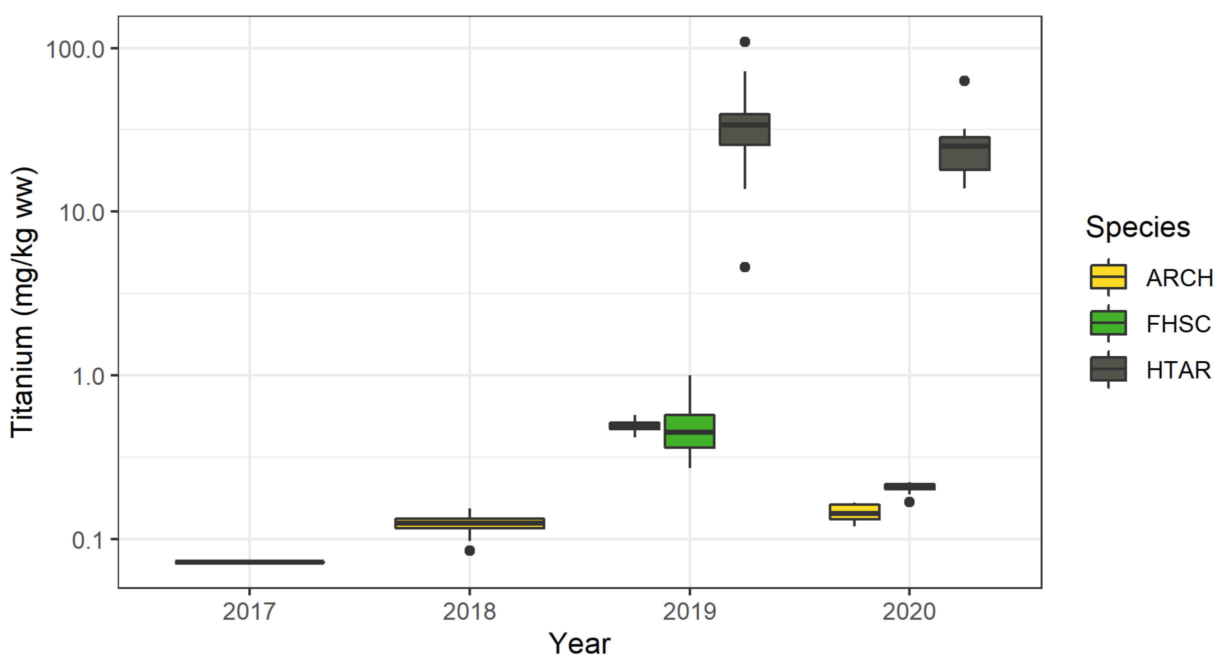
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-30: Detected Concentrations of Thallium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



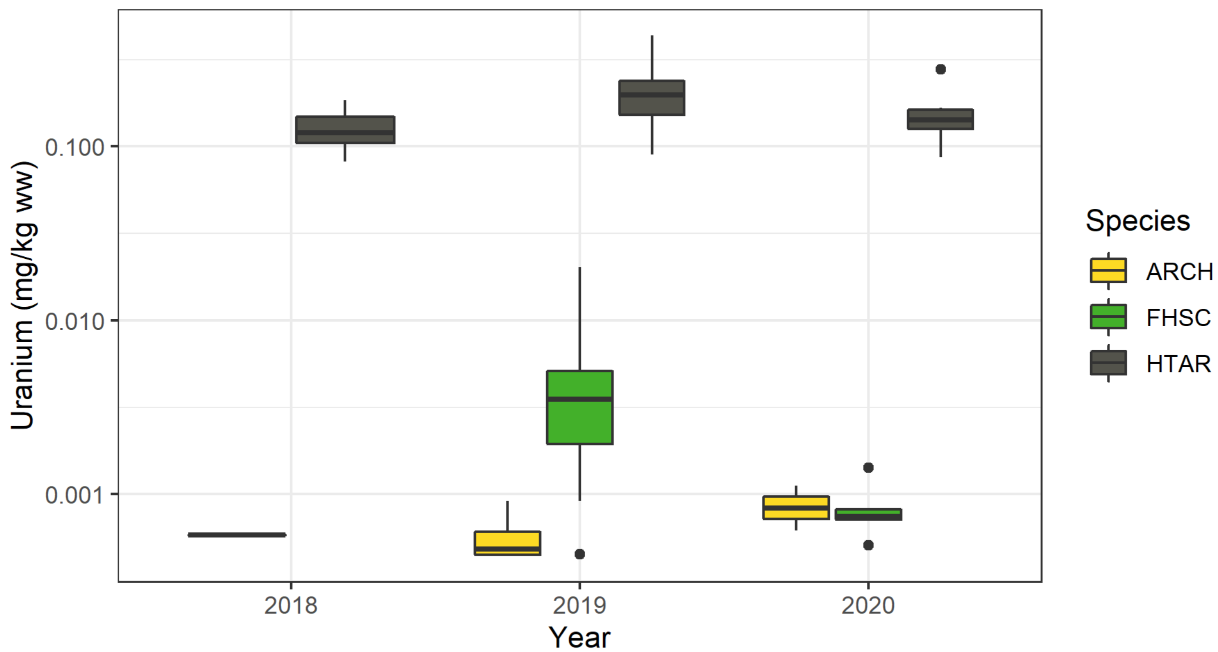
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-31: Detected Concentrations of Tin for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



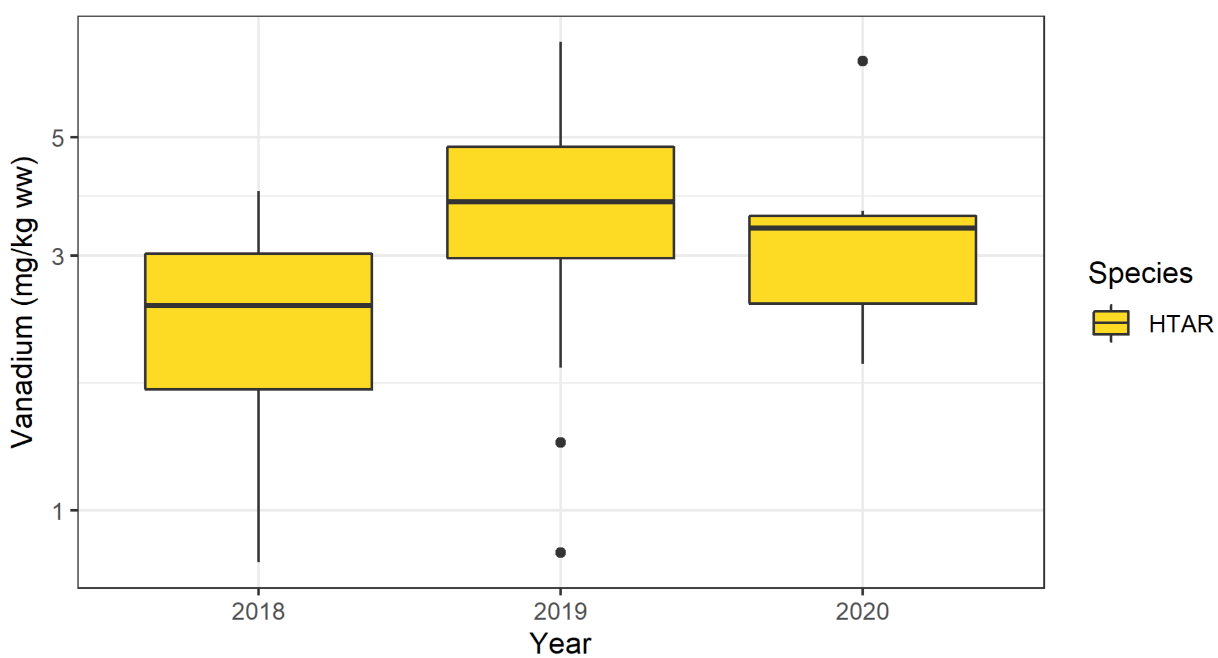
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-32: Detected Concentrations of Titanium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



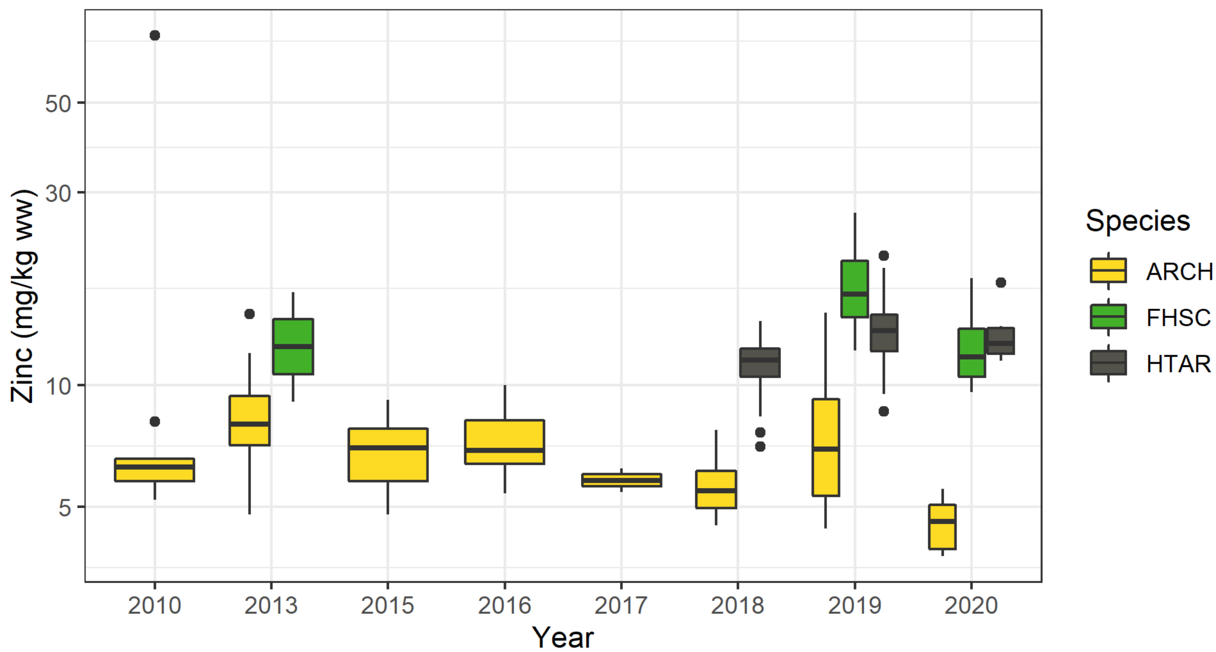
ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-33: Detected Concentrations of Uranium for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



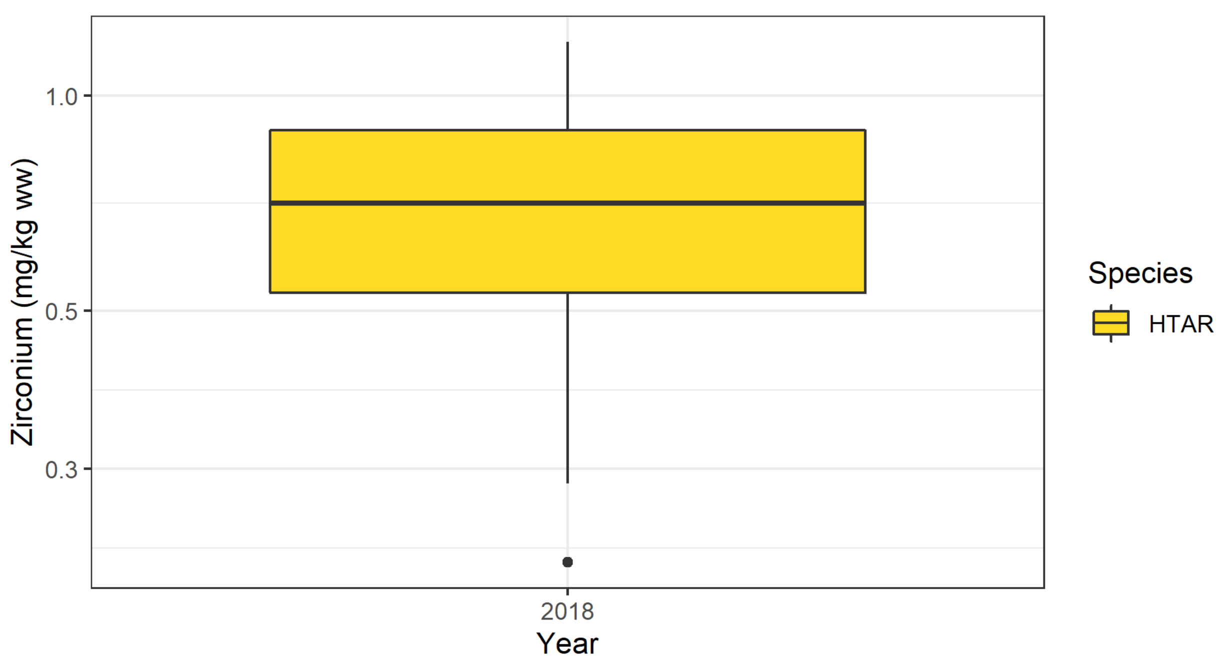
ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-34: Detected Concentrations of Vanadium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



ww= wet weight; ARCH = Arctic Char; FHSC = Fourhorn Sculpin; HTAR = *Hiatella arctica*.

Figure 7C-35: Detected Concentrations of Zinc for Arctic Char, Fourhorn Sculpin and *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020



ww= wet weight; HTAR = *Hiatella arctica*.

Figure 7C-36: Detected Concentrations of Zirconium for *Hiatella arctica* Tissue Sampled from the Milne Port Area, 2010 to 2020

APPENDIX 7D

Certificate of Analysis

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE
GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Your C.O.C. #: 08485884, 08485888, 08485892, 08485896, 08485900

Report Date: 2020/10/14
Report #: R2941978
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C068794
Received: 2020/09/23, 08:00

Sample Matrix: Tissue
Samples Received: 43

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by CRC ICPMS - Tissue Wet Wt	8	2020/10/03	2020/10/09	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue	43	2020/10/03	2020/10/07	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Your C.O.C. #: 08485884, 08485888, 08485892, 08485896, 08485900

Report Date: 2020/10/14
Report #: R2941978
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C068794
Received: 2020/09/23, 08:00

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas Laboratories
14 Oct 2020 15:29:12

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Carmen McKay, Project Manager
Email: Carmen.MCKAY@bvlabs.com
Phone# (403)219-3683
==
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		YM6009	YM6010	YM6011		
Sampling Date		2020/08/01 15:24	2020/08/01 13:40	2020/08/01 15:57		
COC Number		08485884	08485884	08485888		
	UNITS	**BAFF20UMLNFHSC1302**	**BAFF20UMLNFHSC1303**	**BAFF20UMLNFHSC1304**	**RDL**	**QC Batch**
Total Metals by ICPMS						
Total (Wet Wt) Aluminum (Al)	mg/kg	<0.20	0.30	1.23	0.20	A030245
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Arsenic (As)	mg/kg	1.95	3.31	1.76	0.0040	A030245
Total (Wet Wt) Barium (Ba)	mg/kg	0.056	0.031	0.027	0.010	A030245
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0010	0.0017	<0.0010	0.0010	A030245
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	<0.20	0.20	A030245
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0012	0.0020	0.0025	0.0010	A030245
Total (Wet Wt) Calcium (Ca)	mg/kg	612	707	674	2.0	A030245
Total (Wet Wt) Chromium (Cr)	mg/kg	0.496	0.196	0.421	0.010	A030245
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0063	0.0080	0.0049	0.0013	A030245
Total (Wet Wt) Copper (Cu)	mg/kg	0.337	0.468	0.486	0.010	A030245
Total (Wet Wt) Iron (Fe)	mg/kg	7.42	8.32	10.2	0.25	A030245
Total (Wet Wt) Lead (Pb)	mg/kg	0.0014	0.0013	0.0047	0.0010	A030245
Total (Wet Wt) Magnesium (Mg)	mg/kg	295	263	300	0.40	A030245
Total (Wet Wt) Manganese (Mn)	mg/kg	0.364	0.255	0.296	0.010	A030245
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0690	0.142	0.109	0.0020	A030245
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.0104	0.0067	0.0058	0.0040	A030245
Total (Wet Wt) Nickel (Ni)	mg/kg	0.018	0.017	0.016	0.010	A030245
Total (Wet Wt) Phosphorus (P)	mg/kg	2620	2800	2610	2.0	A030245
Total (Wet Wt) Potassium (K)	mg/kg	4070	3860	3910	2.0	A030245
Total (Wet Wt) Selenium (Se)	mg/kg	0.374	0.430	0.388	0.010	A030245
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Sodium (Na)	mg/kg	551	481	669	2.0	A030245
Total (Wet Wt) Strontium (Sr)	mg/kg	2.40	3.75	2.90	0.010	A030245
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00086	0.00106	0.00063	0.00040	A030245
Total (Wet Wt) Tin (Sn)	mg/kg	<0.020	<0.020	<0.020	0.020	A030245
Total (Wet Wt) Titanium (Ti)	mg/kg	0.219	0.210	0.187	0.020	A030245
Total (Wet Wt) Uranium (U)	mg/kg	0.00051	0.00083	0.00071	0.00040	A030245
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	<0.020	0.020	A030245
Total (Wet Wt) Zinc (Zn)	mg/kg	11.2	18.4	10.5	0.040	A030245
RDL = Reportable Detection Limit						

BUREAU VERITAS

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		YM6015	YM6018		YM6019		
Sampling Date		2020/08/02 09:34	2020/08/02 10:26		2020/08/02 10:44		
COC Number		08485888	08485888		08485888		
	UNITS	**BAFF20UMLNFHSC1006**	**BAFF20UMLNFHSC1009**	**QC Batch**	**BAFF20UMLNFHSC1010**	**RDL**	**QC Batch**
Total Metals by ICPMS							
Total (Wet Wt) Aluminum (Al)	mg/kg	0.27	0.41	A030246	0.45	0.20	A030245
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	A030246	<0.0010	0.0010	A030245
Total (Wet Wt) Arsenic (As)	mg/kg	1.95	2.43	A030246	2.82	0.0040	A030245
Total (Wet Wt) Barium (Ba)	mg/kg	0.086	0.077	A030246	0.057	0.010	A030245
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	A030246	<0.0010	0.0010	A030245
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0012	<0.0010	A030246	0.0052	0.0010	A030245
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	A030246	<0.20	0.20	A030245
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0028	0.0088	A030246	<0.0010	0.0010	A030245
Total (Wet Wt) Calcium (Ca)	mg/kg	687	907	A030246	895	2.0	A030245
Total (Wet Wt) Chromium (Cr)	mg/kg	0.187	0.129	A030246	0.107	0.010	A030245
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0060	0.0057	A030246	0.0066	0.0013	A030245
Total (Wet Wt) Copper (Cu)	mg/kg	0.386	0.370	A030246	1.01	0.010	A030245
Total (Wet Wt) Iron (Fe)	mg/kg	5.69	6.67	A030246	5.94	0.25	A030245
Total (Wet Wt) Lead (Pb)	mg/kg	0.0016	0.0019	A030246	0.0027	0.0010	A030245
Total (Wet Wt) Magnesium (Mg)	mg/kg	296	287	A030246	295	0.40	A030245
Total (Wet Wt) Manganese (Mn)	mg/kg	0.307	0.409	A030246	0.292	0.010	A030245
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0940	0.152	A030246	0.0807	0.0020	A030245
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.0059	0.0047	A030246	<0.0040	0.0040	A030245
Total (Wet Wt) Nickel (Ni)	mg/kg	0.013	0.020	A030246	0.011	0.010	A030245
Total (Wet Wt) Phosphorus (P)	mg/kg	2760	2840	A030246	2930	2.0	A030245
Total (Wet Wt) Potassium (K)	mg/kg	4060	4050	A030246	4260	2.0	A030245
Total (Wet Wt) Selenium (Se)	mg/kg	0.477	0.459	A030246	0.435	0.010	A030245
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	A030246	<0.0010	0.0010	A030245
Total (Wet Wt) Sodium (Na)	mg/kg	543	549	A030246	519	2.0	A030245
Total (Wet Wt) Strontium (Sr)	mg/kg	3.24	4.49	A030246	4.21	0.010	A030245
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00084	0.00075	A030246	0.00143	0.00040	A030245
Total (Wet Wt) Tin (Sn)	mg/kg	<0.020	<0.020	A030246	<0.020	0.020	A030245
Total (Wet Wt) Titanium (Ti)	mg/kg	0.214	0.212	A030246	0.223	0.020	A030245
Total (Wet Wt) Uranium (U)	mg/kg	0.00072	0.00077	A030246	<0.00040	0.00040	A030245
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	A030246	<0.020	0.020	A030245
Total (Wet Wt) Zinc (Zn)	mg/kg	12.3	17.2	A030246	12.8	0.040	A030245
RDL = Reportable Detection Limit							

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		YM6021	YM6023		
Sampling Date		2020/08/02 17:30	2020/08/02 18:07		
COC Number		08485892	08485892		
	UNITS	**BAFF20UMLNFHSC1012**	**BAFF20UMLNFHSC1014**	**RDL**	**QC Batch**
Total Metals by ICPMS					
Total (Wet Wt) Aluminum (Al)	mg/kg	0.25	0.20	0.20	A030245
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Arsenic (As)	mg/kg	3.04	1.70	0.0040	A030245
Total (Wet Wt) Barium (Ba)	mg/kg	0.062	0.038	0.010	A030245
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0034	0.0015	0.0010	A030245
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	0.20	A030245
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0013	0.0032	0.0010	A030245
Total (Wet Wt) Calcium (Ca)	mg/kg	867	708	2.0	A030245
Total (Wet Wt) Chromium (Cr)	mg/kg	0.053	0.023	0.010	A030245
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0048	0.0066	0.0013	A030245
Total (Wet Wt) Copper (Cu)	mg/kg	0.594	0.315	0.010	A030245
Total (Wet Wt) Iron (Fe)	mg/kg	4.75	3.74	0.25	A030245
Total (Wet Wt) Lead (Pb)	mg/kg	0.0026	0.0014	0.0010	A030245
Total (Wet Wt) Magnesium (Mg)	mg/kg	304	277	0.40	A030245
Total (Wet Wt) Manganese (Mn)	mg/kg	0.313	0.286	0.010	A030245
Total (Wet Wt) Mercury (Hg)	mg/kg	0.125	0.112	0.0020	A030245
Total (Wet Wt) Molybdenum (Mo)	mg/kg	<0.0040	<0.0040	0.0040	A030245
Total (Wet Wt) Nickel (Ni)	mg/kg	<0.010	<0.010	0.010	A030245
Total (Wet Wt) Phosphorus (P)	mg/kg	2810	2560	2.0	A030245
Total (Wet Wt) Potassium (K)	mg/kg	4090	3970	2.0	A030245
Total (Wet Wt) Selenium (Se)	mg/kg	0.393	0.393	0.010	A030245
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	0.0010	A030245
Total (Wet Wt) Sodium (Na)	mg/kg	736	491	2.0	A030245
Total (Wet Wt) Strontium (Sr)	mg/kg	5.02	3.18	0.010	A030245
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00082	0.00082	0.00040	A030245
Total (Wet Wt) Tin (Sn)	mg/kg	<0.020	<0.020	0.020	A030245
Total (Wet Wt) Titanium (Ti)	mg/kg	0.207	0.168	0.020	A030245
Total (Wet Wt) Uranium (U)	mg/kg	0.00142	<0.00040	0.00040	A030245
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	0.020	A030245
Total (Wet Wt) Zinc (Zn)	mg/kg	9.62	10.4	0.040	A030245
RDL = Reportable Detection Limit					

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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

PHYSICAL TESTING (TISSUE)

BV Labs ID		YM6001	YM6002	YM6003		
Sampling Date		2020/07/30 11:05	2020/07/30 11:32	2020/07/30 13:34		
COC Number		08485884	08485884	08485884		
	UNITS	**BAFF20UMLNFHSC1101**	**BAFF20UMLNFHSC1102**	**BAFF20UMLNFHSC1103**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	79	79	77	0.30	A030353
RDL = Reportable Detection Limit						

BV Labs ID		YM6004	YM6005	YM6006		
Sampling Date		2020/07/30 15:38	2020/07/30 15:56	2020/08/01 11:40		
COC Number		08485884	08485884	08485884		
	UNITS	**BAFF20UMLNFHSC1104**	**BAFF20UMLNFHSC1201**	**BAFF20UMLNFHSC1005**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	81	80	81	0.30	A030353
RDL = Reportable Detection Limit						

BV Labs ID		YM6007	YM6008	YM6009		
Sampling Date		2020/08/01 12:02	2020/08/01 15:06	2020/08/01 15:24		
COC Number		08485884	08485884	08485884		
	UNITS	**BAFF20UMLNFHSC1002**	**BAFF20UMLNFHSC1301**	**BAFF20UMLNFHSC1302**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	81	80	82	0.30	A030353
RDL = Reportable Detection Limit						

BV Labs ID		YM6010	YM6011	YM6012		
Sampling Date		2020/08/01 13:40	2020/08/01 15:57	2020/08/01 17:11		
COC Number		08485884	08485888	08485888		
	UNITS	**BAFF20UMLNFHSC1303**	**BAFF20UMLNFHSC1304**	**BAFF20UMLNFHSC1305**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	82	80	82	0.30	A030353
RDL = Reportable Detection Limit						

BV Labs ID		YM6013	YM6014	YM6015		
Sampling Date		2020/08/01 17:25	2020/08/01 17:40	2020/08/02 09:34		
COC Number		08485888	08485888	08485888		
	UNITS	**BAFF20UMLNFHSC1306**	**BAFF20UMLNFHSC1307**	**BAFF20UMLNFHSC1006**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	80	80	77	0.30	A030353
RDL = Reportable Detection Limit						

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BV Labs Job #: C068794
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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

PHYSICAL TESTING (TISSUE)

BV Labs ID		YM6016	YM6017	YM6018		
Sampling Date		2020/08/02 09:52	2020/08/02 10:07	2020/08/02 10:26		
COC Number		08485888	08485888	08485888		
	UNITS	**BAFF20UMLNFHSC1007**	**BAFF20UMLNFHSC1008**	**BAFF20UMLNFHSC1009**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	80	80	81	0.30	A030353
RDL = Reportable Detection Limit						

BV Labs ID		YM6019	YM6020		YM6021		
Sampling Date		2020/08/02 10:44	2020/08/02 17:13		2020/08/02 17:30		
COC Number		08485888	08485888		08485892		
	UNITS	**BAFF20UMLNFHSC1010**	**BAFF20UMLNFHSC1011**	**QC Batch**	**BAFF20UMLNFHSC1012**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	81	83	A030353	80	0.30	A030466
RDL = Reportable Detection Limit							

BV Labs ID		YM6022	YM6023	YM6024		
Sampling Date		2020/08/02 17:54	2020/08/02 18:07	2020/08/02 18:20		
COC Number		08485892	08485892	08485892		
	UNITS	**BAFF20UMLNFHSC1013**	**BAFF20UMLNFHSC1014**	**BAFF20UMLNFHSC1015**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	80	80	80	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs ID		YM6025	YM6026	YM6027		
Sampling Date		2020/08/02 18:33	2020/08/03 08:48	2020/08/03 09:07		
COC Number		08485892	08485892	08485892		
	UNITS	**BAFF20UMLNFHSC1016**	**BAFF20UMLNFHSC1017**	**BAFF20UMLNFHSC1018**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	79	79	78	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs ID		YM6028	YM6029	YM6030		
Sampling Date		2020/08/03 09:26	2020/08/03 09:47	2020/08/03 10:02		
COC Number		08485892	08485892	08485892		
	UNITS	**BAFF20UMLNFHSC1019**	**BAFF20UMLNFHSC1020**	**BAFF20UMLNFHSC1021**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	79	82	80	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

PHYSICAL TESTING (TISSUE)

BV Labs ID		YM6031	YM6032	YM6033		
Sampling Date		2020/08/03 10:20	2020/08/03 13:35	2020/08/03 13:58		
COC Number		08485896	08485896	08485896		
	UNITS	**BAFF20UMLNFHSC1022**	**BAFF20UMLNFHSC1023**	**BAFF20UMLNFHSC1024**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	78	80	79	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs ID		YM6034	YM6035	YM6036		
Sampling Date		2020/08/03 14:18	2020/08/03 14:37	2020/08/03 14:55		
COC Number		08485896	08485896	08485896		
	UNITS	**BAFF20UMLNFHSC1025**	**BAFF20UMLNFHSC1026**	**BAFF20UMLNFHSC1027**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	80	79	77	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs ID		YM6037	YM6038	YM6039		
Sampling Date		2020/08/03 15:08	2020/08/03 15:22	2020/08/03 15:37		
COC Number		08485896	08485896	08485896		
	UNITS	**BAFF20UMLNFHSC1028**	**BAFF20UMLNFHSC1029**	**BAFF20UMLNFHSC1030**	**RDL**	**QC Batch**
Physical Properties						
Moisture	%	78	81	79	0.30	A030466
RDL = Reportable Detection Limit						

BV Labs ID		YM6040		YM6041	YM6042		
Sampling Date		2020/08/03 15:51		2020/08/03 16:04	2020/08/03 16:22		
COC Number		08485896		08485900	08485900		
	UNITS	**BAFF20UMLNFHSC1031**	**QC Batch**	**BAFF20UMLNFHSC1032**	**BAFF20UMLNFHSC1033**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	80	A030466	79	84	0.30	A030530
RDL = Reportable Detection Limit							

BV Labs ID		YM6043		
Sampling Date		2020/08/03 16:36		
COC Number		08485900		
	UNITS	**BAFF20UMLNFHSC1034**	**RDL**	**QC Batch**
Physical Properties				
Moisture	%	52	0.30	A030530
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

Results relate only to the items tested.

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BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A030245	JBN	QC Standard	Total (Wet Wt) Aluminum (Al)	2020/10/09		96	%	N/A
			Total (Wet Wt) Arsenic (As)	2020/10/09		105	%	N/A
			Total (Wet Wt) Cadmium (Cd)	2020/10/09		98	%	N/A
			Total (Wet Wt) Chromium (Cr)	2020/10/09		76	%	N/A
			Total (Wet Wt) Cobalt (Co)	2020/10/09		88	%	N/A
			Total (Wet Wt) Copper (Cu)	2020/10/09		87	%	N/A
			Total (Wet Wt) Iron (Fe)	2020/10/09		95	%	N/A
			Total (Wet Wt) Lead (Pb)	2020/10/09		52 (1)	%	N/A
			Total (Wet Wt) Mercury (Hg)	2020/10/09		94	%	N/A
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09		98	%	N/A
			Total (Wet Wt) Nickel (Ni)	2020/10/09		86	%	N/A
			Total (Wet Wt) Phosphorus (P)	2020/10/09		100	%	N/A
			Total (Wet Wt) Selenium (Se)	2020/10/09		106	%	N/A
			Total (Wet Wt) Sodium (Na)	2020/10/09		99	%	N/A
			Total (Wet Wt) Tin (Sn)	2020/10/09		110	%	N/A
			Total (Wet Wt) Uranium (U)	2020/10/09		101	%	N/A
			Total (Wet Wt) Zinc (Zn)	2020/10/09		91	%	N/A
A030245	JBN	Spiked Blank	Total (Wet Wt) Aluminum (Al)	2020/10/09		121	%	75 - 125
			Total (Wet Wt) Antimony (Sb)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Arsenic (As)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Barium (Ba)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Beryllium (Be)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Bismuth (Bi)	2020/10/09		94	%	75 - 125
			Total (Wet Wt) Boron (B)	2020/10/09		99	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Calcium (Ca)	2020/10/09		98	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2020/10/09		103	%	75 - 125
			Total (Wet Wt) Cobalt (Co)	2020/10/09		99	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2020/10/09		105	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Magnesium (Mg)	2020/10/09		107	%	75 - 125
			Total (Wet Wt) Manganese (Mn)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2020/10/09		109	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2020/10/09		103	%	75 - 125
			Total (Wet Wt) Phosphorus (P)	2020/10/09		106	%	75 - 125
			Total (Wet Wt) Potassium (K)	2020/10/09		106	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Silver (Ag)	2020/10/09		79	%	75 - 125
			Total (Wet Wt) Sodium (Na)	2020/10/09		109	%	75 - 125
			Total (Wet Wt) Strontium (Sr)	2020/10/09		105	%	75 - 125
			Total (Wet Wt) Thallium (Tl)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Tin (Sn)	2020/10/09		97	%	75 - 125
			Total (Wet Wt) Titanium (Ti)	2020/10/09		104	%	75 - 125
			Total (Wet Wt) Uranium (U)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Vanadium (V)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2020/10/09		106	%	75 - 125
A030245	JBN	Method Blank	Total (Wet Wt) Aluminum (Al)	2020/10/09	<0.20		mg/kg	
			Total (Wet Wt) Antimony (Sb)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Arsenic (As)	2020/10/09	<0.0040		mg/kg	
			Total (Wet Wt) Barium (Ba)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Beryllium (Be)	2020/10/09	<0.0010		mg/kg	

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BUREAU VERITAS

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total (Wet Wt) Bismuth (Bi)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Boron (B)	2020/10/09	<0.20		mg/kg	
			Total (Wet Wt) Cadmium (Cd)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Calcium (Ca)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Chromium (Cr)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Cobalt (Co)	2020/10/09	<0.0013		mg/kg	
			Total (Wet Wt) Copper (Cu)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Iron (Fe)	2020/10/09	<0.25		mg/kg	
			Total (Wet Wt) Lead (Pb)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Magnesium (Mg)	2020/10/09	<0.40		mg/kg	
			Total (Wet Wt) Manganese (Mn)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Mercury (Hg)	2020/10/09	<0.0020		mg/kg	
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09	<0.0040		mg/kg	
			Total (Wet Wt) Nickel (Ni)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Phosphorus (P)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Potassium (K)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Selenium (Se)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Silver (Ag)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Sodium (Na)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Strontium (Sr)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Thallium (Tl)	2020/10/09	<0.00040		mg/kg	
			Total (Wet Wt) Tin (Sn)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Titanium (Ti)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Uranium (U)	2020/10/09	<0.00040		mg/kg	
			Total (Wet Wt) Vanadium (V)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Zinc (Zn)	2020/10/09	<0.040		mg/kg	
A030246	JBN	QC Standard	Total (Wet Wt) Aluminum (Al)	2020/10/09		95	%	N/A
			Total (Wet Wt) Arsenic (As)	2020/10/09		106	%	N/A
			Total (Wet Wt) Cadmium (Cd)	2020/10/09		98	%	N/A
			Total (Wet Wt) Chromium (Cr)	2020/10/09		79	%	N/A
			Total (Wet Wt) Cobalt (Co)	2020/10/09		90	%	N/A
			Total (Wet Wt) Copper (Cu)	2020/10/09		87	%	N/A
			Total (Wet Wt) Iron (Fe)	2020/10/09		97	%	N/A
			Total (Wet Wt) Lead (Pb)	2020/10/09		53	%	N/A
			Total (Wet Wt) Mercury (Hg)	2020/10/09		94	%	N/A
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09		96	%	N/A
			Total (Wet Wt) Nickel (Ni)	2020/10/09		85	%	N/A
			Total (Wet Wt) Phosphorus (P)	2020/10/09		101	%	N/A
			Total (Wet Wt) Selenium (Se)	2020/10/09		105	%	N/A
			Total (Wet Wt) Sodium (Na)	2020/10/09		100	%	N/A
			Total (Wet Wt) Tin (Sn)	2020/10/09		112	%	N/A
			Total (Wet Wt) Uranium (U)	2020/10/09		97	%	N/A
			Total (Wet Wt) Zinc (Zn)	2020/10/09		90	%	N/A
A030246	JBN	Spiked Blank	Total (Wet Wt) Aluminum (Al)	2020/10/09		107	%	75 - 125
			Total (Wet Wt) Antimony (Sb)	2020/10/09		103	%	75 - 125
			Total (Wet Wt) Arsenic (As)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Barium (Ba)	2020/10/09		103	%	75 - 125
			Total (Wet Wt) Beryllium (Be)	2020/10/09		103	%	75 - 125
			Total (Wet Wt) Bismuth (Bi)	2020/10/09		92	%	75 - 125
			Total (Wet Wt) Boron (B)	2020/10/09		98	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Calcium (Ca)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2020/10/09		99	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total (Wet Wt) Cobalt (Co)	2020/10/09		96	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2020/10/09		97	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2020/10/09		107	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2020/10/09		99	%	75 - 125
			Total (Wet Wt) Magnesium (Mg)	2020/10/09		105	%	75 - 125
			Total (Wet Wt) Manganese (Mn)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09		104	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2020/10/09		99	%	75 - 125
			Total (Wet Wt) Phosphorus (P)	2020/10/09		106	%	75 - 125
			Total (Wet Wt) Potassium (K)	2020/10/09		105	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Silver (Ag)	2020/10/09		78	%	75 - 125
			Total (Wet Wt) Sodium (Na)	2020/10/09		107	%	75 - 125
			Total (Wet Wt) Strontium (Sr)	2020/10/09		105	%	75 - 125
			Total (Wet Wt) Thallium (Tl)	2020/10/09		101	%	75 - 125
			Total (Wet Wt) Tin (Sn)	2020/10/09		99	%	75 - 125
			Total (Wet Wt) Titanium (Ti)	2020/10/09		102	%	75 - 125
			Total (Wet Wt) Uranium (U)	2020/10/09		98	%	75 - 125
			Total (Wet Wt) Vanadium (V)	2020/10/09		100	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2020/10/09		190 (2)	%	75 - 125
A030246	JBN	Method Blank	Total (Wet Wt) Aluminum (Al)	2020/10/09	<0.20		mg/kg	
			Total (Wet Wt) Antimony (Sb)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Arsenic (As)	2020/10/09	<0.0040		mg/kg	
			Total (Wet Wt) Barium (Ba)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Beryllium (Be)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Bismuth (Bi)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Boron (B)	2020/10/09	<0.20		mg/kg	
			Total (Wet Wt) Cadmium (Cd)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Calcium (Ca)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Chromium (Cr)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Cobalt (Co)	2020/10/09	<0.0013		mg/kg	
			Total (Wet Wt) Copper (Cu)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Iron (Fe)	2020/10/09	<0.25		mg/kg	
			Total (Wet Wt) Lead (Pb)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Magnesium (Mg)	2020/10/09	<0.40		mg/kg	
			Total (Wet Wt) Manganese (Mn)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Mercury (Hg)	2020/10/09	<0.0020		mg/kg	
			Total (Wet Wt) Molybdenum (Mo)	2020/10/09	<0.0040		mg/kg	
			Total (Wet Wt) Nickel (Ni)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Phosphorus (P)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Potassium (K)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Selenium (Se)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Silver (Ag)	2020/10/09	<0.0010		mg/kg	
			Total (Wet Wt) Sodium (Na)	2020/10/09	<2.0		mg/kg	
			Total (Wet Wt) Strontium (Sr)	2020/10/09	<0.010		mg/kg	
			Total (Wet Wt) Thallium (Tl)	2020/10/09	<0.00040		mg/kg	
			Total (Wet Wt) Tin (Sn)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Titanium (Ti)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Uranium (U)	2020/10/09	<0.00040		mg/kg	
			Total (Wet Wt) Vanadium (V)	2020/10/09	<0.020		mg/kg	
			Total (Wet Wt) Zinc (Zn)	2020/10/09	<0.040		mg/kg	
A030353	CG5	Method Blank	Moisture	2020/10/07	<0.30		%	

BV Labs Job #: C068794
Report Date: 2020/10/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A030353	CG5	RPD [YM6004-01]	Moisture	2020/10/07	0.74		%	20
A030466	CG5	Method Blank	Moisture	2020/10/07	<0.30		%	
A030466	CG5	RPD [YM6028-01]	Moisture	2020/10/07	4.8		%	20
A030530	CG5	Method Blank	Moisture	2020/10/07	<0.30		%	
A030530	CG5	RPD [YM6041-01]	Moisture	2020/10/07	5.7		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

(1) Reference outside acceptance criteria - re-analysis yields similar results.

(2) Blank Spike outside acceptance criteria - re-analysis yields similar results.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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CHAIN OF CUSTODY RECORD

Page 1 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation	C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:	christine_bylonga@golder.com	Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	
			1	
Seal Present		X		
Seal Intact	—	—	Temp	11-5-7
Cooling Media	X			
	YES	NO	Cooler ID	2
Seal Present		X		
Seal Intact	—	—	Temp	11-10-11
Cooling Media	X			
	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested

☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ LEPH / HEPH / PAH; ☐ F2 - F4; ☐ TEH; ☐ Preserved?; ☐ Filtered?; ☐ Preserved?; ☐ Filtered?; ☐ Field Preserved?; ☐ Field Preserved?; ☐ Sulphate; ☐ Fluoride; ☐ COD; ☐ BOD; ☐ TDS; ☐ Alkalinity; ☐ Conductivity; ☐ Ammonia; ☐ Nitrate; ☐ BTEXS / VPH; ☐ BTEX F1; ☐ PAH; ☐ EPH; ☐ Dissolved Metals; ☐ Dissolved Mercury; ☑ Total Metals; ☐ Total Mercury; ☐ Chloride; ☐ TSS; ☐ pH; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	Special Instructions
1	BAFF20UMLNFHSC1101	2020-07-30	11:05	Tissue	1	X	
2	BAFF20UMLNFHSC1102	2020-07-30	11:32	Tissue	1	X	
3	BAFF20UMLNFHSC1103	2020-07-30	13:34	Tissue	1	X	
4	BAFF20UMLNFHSC1104	2020-07-30	15:38	Tissue	1	X	
5	BAFF20UMLNFHSC1201	2020-07-30	15:56	Tissue	1	X	
6	BAFF20UMLNFHSC1005	2020-08-01	11:40	Tissue	1	X	
7	BAFF20UMLNFHSC1002	2020-08-01	12:02	Tissue	1	X	
8	BAFF20UMLNFHSC1301	2020-08-01	15:06	Tissue	1	X	
9	BAFF20UMLNFHSC1302	2020-08-01	15:24	Tissue	1	X	
10	BAFF20UMLNFHSC1303	2020-08-01	13:40	Tissue	1	X	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			[signature] TACC	2020/09/23	08:00

C068794_COC

08485888

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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CHAIN OF CUSTODY RECORD

Page 2 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation	C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID 1	
Seal Present		X		
Seal Intact		—	Temp	11-5-7
Cooling Media	X			

	YES	NO	Cooler ID 2	
Seal Present		X		
Seal Intact		—	Temp	11-10-11
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested: ☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☐ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Metals; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Mercury; ☐ Field Preserved?; ☑ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR; ☐ YK CSR; ☐ CCME; ☐ Drinking Water; ☐ BC Water Quality; ☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	Special Instructions
1	BAFF20UMLNFHSC1304	2020-08-01	15:57	Tissue	1	X	
2	BAFF20UMLNFHSC1305	2020-08-01	17:11	Tissue	1	X	
3	BAFF20UMLNFHSC1306	2020-08-01	17:25	Tissue	1	X	
4	BAFF20UMLNFHSC1307	2020-08-01	17:40	Tissue	1	X	
5	BAFF20UMLNFHSC1006	2020-08-02	9:34	Tissue	1	X	
6	BAFF20UMLNFHSC1007	2020-08-02	9:52	Tissue	1	X	
7	BAFF20UMLNFHSC1008	2020-08-02	10:07	Tissue	1	X	
8	BAFF20UMLNFHSC1009	2020-08-02	10:26	Tissue	1	X	
9	BAFF20UMLNFHSC1010	2020-08-02	10:44	Tissue	1	X	
10	BAFF20UMLNFHSC1011	2020-08-02	17:13	Tissue	1	X	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			M. PEDRO TAEC	2020/09/23	08:00

C068794_COC

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CHAIN OF CUSTODY RECORD

Page 3 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information	
Company:	Golder Associates Ltd.	Company:		Quotation	C00599
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:	
Address:	16820 107 Ave.	Address:			
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	1
Seal Present		X		
Seal Intact	—		Temp	11-5-7
Cooling Media	X			

	YES	NO	Cooler ID	2
Seal Present		X		
Seal Intact	—		Temp	11-10-11
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested

☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☐ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Metals; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Mercury; ☐ Field Preserved?; ☐ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	Special Instructions
1	BAFF20UMLNFHSC1012	2020-08-02	17:30	Tissue	1	X	
2	BAFF20UMLNFHSC1013	2020-08-02	17:54	Tissue	1	X	
3	BAFF20UMLNFHSC1014	2020-08-02	18:07	Tissue	1	X	
4	BAFF20UMLNFHSC1015	2020-08-02	18:20	Tissue	1	X	
5	BAFF20UMLNFHSC1016	2020-08-02	18:33	Tissue	1	X	
6	BAFF20UMLNFHSC1017	2020-08-03	8:48	Tissue	1	X	
7	BAFF20UMLNFHSC1018	2020-08-03	9:07	Tissue	1	X	
8	BAFF20UMLNFHSC1019	2020-08-03	9:26	Tissue	1	X	
9	BAFF20UMLNFHSC1020	2020-08-03	9:47	Tissue	1	X	
10	BAFF20UMLNFHSC1021	2020-08-03	10:02	Tissue	1	X	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			PEDRO TACA	2020/09/23	08-00

C068794_COC

08485896

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CHAIN OF CUSTODY RECORD

Page 4 of 5

Invoice Information	Report Information (if differs from invoice)	Project Information	Turnaround Time (TAT) Required
Company: Golder Associates Ltd.	Company:	Quotation: C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name: Rainie Sharpe	Contact Name:	P.O. #/AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 16820 107 Ave.	Address:		Rush TAT (Surcharges will be applied)
Edmonton, AB PC: T5P 4C3	PC:	Project #: 1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax: 780-733-7404	Phone/Fax:	Site Location: Baffin Island	☐ 1 Day ☐ 3-4 Days
Email: rsharpe@golder.com	Email:	Site #: Milne Inlet	Date Required:
Copies: christine_bylenga@golder.com	Copies:	Sampled By: Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	
Seal Present		X	1	
Seal Intact	—	—	Temp	-11-5-7
Cooling Media	X			
	YES	NO	Cooler ID	2
Seal Present		X		
Seal Intact	—	—	Temp	-11-10-11
Cooling Media	✓			
	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested: ☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☐ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Metals; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Mercury; ☐ Field Preserved?; ☐ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR; ☐ YK CSR; ☐ CCME; ☐ Drinking Water; ☐ BC Water Quality; ☐ Other

#	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	HOLD - DO NOT ANALYZE	Special Instructions
1	BAFF20UMLNFHSC1022	2020-08-03	10:20	Tissue	1	X		
2	BAFF20UMLNFHSC1023	2020-08-03	13:35	Tissue	1	X		
3	BAFF20UMLNFHSC1024	2020-08-03	13:58	Tissue	1	X		
4	BAFF20UMLNFHSC1025	2020-08-03	14:18	Tissue	1	X		
5	BAFF20UMLNFHSC1026	2020-08-03	14:37	Tissue	1	X		
6	BAFF20UMLNFHSC1027	2020-08-03	14:55	Tissue	1	X		
7	BAFF20UMLNFHSC1028	2020-08-03	15:08	Tissue	1	X		
8	BAFF20UMLNFHSC1029	2020-08-03	15:22	Tissue	1	X		
9	BAFF20UMLNFHSC1030	2020-08-03	15:37	Tissue	1	X		
10	BAFF20UMLNFHSC1031	2020-08-03	15:51	Tissue	1	X		

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptan...

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			Pedro Tack	2020/09/23	08:00

C068794_COC

08485900

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CHAIN OF CUSTODY RECORD

Page 5 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation	C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	
Seal Present		X	1	
Seal Intact	—		Temp	11 - 5 - 7
Cooling Media	X			
Seal Present		X	2	
Seal Intact	—		Temp	11 - 10 - 11
Cooling Media	X			
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested: ☐ BTEXS / VPH ☐ VOC / BTEXS / VPH ☐ MTBE ☐ BTEX F1 ☐ VOC / BTEX / F1 ☐ PAH ☐ LEPH / HEPH / PAH ☐ EPH ☐ TEH ☐ F2 - F4 ☐ Dissolved Metals ☐ Filtered? ☐ Preserved? ☐ Dissolved Mercury ☐ Filtered? ☐ Preserved? ☑ Total Metals ☐ Field Preserved? ☐ Total Mercury ☐ Field Preserved? ☐ Chloride ☐ Fluoride ☐ Sulphate ☐ TSS ☐ TDS ☐ BOD ☐ COD ☐ pH ☐ Conductivity ☐ Alkalinity ☐ Nitrite ☐ Nitrate ☐ Ammonia; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	HOLD - DO NOT ANALYZE	Special Instructions
1	BAFF20UMLNFHSC1032	2020-08-03	16:04		1	X		
2	BAFF20UMLNFHSC1033	2020-08-03	16:22		1	X		
3	BAFF20UMLNFHSC1034	2020-08-03	16:36		1	X		
4						X		
5						X		
6						X		
7						X		
8						X		
9						X		
10						X		

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			[illegible signature]	2020/08/23	08:00

C068794_COC

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Your C.O.C. #: 08485908, 08485904, 08485872, 08485876, 08485880

Report Date: 2020/10/19
Report #: R2943852
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C068799
Received: 2020/09/23, 08:00

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
PAH IN Tissue Subcontract (1)	8	2020/10/19	2020/10/19		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Ontario (From Burnaby)

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Your C.O.C. #: 08485908, 08485904, 08485872, 08485876, 08485880

Report Date: 2020/10/19
Report #: R2943852
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C068799
Received: 2020/09/23, 08:00

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas Laboratories
19 Oct 2020 10:37:16

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Carmen McKay, Project Manager
Email: Carmen.MCKAY@bvlabs.com
Phone# (403)219-3683
==
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C068799
Report Date: 2020/10/19

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

RESULTS OF CHEMICAL ANALYSES OF TISSUE

BV Labs ID		YM6093	YM6094	YM6115	YM6119	
Sampling Date		2020/08/01 15:24	2020/08/01 13:40	2020/08/01 15:57	2020/08/02 09:34	
COC Number		08485908	08485908	08485904	08485904	
	UNITS	**BAFF20UMLNFHSC1302**	**BAFF20UMLNFHSC1303**	**BAFF20UMLNFHSC1304**	**BAFF20UMLNFHSC1006**	**QC Batch**
Parameter						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	A054092

BV Labs ID		YM6122	YM6123	YM6125	YM6127	
Sampling Date		2020/08/02 10:26	2020/08/02 10:44	2020/08/02 17:30	2020/08/02 18:07	
COC Number		08485904	08485904	08485872	08485872	
	UNITS	**BAFF20UMLNFHSC1009**	**BAFF20UMLNFHSC1010**	**BAFF20UMLNFHSC1012**	**BAFF20UMLNFHSC1014**	**QC Batch**
Parameter						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	A054092

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

08485908

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAIN OF CUSTODY RECORD

Page 1 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information	
Company:	Golder Associates Ltd.	Company:		Quotation	C00599
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:	
Address:	16820 107 Ave.	Address:			
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	
				1
Seal Present		X		
Seal Intact	—	—	Temp	11-5-7
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present		X		
Seal Intact	—	—	Temp	11-10-11
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested

☐ BTEXS / VPH ☐ VOC / BTEXS / VPH ☐ MTBE ☐ BTEX F1 ☐ VOC / BTEX / F1 ☑ PAH ☐ LEPH / HEPH / PAH ☐ EPH ☐ TEH ☐ F2 - F4 ☐ Dissolved Metals ☐ Filtered? ☐ Preserved? ☐ Dissolved Mercury ☐ Filtered? ☐ Preserved? ☐ Total Metals ☐ Field Preserved? ☐ Total Mercury ☐ Field Preserved? ☐ Chloride ☐ Fluoride ☐ Sulphate ☐ TSS ☐ TDS ☐ BOD ☐ COD ☐ pH ☐ Conductivity ☐ Alkalinity ☐ Nitrite ☐ Nitrate ☐ Ammonia

HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	PAH
1	BAFF20UMLNFHSC1101	2020-07-30	11:05	Tissue	1	X
2	BAFF20UMLNFHSC1102	2020-07-30	11:32	Tissue	1	X
3	BAFF20UMLNFHSC1103	2020-07-30	13:34	Tissue	1	X
4	BAFF20UMLNFHSC1104	2020-07-30	15:38	Tissue	1	X
5	BAFF20UMLNFHSC1201	2020-07-30	15:56	Tissue	1	X
6	BAFF20UMLNFHSC1005	2020-08-01	11:40	Tissue	1	X
7	BAFF20UMLNFHSC1002	2020-08-01	12:02	Tissue	1	X
8	BAFF20UMLNFHSC1301	2020-08-01	15:06	Tissue	1	X
9	BAFF20UMLNFHSC1302	2020-08-01	15:24	Tissue	1	X
10	BAFF20UMLNFHSC1303	2020-08-01	13:40	Tissue	1	X

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			PEDRO TACL	2020/09/23	08:00

C068799_COC

08485904

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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CHAIN OF CUSTODY RECORD

Page 2 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information	
Company:	Golder Associates Ltd.	Company:		Quotation	C00599
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:	
Address:	16820 107 Ave.	Address:			
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	1
Seal Present		X		
Seal Intact	—	—	Temp	11-5-7
Cooling Media	X			

	YES	NO	Cooler ID	2
Seal Present		X		
Seal Intact	—	—	Temp	11-10-11
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present				
Seal Intact			Temp	
Cooling Media				

Depot Reception

Analysis Requested

☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ LEPH / HEPH / PAH; ☐ F2 - F4; ☐ Preserved?; ☐ Preserved?; ☐ Sulphate; ☐ COD; ☐ Alkalinity; ☐ Ammonia; ☐ TEH; ☐ Filtered?; ☐ Filtered?; ☐ Field Preserved?; ☐ Field Preserved?; ☐ Fluoride; ☐ BOD; ☐ TDS; ☐ Conductivity; ☐ Nitrate; ☐ BTEXS / VPH; ☐ BTEX F1; ☑ PAH; ☐ EPH; ☐ Dissolved Metals; ☐ Dissolved Mercury; ☐ Total Metals; ☐ Total Mercury; ☐ Chloride; ☐ TSS; ☐ pH; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	PAH	Special Instructions
1	BAFF20UMLNFHSC1304	2020-08-01	15:57	Tissue	1	X	
2	BAFF20UMLNFHSC1305	2020-08-01	17:11	Tissue	1	X	
3	BAFF20UMLNFHSC1306	2020-08-01	17:25	Tissue	1	X	
4	BAFF20UMLNFHSC1307	2020-08-01	17:40	Tissue	1	X	
5	BAFF20UMLNFHSC1006	2020-08-02	9:34	Tissue	1	X	
6	BAFF20UMLNFHSC1007	2020-08-02	9:52	Tissue	1	X	
7	BAFF20UMLNFHSC1008	2020-08-02	10:07	Tissue	1	X	
8	BAFF20UMLNFHSC1009	2020-08-02	10:26	Tissue	1	X	
9	BAFF20UMLNFHSC1010	2020-08-02	10:44	Tissue	1	X	
10	BAFF20UMLNFHSC1011	2020-08-02	17:13	Tissue	1	X	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			Pedro Tack	2020/09/23	08:00

C068799_COC

08485872

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAIN OF CUSTODY RECORD

Page 3 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information	
Company:	Golder Associates Ltd.	Company:		Quotation	C00599
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:	
Address:	16820 107 Ave. Edmonton, AB PC: T5P 4C3	Address:	PC:	Project #:	1663724-34000-03
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID 1
Seal Present		X	
Seal Intact		—	Temp 11-5-7
Cooling Media	X		

	YES	NO	Cooler ID 2
Seal Present		X	
Seal Intact		—	Temp 11-10-11
Cooling Media	X		

	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			

Depot Reception

Analysis Requested

Additional analysis column labels (upper tiers): MTBE; VOC / BTEXS / VPH; VOC / BTEX / F1; LEPH / HEPH / PAH; F2 - F4; TEH; Preserved?; Filtered?; Preserved?; Filtered?; Field Preserved?; Field Preserved?; Sulphate; Fluoride; COD; BOD; TDS; Alkalinity; Conductivity; Ammonia; Nitrate

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	BTEX F1	PAH	EPH	Dissolved Metals	Dissolved Mercury	Total Metals	Total Mercury	Chloride	TSS	pH	Nitrite	HOLD - DO NOT ANALYZE	Special Instructions
1	BAFF20UMLNFHSC1012	2020-08-02	17:30	Tissue	1			X											
2	BAFF20UMLNFHSC1013	2020-08-02	17:54	Tissue	1			X											
3	BAFF20UMLNFHSC1014	2020-08-02	18:07	Tissue	1			X											
4	BAFF20UMLNFHSC1015	2020-08-02	18:20	Tissue	1			X											
5	BAFF20UMLNFHSC1016	2020-08-02	18:33	Tissue	1			X											
6	BAFF20UMLNFHSC1017	2020-08-03	8:48	Tissue	1			X											
7	BAFF20UMLNFHSC1018	2020-08-03	9:07	Tissue	1			X											
8	BAFF20UMLNFHSC1019	2020-08-03	9:26	Tissue	1			X											
9	BAFF20UMLNFHSC1020	2020-08-03	9:47	Tissue	1			X											
10	BAFF20UMLNFHSC1021	2020-08-03	10:02	Tissue	1			X											

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			AuPedro Tack	2020/09/23	08:00

C068799_COC

08485876

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAIN OF CUSTODY RECORD

Page 4 of 5

Invoice Information

Company: Golder Associates Ltd.
Contact Name: Rainie Sharpe
Address: 16820 107 Ave.
Edmonton, AB PC: T5P 4C3
Phone/Fax: 780-733-7404
Email: rsharpe@golder.com
Copies: christine_bylenga@golder.com

Report Information (if differs from invoice)

Company:
Contact Name:
Address:
PC:
Phone/Fax:
Email:
Copies:

Project Information

Quotation: C00599
P.O. #/AFE#:
Project #: 1663724-34000-03
Site Location: Baffin Island
Site #: Milne Inlet
Sampled By: Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:
Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID 1
Seal Present		X	Temp 11-5-7
Seal Intact	—		
Cooling Media	X		

	YES	NO	Cooler ID 2
Seal Present		X	Temp 11-10-11
Seal Intact	—		
Cooling Media	X		

	YES	NO	Cooler ID
Seal Present			Temp
Seal Intact			
Cooling Media			

Depot Reception

Analysis Requested

☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☑ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Metals; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Mercury; ☐ Field Preserved?; ☐ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	PAH	HOLD - DO NOT ANALYZE	Special Instructions
1	BAFF20UMLNFHSC1022	2020-08-03	10:20	Tissue	1	X		
2	BAFF20UMLNFHSC1023	2020-08-03	13:35	Tissue	1	X		
3	BAFF20UMLNFHSC1024	2020-08-03	13:58	Tissue	1	X		
4	BAFF20UMLNFHSC1025	2020-08-03	14:18	Tissue	1	X		
5	BAFF20UMLNFHSC1026	2020-08-03	14:37	Tissue	1	X		
6	BAFF20UMLNFHSC1027	2020-08-03	14:55	Tissue	1	X		
7	BAFF20UMLNFHSC1028	2020-08-03	15:08	Tissue	1	X		
8	BAFF20UMLNFHSC1029	2020-08-03	15:22	Tissue	1	X		
9	BAFF20UMLNFHSC1030	2020-08-03	15:37	Tissue	1	X		
10	BAFF20UMLNFHSC1031	2020-08-03	15:51	Tissue	1	X		

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			PEDRO TACE	2020/09/23	08:00

C068799_COC

08485880

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAIN OF CUSTODY RECORD

Page 5 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation	C00599	☒ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:	christine_bylenga@golder.com	Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	1
Seal Present		X	Temp	11-5-7
Seal Intact	—	—		
Cooling Media	X			

	YES	NO	Cooler ID	2
Seal Present		X	Temp	11-10-11
Seal Intact	—	—		
Cooling Media	X			

	YES	NO	Cooler ID	
Seal Present			Temp	
Seal Intact				
Cooling Media				

Depot Reception

Analysis Requested: ☐ BTEXS / VPH; ☐ VOC / BTEXS / VPH; ☐ MTBE; ☐ BTEX F1; ☐ VOC / BTEX / F1; ☒ PAH; ☐ LEPH / HEPH / PAH; ☐ EPH; ☐ TEH; ☐ F2 - F4; ☐ Dissolved Metals; ☐ Filtered?; ☐ Preserved?; ☐ Dissolved Mercury; ☐ Filtered?; ☐ Preserved?; ☐ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Field Preserved?; ☐ Chloride; ☐ Fluoride; ☐ Sulphate; ☐ TSS; ☐ TDS; ☐ BOD; ☐ COD; ☐ pH; ☐ Conductivity; ☐ Alkalinity; ☐ Nitrite; ☐ Nitrate; ☐ Ammonia; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR; ☐ YK CSR; ☐ CCME; ☐ Drinking Water; ☐ BC Water Quality; ☐ Other

#	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	PAH	Special Instructions
1	BAFF20UMLNFHSC1032	2020-08-03	16:04	Tissue	1	X	
2	BAFF20UMLNFHSC1033	2020-08-03	16:22	Tissue	1	X	
3	BAFF20UMLNFHSC1034	2020-08-03	16:36	Tissue	1	X	
4				Tissue			
5				Tissue			
6				Tissue			
7				Tissue			
8				Tissue			
9				Tissue			
10				Tissue			

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
			[signature] PEDRO TACK	2020/09/23	08:00

C068799_COC

Your Project #: 1663724-34000-03 [C068799]
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: c068799-ontv-01-01

Attention: Carmen McKay

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2020/10/19
Report #: R6375179
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0P1388
Received: 2020/09/26, 12:00

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Benzo(b/j)fluoranthene Sum (tissue)	8	N/A	2020/10/14	N/A	Auto Calc.
PAH in Tissue by GC/MS (SIM) (1)	3	2020/10/08	2020/10/10	ATL SOP 00104	EPA 8270E R6 m
PAH in Tissue by GC/MS (SIM) (1)	5	2020/10/08	2020/10/09	ATL SOP 00104	EPA 8270E R6 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Results are reported on an as received basis unless otherwise indicated.

Your Project #: 1663724-34000-03 [C068799]
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: c068799-ontv-01-01

Attention: Carmen McKay

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2020/10/19
Report #: R6375179
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0P1388
Received: 2020/09/26, 12:00

Encryption Key

Sam Sherker
Project Manager Assistant
19 Oct 2020 13:10:17

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sam Sherker, Project Manager Assistant
Email: Sam.Sherker@bvlabs.com
Phone# (902)420-0203
==
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BUREAU VERITAS

BV Labs Job #: C0P1388
Report Date: 2020/10/19

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C068799]
Site Location: BAFFIN ISLAND
Sampler Initials: BC

SEMI-VOLATILE ORGANICS BY GC-MS (TISSUE)

BV Labs ID		NST141	NST142	NST143	NST147		
Sampling Date		2020/08/01 15:24	2020/08/01 13:40	2020/08/01 15:57	2020/08/02 09:34		
COC Number		c068799-ontv-01-01	c068799-ontv-01-01	c068799-ontv-01-01	c068799-ontv-01-01		
	UNITS	**YM6093-BAFF20UMLNFHSC1302**	**YM6094-BAFF20UMLNFHSC1303**	**YM6115-BAFF20UMLNFHSC1304**	**YM6119-BAFF20UMLNFHSC1006**	**RDL**	**QC Batch**
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
2-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Acenaphthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Acenaphthylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(a)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(a)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(b)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(b/j)fluoranthene	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	6968488
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(j)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(k)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Chrysene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Dibenzo(a,h)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Fluorene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Naphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Phenanthrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Surrogate Recovery (%)							
D10-Anthracene	%	99	97	106	99		6987923
D14-Terphenyl	%	99	99	99	99		6987923
D8-Acenaphthylene	%	99	96	86	100		6987923

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0P1388
Report Date: 2020/10/19

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C068799]
Site Location: BAFFIN ISLAND
Sampler Initials: BC

SEMI-VOLATILE ORGANICS BY GC-MS (TISSUE)

BV Labs ID		NST150	NST151	NST153	NST155		
Sampling Date		2020/08/02 10:26	2020/08/02 10:44	2020/08/02 17:30	2020/08/02 18:07		
COC Number		c068799-ontv-01-01	c068799-ontv-01-01	c068799-ontv-01-01	c068799-ontv-01-01		
	UNITS	**YM6122-BAFF20UMLNFHSC1009**	**YM6123-BAFF20UMLNFHSC1010**	**YM6125-BAFF20UMLNFHSC1012**	**YM6127-BAFF20UMLNFHSC1014**	**RDL**	**QC Batch**
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
2-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Acenaphthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Acenaphthylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(a)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(a)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(b)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(b/j)fluoranthene	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	6968488
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(j)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Benzo(k)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Chrysene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Dibenzo(a,h)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Fluorene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Naphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Phenanthrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	6987923
Surrogate Recovery (%)							
D10-Anthracene	%	101	105	100	96		6987923
D14-Terphenyl	%	101	103	108	93		6987923
D8-Acenaphthylene	%	87	96	100	91		6987923

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Results relate only to the items tested.

BV Labs Job #: C0P1388
Report Date: 2020/10/19

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C068799]
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6987923	LGE	Reagent Blank	1-Methylnaphthalene	2020/10/09	<0.050		mg/kg	
			2-Methylnaphthalene	2020/10/09	<0.050		mg/kg	
			Acenaphthene	2020/10/09	<0.050		mg/kg	
			Acenaphthylene	2020/10/09	<0.050		mg/kg	
			Anthracene	2020/10/09	<0.050		mg/kg	
			Benzo(a)anthracene	2020/10/09	<0.050		mg/kg	
			Benzo(a)pyrene	2020/10/09	<0.050		mg/kg	
			Benzo(b)fluoranthene	2020/10/09	<0.050		mg/kg	
			Benzo(g,h,i)perylene	2020/10/09	<0.050		mg/kg	
			Benzo(j)fluoranthene	2020/10/09	<0.050		mg/kg	
			Benzo(k)fluoranthene	2020/10/09	<0.050		mg/kg	
			Chrysene	2020/10/09	<0.050		mg/kg	
			D10-Anthracene	2020/10/09		103	%	50 - 130
			D14-Terphenyl	2020/10/09		103	%	50 - 130
			D8-Acenaphthylene	2020/10/09		101	%	50 - 130
			Dibenzo(a,h)anthracene	2020/10/09	<0.050		mg/kg	
			Fluoranthene	2020/10/09	<0.050		mg/kg	
			Fluorene	2020/10/09	<0.050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/10/09	<0.050		mg/kg	
			Naphthalene	2020/10/09	<0.050		mg/kg	
			Perylene	2020/10/09	<0.050		mg/kg	
			Phenanthrene	2020/10/09	<0.050		mg/kg	
			Pyrene	2020/10/09	<0.050		mg/kg	
6987923	LGE	Spiked Blank	1-Methylnaphthalene	2020/10/09		86	%	50 - 130
			2-Methylnaphthalene	2020/10/09		93	%	50 - 130
			Acenaphthene	2020/10/09		95	%	50 - 130
			Acenaphthylene	2020/10/09		99	%	50 - 130
			Anthracene	2020/10/09		93	%	50 - 130
			Benzo(a)anthracene	2020/10/09		93	%	50 - 130
			Benzo(a)pyrene	2020/10/09		88	%	50 - 130
			Benzo(b)fluoranthene	2020/10/09		91	%	50 - 130
			Benzo(g,h,i)perylene	2020/10/09		89	%	50 - 130
			Benzo(j)fluoranthene	2020/10/09		86	%	50 - 130
			Benzo(k)fluoranthene	2020/10/09		87	%	50 - 130
			Chrysene	2020/10/09		91	%	50 - 130
			D10-Anthracene	2020/10/09		100	%	50 - 130
			D14-Terphenyl	2020/10/09		100	%	50 - 130
			D8-Acenaphthylene	2020/10/09		99	%	50 - 130
			Dibenzo(a,h)anthracene	2020/10/09		90	%	50 - 130
			Fluoranthene	2020/10/09		91	%	50 - 130
			Fluorene	2020/10/09		94	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/10/09		88	%	50 - 130
			Naphthalene	2020/10/09		92	%	50 - 130
			Perylene	2020/10/09		82	%	50 - 130
			Phenanthrene	2020/10/09		97	%	50 - 130
			Pyrene	2020/10/09		92	%	50 - 130
6987923	LGE	Method Blank	1-Methylnaphthalene	2020/10/09	<0.050		mg/kg	
			2-Methylnaphthalene	2020/10/09	<0.050		mg/kg	
			Acenaphthene	2020/10/09	<0.050		mg/kg	
			Acenaphthylene	2020/10/09	<0.050		mg/kg	
			Anthracene	2020/10/09	<0.050		mg/kg	
			Benzo(a)anthracene	2020/10/09	<0.050		mg/kg	
			Benzo(a)pyrene	2020/10/09	<0.050		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b)fluoranthene	2020/10/09	<0.050		mg/kg	
			Benzo(g,h,i)perylene	2020/10/09	<0.050		mg/kg	
			Benzo(j)fluoranthene	2020/10/09	<0.050		mg/kg	
			Benzo(k)fluoranthene	2020/10/09	<0.050		mg/kg	
			Chrysene	2020/10/09	<0.050		mg/kg	
			D10-Anthracene	2020/10/09		116	%	50 - 130
			D14-Terphenyl	2020/10/09		116	%	50 - 130
			D8-Acenaphthylene	2020/10/09		114	%	50 - 130
			Dibenzo(a,h)anthracene	2020/10/09	<0.050		mg/kg	
			Fluoranthene	2020/10/09	<0.050		mg/kg	
			Fluorene	2020/10/09	<0.050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/10/09	<0.050		mg/kg	
			Naphthalene	2020/10/09	<0.050		mg/kg	
			Perylene	2020/10/09	<0.050		mg/kg	
			Phenanthrene	2020/10/09	<0.050		mg/kg	
			Pyrene	2020/10/09	<0.050		mg/kg	

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Rosemarie MacDonald

Rosemarie MacDonald, Scientific Specialist (Organics)

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Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: 08487309

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Report Date: 2020/12/30
Report #: R2972551
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C079092
Received: 2020/10/27, 08:17

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICPMS - Tissue Plug Wet Wt	8	2020/12/03	2020/12/08	BBY WI-00033	Auto Calc
Moisture in Tissue - Freeze Drying	8	2020/12/03	2020/12/05	BBY7SOP-00021	BCMOE BCLM Aug 2014
PAH IN Tissue Subcontract (1)	8	2020/12/22	2020/12/22		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Ontario (From Burnaby)

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: 08487309

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Report Date: 2020/12/30
Report #: R2972551
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C079092
Received: 2020/10/27, 08:17

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas Laboratories
30 Dec 2020 09:45:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Carmen McKay, Key Account Specialist
Email: Carmen.MCKAY@bvlabs.com
Phone# (403)219-3683
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BUREAU VERITAS

BV Labs Job #: C079092
Report Date: 2020/12/30

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

RESULTS OF CHEMICAL ANALYSES OF TISSUE

BV Labs ID		YS9262	YS9263	YS9264	YS9265	YS9266	YS9267	
Sampling Date		2020/08/05	2020/08/05	2020/08/05	2020/08/05	2020/08/05	2020/08/05	
COC Number		08487309	08487309	08487309	08487309	08487309	08487309	
	UNITS	HTAR_COMP_1	HTAR_COMP_2	HTAR_COMP_3	HTAR_COMP_4	HTAR_COMP_5	HTAR_COMP_6	QC Batch
Parameter								
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	A121166

BV Labs ID		YS9268	YS9269	
Sampling Date		2020/08/05	2020/08/05	
COC Number		08487309	08487309	
	UNITS	HTAR_COMP_7	HTAR_COMP_8	QC Batch
Parameter				
Subcontract Parameter	N/A	ATTACHED	ATTACHED	A121166

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C079092
Report Date: 2020/12/30

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		YS9262	YS9263	YS9264	YS9265	YS9266		
Sampling Date		2020/08/05	2020/08/05	2020/08/05	2020/08/05	2020/08/05		
COC Number		08487309	08487309	08487309	08487309	08487309		
	UNITS	HTAR_COMP_1	HTAR_COMP_2	HTAR_COMP_3	HTAR_COMP_4	HTAR_COMP_5	RDL	QC Batch
Total Metals by ICPMS								
Total (Wet Wt) Aluminum (Al)	mg/kg	1750	705	666	894	367	0.50	A104161
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0354	0.0206	0.0209	0.0210	0.0085	0.0020	A104161
Total (Wet Wt) Arsenic (As)	mg/kg	3.36	2.40	2.96	2.45	2.47	0.0050	A104161
Total (Wet Wt) Barium (Ba)	mg/kg	8.98	8.31	16.5	7.93	20.1	0.010	A104161
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0966	0.0371	0.0408	0.0510	0.0213	0.0020	A104161
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0236	0.0085	0.0091	0.0103	0.0056	0.0013	A104161
Total (Wet Wt) Boron (B)	mg/kg	13.2	6.48	6.97	7.71	4.36	0.20	A104161
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.755	0.595	0.734	0.548	0.599	0.0013	A104161
Total (Wet Wt) Calcium (Ca)	mg/kg	10600	6080	5910	8140	4430	4.0	A104161
Total (Wet Wt) Chromium (Cr)	mg/kg	31.8	64.0	31.6	33.9	5.90	0.025	A104161
Total (Wet Wt) Cobalt (Co)	mg/kg	2.46	1.50	1.88	1.39	0.757	0.0013	A104161
Total (Wet Wt) Copper (Cu)	mg/kg	4.02	4.02	2.83	3.15	1.76	0.013	A104161
Total (Wet Wt) Iron (Fe)	mg/kg	3910	2450	2110	2750	904	0.25	A104161
Total (Wet Wt) Lead (Pb)	mg/kg	4.33	0.865	1.23	1.12	0.509	0.0013	A104161
Total (Wet Wt) Magnesium (Mg)	mg/kg	5030	2960	3160	4200	2390	0.40	A104161
Total (Wet Wt) Manganese (Mn)	mg/kg	250	132	271	151	73.9	0.010	A104161
Total (Wet Wt) Mercury (Hg)	mg/kg	0.024	0.029	0.032	0.036	0.041	0.013	A104161
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.817	1.30	0.809	0.805	0.282	0.0080	A104161
Total (Wet Wt) Nickel (Ni)	mg/kg	15.2	29.9	14.8	15.7	3.46	0.010	A104161
Total (Wet Wt) Phosphorus (P)	mg/kg	1300	1570	1220	1020	1050	2.0	A104161
Total (Wet Wt) Potassium (K)	mg/kg	1700	1440	1380	1510	1260	2.5	A104161
Total (Wet Wt) Selenium (Se)	mg/kg	1.05	1.28	1.26	1.15	1.43	0.010	A104161
Total (Wet Wt) Silver (Ag)	mg/kg	0.0083	0.0055	0.0047	0.0046	0.0035	0.0013	A104161
Total (Wet Wt) Sodium (Na)	mg/kg	3600	3250	4490	3310	3990	2.5	A104161
Total (Wet Wt) Strontium (Sr)	mg/kg	30.2	16.3	17.4	13.4	12.1	0.013	A104161
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0422	0.0169	0.0217	0.0211	0.0107	0.00040	A104161
Total (Wet Wt) Tin (Sn)	mg/kg	0.360	0.250	0.157	0.162	0.086	0.020	A104161
Total (Wet Wt) Titanium (Ti)	mg/kg	63.2	25.9	24.5	31.9	14.7	0.13	A104161
Total (Wet Wt) Uranium (U)	mg/kg	0.277	0.162	0.143	0.167	0.121	0.00040	A104161
Total (Wet Wt) Vanadium (V)	mg/kg	6.94	3.26	3.50	3.64	1.88	0.020	A104161
Total (Wet Wt) Zinc (Zn)	mg/kg	17.9	14.0	13.1	12.3	13.8	0.20	A104161
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C079092
Report Date: 2020/12/30

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		YS9267	YS9268	YS9269		
Sampling Date		2020/08/05	2020/08/05	2020/08/05		
COC Number		08487309	08487309	08487309		
	UNITS	**HTAR_COMP_6**	**HTAR_COMP_7**	**HTAR_COMP_8**	**RDL**	**QC Batch**
Total Metals by ICPMS						
Total (Wet Wt) Aluminum (Al)	mg/kg	333	771	573	0.50	A104161
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0112	0.0190	0.0143	0.0020	A104161
Total (Wet Wt) Arsenic (As)	mg/kg	2.67	2.62	2.50	0.0050	A104161
Total (Wet Wt) Barium (Ba)	mg/kg	9.64	8.66	5.31	0.010	A104161
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0216	0.0406	0.0448	0.0020	A104161
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0050	0.0106	0.0064	0.0013	A104161
Total (Wet Wt) Boron (B)	mg/kg	5.02	6.77	5.22	0.20	A104161
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.613	0.432	0.660	0.0013	A104161
Total (Wet Wt) Calcium (Ca)	mg/kg	4020	4980	4090	4.0	A104161
Total (Wet Wt) Chromium (Cr)	mg/kg	12.0	14.9	29.5	0.025	A104161
Total (Wet Wt) Cobalt (Co)	mg/kg	1.05	1.55	1.06	0.0013	A104161
Total (Wet Wt) Copper (Cu)	mg/kg	2.20	2.31	2.79	0.013	A104161
Total (Wet Wt) Iron (Fe)	mg/kg	1090	1860	1730	0.25	A104161
Total (Wet Wt) Lead (Pb)	mg/kg	0.429	1.71	0.696	0.0013	A104161
Total (Wet Wt) Magnesium (Mg)	mg/kg	2370	3000	2470	0.40	A104161
Total (Wet Wt) Manganese (Mn)	mg/kg	108	171	88.0	0.010	A104161
Total (Wet Wt) Mercury (Hg)	mg/kg	0.047	0.022	0.026	0.013	A104161
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.453	0.563	0.633	0.0080	A104161
Total (Wet Wt) Nickel (Ni)	mg/kg	6.18	7.64	13.9	0.010	A104161
Total (Wet Wt) Phosphorus (P)	mg/kg	1240	1350	1560	2.0	A104161
Total (Wet Wt) Potassium (K)	mg/kg	1390	1470	1450	2.5	A104161
Total (Wet Wt) Selenium (Se)	mg/kg	1.56	1.14	1.22	0.010	A104161
Total (Wet Wt) Silver (Ag)	mg/kg	0.0036	0.0037	0.0048	0.0013	A104161
Total (Wet Wt) Sodium (Na)	mg/kg	3970	3370	4190	2.5	A104161
Total (Wet Wt) Strontium (Sr)	mg/kg	10.3	17.3	12.5	0.013	A104161
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0120	0.0214	0.0122	0.00040	A104161
Total (Wet Wt) Tin (Sn)	mg/kg	0.134	0.133	0.193	0.020	A104161
Total (Wet Wt) Titanium (Ti)	mg/kg	13.8	27.5	19.3	0.13	A104161
Total (Wet Wt) Uranium (U)	mg/kg	0.0868	0.128	0.141	0.00040	A104161
Total (Wet Wt) Vanadium (V)	mg/kg	2.14	3.53	2.55	0.020	A104161
Total (Wet Wt) Zinc (Zn)	mg/kg	11.8	12.0	11.5	0.20	A104161
RDL = Reportable Detection Limit						

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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

PHYSICAL TESTING (TISSUE)

BV Labs ID		YS9262	YS9263	YS9264	YS9265	YS9266		
Sampling Date		2020/08/05	2020/08/05	2020/08/05	2020/08/05	2020/08/05		
COC Number		08487309	08487309	08487309	08487309	08487309		
	UNITS	HTAR_COMP_1	HTAR_COMP_2	HTAR_COMP_3	HTAR_COMP_4	HTAR_COMP_5	RDL	QC Batch
Physical Properties								
Moisture	%	78	80	81	81	85	0.30	A100586
RDL = Reportable Detection Limit								

BV Labs ID		YS9267	YS9268	YS9269		
Sampling Date		2020/08/05	2020/08/05	2020/08/05		
COC Number		08487309	08487309	08487309		
	UNITS	HTAR_COMP_6	HTAR_COMP_7	HTAR_COMP_8	RDL	QC Batch
Physical Properties						
Moisture	%	82	83	80	0.30	A100586
RDL = Reportable Detection Limit						

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BV Labs Job #: C079092
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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
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GENERAL COMMENTS

Results relate only to the items tested.

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BV Labs Job #: C079092
Report Date: 2020/12/30

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A104161	JBN	QC Standard	Total (Wet Wt) Aluminum (Al)	2020/12/08		102	%	75 - 125
			Total (Wet Wt) Arsenic (As)	2020/12/08		94	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2020/12/08		93	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2020/12/08		75	%	75 - 125
			Total (Wet Wt) Cobalt (Co)	2020/12/08		93	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2020/12/08		87	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2020/12/08		99	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2020/12/08		55 (1)	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2020/12/08		93	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2020/12/08		91	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2020/12/08		81	%	75 - 125
			Total (Wet Wt) Phosphorus (P)	2020/12/08		94	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2020/12/08		99	%	75 - 125
			Total (Wet Wt) Sodium (Na)	2020/12/08		98	%	75 - 125
			Total (Wet Wt) Uranium (U)	2020/12/08		99	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2020/12/08		90	%	75 - 125
A104161	JBN	Spiked Blank	Total (Wet Wt) Aluminum (Al)	2020/12/08		110	%	80 - 120
			Total (Wet Wt) Antimony (Sb)	2020/12/08		105	%	80 - 120
			Total (Wet Wt) Arsenic (As)	2020/12/08		107	%	80 - 120
			Total (Wet Wt) Barium (Ba)	2020/12/08		108	%	80 - 120
			Total (Wet Wt) Beryllium (Be)	2020/12/08		100	%	80 - 120
			Total (Wet Wt) Bismuth (Bi)	2020/12/08		109	%	80 - 120
			Total (Wet Wt) Boron (B)	2020/12/08		103	%	80 - 120
			Total (Wet Wt) Cadmium (Cd)	2020/12/08		103	%	80 - 120
			Total (Wet Wt) Calcium (Ca)	2020/12/08		102	%	80 - 120
			Total (Wet Wt) Chromium (Cr)	2020/12/08		105	%	80 - 120
			Total (Wet Wt) Cobalt (Co)	2020/12/08		106	%	80 - 120
			Total (Wet Wt) Copper (Cu)	2020/12/08		102	%	80 - 120
			Total (Wet Wt) Iron (Fe)	2020/12/08		114	%	80 - 120
			Total (Wet Wt) Lead (Pb)	2020/12/08		107	%	80 - 120
			Total (Wet Wt) Magnesium (Mg)	2020/12/08		106	%	80 - 120
			Total (Wet Wt) Manganese (Mn)	2020/12/08		106	%	80 - 120
			Total (Wet Wt) Mercury (Hg)	2020/12/08		107	%	80 - 120
			Total (Wet Wt) Molybdenum (Mo)	2020/12/08		110	%	80 - 120
			Total (Wet Wt) Nickel (Ni)	2020/12/08		106	%	80 - 120
			Total (Wet Wt) Phosphorus (P)	2020/12/08		102	%	80 - 120
			Total (Wet Wt) Potassium (K)	2020/12/08		104	%	80 - 120
			Total (Wet Wt) Selenium (Se)	2020/12/08		110	%	80 - 120
			Total (Wet Wt) Silver (Ag)	2020/12/08		98	%	80 - 120
			Total (Wet Wt) Sodium (Na)	2020/12/08		110	%	80 - 120
			Total (Wet Wt) Strontium (Sr)	2020/12/08		108	%	80 - 120
			Total (Wet Wt) Thallium (Tl)	2020/12/08		109	%	80 - 120
			Total (Wet Wt) Tin (Sn)	2020/12/08		103	%	80 - 120
			Total (Wet Wt) Titanium (Ti)	2020/12/08		102	%	80 - 120
			Total (Wet Wt) Uranium (U)	2020/12/08		113	%	80 - 120
			Total (Wet Wt) Vanadium (V)	2020/12/08		104	%	80 - 120
			Total (Wet Wt) Zinc (Zn)	2020/12/08		106	%	80 - 120
A104161	JBN	Method Blank	Total (Wet Wt) Aluminum (Al)	2020/12/08	<0.50		mg/kg	
			Total (Wet Wt) Antimony (Sb)	2020/12/08	<0.0020		mg/kg	
			Total (Wet Wt) Arsenic (As)	2020/12/08	<0.0050		mg/kg	
			Total (Wet Wt) Barium (Ba)	2020/12/08	<0.010		mg/kg	
			Total (Wet Wt) Beryllium (Be)	2020/12/08	<0.0020		mg/kg	
			Total (Wet Wt) Bismuth (Bi)	2020/12/08	<0.0013		mg/kg	

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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total (Wet Wt) Boron (B)	2020/12/08	<0.20		mg/kg	
			Total (Wet Wt) Cadmium (Cd)	2020/12/08	<0.0013		mg/kg	
			Total (Wet Wt) Calcium (Ca)	2020/12/08	<4.0		mg/kg	
			Total (Wet Wt) Chromium (Cr)	2020/12/08	<0.025		mg/kg	
			Total (Wet Wt) Cobalt (Co)	2020/12/08	<0.0013		mg/kg	
			Total (Wet Wt) Copper (Cu)	2020/12/08	0.015, RDL=0.013 (2)		mg/kg	
			Total (Wet Wt) Iron (Fe)	2020/12/08	<0.25		mg/kg	
			Total (Wet Wt) Lead (Pb)	2020/12/08	<0.0013		mg/kg	
			Total (Wet Wt) Magnesium (Mg)	2020/12/08	<0.40		mg/kg	
			Total (Wet Wt) Manganese (Mn)	2020/12/08	<0.010		mg/kg	
			Total (Wet Wt) Mercury (Hg)	2020/12/08	<0.013		mg/kg	
			Total (Wet Wt) Molybdenum (Mo)	2020/12/08	<0.0080		mg/kg	
			Total (Wet Wt) Nickel (Ni)	2020/12/08	<0.010		mg/kg	
			Total (Wet Wt) Phosphorus (P)	2020/12/08	<2.0		mg/kg	
			Total (Wet Wt) Potassium (K)	2020/12/08	<2.5		mg/kg	
			Total (Wet Wt) Selenium (Se)	2020/12/08	<0.010		mg/kg	
			Total (Wet Wt) Silver (Ag)	2020/12/08	<0.0013		mg/kg	
			Total (Wet Wt) Sodium (Na)	2020/12/08	<2.5		mg/kg	
			Total (Wet Wt) Strontium (Sr)	2020/12/08	<0.013		mg/kg	
			Total (Wet Wt) Thallium (Tl)	2020/12/08	<0.00040		mg/kg	
			Total (Wet Wt) Tin (Sn)	2020/12/08	<0.020		mg/kg	
			Total (Wet Wt) Titanium (Ti)	2020/12/08	<0.13		mg/kg	
			Total (Wet Wt) Uranium (U)	2020/12/08	<0.00040		mg/kg	
			Total (Wet Wt) Vanadium (V)	2020/12/08	<0.020		mg/kg	
			Total (Wet Wt) Zinc (Zn)	2020/12/08	<0.20		mg/kg	

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

(1) Reference outside acceptance criteria due to digestion limitations.

(2) Method Blank exceeds acceptance limits for (Cu). Sample values for (Cu) are >10x the concentration of the method blank and the contamination is considered irrelevant.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Shanaz Akbar, Project Solutions Representative

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

08487309

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information	
Company:	Golder Associates Ltd.	Company:		Quotation	C00599
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:	
Address:	16820 107 Ave. Edmonton, AB PC: T5P 4C3	Address:	PC:	Project #:	1663724-34000-03
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet
Copies:		Copies:		Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☑ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID	1		
Seal Present		X	Temp	10	9	9
Seal Intact	X					
Cooling Media	X					

Depot Reception

Analysis Requested: # of Containers; BTEXS / VPH, ☐VOC / BTEXS / VPH, ☐MTBE; BTEX F1, ☐VOC / BTEX / F1; PAH, ☐LEPH / HEPH / PAH; EPH, TEH, F2 - F4; ☐Dissolved Metals, ☐Filtered?, Preserved?; ☐Dissolved Mercury, ☐Filtered?, ☐Preserved?; Total Metals, ☐Field Preserved?; ☐Total Mercury, ☐Field Preserved?; Chloride, ☐Fluoride, ☐Sulphate; TSS, ☐TDS, ☐BOD, COD; pH, Conductivity, Alkalinity; Nitrite, ☐Nitrate, ☐Ammonia; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	PAH	Total Metals	Special Instructions: Composite the following samples:
1	HTAR_COMP_1	8/5/2020		Tissue	X	X	1902, 1925, 1941, 1942, 1943, 1947, 1950
2	HTAR_COMP_2	8/5/2020		Tissue	X	X	1900, 1907, 1920, 1932, 1939, 1948
3	HTAR_COMP_3	8/5/2020		Tissue	X	X	1905, 1912, 1915, 1922, 1936, 1949
4	HTAR_COMP_4	8/5/2020		Tissue	X	X	1901, 1903, 1914, 1923, 1926, 1938
5	HTAR_COMP_5	8/5/2020		Tissue	X	X	1909, 1913, 1923, 1927, 1931, 1937, 1945
6	HTAR_COMP_6	8/5/2020		Tissue	X	X	1910, 1916, 1917, 1918, 1928, 1940
7	HTAR_COMP_7	8/5/2020		Tissue	X	X	1904, 1906, 1919, 1929, 1930, 1944
8	HTAR_COMP_8	8/5/2020		Tissue	X	X	1911, 1924, 1933, 1934, 1935, 1946
9							
10							

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):
Kayla Hartemink (@Biologica)			[signature] PEDRO TAOC	2020/10/27	08:17

COC-1020

C079092_COC

Golder Sample ID	Biologica Sample ID	Composite #
BAFF-20-U-MLN-HTAR-1900	sa20-045-075	2
BAFF-20-U-MLN-HTAR-1901	sa20-045-076	4
BAFF-20-U-MLN-HTAR-1902	sa20-045-077	1
BAFF-20-U-MLN-HTAR-1903	sa20-045-078	4
BAFF-20-U-MLN-HTAR-1904	sa20-045-079	7
BAFF-20-U-MLN-HTAR-1905	sa20-045-080	3
BAFF-20-U-MLN-HTAR-1906	sa20-045-081	7
BAFF-20-U-MLN-HTAR-1907	sa20-045-082	2
BAFF-20-U-MLN-HTAR-1909	sa20-045-083	5
BAFF-20-U-MLN-HTAR-1910	sa20-045-084	6
BAFF-20-U-MLN-HTAR-1911	sa20-045-085	8
BAFF-20-U-MLN-HTAR-1912	sa20-045-086	3
BAFF-20-U-MLN-HTAR-1913	sa20-045-087	5
BAFF-20-U-MLN-HTAR-1914	sa20-045-088	4
BAFF-20-U-MLN-HTAR-1915	sa20-045-089	3
BAFF-20-U-MLN-HTAR-1916	sa20-045-090	6
BAFF-20-U-MLN-HTAR-1917	sa20-045-091	6
BAFF-20-U-MLN-HTAR-1918	sa20-045-092	6
BAFF-20-U-MLN-HTAR-1919	sa20-045-093	7
BAFF-20-U-MLN-HTAR-1920	sa20-045-094	2
BAFF-20-U-MLN-HTAR-1921	sa20-045-095	4
BAFF-20-U-MLN-HTAR-1922	sa20-045-096	3
BAFF-20-U-MLN-HTAR-1923	sa20-045-097	5
BAFF-20-U-MLN-HTAR-1924	sa20-045-098	8
BAFF-20-U-MLN-HTAR-1925	sa20-045-099	1
BAFF-20-U-MLN-HTAR-1926	sa20-045-100	4
BAFF-20-U-MLN-HTAR-1927	sa20-045-101	5
BAFF-20-U-MLN-HTAR-1928	sa20-045-102	6
BAFF-20-U-MLN-HTAR-1929	sa20-045-103	7
BAFF-20-U-MLN-HTAR-1930	sa20-045-104	7
BAFF-20-U-MLN-HTAR-1931	sa20-045-105	5
BAFF-20-U-MLN-HTAR-1932	sa20-045-106	2
BAFF-20-U-MLN-HTAR-1933	sa20-045-107	8
BAFF-20-U-MLN-HTAR-1934	sa20-045-108	8
BAFF-20-U-MLN-HTAR-1935	sa20-045-109	8
BAFF-20-U-MLN-HTAR-1936	sa20-045-110	3
BAFF-20-U-MLN-HTAR-1937	sa20-045-111	5
BAFF-20-U-MLN-HTAR-1938	sa20-045-112	4
BAFF-20-U-MLN-HTAR-1939	sa20-045-113	2
BAFF-20-U-MLN-HTAR-1940	sa20-045-114	6
BAFF-20-U-MLN-HTAR-1941	sa20-045-115	1
BAFF-20-U-MLN-HTAR-1942	sa20-045-116	1
BAFF-20-U-MLN-HTAR-1943	sa20-045-117	1
BAFF-20-U-MLN-HTAR-1944	sa20-045-118	7
BAFF-20-U-MLN-HTAR-1945	sa20-045-119	5
BAFF-20-U-MLN-HTAR-1946	sa20-045-120	8
BAFF-20-U-MLN-HTAR-1947	sa20-045-121	1
BAFF-20-U-MLN-HTAR-1948	sa20-045-122	2
BAFF-20-U-MLN-HTAR-1949	sa20-045-123	3
BAFF-20-U-MLN-HTAR-1950	sa20-045-124	1

BUREAU VERITAS

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Your C.O.C. #: 08488378, 08488382, 08488386, 08488394, 08488390

Report Date: 2021/01/14
Report #: R2976538
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C093451
Received: 2020/09/23, 08:00

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by CRC ICPMS - Tissue Wet Wt	8	2021/01/06	2021/01/10	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue	8	2021/01/04	2021/01/05	BBY8SOP-00017	BCMOE BCLM Dec2000 m
PAH IN Tissue Subcontract (1)	8	2021/01/13	2021/01/13		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Bedford(From Burnaby)

Your Project #: 1663724-34000-03
Site#: MILNE INLET
Site Location: BAFFIN ISLAND

Attention: RAINIE SHARPE

GOLDER ASSOCIATES LTD
16820-107 AVE
EDMONTON, AB
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CERTIFICATE OF ANALYSIS

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Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas Laboratories
14 Jan 2021 10:55:05

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Carmen McKay, Key Account Specialist
Email: Carmen.MCKAY@bureauveritas.com
Phone# (403)219-3683
==
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

RESULTS OF CHEMICAL ANALYSES OF TISSUE

BV Labs ID		ZB4617	ZB4618	ZB4621	ZB4632	
Sampling Date		2020/07/28	2020/07/28	2020/07/29	2020/07/30	
COC Number		08488378	08488378	08488378	08488382	
	UNITS	**BAFF-20-U-MLN-GN06 -ARCH-03**	**BAFF-20-U-MLN-GN06 -ARCH-09**	**BAFF-20-U-MLN-GN10 -ARCH-01**	**BAFF-20-U-MLN-GN11 -ARCH-11**	**QC Batch**
Parameter						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	A132740

BV Labs ID		ZB4670	ZB4674	ZB4682	ZB4695	
Sampling Date		2020/08/01	2020/08/08	2020/08/11	2020/08/14	
COC Number		08488386	08488386	08488394	08488390	
	UNITS	**BAFF-20-U-MLN-GN13 -ARCH-17**	**BAFF-20-U-MLN-GN18 -ARCH-003**	**BAFF-20-U-MLN-GN20 -ARCH-17**	**BAFF-20-U-MLN-GN23A-ARCH-17**	**QC Batch**
Parameter						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	A132740

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BUREAU VERITAS

BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ZB4617	ZB4618	ZB4621		
Sampling Date		2020/07/28	2020/07/28	2020/07/29		
COC Number		08488378	08488378	08488378		
	UNITS	**BAFF-20-U-MLN-GN06 -ARCH-03**	**BAFF-20-U-MLN-GN06 -ARCH-09**	**BAFF-20-U-MLN-GN10 -ARCH-01**	**RDL**	**QC Batch**
Total Metals by ICPMS						
Total (Wet Wt) Aluminum (Al)	mg/kg	0.46	0.41	0.31	0.20	A128751
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Arsenic (As)	mg/kg	0.389	0.894	1.20	0.0040	A128751
Total (Wet Wt) Barium (Ba)	mg/kg	<0.010	<0.010	0.068	0.010	A128751
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	<0.20	0.20	A128751
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0035	0.0171	0.0015	0.0010	A128751
Total (Wet Wt) Calcium (Ca)	mg/kg	113	39.4	112	2.0	A128751
Total (Wet Wt) Chromium (Cr)	mg/kg	0.042	<0.010	<0.010	0.010	A128751
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0041	0.0030	0.0033	0.0013	A128751
Total (Wet Wt) Copper (Cu)	mg/kg	0.344	0.347	0.326	0.010	A128751
Total (Wet Wt) Iron (Fe)	mg/kg	4.61	4.43	3.83	0.25	A128751
Total (Wet Wt) Lead (Pb)	mg/kg	0.0028	0.0012	0.0012	0.0010	A128751
Total (Wet Wt) Magnesium (Mg)	mg/kg	324	305	297	0.40	A128751
Total (Wet Wt) Manganese (Mn)	mg/kg	0.129	0.056	0.077	0.010	A128751
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0320	0.0485	0.0418	0.0020	A128751
Total (Wet Wt) Molybdenum (Mo)	mg/kg	<0.0040	<0.0040	<0.0040	0.0040	A128751
Total (Wet Wt) Nickel (Ni)	mg/kg	0.028	<0.010	<0.010	0.010	A128751
Total (Wet Wt) Phosphorus (P)	mg/kg	3510	2990	3080	2.0	A128751
Total (Wet Wt) Potassium (K)	mg/kg	5190	4320	4560	2.0	A128751
Total (Wet Wt) Selenium (Se)	mg/kg	0.327	0.307	0.322	0.010	A128751
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Sodium (Na)	mg/kg	318	313	242	2.0	A128751
Total (Wet Wt) Strontium (Sr)	mg/kg	0.285	0.088	0.237	0.010	A128751
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00197	0.00232	0.00196	0.00040	A128751
Total (Wet Wt) Tin (Sn)	mg/kg	0.034	0.034	<0.020	0.020	A128751
Total (Wet Wt) Titanium (Ti)	mg/kg	0.164	0.124	0.143	0.020	A128751
Total (Wet Wt) Uranium (U)	mg/kg	<0.00040	0.00062	<0.00040	0.00040	A128751
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	<0.020	0.020	A128751
Total (Wet Wt) Zinc (Zn)	mg/kg	4.98	3.99	3.79	0.040	A128751
RDL = Reportable Detection Limit						

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BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ZB4632	ZB4670	ZB4674		
Sampling Date		2020/07/30	2020/08/01	2020/08/08		
COC Number		08488382	08488386	08488386		
	UNITS	**BAFF-20-U-MLN-GN11 -ARCH-11**	**BAFF-20-U-MLN-GN13 -ARCH-17**	**BAFF-20-U-MLN-GN18 -ARCH-003**	**RDL**	**QC Batch**
Total Metals by ICPMS						
Total (Wet Wt) Aluminum (Al)	mg/kg	0.32	0.28	0.44	0.20	A128751
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	0.0094	0.0010	A128751
Total (Wet Wt) Arsenic (As)	mg/kg	1.26	0.565	33.2	0.0040	A128751
Total (Wet Wt) Barium (Ba)	mg/kg	<0.010	0.019	0.015	0.010	A128751
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	<0.20	0.20	A128751
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0115	0.0028	0.0012	0.0010	A128751
Total (Wet Wt) Calcium (Ca)	mg/kg	88.3	506	74.0	2.0	A128751
Total (Wet Wt) Chromium (Cr)	mg/kg	1.52	0.038	0.021	0.010	A128751
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0057	0.0037	0.0029	0.0013	A128751
Total (Wet Wt) Copper (Cu)	mg/kg	0.290	0.331	0.165	0.010	A128751
Total (Wet Wt) Iron (Fe)	mg/kg	16.8	4.93	2.39	0.25	A128751
Total (Wet Wt) Lead (Pb)	mg/kg	0.0022	0.0014	0.0052	0.0010	A128751
Total (Wet Wt) Magnesium (Mg)	mg/kg	294	315	219	0.40	A128751
Total (Wet Wt) Manganese (Mn)	mg/kg	0.120	0.180	0.062	0.010	A128751
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0432	0.0230	0.297	0.0020	A128751
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.0105	<0.0040	<0.0040	0.0040	A128751
Total (Wet Wt) Nickel (Ni)	mg/kg	0.029	0.019	0.018	0.010	A128751
Total (Wet Wt) Phosphorus (P)	mg/kg	3090	3520	2350	2.0	A128751
Total (Wet Wt) Potassium (K)	mg/kg	4750	4910	4190	2.0	A128751
Total (Wet Wt) Selenium (Se)	mg/kg	0.332	0.285	0.306	0.010	A128751
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Sodium (Na)	mg/kg	325	339	633	2.0	A128751
Total (Wet Wt) Strontium (Sr)	mg/kg	0.188	1.28	0.402	0.010	A128751
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00235	0.00161	0.00071	0.00040	A128751
Total (Wet Wt) Tin (Sn)	mg/kg	0.038	<0.020	0.026	0.020	A128751
Total (Wet Wt) Titanium (Ti)	mg/kg	0.134	0.162	0.119	0.020	A128751
Total (Wet Wt) Uranium (U)	mg/kg	<0.00040	0.00112	<0.00040	0.00040	A128751
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	<0.020	0.020	A128751
Total (Wet Wt) Zinc (Zn)	mg/kg	3.78	4.94	5.28	0.040	A128751
RDL = Reportable Detection Limit						

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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ZB4682	ZB4695		
Sampling Date		2020/08/11	2020/08/14		
COC Number		08488394	08488390		
	UNITS	**BAFF-20-U-MLN-GN20-ARCH-17**	**BAFF-20-U-MLN-GN23A-ARCH-17**	**RDL**	**QC Batch**
Total Metals by ICPMS					
Total (Wet Wt) Aluminum (Al)	mg/kg	0.50	0.62	0.20	A128751
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Arsenic (As)	mg/kg	0.724	0.766	0.0040	A128751
Total (Wet Wt) Barium (Ba)	mg/kg	0.023	0.052	0.010	A128751
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Boron (B)	mg/kg	<0.20	<0.20	0.20	A128751
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0105	0.0012	0.0010	A128751
Total (Wet Wt) Calcium (Ca)	mg/kg	485	337	2.0	A128751
Total (Wet Wt) Chromium (Cr)	mg/kg	0.011	0.090	0.010	A128751
Total (Wet Wt) Cobalt (Co)	mg/kg	0.0029	0.0047	0.0013	A128751
Total (Wet Wt) Copper (Cu)	mg/kg	0.325	0.311	0.010	A128751
Total (Wet Wt) Iron (Fe)	mg/kg	4.80	5.58	0.25	A128751
Total (Wet Wt) Lead (Pb)	mg/kg	0.0026	0.0024	0.0010	A128751
Total (Wet Wt) Magnesium (Mg)	mg/kg	300	348	0.40	A128751
Total (Wet Wt) Manganese (Mn)	mg/kg	0.141	0.155	0.010	A128751
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0290	0.0676	0.0020	A128751
Total (Wet Wt) Molybdenum (Mo)	mg/kg	<0.0040	<0.0040	0.0040	A128751
Total (Wet Wt) Nickel (Ni)	mg/kg	<0.010	0.010	0.010	A128751
Total (Wet Wt) Phosphorus (P)	mg/kg	3160	3950	2.0	A128751
Total (Wet Wt) Potassium (K)	mg/kg	4290	5360	2.0	A128751
Total (Wet Wt) Selenium (Se)	mg/kg	0.296	0.387	0.010	A128751
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0010	<0.0010	0.0010	A128751
Total (Wet Wt) Sodium (Na)	mg/kg	425	338	2.0	A128751
Total (Wet Wt) Strontium (Sr)	mg/kg	1.59	0.611	0.010	A128751
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00208	0.00324	0.00040	A128751
Total (Wet Wt) Tin (Sn)	mg/kg	0.029	0.026	0.020	A128751
Total (Wet Wt) Titanium (Ti)	mg/kg	0.142	0.167	0.020	A128751
Total (Wet Wt) Uranium (U)	mg/kg	<0.00040	<0.00040	0.00040	A128751
Total (Wet Wt) Vanadium (V)	mg/kg	<0.020	<0.020	0.020	A128751
Total (Wet Wt) Zinc (Zn)	mg/kg	4.29	5.54	0.040	A128751
RDL = Reportable Detection Limit					

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GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

PHYSICAL TESTING (TISSUE)

BV Labs ID		ZB4617	ZB4618	ZB4621	ZB4632		
Sampling Date		2020/07/28	2020/07/28	2020/07/29	2020/07/30		
COC Number		08488378	08488378	08488378	08488382		
	UNITS	**BAFF-20-U-MLN-GN06-ARCH-03**	**BAFF-20-U-MLN-GN06-ARCH-09**	**BAFF-20-U-MLN-GN10-ARCH-01**	**BAFF-20-U-MLN-GN11-ARCH-11**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	75	75	72	74	0.30	A126779
RDL = Reportable Detection Limit							

BV Labs ID		ZB4670	ZB4674	ZB4682	ZB4695		
Sampling Date		2020/08/01	2020/08/08	2020/08/11	2020/08/14		
COC Number		08488386	08488386	08488394	08488390		
	UNITS	**BAFF-20-U-MLN-GN13-ARCH-17**	**BAFF-20-U-MLN-GN18-ARCH-003**	**BAFF-20-U-MLN-GN20-ARCH-17**	**BAFF-20-U-MLN-GN23A-ARCH-17**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	73	83	70	76	0.30	A126779
RDL = Reportable Detection Limit							

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GENERAL COMMENTS

Results relate only to the items tested.

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BUREAU VERITAS

BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A126779	LA5	Method Blank	Moisture	2021/01/05	<0.30		%	
A126779	LA5	RPD [ZB4617-01]	Moisture	2021/01/05	0.27		%	20
A128751	JBN	Matrix Spike [ZB4617-01]	Total (Wet Wt) Aluminum (Al)	2021/01/10		110	%	75 - 125
			Total (Wet Wt) Antimony (Sb)	2021/01/10		102	%	75 - 125
			Total (Wet Wt) Arsenic (As)	2021/01/10		107	%	75 - 125
			Total (Wet Wt) Barium (Ba)	2021/01/10		104	%	75 - 125
			Total (Wet Wt) Beryllium (Be)	2021/01/10		93	%	75 - 125
			Total (Wet Wt) Bismuth (Bi)	2021/01/10		97	%	75 - 125
			Total (Wet Wt) Boron (B)	2021/01/10		92	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2021/01/10		95	%	75 - 125
			Total (Wet Wt) Calcium (Ca)	2021/01/10		117	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2021/01/10		83	%	75 - 125
			Total (Wet Wt) Cobalt (Co)	2021/01/10		84	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2021/01/10		83	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2021/01/10		119	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2021/01/10		96	%	75 - 125
			Total (Wet Wt) Magnesium (Mg)	2021/01/10		99	%	75 - 125
			Total (Wet Wt) Manganese (Mn)	2021/01/10		89	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2021/01/10		114	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2021/01/10		106	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2021/01/10		80	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2021/01/10		99	%	75 - 125
			Total (Wet Wt) Silver (Ag)	2021/01/10		71 (1)	%	75 - 125
			Total (Wet Wt) Sodium (Na)	2021/01/10		120	%	75 - 125
			Total (Wet Wt) Strontium (Sr)	2021/01/10		108	%	75 - 125
			Total (Wet Wt) Thallium (Tl)	2021/01/10		95	%	75 - 125
			Total (Wet Wt) Tin (Sn)	2021/01/10		98	%	75 - 125
			Total (Wet Wt) Titanium (Ti)	2021/01/10		92	%	75 - 125
			Total (Wet Wt) Uranium (U)	2021/01/10		97	%	75 - 125
			Total (Wet Wt) Vanadium (V)	2021/01/10		91	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2021/01/10		109	%	75 - 125
A128751	JBN	QC Standard	Total (Wet Wt) Arsenic (As)	2021/01/10		111	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2021/01/10		90	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2021/01/10		61 (2)	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2021/01/10		73 (3)	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2021/01/10		86	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2021/01/10		88	%	75 - 125
			Total (Wet Wt) Manganese (Mn)	2021/01/10		82	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2021/01/10		91	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2021/01/10		95	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2021/01/10		74 (4)	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2021/01/10		88	%	75 - 125
			Total (Wet Wt) Strontium (Sr)	2021/01/10		99	%	75 - 125
			Total (Wet Wt) Vanadium (V)	2021/01/10		86	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2021/01/10		83	%	75 - 125
A128751	JBN	Spiked Blank	Total (Wet Wt) Aluminum (Al)	2021/01/10		105	%	75 - 125
			Total (Wet Wt) Antimony (Sb)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Arsenic (As)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Barium (Ba)	2021/01/10		102	%	75 - 125
			Total (Wet Wt) Beryllium (Be)	2021/01/10		94	%	75 - 125
			Total (Wet Wt) Bismuth (Bi)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Boron (B)	2021/01/10		96	%	75 - 125
			Total (Wet Wt) Cadmium (Cd)	2021/01/10		100	%	75 - 125

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total (Wet Wt) Calcium (Ca)	2021/01/10		105	%	75 - 125
			Total (Wet Wt) Chromium (Cr)	2021/01/10		100	%	75 - 125
			Total (Wet Wt) Cobalt (Co)	2021/01/10		98	%	75 - 125
			Total (Wet Wt) Copper (Cu)	2021/01/10		98	%	75 - 125
			Total (Wet Wt) Iron (Fe)	2021/01/10		112	%	75 - 125
			Total (Wet Wt) Lead (Pb)	2021/01/10		102	%	75 - 125
			Total (Wet Wt) Magnesium (Mg)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Manganese (Mn)	2021/01/10		101	%	75 - 125
			Total (Wet Wt) Mercury (Hg)	2021/01/10		107	%	75 - 125
			Total (Wet Wt) Molybdenum (Mo)	2021/01/10		102	%	75 - 125
			Total (Wet Wt) Nickel (Ni)	2021/01/10		99	%	75 - 125
			Total (Wet Wt) Phosphorus (P)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Potassium (K)	2021/01/10		102	%	75 - 125
			Total (Wet Wt) Selenium (Se)	2021/01/10		105	%	75 - 125
			Total (Wet Wt) Silver (Ag)	2021/01/10		73 (5)	%	75 - 125
			Total (Wet Wt) Sodium (Na)	2021/01/10		105	%	75 - 125
			Total (Wet Wt) Strontium (Sr)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Thallium (Tl)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Tin (Sn)	2021/01/10		103	%	75 - 125
			Total (Wet Wt) Titanium (Ti)	2021/01/10		93	%	75 - 125
			Total (Wet Wt) Uranium (U)	2021/01/10		104	%	75 - 125
			Total (Wet Wt) Vanadium (V)	2021/01/10		99	%	75 - 125
			Total (Wet Wt) Zinc (Zn)	2021/01/10		98	%	75 - 125
A128751	JBN	Method Blank	Total (Wet Wt) Aluminum (Al)	2021/01/10	<0.20		mg/kg	
			Total (Wet Wt) Antimony (Sb)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Arsenic (As)	2021/01/10	<0.0040		mg/kg	
			Total (Wet Wt) Barium (Ba)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Beryllium (Be)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Bismuth (Bi)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Boron (B)	2021/01/10	<0.20		mg/kg	
			Total (Wet Wt) Cadmium (Cd)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Calcium (Ca)	2021/01/10	<2.0		mg/kg	
			Total (Wet Wt) Chromium (Cr)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Cobalt (Co)	2021/01/10	<0.0013		mg/kg	
			Total (Wet Wt) Copper (Cu)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Iron (Fe)	2021/01/10	<0.25		mg/kg	
			Total (Wet Wt) Lead (Pb)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Magnesium (Mg)	2021/01/10	<0.40		mg/kg	
			Total (Wet Wt) Manganese (Mn)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Mercury (Hg)	2021/01/10	<0.0020		mg/kg	
			Total (Wet Wt) Molybdenum (Mo)	2021/01/10	<0.0040		mg/kg	
			Total (Wet Wt) Nickel (Ni)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Phosphorus (P)	2021/01/10	<2.0		mg/kg	
			Total (Wet Wt) Potassium (K)	2021/01/10	<2.0		mg/kg	
			Total (Wet Wt) Selenium (Se)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Silver (Ag)	2021/01/10	<0.0010		mg/kg	
			Total (Wet Wt) Sodium (Na)	2021/01/10	<2.0		mg/kg	
			Total (Wet Wt) Strontium (Sr)	2021/01/10	<0.010		mg/kg	
			Total (Wet Wt) Thallium (Tl)	2021/01/10	<0.00040		mg/kg	
			Total (Wet Wt) Tin (Sn)	2021/01/10	<0.020		mg/kg	
			Total (Wet Wt) Titanium (Ti)	2021/01/10	<0.020		mg/kg	
			Total (Wet Wt) Uranium (U)	2021/01/10	<0.00040		mg/kg	
			Total (Wet Wt) Vanadium (V)	2021/01/10	<0.020		mg/kg	

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BV Labs Job #: C093451
Report Date: 2021/01/14

GOLDER ASSOCIATES LTD
Client Project #: 1663724-34000-03
Site Location: BAFFIN ISLAND
Sampler Initials: BC

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total (Wet Wt) Zinc (Zn)	2021/01/10	<0.040		mg/kg	
A128751	JBN	RPD	Total (Wet Wt) Aluminum (Al)	2021/01/10	14		%	40
			Total (Wet Wt) Antimony (Sb)	2021/01/10	NC		%	40
			Total (Wet Wt) Arsenic (As)	2021/01/10	NC		%	40
			Total (Wet Wt) Barium (Ba)	2021/01/10	37		%	40
			Total (Wet Wt) Beryllium (Be)	2021/01/10	NC		%	40
			Total (Wet Wt) Bismuth (Bi)	2021/01/10	NC		%	40
			Total (Wet Wt) Boron (B)	2021/01/10	23		%	40
			Total (Wet Wt) Cadmium (Cd)	2021/01/10	24		%	40
			Total (Wet Wt) Calcium (Ca)	2021/01/10	17		%	60
			Total (Wet Wt) Chromium (Cr)	2021/01/10	NC		%	40
			Total (Wet Wt) Cobalt (Co)	2021/01/10	18		%	40
			Total (Wet Wt) Copper (Cu)	2021/01/10	22		%	40
			Total (Wet Wt) Iron (Fe)	2021/01/10	21		%	40
			Total (Wet Wt) Lead (Pb)	2021/01/10	21		%	40
			Total (Wet Wt) Magnesium (Mg)	2021/01/10	25		%	40
			Total (Wet Wt) Manganese (Mn)	2021/01/10	21		%	40
			Total (Wet Wt) Mercury (Hg)	2021/01/10	19		%	40
			Total (Wet Wt) Molybdenum (Mo)	2021/01/10	21		%	40
			Total (Wet Wt) Nickel (Ni)	2021/01/10	9.7		%	40
			Total (Wet Wt) Phosphorus (P)	2021/01/10	24		%	40
			Total (Wet Wt) Potassium (K)	2021/01/10	27		%	40
			Total (Wet Wt) Selenium (Se)	2021/01/10	20		%	40
			Total (Wet Wt) Silver (Ag)	2021/01/10	NC		%	40
			Total (Wet Wt) Sodium (Na)	2021/01/10	25		%	40
			Total (Wet Wt) Strontium (Sr)	2021/01/10	21		%	60
			Total (Wet Wt) Thallium (Tl)	2021/01/10	26		%	40
			Total (Wet Wt) Tin (Sn)	2021/01/10	NC		%	40
			Total (Wet Wt) Titanium (Ti)	2021/01/10	23		%	40
			Total (Wet Wt) Uranium (U)	2021/01/10	NC		%	40
			Total (Wet Wt) Vanadium (V)	2021/01/10	NC		%	40
			Total (Wet Wt) Zinc (Zn)	2021/01/10	19		%	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Reference Material for (Chromium) outside acceptance criteria due to digestion limitation.

(3) Reference Material for (Copper) outside acceptance criteria due to digestion limitation.

(4) Reference Material for (Nickel) outside acceptance criteria due to digestion limitation.

(5) Blank Spike for (Silver) outside acceptance criteria (10% of analytes failure allowed).

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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Page 1 of 5

Invoice Information

Company: Golder Associates Ltd.
Contact Name: Rainie Sharpe
Address: 16820 107 Ave.
Edmonton, AB PC: T5P 4C3
Phone/Fax: 780-733-7404
Email: rsharpe@golder.com
Copies:

Report Information (if differs from invoice)

Company:
Contact Name:
Address:
PC:
Phone/Fax:
Email:
Copies:

Project Information

Quotation: C00599
P.O. #/AFE#:
Project #: 1663724-34000-03
Site Location: Baffin Island
Site #: Milne Inlet
Sampled By: Brief Cox

Turnaround Time (TAT) Required

☒ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:
Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

☐ BTEX / VPH ☐ VOC / BTEX / VPH ☐ MTBE; ☐ BTEX F1 ☐ VOC / BTEX / F1; ☐ PAH ☐ LEPH / HEPH / PAH; ☐ EPH ☐ TEH ☐ F2 - F4; ☐ Dissolved Metals ☐ Filtered? ☐ Preserved?; ☐ Dissolved Mercury ☐ Filtered? ☐ Preserved?; ☐ Total Metals ☐ Field Preserved?; ☐ Total Mercury ☐ Field Preserved?; ☐ Chloride ☐ Fluoride ☐ Sulphate; ☐ TSS ☐ TDS ☐ BOD ☐ COD; ☐ pH ☐ Conductivity ☐ Alkalinity; ☐ Nitrite ☐ Nitrate ☐ Ammonia; HOLD - DO NOT ANALYZE

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

#	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	HOLD - DO NOT ANALYZE
1	BAFF-20-U-MLN-HA006-FMSC-02	2020/08/03		Tissue	1	X	
2	BAFF-20-U-MLN-ANK7-GRCD-003	2020/08/07		Tissue	1	X	
3	BAFF-20-U-MLN-AN04-GRCD-09	2020/07/31		Tissue	1	X	
4	BAFF-20-U-MLN-AN01-GRCD-10	2020/07/31		Tissue	1	X	
5	BAFF-20-U-MLN-GN06-ARCH-03	2020/07/28		Tissue	1	X	
6	BAFF-20-U-MLN-GN06-ARCH-09	2020/07/28		Tissue	1	X	
7	BAFF-20-U-MLN-GN10-ARCH-12	2020/07/29		Tissue	1	X	
8	BAFF-20-U-MLN-GN10-ARCH-11	2020/07/29		Tissue	1	X	
9	BAFF-20-U-MLN-GN10-ARCH-01	2020/07/29		Tissue	1	X	
10	BAFF-20-U-MLN-GN10-ARCH-10	2020/07/29		Tissue	1	X	

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and ac[ceptance]...

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):

COC-1020

C093451_COC

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation	C00599	☒ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-04000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:		Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			
	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			
	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			

Depot Reception

Analysis Requested: ☐ MTBE; ☐ VOC / BTEXS / VPH; ☐ BTEXS / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☐ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Dissolved Metals (☐ Filtered? ☐ Preserved?); ☐ Dissolved Mercury (☐ Filtered? ☐ Preserved?); ☐ Total Metals (☐ Field Preserved?); ☐ Total Mercury (☐ Field Preserved?); ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR; ☐ YK CSR; ☐ CCME; ☐ Drinking Water; ☐ BC Water Quality; ☐ Other

Special Instructions

#	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals
1	BAFF-20-U-MLN-GNM-ARCH-08	2020/07/29		Tissue	1	X
2	BAFF-20-U-MLN-GNII-ARCH-25	2020/07/30		Tissue	1	X
3	BAFF-20-U-MLN-GNII-ARCH-20	2020/07/30		Tissue	1	X
4	BAFF-20-U-MLN-GNII-ARCH-19	2020/07/30		Tissue	1	X
5	BAFF-20-U-MLN-GNII-ARCH-21	2020/07/30		Tissue	1	X
6	BAFF-20-U-MLN-GNII-ARCH-22	2020/07/30		Tissue	1	X
7	BAFF-20-U-MLN-GNII-ARCH-26	2020/07/30		Tissue	1	X
8	BAFF-20-U-MLN-GNII-ARCH-24	2020/07/30		Tissue	1	X
9	BAFF-20-U-MLN-GNII-ARCH-04	2020/07/30		Tissue	1	X
10	BAFF-20-U-MLN-GNII-ARCH-11	2020/07/30		Tissue	1	X

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Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):

C093451_COC

COC-1020

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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Invoice Information	
Company:	Golder Associates Ltd.
Contact Name:	Rainie Sharpe
Address:	16820 107 Ave.
	Edmonton, AB PC: T5P 4C3
Phone/Fax:	780-733-7404
Email:	rsharpe@golder.com
Copies:	

Report Information (if differs from invoice)	
Company:	
Contact Name:	
Address:	
	PC:
Phone/Fax:	
Email:	
Copies:	

Project Information	
Quotation:	C00599
P.O. #/AFE#:	
Project #:	1663724-34000-03
Site Location:	Baffin Island
Site #:	Milne Inlet
Sampled By:	Brad Cox

Turnaround Time (TAT) Required

☐ 5 - 7 Days Regular (Most analyses)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)

☐ Same Day ☐ 2 Days
☐ 1 Day ☐ 3-4 Days

Date Required:

Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			
Seal Present			
Seal Intact			Temp
Cooling Media			
Seal Present			
Seal Intact			Temp
Cooling Media			

Depot Reception

Analysis Requested

☐ MTBE ☐ VOC / BTEX / VPH ☐ VOC / BTEX / F1 ☐ LEPH / HEPH / PAH ☐ F2 - F4 ☐ Preserved? ☐ Preserved? ☐ Field Preserved? ☐ Field Preserved? ☐ Sulphate ☐ COD ☐ Alkalinity ☐ Ammonia ☐ TEH ☐ Filtered? ☐ Filtered? ☐ Fluoride ☐ BOD ☐ TDS ☐ Conductivity ☐ Nitrate ☐ BTEX / VPH ☐ BTEX F1 ☐ PAH ☐ EPH ☐ Dissolved Metals ☐ Dissolved Mercury ☐ Total Metals ☐ Total Mercury ☐ Chloride ☐ TSS ☐ pH ☐ Nitrite

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	HOLD - DO NOT ANALYZE	Special Instructions
1	BAFF-20-U-MLN-GN11-ARCH-23	2020/07/30		Tissue	1	X		
2	BAFF-20-V-MLN-GN11-ARCH-12	2020/07/30		Tissue	1	X		
3	BAFF-20-U-MLN-GN13-ARCH-05	2020/08/01		Tissue	1	X		
4	BAFF-20-U-MLN-GN13-ARCH-17	2020/08/01		Tissue	1	X		
5	BAFF-20-U-MLN-GN05-ARCH-05	2020/08/02		Tissue	1	X		
6	BAFF-20-U-MLN-GN14-ARCH-04	2020/08/02		Tissue	1	X		
7	BAFF-20-U-MLN-GN16-ARCH-02	2020/08/06		Tissue	1	X		
8	BAFF-20-U-MLN-GN13-ARCH-003	2020/08/03		Tissue	1	X		
9	BAFF-20-U-MLN-GN17-ARCH-009	2020/08/08		Tissue	1	X		
10	BAFF-20-U-MLN-GN17-ARCH-008	2020/08/08		Tissue	1	X		

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C093451_COC

COC-1020

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…USTODY RECORD

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Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
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Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation:	C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:		Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only: Seal Present / Seal Intact / Cooling Media (YES / NO), Cooler ID, Temp — Depot Reception

Analysis Requested: MTBE; VOC / BTEX / VPH; VOC / BTEX / F1; LEPH / HEPH / PAH; F2 - F4; Preserved?; Preserved?; Field Preserved?; Field Preserved?; Sulphate; COD; Alkalinity; Ammonia; BTEX / VPH; BTEX F1; PAH; EPH; TEH; Dissolved Metals; Filtered?; Dissolved Mercury; Filtered?; Total Metals; Total Mercury; Chloride; Fluoride; TSS; TDS; BOD; pH; Conductivity; Nitrite; Nitrate; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	Special Instructions
1	BAFF-20-U-MLN-GN19-ARCR-009	2020/08/06		Tissue	1	X	
2	BAFF-20-U-MLN-GN20-ARCH-15	2020/08/11		Tissue	1	X	
3	BAFF-20-U-MLN-GN20-ARCH-15	2020/08/11		Tissue	1	X	
4	BAFF-20-U-MLN-GN20-ARCH-04	2020/08/11		Tissue	1	X	
5	BAFF-20-U-MLN-GN20-ARCH-17	2020/08/11		Tissue	1	X	
6	BAFF-20-U-MLN-GN20-ARCR-06	2020/08/11		Tissue	1	X	
7	BAFF-20-U-MLN-GN20-ARCR-05	2020/08/11		Tissue	1	X	
8	BAFF-20-U-MLN-GN20-ARCH-[illegible]	2020/08/13		Tissue	1	X	
9	BAFF-20-U-MLN-GN20-ARCR-[illegible]	2020/08/14		Tissue	1	X	
10	BAFF-20-U-MLN-GN20-ARCR-14	2020/08/14		Tissue	1	X	

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance…

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd)	Time (hh:mm)	Received by: (Signature/ Print)	Date (yyyy/mm/dd)	Time (hh:mm)

COC-1020

C093451_COC

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvlabs.com

CHAI[illegible] 08488390

Page 5 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Golder Associates Ltd.	Company:		Quotation:	C00599	☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Rainie Sharpe	Contact Name:		P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	16820 107 Ave.	Address:				Rush TAT (Surcharges will be applied)
	Edmonton, AB PC: T5P 4C3		PC:	Project #:	1663724-34000-03	☐ Same Day ☐ 2 Days
Phone/Fax:	780-733-7404	Phone/Fax:		Site Location:	Baffin Island	☐ 1 Day ☐ 3-4 Days
Email:	rsharpe@golder.com	Email:		Site #:	Milne Inlet	Date Required:
Copies:		Copies:		Sampled By:	Brad Cox	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			
	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			
	YES	NO	Cooler ID
Seal Present			
Seal Intact			Temp
Cooling Media			

Depot Reception

Analysis Requested: ☐ MTBE; ☐ VOC / BTEX / VPH; ☐ BTEX / VPH; ☐ VOC / BTEX / F1; ☐ BTEX F1; ☐ LEPH / HEPH / PAH; ☑ PAH; ☐ F2 - F4; ☐ TEH; ☐ EPH; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Metals; ☐ Preserved?; ☐ Filtered?; ☐ Dissolved Mercury; ☐ Field Preserved?; ☑ Total Metals; ☐ Field Preserved?; ☐ Total Mercury; ☐ Sulphate; ☐ Fluoride; ☐ Chloride; ☐ COD; ☐ BOD; ☐ TDS; ☐ TSS; ☐ Alkalinity; ☐ Conductivity; ☐ pH; ☐ Ammonia; ☐ Nitrate; ☐ Nitrite; HOLD - DO NOT ANALYZE

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

#	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	Total Metals	Special Instructions
1	BAFF-20-U-MLN-GN23A-ARCH-24	2020/08/14		Tissue	1	X	
2	BAFF-20-U-MLN-GN23A-ARCH-17	2020/08/14		Tissue	1	X	
3	BAFF-20-U-MLN-GN23A-ARCH-15	2020/08/14		Tissue	1	X	
4	BAFF-20-U-MLN-GN24-ARCH-002	2020/08/15		Tissue	1	X	
5				Tissue			
6				Tissue			
7				Tissue			
8				Tissue			
9				Tissue			
10				Tissue			

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance [illegible]

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):

C093451_COC

COC-1020

Your Project #: 1663724-34000-03 [C093451]
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: C093451-BEDV-01-01

Attention: Carmen McKay

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2021/01/13
Report #: R6478749
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C104764
Received: 2021/01/08, 10:54

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Benzo(b/j)fluoranthene Sum (tissue)	8	N/A	2021/01/13	N/A	Auto Calc.
PAH in Tissue by GC/MS (SIM) (1)	1	2021/01/11	2021/01/12	ATL SOP 00104	EPA 8270E R6 m
PAH in Tissue by GC/MS (SIM) (1)	7	2021/01/11	2021/01/13	ATL SOP 00104	EPA 8270E R6 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Results are reported on an as received basis unless otherwise indicated.

Your Project #: 1663724-34000-03 [C093451]
Site#: MILNE INLET
Site Location: BAFFIN ISLAND
Your C.O.C. #: C093451-BEDV-01-01

Attention: Carmen McKay

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2021/01/13
Report #: R6478749
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C104764
Received: 2021/01/08, 10:54

Encryption Key

Sam Sherker
Project Manager Assistant
13 Jan 2021 11:30:21

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sam Sherker, Project Manager Assistant
Email: Sam.Sherker@bureauveritas.com
Phone# (902)420-0203
==
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: C104764
Report Date: 2021/01/13

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C093451]
Site Location: BAFFIN ISLAND

SEMI-VOLATILE ORGANICS BY GC-MS (TISSUE)

BV Labs ID		OOG415			OOG415		
Sampling Date		2020/07/28			2020/07/28		
COC Number		C093451-BEDV-01-01			C093451-BEDV-01-01		
	UNITS	**ZB4617-BAFF-20-U-MLN-GN06-ARCH-03**	**RDL**	**QC Batch**	**ZB4617-BAFF-20-U-MLN-GN06-ARCH-03 Lab-Dup**	**RDL**	**QC Batch**
1-Methylnaphthalene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
2-Methylnaphthalene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Acenaphthene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Acenaphthylene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Anthracene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(a)anthracene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(a)pyrene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(b)fluoranthene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(b/j)fluoranthene	mg/kg	<0.10	0.10	7141402			
Benzo(g,h,i)perylene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(j)fluoranthene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Benzo(k)fluoranthene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Chrysene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Dibenzo(a,h)anthracene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Fluoranthene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Fluorene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Naphthalene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Perylene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Phenanthrene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Pyrene	mg/kg	<0.050	0.050	7144355	<0.050	0.050	7144355
Surrogate Recovery (%)							
D10-Anthracene	%	99		7144355	98		7144355
D14-Terphenyl	%	102		7144355	98		7144355
D8-Acenaphthylene	%	97		7144355	95		7144355

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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SEMI-VOLATILE ORGANICS BY GC-MS (TISSUE)

BV Labs ID		OOG416	OOG417	OOG418	OOG419		
Sampling Date		2020/07/28	2020/07/29	2020/07/30	2020/08/01		
COC Number		C093451-BEDV-01-01	C093451-BEDV-01-01	C093451-BEDV-01-01	C093451-BEDV-01-01		
	UNITS	**ZB4618-BAFF-20-U-MLN-GN06-ARCH-09**	**ZB4621-BAFF-20-U-MLN-GN10-ARCH-01**	**ZB4632-BAFF-20-U-MLN-GN11-ARCH-11**	**ZB4670-BAFF-20-U-MLN-GN13-ARCH-17**	**RDL**	**QC Batch**
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
2-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Acenaphthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Acenaphthylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(a)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(a)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(b)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(b/j)fluoranthene	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	7141402
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(j)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Benzo(k)fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Chrysene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Dibenzo(a,h)anthracene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Fluoranthene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Fluorene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Naphthalene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Perylene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Phenanthrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Pyrene	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	7144355
Surrogate Recovery (%)							
D10-Anthracene	%	96	92	92	95		7144355
D14-Terphenyl	%	98	94	95	95		7144355
D8-Acenaphthylene	%	95	91	92	95		7144355

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: C104764
Report Date: 2021/01/13

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C093451]
Site Location: BAFFIN ISLAND

SEMI-VOLATILE ORGANICS BY GC-MS (TISSUE)

BV Labs ID		OOG420	OOG421	OOG422		
Sampling Date		2020/08/08	2020/08/11	2020/08/14		
COC Number		C093451-BEDV-01-01	C093451-BEDV-01-01	C093451-BEDV-01-01		
	UNITS	**ZB4674-BAFF-20-U-MLN-GN18-ARCH-003**	**ZB4682-BAFF-20-U-MLN-GN20-ARCH-17**	**ZB4695-BAFF-20-U-MLN-GN23A-ARCH-17**	**RDL**	**QC Batch**
1-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
2-Methylnaphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Acenaphthene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Acenaphthylene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Anthracene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(a)anthracene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(a)pyrene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(b)fluoranthene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(b/j)fluoranthene	mg/kg	<0.10	<0.10	<0.10	0.10	7141402
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(j)fluoranthene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Benzo(k)fluoranthene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Chrysene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Dibenzo(a,h)anthracene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Fluoranthene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Fluorene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Naphthalene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Perylene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Phenanthrene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Pyrene	mg/kg	<0.050	<0.050	<0.050	0.050	7144355
Surrogate Recovery (%)						
D10-Anthracene	%	102	90	91		7144355
D14-Terphenyl	%	103	93	95		7144355
D8-Acenaphthylene	%	100	89	90		7144355

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Results relate only to the items tested.

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BV Labs Job #: C104764
Report Date: 2021/01/13

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C093451]
Site Location: BAFFIN ISLAND

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7144355	LGE	Reagent Blank	1-Methylnaphthalene	2021/01/12	<0.050		mg/kg	
			2-Methylnaphthalene	2021/01/12	<0.050		mg/kg	
			Acenaphthene	2021/01/12	<0.050		mg/kg	
			Acenaphthylene	2021/01/12	<0.050		mg/kg	
			Anthracene	2021/01/12	<0.050		mg/kg	
			Benzo(a)anthracene	2021/01/12	<0.050		mg/kg	
			Benzo(a)pyrene	2021/01/12	<0.050		mg/kg	
			Benzo(b)fluoranthene	2021/01/12	<0.050		mg/kg	
			Benzo(g,h,i)perylene	2021/01/12	<0.050		mg/kg	
			Benzo(j)fluoranthene	2021/01/12	<0.050		mg/kg	
			Benzo(k)fluoranthene	2021/01/12	<0.050		mg/kg	
			Chrysene	2021/01/12	<0.050		mg/kg	
			D10-Anthracene	2021/01/12		103	%	50 - 130
			D14-Terphenyl	2021/01/12		103	%	50 - 130
			D8-Acenaphthylene	2021/01/12		100	%	50 - 130
			Dibenzo(a,h)anthracene	2021/01/12	<0.050		mg/kg	
			Fluoranthene	2021/01/12	<0.050		mg/kg	
			Fluorene	2021/01/12	<0.050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2021/01/12	<0.050		mg/kg	
			Naphthalene	2021/01/12	<0.050		mg/kg	
			Perylene	2021/01/12	<0.050		mg/kg	
			Phenanthrene	2021/01/12	<0.050		mg/kg	
			Pyrene	2021/01/12	<0.050		mg/kg	
7144355	LGE	Matrix Spike [OOG415-01]	1-Methylnaphthalene	2021/01/12		78	%	50 - 130
			2-Methylnaphthalene	2021/01/12		80	%	50 - 130
			Acenaphthene	2021/01/12		87	%	50 - 130
			Acenaphthylene	2021/01/12		85	%	50 - 130
			Anthracene	2021/01/12		94	%	50 - 130
			Benzo(a)anthracene	2021/01/12		93	%	50 - 130
			Benzo(a)pyrene	2021/01/12		88	%	50 - 130
			Benzo(b)fluoranthene	2021/01/12		88	%	50 - 130
			Benzo(g,h,i)perylene	2021/01/12		90	%	50 - 130
			Benzo(j)fluoranthene	2021/01/12		88	%	50 - 130
			Benzo(k)fluoranthene	2021/01/12		88	%	50 - 130
			Chrysene	2021/01/12		98	%	50 - 130
			D10-Anthracene	2021/01/12		93	%	50 - 130
			D14-Terphenyl	2021/01/12		95	%	50 - 130
			D8-Acenaphthylene	2021/01/12		93	%	50 - 130
			Dibenzo(a,h)anthracene	2021/01/12		86	%	50 - 130
			Fluoranthene	2021/01/12		92	%	50 - 130
			Fluorene	2021/01/12		89	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2021/01/12		87	%	50 - 130
			Naphthalene	2021/01/12		82	%	50 - 130
			Perylene	2021/01/12		90	%	50 - 130
			Phenanthrene	2021/01/12		91	%	50 - 130
			Pyrene	2021/01/12		96	%	50 - 130
7144355	LGE	Spiked Blank	1-Methylnaphthalene	2021/01/12		86	%	50 - 130
			2-Methylnaphthalene	2021/01/12		87	%	50 - 130
			Acenaphthene	2021/01/12		95	%	50 - 130
			Acenaphthylene	2021/01/12		92	%	50 - 130
			Anthracene	2021/01/12		103	%	50 - 130
			Benzo(a)anthracene	2021/01/12		102	%	50 - 130
			Benzo(a)pyrene	2021/01/12		97	%	50 - 130

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BV Labs Job #: C104764
Report Date: 2021/01/13

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C093451]
Site Location: BAFFIN ISLAND

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b)fluoranthene	2021/01/12		96	%	50 - 130
			Benzo(g,h,i)perylene	2021/01/12		99	%	50 - 130
			Benzo(j)fluoranthene	2021/01/12		96	%	50 - 130
			Benzo(k)fluoranthene	2021/01/12		97	%	50 - 130
			Chrysene	2021/01/12		108	%	50 - 130
			D10-Anthracene	2021/01/12		104	%	50 - 130
			D14-Terphenyl	2021/01/12		103	%	50 - 130
			D8-Acenaphthylene	2021/01/12		101	%	50 - 130
			Dibenzo(a,h)anthracene	2021/01/12		96	%	50 - 130
			Fluoranthene	2021/01/12		101	%	50 - 130
			Fluorene	2021/01/12		97	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2021/01/12		96	%	50 - 130
			Naphthalene	2021/01/12		90	%	50 - 130
			Perylene	2021/01/12		98	%	50 - 130
			Phenanthrene	2021/01/12		100	%	50 - 130
			Pyrene	2021/01/12		107	%	50 - 130
7144355	LGE	Method Blank	1-Methylnaphthalene	2021/01/12	<0.050		mg/kg	
			2-Methylnaphthalene	2021/01/12	<0.050		mg/kg	
			Acenaphthene	2021/01/12	<0.050		mg/kg	
			Acenaphthylene	2021/01/12	<0.050		mg/kg	
			Anthracene	2021/01/12	<0.050		mg/kg	
			Benzo(a)anthracene	2021/01/12	<0.050		mg/kg	
			Benzo(a)pyrene	2021/01/12	<0.050		mg/kg	
			Benzo(b)fluoranthene	2021/01/12	<0.050		mg/kg	
			Benzo(g,h,i)perylene	2021/01/12	<0.050		mg/kg	
			Benzo(j)fluoranthene	2021/01/12	<0.050		mg/kg	
			Benzo(k)fluoranthene	2021/01/12	<0.050		mg/kg	
			Chrysene	2021/01/12	<0.050		mg/kg	
			D10-Anthracene	2021/01/12		121	%	50 - 130
			D14-Terphenyl	2021/01/12		121	%	50 - 130
			D8-Acenaphthylene	2021/01/12		117	%	50 - 130
			Dibenzo(a,h)anthracene	2021/01/12	<0.050		mg/kg	
			Fluoranthene	2021/01/12	<0.050		mg/kg	
			Fluorene	2021/01/12	<0.050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2021/01/12	<0.050		mg/kg	
			Naphthalene	2021/01/12	<0.050		mg/kg	
			Perylene	2021/01/12	<0.050		mg/kg	
			Phenanthrene	2021/01/12	<0.050		mg/kg	
			Pyrene	2021/01/12	<0.050		mg/kg	
7144355	LGE	RPD [OOG415-01]	1-Methylnaphthalene	2021/01/12	NC		%	50
			2-Methylnaphthalene	2021/01/12	NC		%	50
			Acenaphthene	2021/01/12	NC		%	50
			Acenaphthylene	2021/01/12	NC		%	50
			Anthracene	2021/01/12	NC		%	50
			Benzo(a)anthracene	2021/01/12	NC		%	50
			Benzo(a)pyrene	2021/01/12	NC		%	50
			Benzo(b)fluoranthene	2021/01/12	NC		%	50
			Benzo(g,h,i)perylene	2021/01/12	NC		%	50
			Benzo(j)fluoranthene	2021/01/12	NC		%	50
			Benzo(k)fluoranthene	2021/01/12	NC		%	50
			Chrysene	2021/01/12	NC		%	50
			Dibenzo(a,h)anthracene	2021/01/12	NC		%	50
			Fluoranthene	2021/01/12	NC		%	50
			Fluorene	2021/01/12	NC		%	50

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BV Labs Job #: C104764
Report Date: 2021/01/13

Bureau Veritas Laboratories
Client Project #: 1663724-34000-03 [C093451]
Site Location: BAFFIN ISLAND

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2021/01/12	NC		%	50
			Naphthalene	2021/01/12	NC		%	50
			Perylene	2021/01/12	NC		%	50
			Phenanthrene	2021/01/12	NC		%	50
			Pyrene	2021/01/12	NC		%	50

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

RoseMarie MacDonald

Rosemarie MacDonald, Scientific Specialist (Organics)

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Chapter 8.0 Non-Indigenous and Aquatic Invasive Species (NIS/AIS)

2020 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program

Submitted to:

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1663724-281g-R-Rev1

18 August 2021

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FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
AIS	Aquatic Invasive Species
Biologica	Biological Environmental Services Ltd.
FEIS	2012 Final Environmental Impact Statement
Indet.	Indeterminate
km/h	Kilometre per hour
MEEMP	Marine Environmental Effects Monitoring Program
MEWG	Marine Environmental Working Group
µm	micrometer
NIS	Non-Indigenous Species
PC	Project Certificate
QA/QC	quality assurance and quality control
ROV	Remote operated vehicle
Sp.	Species

8.0 NON-INDIGENOUS SPECIES/AQUATIC INVASIVE SPECIES (NIS/AIS)

8.1 Introduction

This chapter presents the results of the Non-Indigenous Species (NIS) and Aquatic Invasive Species (AIS) monitoring program as a part of the larger Marine Environmental Effects Monitoring Program (MEEMP) conducted at Milne Port and in Milne Inlet during the 2020 open-water season. This component was developed in consideration of the monitoring requirements outlined in the PC Conditions described in Chapter 1.0, Table 1-2. Project Certificate (PC) Conditions related to the monitoring of NIS and AIS included PC Conditions No. 76, 87, 89, 91, 99 (a), and 99 (c).

8.1.1 Objectives

Objectives of the NIS/AIS monitoring program include:

- Sampling of marine environment to screen for potential Project-related introductions of taxa that are invasive or non-indigenous.
- Sampling of ship hulls to screen for potential Project-related introductions of taxa that are invasive or non-indigenous.
- Compilation of a taxonomic inventory of marine biota (i.e., list of organisms observed) for Milne Inlet.
- Communicate outcomes for specimens sent for independent verification.

8.1.2 Definitions

Definitions are provided below for technical terms used throughout this chapter:

Non-indigenous species (NIS): a species that exists outside the particular region or body of water where it originated naturally with the potential to become harmful.

Aquatic invasive species (AIS): a species that exists outside the particular region or body of water where it originated naturally and that can harm the environment, the economy, or society.

Cryptogenic: a species that is not demonstrably native or introduced.

Other terms used throughout the report include:

Flagged taxa: Taxa are flagged where there is low confidence in their identifications, uncertainties in the range on record, or presence on any of the AIS databases.

No Risk: A species is considered "No Risk" if it has a confirmed range that includes the Canadian Arctic and is not present in any AIS databases. For higher taxonomic levels, a taxon is considered "No Risk" if at least one representative species within the taxon has a confirmed range that includes the Canadian Arctic.

Low Risk: Taxa is considered "Low Risk" if the species (or any representative species for higher taxonomic levels) does not have a confirmed range that includes the Canadian Arctic, and it is not considered invasive in any AIS databases.

High Risk: Taxa is considered "High Risk" if the species (or any representative species for higher taxonomic levels) does not have a confirmed range that includes the Canadian Arctic, and it is considered invasive in any AIS databases.

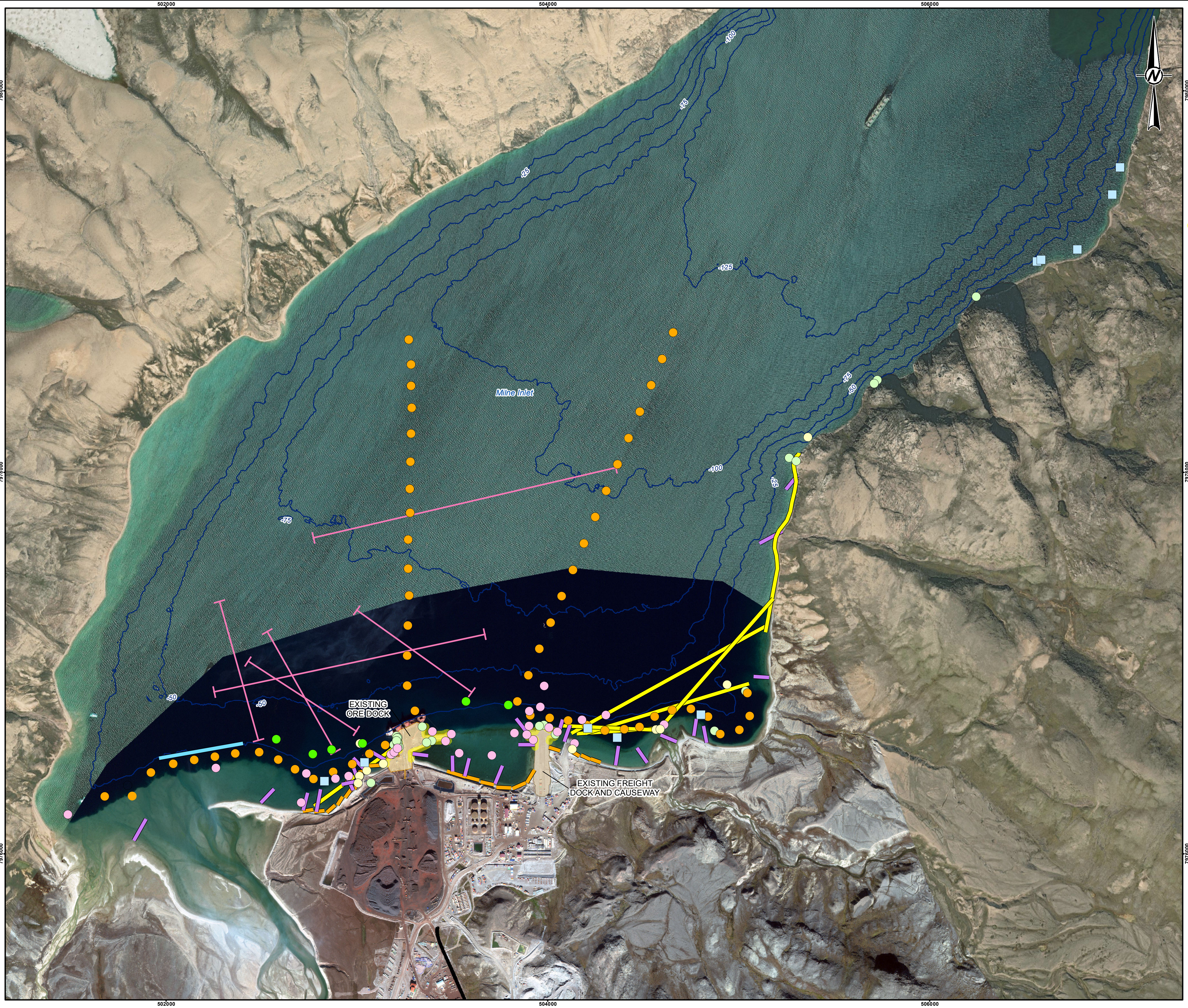
Watchlist: a list of taxa identified in Milne Port that are considered to be “Low Risk” or “High Risk” but not directly attributable to the Project. Taxa on this list are subjected to a heightened level of monitoring.

Trigger List: a list that contains species confirmed as Project-related introductions of High-Risk taxa. Responsive actions will be species specific and proportional to the risk.

8.2 Study Design

The NIS/AIS monitoring program is designed to detect potential Project-related introductions of non-indigenous and/or invasive species from ballast water discharges and/or hull biofouling. Since ballast water releases only occur at the anchorages and the Ore Dock in Milne Port, sampling conducted to date has largely focused on southern Milne Inlet as the area with highest likelihood of marine invasion.

NIS/AIS monitoring involves a combination of dedicated surveys as well as screening all specimens caught during surveys for all the various MEEMP components; thus, NIS/AIS monitoring involves data collection across multiple trophic levels – marine vegetation, zooplankton, benthic invertebrates and fish – to establish a comprehensive inventory of existing marine biota in the Project area that serves as a point of reference for any new species/taxa identified (herein referred to as the “Milne Inlet Taxonomic Inventory”). The Milne Inlet Taxonomic Inventory was initially populated with organisms identified during baseline studies in 2008, 2010 and 2013 and has been updated annually with new records collected during MEEMP surveys; 2020 sampling locations are shown in Figure 8-1.



LEGEND

- ANGLING (JIGGING) SAMPLING LOCATION
- BENTHIC INFAUNA SAMPLING LOCATION
- FUKUI TRAP SAMPLING LOCATION
- HOOP NET SAMPLING LOCATION
- QUADRAT SAMPLING LOCATION
- ZOOPLANKTON VERTICAL TOW SAMPLING LOCATION
- ANGLING (TROLLING) SAMPLING LOCATION
- GILL NET SAMPLING LOCATION
- SEINE NET SAMPLING LOCATION
- TRAWLING SAMPLING LOCATION
- ZOOPLANKTON OBLIQUE TOW SAMPLING LOCATION
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- OFFSET HABITAT SURVEY
- MILNE INLET TOTE ROAD
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 500 1,000

1:20,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE, INC. IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
MEEMP SAMPLING LOCATIONS IN MILNE PORT USED TO INFORM NIS/AIS PROGRAM SPECIES INVENTORIES, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	8-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm 0

PATH: I:\2016\1663724\Mapping\MXD\34000_2020_MEEMP\Task_04\1663724_34000_04_Fig8_1_MilnePort_NIS_AIS_SamplingToInform_RevB.mxd PRINTED ON: 2021-08-03 AT: 1:50:20 PM

Dedicated surveys involve:

i) NIS/AIS sampling of zooplankton and benthic invertebrates at Milne Port (Figure 8-2) and Ragged Island (Figure 8-3); sampling at Ragged Island was added to monitoring efforts in response to Inuit concern over ships potentially discharging ballast water while occupying anchorage sites in this area. Monitoring is also important in the area because ships anchor and there is therefore a risk of release for biofouling organisms.

ii) remotely operated vehicle (ROV)-based underwater video surveys of ore carrier ship hulls to assess for potential biofouling and transport of non-native species by Project vessels.

NIS/AIS monitoring is recommended to be conducted annually until results of ballast water treatment and compliance monitoring, and Project vessel biofouling management practices are better understood to recommend reducing the frequency of monitoring in the receiving environment.

8.2.1 Modifications to the Program (2020)

Benthic infauna specimen collection increased substantially in 2020 relative to previous survey years. Prior to 2018, benthic infauna samples were collected at eight locations in Milne Port and two locations at Ragged Island. Following results of a power analysis completed at the request of the Marine Environment Working Group (MEWG), benthic infaunal sample collection expanded to thirty-four stations in 2019, and to 60 stations in Milne Port in 2020 (Chapter 4.0).

Additionally, 2020 was the first year that targeted sampling was conducted to obtain specimens for genetic analysis. Five locations were sampled where species of concern were previously observed (benthic samples for DNA on Figure 8-2).

8.2.2 Indicators & Thresholds

The NIS/AIS monitoring program is designed as a surveillance survey and therefore does not use traditional indicators and thresholds. Detection of a single NIS/AIS will initiate a response protocol aimed to assess the risk and determine the appropriate course of action. Ultimately, species are either determined to be “No Risk” or are determined to be “High Risk” or “Low Risk” and placed on a “Watchlist” and subject to heightened monitoring efforts, or placed on a “Trigger List”, where rapid response plans and potential intervention measures would be developed and implemented. The protocol framework is depicted in Figure 8-4.

LEGEND

- BENTHIC SAMPLES FOR DNA
- INCIDENTAL SPECIES COLLECTION
- ZOOPLANKTON VERTICAL TOW
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- OFFSET HABITAT SURVEY
- ZOOPLANKTON OBLIQUE TOW
- EXISTING FREIGHT DOCK AND CAUSEWAY
- EXISTING ORE DOCK

0 250 500

1:10,000 METRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. ADDITIONAL MILNE PORT INFRASTRUCTURE DATA OBTAINED FROM CLIENT, MAY 2, 2020 AND MAY 28, 2018. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

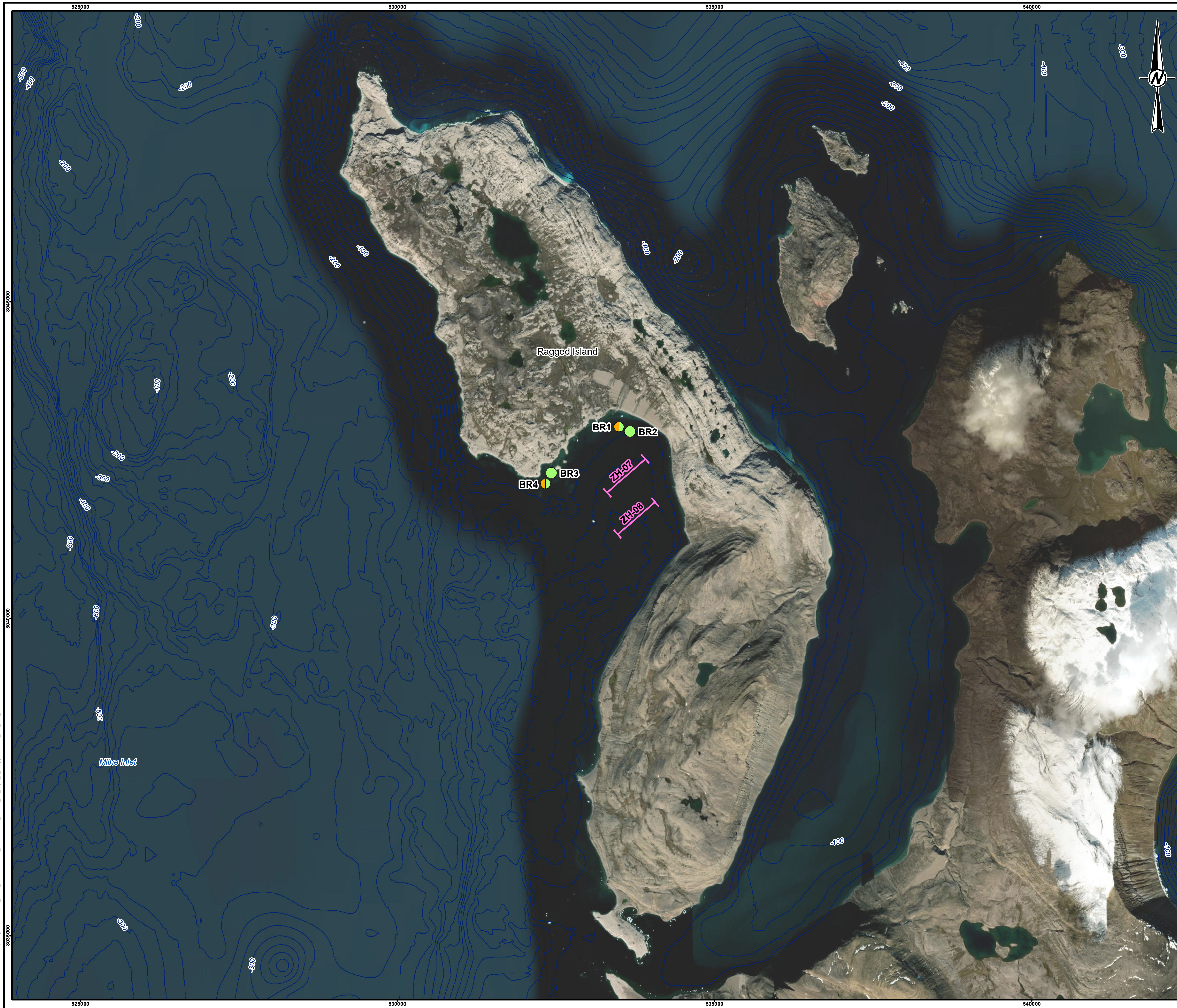
TITLE
SPECIFIC NIS/AIS SAMPLING LOCATIONS IN MILNE PORT, 2020

CONSULTANT

GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	8-2



LEGEND

- BENTHIC INFAUNA SAMPLES AND ZOOPLANKTON VERTICAL TOW
- ZOOPLANKTON VERTICAL TOW
- BATHYMETRIC CONTOUR (25 m INTERVAL)
- ZOOPLANKTON OBLIQUE TOW

0 2 4

1:60,000 KILOMETRES

REFERENCE(S)

BATHYMETRY CREATED BY GOLDER FROM MULTIPLE DATA SOURCES. FREIGHT DOCK DATA PROVIDED BY HATCH, MARCH 4, 2020. HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. IMAGERY COPYRIGHT © 20170815 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.

PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT

BAFFINLAND IRON MINES CORPORATION

PROJECT

MARY RIVER PROJECT

TITLE

SPECIFIC NIS/AIS SAMPLING LOCATIONS AT RAGGED ISLAND, 2020

CONSULTANT

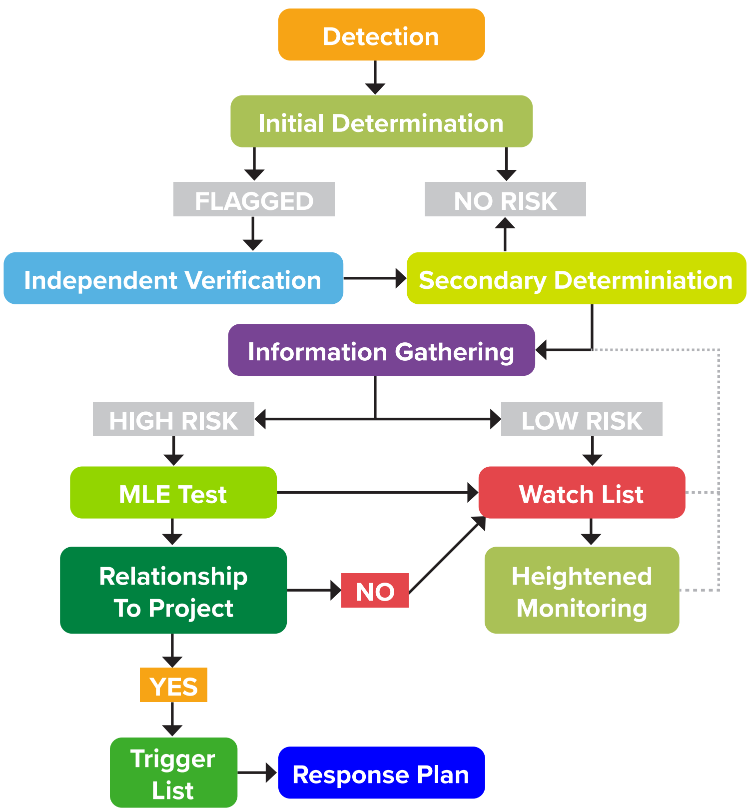
GOLDER

YYYY-MM-DD	2021-08-03
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	PR

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	34000-04	0	8-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Figure 8-4: Flow Chart Describing Taxa Review Process for Flagging Species as Low or High Risk



Detection

Detection involves screening the taxonomic list received from annual survey efforts against the taxonomic inventory developed for Milne Inlet (which includes all taxa observed across all baseline and monitoring surveys) to identify taxa that have not been observed previously.

Initial Determination

Taxa identified in the detection stage are compared to existing taxonomic resources and available regional species records of occurrence. Resources include, but are not limited to, the World Register of Marine Species (WoRMS), the Global Biodiversity Information Facility (GBIF), and Arctic species inventories published or accessed through the Ocean Biogeographic Information System (OBIS). Taxa are also screened against available global and domestic AIS databases including, but not limited to, the Global invasive species database (Molnar et al. 2008), the National Exotic Marine and Estuarine Species Information System (NEMESIS), the Global Invasive Species Database (GISD) published by the IUCN Invasive Species Specialist Group (ISSG) and the invasive species list within the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014). Species, or taxa of higher levels with at least one representative species that are found to have a range that includes the Canadian Arctic and do not appear on the AIS databases are considered “No Risk” and added to the inventory. Taxa are **flagged** for independent verification where there is low confidence in their identifications, uncertainties in the range on record, or presence on any of the AIS databases.

Independent Verification

Specimens of flagged taxa are sent for an independent identification or verification of the initial identification. Currently, taxa are verified by the Benthic Ecology Lab at Université Laval. Additional specialists in particular taxonomic groups or species are also being sought to provide clarity on identifications unable to be resolved by Laval. Specimens preserved in ethanol are alternatively sent for DNA verification by the Canadian Centre for DNA Barcoding at the University of Guelph.

Secondary Determiniation

Results and rationale for the independent verifications are reviewed by Biologica Environmental Services Ltd. for accuracy and confidence in the identification. Results from the independent verifications are compared to the same taxonomic resources and AIS databases as described in the Initial Determination step. Species, or taxa of higher levels with at least one representative species that are found to have a range that includes the Canadian Arctic and do not appear on the AIS databases are considered “No Risk” and added to the Milne Inlet taxonomic inventory. Specimens where the initial identification was confirmed or updated identifications with uncertainties in the range on record, or a presence on any of the AIS databases are flagged for a more detailed review stage.

Information Gathering

All taxa not determined to be “No Risk” following Secondary Determination are subjected to a detailed and focussed literature review. Information Gathering includes examining documented occurrences relative to the range on record, as well as genetic and phylogenetic studies that may help resolve a taxon’s origin. Following the review, taxa will either be classified as “Low Risk” and added to the Watchlist, or classified as “High Risk” and subjected to the MLE Test.

MLE Test

The Multiple Lines of Evidence (MLE) test is applied to all “High Risk” taxa determined through the Information Gathering step. Recognizing the limitations of existing AIS databases, the MLE test informs whether site-specific biogeographic, ecological, and genetic evidence supports the categorization of a particular species/taxon as invasive. Biogeographic evidence may include information from the historical taxonomic record or historical documented occurrences. Ecological evidence considers vectors of introduction as well as whether the species/taxon of concern is displaying invasive behaviour at Milne Port (i.e., increase in relative abundance, geographic spread, change in benthic community indices). Genetic evidence may help resolve trickier taxonomic identifications and may also identify related or source populations of the same species in linked Ports and nearby areas.

Relationship To Project

Following the MLE test, a determination will be made as to whether a potential introduction is Project-related. An introduction is considered Project-related if a species/taxon was not documented in baseline surveys or if there are no documented occurrences in the Canadian Arctic prior to the commencement of shipping operations. Introductions attributable to the Project will be added to the Trigger List while those that are not will be added to the Watchlist.

Watch List

The Watchlist is a list of taxa identified in Milne Port that are considered to be “Low Risk” or “High Risk” but not attributable to the Project. Taxa on this list are subjected to a heightened level of monitoring, which may include increased surveillance through targeted sampling events, and the involvement of taxonomic specialists. Additionally, each year the taxa is reidentified in samples, the Information Gathering step will be performed again to review any updates to the literature and NIS/AIS status of the taxa. The taxa will be reassessed as “No Risk”, “Low Risk” or “High Risk” accordingly.

Heighted monitoring includes annual sampling at the locations where taxa have been previously observed to monitor for changes in metrics such as relative abundance, species diversity and richness, and other indications that the taxa is displaying invasive behaviours. Should invasive behaviours be identified, the taxa will be considered “High Risk” and the MLE Test performed again.

Trigger List

The Trigger List contains species confirmed as Project-related introductions of High-Risk taxa. Responsive actions will be species specific and proportional to the risk.

Response Plan

Species specific response plans will be developed in collaboration with DFO and may include possible interventions such as control or eradication efforts, balancing the environmental impacts of the response.

8.3 Materials and Methods

The 2020 MEEMP and NIS/AIS monitoring programs were conducted over eight weeks between 21 July and 15 September by a field team composed of Golder biologists, subcontracted ROV operators, a Golder vessel operator, and a local Inuit vessel operator from Pond Inlet, NU. Sampling was conducted from a 30-foot aluminum vessel (research vessel), a 28-foot aluminum vessel (field vessel) and two 16-foot zodiac tender vessels based at the Milne Port facility.

8.3.1 Sample Collection for Taxonomic Identification

8.3.1.1 Benthic Infauna, Macroflora and Benthic Epifauna, Fish and Incidentals

All specimens caught during surveys for all the various MEEMP components were screened for NIS/AIS status, including benthic infaunal and epifaunal invertebrates (Chapter 4.0 and Chapter 5.0, respectively), macroflora (Chapter 5.0), fish species (Chapter 6.0), and taxa found in fish stomachs (Chapter 7.0). Methodology for these collections are described in the respective chapters. Additional observations of species presence were made as part of monitoring of offset habitat in Milne Port along the Ore Dock and the Freight Dock, reported in Golder (2020b and 2021).

In addition to benthic infaunal samples collected as part of community studies, two NIS/AIS program-specific samples are collected at Ragged Island, to monitor for potential introductions at the anchorages (Figure 8-3). Collection of benthic infaunal invertebrate samples followed the same methodology as used in previous years, as described in Chapter 4.0. Incidental samples were also collected opportunistically, including the collection of several juvenile cod and a sandlance that were found washed on shore; these samples were frozen whole to be sent for taxonomic identification due to the difficulty of field identification. Incidental samples were also collected from other efforts where invertebrate species are not typically collected, such as fishing efforts and sediment collections.

8.3.1.2 Zooplankton

Zooplankton samples were collected at both Milne Port and Ragged Island using a combination of vertical and horizontal oblique tows (Figure 8-2, Figure 8-3). Vertical hauls were conducted at six sampling stations in the Milne Port area, and four stations at Ragged Island by lowering a 0.3 m diameter (64 µm mesh size) plankton net to 1 to 3 m above the bottom and then raising the net by hand to the surface at a rate of approximately 1 m/s (visually estimated). Three replicate hauls were conducted at each station and combined into a single composite sample following methodology from previous years (SEM 2017a; Golder 2018, 2019a, 2020a).

Horizontal oblique tows were conducted along six transects in Milne Port consistent with the studies conducted in 2018, and at two locations at Ragged Island added to the program in 2019. Horizontal oblique tows were conducted by towing a 0.5 m diameter net (250 µm mesh size) at a speed of approximately 8-10 km/h for a period of at least ten minutes per tow. Tows were conducted near the surface in a sinusoidal fashion by means of regular transitions in tow speed (1-minute towing, 1-minute idling), which allowed the weighted net to periodically sink and rise during active sampling. This helped to avoid sampling only in the upper few metres of the water column. The sinusoidal oblique tow approach was used to help catch a more representative sample of zooplankton in the water column and to catch faster moving larvae (e.g., fish larvae, larger crustaceans). Transects were towed in sections to allow for clearing of the plankton net, and samples were carefully flushed into a sample container as a single composite sample for each transect. Once the sample was transferred, water was splashed or sprayed on the outside of the net to rinse any remaining sample into the sample container. Between each tow, the nets and bottles were rinsed (either flushed with sea water or by using a spray bottle filled with sea water through the net mesh to exclude organisms). All zooplankton samples were preserved in 5% formalin and submitted to Biologica Environmental Services Ltd. (henceforth referred to as “Biologica”; a Canadian marine and freshwater taxonomy laboratory) for taxonomic identification.

8.3.2 Sample Collection for Genetic Analysis

As mentioned in Section 8.2 above, in 2019, potential NIS/AIS taxa were collected at five particular locations in Milne Port during MEEMP surveys. In 2020, duplicate benthic infauna grabs were collected at the five stations where flagged taxa were found in 2019 (Benthic Samples for DNA, Figure 8-2). These samples were collected and processed in a similar manner to the other benthic infauna samples, with some differences. The samples were collected as a single grab instead of a composite and were not split into a macro fraction. The samples were preserved in 90% ethanol, rather than formalin, to allow for DNA analysis should the flagged taxa be identified again in 2020.

8.3.3 Ship Hull Monitoring

Underwater video surveys were performed on the hulls of three ore carriers berthed at the Ore Dock using an ROV-based underwater video system. Survey methodology followed that of Sylvester and MacIsaac (2010), extending along the visible hull from stern to bow, in a zigzag pattern from the waterline to the deepest portion accessible by the ROV, covering a representative range of depths of the submerged hulls (Table 8-1). Much of the effort was focused on areas of the hull where biofouling was most likely to occur (e.g., chain lockers, bulbous bow and stem, sea-chain grating, stern tube, rope guard, propeller nose cone and blades, rudder side, bottom, leading and trailing edges, Sylvester and MacIsaac 2010).

Surveys in 2020 were conducted on three ships due to a limited window of time in which the ROV was available for surveys, in addition to limitations on safe access to ore carriers due to vessel movements in port and timing of deballasting events. The survey on the *Golden Brilliant* was further restricted, as the vessel was moored at the Ore Dock thus only granting safe access to the lee side of the ship, limiting the length of the survey to the hull that extended beyond the Ore Dock.

Table 8-1: Dates, Locations, and Depths of Ship Hull Monitoring Surveys

Date (2020)	Vessel	Ship Location	Maximum depth (m)
31 July	*Golden Brilliant*	Moored at Ore Dock	6
2 August	*Pabal*	At Anchor	4.4
2 August	*Golden Ruby*	At Anchor	8.8

8.3.4 Data Analysis

8.3.4.1 Taxonomic Identification and Literature Review

Underwater video from quadrats and ship hull surveys was post-processed by a qualified marine biologist. The recorded underwater video footage was analyzed frame by frame to record benthic macroflora and epifauna. Taxonomic identification was made for all observed flora and fauna down to the lowest practical taxonomic level, and estimates of percent cover made for biofouling. For quadrats, data presented in this chapter includes presence only, rather than enumeration, since relative abundance and other species metrics were not of interest for the NIS/AIS monitoring program. Abundance and diversity metrics for quadrats are presented in Chapter 5.0.

Zooplankton, benthic infauna, fish stomachs, and samples collected incidentally were sent to Biologica for taxonomic identification, with specimens identified to the lowest possible taxonomic level. The process for reviewing taxa is described in Figure 8-4. All specimens were compared to the taxonomic inventory compiled for Milne Inlet, and those not on the list (i.e., not found in previous surveys) were assessed further through literature review to determine if their known distributions and ranges included north Atlantic, Arctic and/or Canadian Arctic waters. The inventory was also updated to include any new or updated accepted species names for any previously identified species.

Information on general species biology and distributions for the literature review was sourced from:

- World Register of Marine Species (WoRMS 2021)
- Global Biodiversity Information Facility (GBIF 2021)
- Encyclopedia of Life (EOL 2020)
- SeaLifeBase (Palomares and Pauly 2020)
- Marine Species Identification Portal (ETI 2021)
- National Centers for Coastal Ocean Science (NCCOS 2020)
- Arctic Register of Marine Species (ARMS) compiled by the Arctic Ocean Diversity (ArcOD, Sirenko et al. 2020)
- Arctic species inventories published or accessed through the Ocean Biogeographic Information System (OBIS 2021)

In addition, specimens were also compared against the following global and domestic AIS databases:

- Global invasive species database (Molnar et al. 2008)
- National Exotic Marine and Estuarine Species Information System (NEMESIS; Fofonoff et al. 2021)
- Global Invasive Species Database (GISD) published by the IUCN Invasive Species Specialist Group (ISSG 2021)
- Known invasive species list within the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014)

Specimens were not always identified to the species level due to a variety of limitations such as incomplete morphological descriptions, missing features, or damage to specimens. These specimens were recorded to the lowest practical taxonomic level as indet. (indeterminate) or sp. (species) when identifiable to the genus level. For literature review, where taxa were not identifiable to the species level, an attempt was made to confirm the higher taxon includes members that have a distribution or range that included north Atlantic, Arctic and/or Canadian Arctic waters. The higher taxonomic levels were also compared to the invasive species databases; for example, if a specimen from Milne Port could only be identified down to genus, and the database revealed that no species within that genus have ranges that include the Canadian Arctic, the specimen was flagged for further review.

Surveys and species inventories in the Canadian Arctic are not exhaustive, and species descriptions may not include a comprehensive description of range. Rarer and more recently described taxa may not have a record of occurrence or range on record within Canadian Arctic waters despite having the potential to be present. Species where the native range is unknown, disputed, or uncertain are considered cryptogenic, being unable to be classified as native or introduced where they are found to be present.

8.3.4.2 Community Characterization

Taxa accumulation curves were calculated for samples collected in Milne Inlet and Ragged Island to compare sampling effort with previous NIS/AIS monitoring surveys and to provide an estimate of the effort required to fully characterize the zooplankton and benthic infauna communities. The non-parametric species estimator Chao 2 was calculated for 2019 following the methods used in SEM 2017a. Chao 2 provides an estimate of species diversity in a population based on presence/absence and observations of rarity. Rarity is accounted for by the number of taxa that appear only once (singletons) or twice (doubletons). Chao 2 is calculated as

$$S_1 = S_{obs} + \left(\frac{{Q_1}^2}{2Q_2}\right)$$

Where S_1 is the number of taxa estimated to be observed, S_{obs} is the number of taxa observed in samples, Q_1 is the number of singletons, and Q_2 the number of doubletons. The difference between the estimated number of species and the observed provides an indication of how effectively the community is represented in the samples. A high percent difference may indicate that sampling is not sufficient to capture species richness, specifically in the rarer taxa.

Chao 2 analyses require different assumptions depending on whether a species has been previously identified in the area or not. However, during taxonomic identification, some specimens are not able to be resolved to species and are left at a higher taxonomic level. The term “unique” is used to indicate a taxon that is not seen with better resolution (e.g., it is only to the genus level, and no species have been identified within that genus already). For example, where a specimen is identified to the genus level but not species (e.g., *Macoma* sp.), it would be considered unique if no other *Macoma* species had been identified. If the taxonomic results had some specimens identified as *Macoma balthica* and others only as *Macoma* sp., the *Macoma balthica* would be considered unique and the *Macoma* sp. as present, but not unique. In the accumulation curve and Chao 2 analyses, it was assumed that all taxonomic designations were representative of unique taxa, which may have resulted in an over-estimation of the expected number of taxa within an infinite number of samples.

8.3.4.3 DNA Analysis

Benthic infauna samples collected for DNA analysis (Section 8.3.2) were sent to Biologica and sorted for target taxa. Targeted taxa included potential NIS/AIS species that were placed on the Watchlist after being flagged in previous surveys and also included other potential invasive taxa for Nunavut compiled from a high-risk species brochure (Appendix 8D-3, Government of Nunavut 2016). Frozen samples collected in other MEEMP components were also compared to the watch list for consideration of DNA barcoding. Whole specimen or tissue samples of taxa sent for DNA verification were sent to the Canadian Centre for DNA Barcoding at the University of Guelph for barcoding. Laboratory methodologies are detailed in Appendix 8D-2.

8.3.4.4 Independent Verification

Following literature review, nine specimens were flagged as requiring closer examination and, as such, underwent secondary taxonomic review by Biologica and were sent for independent verification to the Benthic Ecology Lab at Université Laval. Samples were sent for independent verification for a number of reasons, including possible NIS/AIS status, existence of a new species description, limited information on the distribution, or uncertainty on the identification; in other words, not all species sent for independent verification were flagged as of concern as non-indigenous or invasive species.

Specimens flagged for review from the 2019 MEEMP program samples were sent to Laval in early 2020; however, prior to the lab completing their identifications, the lab was closed due to the COVID-19 pandemic and results were not received in full prior to the release of the 2019 report. Therefore, results of the independent review of 2019 specimens is presented in this report, alongside available results from review of 2020 specimens.

8.3.5 Quality Management

8.3.5.1 Field QA/QC

- The same field QA/QC procedures were used during benthic infauna collection (Chapter 4.0), macroflora and benthic epifauna monitoring (Chapter 5.0), and fish population monitoring (Chapter 6.0) for the NIS/AIS Program as those used for the MEEMP. These methods are discussed in their respective chapters. QA/QC procedure for samples collected for DNA analysis followed the procedure for benthic infauna collection (Chapter 4.0).
- Zooplankton collection was standardized to minimize the introduction of sampling error during sample collection. Nets were rinsed using the same rinsing techniques and samples were subject to the same preservation methods to ensure consistency.
- During NIS/AIS quadrat surveys, underwater video was viewed in real-time to ensure appropriate visual representation of the quadrat features.
- Video documented during the ship hull monitoring surveys was viewed in real-time to verify that all representative areas of the ship were surveyed and ensure appropriate visual representation of the recorded locations. Field notes were taken during the survey.

8.3.5.2 Laboratory and Data Analysis QA/QC

- The same lab QA/QC procedures were used during analysis for benthic infauna (Chapter 4.0), macroflora and benthic epifauna (Chapter 5.0), fish population (Chapter 6.0), and fish health (Chapter 7.0) for the NIS/AIS Program as those used for the MEEMP. These methods are discussed in their respective Chapters.
- Zooplankton analysis was conducted by Biologica Environmental Services Ltd., which identified organisms down to the lowest practical taxonomic level. Results of QA/QC measures implemented by the taxonomic laboratory are reported in Appendix 8C-2. Data were checked thoroughly, and no errors or omissions were found. Species distributions within each collected sample are believed to be representative of the zooplankton community at each sampling location.
- Video footage from each survey was post-processed by a qualified marine biologist with local Arctic experience. Epibenthic organisms were identified to the lowest practical taxonomic level using a variety of

species identification books in coordination with the benthic infauna data; a subset of images used to identify organisms was checked by a second observer to confirm species identifications.

- Video footage from each survey was post-processed by a qualified marine biologist with local Arctic experience. Biofouling or encrusting organisms were identified to the lowest practical taxonomic level where possible using a variety of species identification keys and databases. A subset of images was checked by a second qualified observer (marine biologist) to confirm quality of observations.
- Lab QA/QC for independent verifications was dependent on the methodology. Results of DNA barcoding were internally reviewed at the Canadian Centre for DNA Barcoding (Appendix 8D-2).

8.4 Results

8.4.1 Taxonomic Identification

8.4.1.1 Benthic Infauna

Benthic infaunal sampling in 2020 was conducted at 60 stations in Milne Port and two at Ragged Island, which represents a considerable increase compared to previous years. A total of 237,145 infaunal organisms representing at least 369 different taxonomic designations were identified in 2020 benthic infauna surveys at Milne Inlet, including 15,047 organisms at Ragged Island (Appendix 4C, Appendix 8A). Of the 369 taxa identified, 33 are considered “new”, meaning they were not found in previous surveys at Milne Port and Ragged Island; a list of the new records is presented in Table 8-2, along with a description of the distribution on record. All newly identified taxa were found only at Milne Port and none at Ragged Island. Approximately 38% of the new taxa were identified to species level, 41% to genus level, and 21% represented the first observations of higher taxonomic levels in Milne Inlet. Incidental taxa were also observed in the samples including parasitic and planktonic specimens, while these were considered for NIS/AIS status in this chapter, they are not included in the taxa counts.

The majority of newly identified taxa were confirmed to have ranges that included the Canadian Arctic or the Northern Atlantic extending past Greenland and Southern Baffin Island (Table 8-2) while others had very limited descriptions or no description of natural ranges with few georeferenced specimens on record. Ranges were considered to have a high probability of including the Project area if the limited collections on record were georeferenced to Arctic waters or were spread across a wide geographic range that could reasonably include Canadian Arctic waters. To address some of the uncertainty surrounding limited taxonomic descriptions, relevant specimens were sent for independent verification, as described in greater detail in Section 8.4.4.2 below.

Some of the newly observed species represented the first occurrences where a specimen previously classified at higher taxonomic level was able to be identified to the species level; for example, the anthozoan cnidarian *Cerianthus lloydii* is the first species identified in the Subclass Ceriantharia while *Tiron spiniferus* represents the first species observed from the amphipod Family Synopiidae. New taxa in 2020 also included the first taxonomic observations from the Phyla Nematoda and Entoprocta.

Table 8-2: List of Newly Observed Benthic Infauna Taxa Identified at Milne Port and Ragged Island in 2020 with Description of Distribution on Record

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Annelida				
Polychaeta/ Eunicida	Dorvilleidae	*Ophryotrocha* sp.	Large genus of errantian polychaetes. Including species with documented distributions that include the Canadian Arctic	1, 2, 5, 8, 10, 11
Polychaeta/ Phyllodocida	Phyllodocidae	*Eulalia bilineata*	Errantian polychaete worm with a range that includes the Canadian Arctic	1, 2, 3, 4, 10, 11
Polychaeta/ Phyllodocida	Polynoidae	*Bylgides promamme*	Errantian polychaete worm with a range that includes the Canadian Arctic	1, 2
Polychaeta/ Phyllodocida	Polynoidae	*Harmothoe propinqua*	Data poor species, multiple synonyms used interchangeably for related species, uncertainty with the range on record. Limited georeferenced collections. Considered arctic-boreal with a probable range extending to Canadian Arctic.	12, 13, 14
Polychaeta/ Phyllodocida	Polynoidae	*Hesperonoe sp.*	Poorly described genus with limited collection records. Collections indicate there are species with distributions that extend into the Arctic Ocean (Laptev Sea and North Alaska).	2
Polychaeta/ Phyllodocida	Sphaerodoridae	*Ephesiella* sp.	Genus of errantian polychaetes, with representative species with ranges that include the Canadian Arctic	1, 2, 7, 10
Polychaeta/-	Maldanidae	*Axiothella* sp.	Genus of sedentarian polychaetes, with representative species with ranges that include the Canadian Arctic	1, 2, 4, 5, 8, 10, 11
Polychaeta/-	Paraonidae	*Paraonides* sp.	Genus of sedentarian polychaetes, with representative species with ranges that include the Canadian Arctic	1, 2, 7, 8, 11
Polychaeta/ Terebellida	Ampharetidae	*Ampharete finmarchica*	Terebellid worm with a range that includes the Canadian Arctic and waters around Western Greenland	1, 2, 5, 6, 8, 11
Polychaeta/ Terebellida	Ampharetidae	*Ampharete petersenae*	Data poor species, recently described, probable range extends from Iceland to Western Greenland and South Baffin Island	13, 16
Polychaeta/ Terebellida	Terebellidae	*Paramphitrite birulai*	Terebellid worm with a limited collection record. Specimen collections from Norwegian waters to Newfoundland and Labrador, indicating a potentially wide range across the Northern Atlantic	11
Polychaeta/ Terebellida	Terebellidae	*Amphitrite cirrata*	Terebellid worm with recorded occurrences in the Canadian Arctic including close to the Project Area in Koluktoo Bay.	1, 2, 4, 7, 10, 11, 18

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Arthropoda				
Malacostraca/ Amphipoda	Aoridae	Aoridae indet.	Amphipod family with wide distribution, multiple species with ranges that include the Canadian Arctic	1, 2, 8, 10, 18
Malacostraca/ Amphipoda	Corophiidae	*Crassicorophium clarencense*	Poorly described amphipod species, with a single specimen collection on record, indications of a range within the Canadian Arctic	1, 7,
Malacostraca/ Amphipoda	Dulichiidae	*Dulichia* sp.	Amphipod genus with a wide distribution including Canadian Arctic waters and Greenland	1, 2, 4, 5, 6, 9, 10
Malacostraca/ Amphipoda	Melphidippidae	*Melphidippa* sp.	Amphipod genus with a Global distribution, including species with ranges that include the Arctic Ocean, extending to western Greenland and North Alaska	2, 6
Malacostraca/ Amphipoda	Podoceridae	Podoceridae indet.	Amphipod family with wide distribution, includes representative species with ranges that include Arctic waters around Greenland and Eastern Canada	1, 2, 6, 10
Malacostraca/ Amphipoda	Synopiidae	*Tiron spiniferus*	Amphipod species with a range that includes the Canadian Arctic and waters of western Greenland	1, 2, 3, 5, 6, 10
Malacostraca/ Amphipoda	Uristidae	*Anonyx lilljeborgi*	Species of amphipod with a wide distribution that includes the Canadian Arctic	1, 2, 7, 10
Insecta/ Diptera	Chironomidae	*Diamesa* sp.	Freshwater larvae of snow midge. Range includes Arctic Canada. Phillips Creek is a potential source of these larvae in the Marine environment.	17
Insecta/ Diptera	Chironomidae	*Cricotopus/Orthocladius* sp. Complex	Freshwater chironomid larvae. Multiple species from *Orthocladius* and *Cricoctopus* with ranges that include Baffin Island. Phillips Creek is a potential source of these larvae to the marine environment	2
Insecta/ Diptera	Chironomidae	*Eukiefferiella* sp.	Freshwater chironomid genus with multiple species with ranges that include Baffin Island. Phillips Creek is a potential source of these larvae to the marine environment	2
Insecta/ Diptera	Empididae	*Clinocera* sp.	Dipteran genus with freshwater larvae. Multiple species with ranges that include Baffin Island and Greenland. Specimen collected near Phillips Creek, with the creek being a potential source of the larvae to the marine environment	2
Bryozoa				
Gymnolaemata/ Cheilostomatida	Eucrateidae	*Eucratea* sp.	Genus with one described species, which has wide distribution that includes the Canadian Arctic	1, 2, 8, 18
Cnidaria				
Anthozoa/ Spirularia	Cerianthidae	*Cerianthus lloydii*	Species of burrowing anemone with a wide distribution in the Arctic Ocean including collections in Western Greenland	1, 2

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Anthozoa/ Actiniaria	Halcampidae	*Halcampa* sp.	Genus of burrowing anemones with at least one species with a natural range that includes the Canadian Arctic	1, 2, 10
Echinodermata				
Ophiuroidea/ Amphilepidida	-	Amphilepidida indet.	Order of brittle stars with global distribution. Includes representative species with natural ranges within the Canadian Arctic	1, 2
Echinoidea/ Camarodonta	Strongylocentrotidae	*Strongylocentrotus pallidus*	Pale sea urchin, has a wide distribution in the northern hemisphere, including the Canadian arctic	1, 2
Entoprocta				
-/-	-	Entoprocta indet.*	Relatively poorly described Phylum, with collections around the globe, including the Arctic Ocean and the Canadian Arctic	1, 2, 18
-/Coloniales	Barentsiidae	*Barentsia* sp.	Poorly described entoproctan genus with an apparent global distribution, including species descriptions from collections in Canadian Arctic waters.	1, 2, 19
Hemichordata				
Enteropneusta/-	-	Enteropneusta indet.	Poorly described class of hemichordates with a global distribution including the Canadian Arctic	1, 2
Nematoda				
-/-	-	Nematoda indet.	Phylum with a global distribution containing species with a range that includes the Canadian Arctic	1, 2, 8, 18
Nemertea				
Hoplonemertea/ Monostilifera	Amphiporidae	*Amphiporus* sp.	Genus of nermertean worms with a global distribution, including representative species with ranges including the Canadian Arctic	1, 2, 8
Porifera				
Demospongiae/-	-	Demospongiae indet.	Class of sponges with a global distribution containing species with a range that includes the Canadian Arctic	1, 2, 10, 18

Notes: Taxa identified to the lowest practical taxonomic level; *indicates non-unique taxa; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.
Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014.
All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.4.1.2 Macroflora and Benthic Epifauna

Ten permanent steel quadrats were deployed in Milne Inlet to monitor for changes in macroflora and benthic epifauna community assemblages (Chapter 5.0).

A total of ten distinct macroflora taxa were observed during quadrat surveys in Milne Port in 2020, two of which were identifiable to the species level (Table 8-3). A literature review was performed for all macroflora identified in quadrat surveys and all were determined to have ranges that included the Canadian Arctic or had at least one representative species with a native distribution that includes Canadian Arctic waters. Each newly observed taxa was also cross-checked against available databases of marine invasive species and none of the taxa were identified as a globally-recognized invasive species.

The seventeen distinct epifauna taxa recorded quadrat surveys in Milne Port in 2020 included taxa from five phyla: Annelida, Arthropoda, Chordata, Echinodermata, and Mollusca (Table 8-4). The majority of the epibenthic taxa observed were observed in previous surveys in Milne Port aside from an unidentified species from the genus *Pandalus*. A literature review was performed for all epifauna identified in quadrat surveys and all were determined to have ranges that included the Canadian Arctic or had at least one representative species with a native distribution that includes Canadian Arctic waters. Each taxa was also cross-checked against available databases of marine invasive species and none of the taxa were identified as a globally-recognized invasive species.

Table 8-3: Macroflora Taxa Identified in Permanent Quadrat Surveys in Milne Port, 2020

Phylum Class/Order	Family	Taxa Common Name	Description	Distribution Reference
Ochrophyta				
Phaeophyceae/ Ectocarpales	Acinetosporaceae	***Pylaiella* sp.** **Angel Hair**	Genus of filamentous brown algae. Globally common with at least one native representative in the Canadian Arctic.	1, 2, 24
Phaeophyceae/ Fucales	Fucaceae	***Fucus distichus*** **Rockweed**	Small brown algae with a native distribution that includes the Canadian Arctic. Unidentified species within the genus seen in previous MEEMP surveys.	1, 2, 24
Phaeophyceae/ Laminariales	Lamanariaceae	***Saccharina latissima*** **Sugar Kelp**	A globally common species of brown algae, including native distribution in the Canadian Arctic, unidentified bladed kelps observed in previous MEEMP and baseline surveys.	1, 2, 24
Phaeophyceae	---	Phaeophyceae indet. 1 Brown Branching	Multiple unidentified brown algae species from the same class. Class with known species in the Canadian Arctic. Previously identified in baseline and MEEMP surveys in Milne Port.	1, 2, 24
Phaeophyceae	---	Phaeophyceae indet. 2 Brown Filamentous		1, 2, 24
Phaeophyceae	---	Phaeophyceae indet. 3 Brown Foliose		1, 2, 24
Rhodophyta				
Florideophyceae Corallinales	---	Corallinales indet. Encrusting Coralline	Unidentified encrusting coralline red algae. Globally distributed order, with at least one native representative in the Canadian Arctic	1, 2, 24
---	---	Rhodophyta indet. 1 Red Branching	Multiple unidentified red algae species from the same phylum. Phylum with known species in the Canadian Arctic. Previously identified in baseline and MEEMP surveys in Milne Port.	1, 2, 24
---	---	Rhodophyta indet. 2 Red Filamentous		1, 2, 24
---	---	Rhodophyta indet. 3 Red Foliose		1, 2, 24

Notes: Taxa identified to the lowest practical taxonomic level; taxa in bold indicates first record of specimen in MEEMP and NIS/AIS surveys; indet.= indeterminate (taxa could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014.

Table 8-4: Epibenthic Fauna Taxa Identified in Permanent Quadrat Surveys in Milne Port, 2020

Phylum Class/Order	Family	Taxa Common Name	Description	Distribution Reference
Annelida				
Polychaeta/ Terebellida	Pectinariidae	*Cistenides granulata* Ice cream Cone Worm	Tube dwelling worm with a distribution in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Polychaeta/ Sabellida	Sabellidae	Sabellidae indet. Sabellid Worm	Unidentified sabellid worm, representative species with distributions in the Canadian Arctic, and observed in previous surveys in Milne Port.	1, 2
Polychaeta	---	Polychaeta indet. 1 Tube Dwelling Worm	Unidentified polychaete worms, representative species with distributions in the Canadian Arctic, and observed in previous surveys in Milne Port.	1, 2
Polychaeta	---	Polychaete indet. 2 Feather Duster Worm		1, 2
Arthropoda				
Malacostraca/ Decapoda	Pandalidae	***Pandalus* sp. Shrimp**	Globally distributed genus, with at least one native representative in the Canadian Arctic	1, 2, 4, 7, 9
Chordata				
Actinopterygii/ Scorpaeniformes	Cottidae	Cottidae indet.	Unidentified sculpin species, representative species with distributions in the Canadian Arctic, and observed in previous surveys in Milne Port.	1, 2, 25
---	---	Tunicata indet.	Unidentified tunicate species, representative species with distributions in the Canadian Arctic, and observed in previous surveys in Milne Port.	1, 2
Echinodermata				
Echinoidea/ Echinoida	Strongylocentrotidae	*Strongylocentrotus* sp. Sea Urchin	Unidentified urchin species, representative species with distributions in the Canadian Arctic, and observed in previous surveys in Milne Port.	1, 2
Echinoidea/ Echinoida	Strongylocentrotidae	*Strongylocentrotus droebachiensis* Green Sea Urchin	Urchin species with a distribution in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Ophiuroidea/ Ophiurida	Ophiuridae	Ophiuridae indet. Brittle Star	Unidentified brittle stars, representative species with distributions in the Canadian Arctic, and common in previous surveys in Milne Port.	1, 2

Phylum Class/Order	Family	Taxa Common Name	Description	Distribution Reference
Mollusca				
Bivalvia/ Adepedonta	Hiatellidae	*Hiatella arctica* Wrinkled Rock Borer	Bivalve species with a distribution in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Bivalvia/ Myida	Myidae	*Mya* sp. Blunt Gaper	Bivalve genus with representative species distributed in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Bivalvia/ Mytilida	---	Mytilida indet. Mussels	Globally distributed class, with representative species distributed in the Canadian Arctic, observed in previous surveys in Milne Port.	1, 2
Bivalvia/ Pectinioida	Propeamussiidae	*Similipecten greenlandicus* Mud Scallop	Scallop species with a distribution in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Gastropoda/ Not assigned	Clinonidae	*Clione limacina* Sea Angel	Swimming gastropod species, with a distribution in the Canadian Arctic, common in previous surveys in Milne Port.	1, 2
Gastropoda/ Not assigned	Lottiidae	Lottiidae indet. Limpet	Limpet family with representative species distributed in the Canadian Arctic, observed in previous surveys in Milne Port.	1, 2
Polyplacophora/ Chitonida	Tonicellidae	*Tonicella* sp. Chiton	Chiton genus with representative species distributed in the Canadian Arctic, observed in previous surveys in Milne Port.	1, 2

Notes: Taxa identified to the lowest practical taxonomic level; taxa in bold indicates first record of specimen in MEEMP and NIS/AIS surveys; indet.= indeterminate (taxa could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014.

All new taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.4.1.3 Fish and Incidentals

Throughout the MEEMP, some species are targeted and caught intentionally (such as fish as part of fish health and population chapters; Chapters 6.0 and 7.0) while others are caught incidentally. Throughout surveys at Milne Port, 106 taxa were caught or observed incidentally and of these, twenty-six were new observations in MEEMP surveys (Table 8-5). The full list of incidental taxa is available in Appendix 8B.

All taxa observed or caught incidentally in MEEMP and NIS/AIS surveys were cross-checked against a global database of marine invasive species and none of the taxa were identified as a globally-recognized invasive species (Molnar et al. 2008) or an invasive species in Canada according to the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014). In addition to these databases, each taxa was researched independently in the literature for their known habitats and distributions for signs of taxa that may be considered non-native to the Arctic region. Fish that were not identified to the species level were confirmed that the identified higher-level taxa had at least one representative species with a distribution that included Arctic waters.

Table 8-5: Newly Incidental Macroflora and Fauna Taxa Identified at Milne Port in 2020

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Acanthocephala				
-/-	-	Acanthocephala indet.	Parasitic worm phylum with at least one representative species with an Arctic distribution.	2
Annelida				
Clitellata/ Rhynchobdellida	Piscicolidae	*Oceanobdella* sp.	Globally distributed genus of marine leeches, with limited species occurrences on record, at least one native representative with a record in the Canadian Arctic.	1, 10
Polychaeta/ Phyllodocida	Phyllodocidae	*Paranaitis* sp.	Errantian polychaete worm with at least one representative species with a range that includes the Canadian Arctic.	1, 2, 7, 10
Arthropoda				
Malacostraca/ Amphipoda	Gammaracanthidae	*Gammaracanthus loricatus*	Amphipod species with a documented distribution that includes the Canadian Arctic.	1, 2, 7, 9, 10, 18
Malacostraca/ Decapoda	Crangonidae	*Argis dentata*	Shrimp species with a documented distribution that includes the Canadian Arctic.	1, 2, 4, 7, 8, 9, 18
Malacostraca/ Decapoda	Thoridae	*Eualus gaimardii*	Shrimp species with a documented distribution that includes the Canadian Arctic.	1, 2, 4, 7, 9, 18
Malacostraca/ Isopoda	Munnopsidae	*Munnopsis typica*	Isopod with documented range that includes the Canadian Arctic.	1, 2, 7, 9, 18
Chordata				
Actinopterygii/ Gadiformes	Gadidae	*Arctogadus glacialis*	Cod species common to the Canadian Arctic, multiple documented observations in the vicinity of the project.	1, 2, 25
Actinopterygii/Perciformes	Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance, not native to the project area, presumed observed in previous MEEMP surveys, currently undergoing northern range expansion into the Canadian Arctic due to climate change and ocean warming.	20, 25, 26
Actinopterygii/ Perciformes	Zoarcidae	*Lycodes mucosus*	Saddled eelpout, endemic to the Canadian Arctic. Presumed observations in in previous MEEMP ROV surveys, this is the first confirmation of the species.	1, 2, 7, 25
Actinopterygii/ Scorpaeniformes	Cottidae	*Gymnocanthus tricuspis*	Arctic Staghorn Sculpin, native distribution includes the Canadian Arctic, observed in baseline surveys.	1, 2, 7, 9, 18, 25

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Actinopterygii/ Scorpaeniformes	Cottidae	*Triglops* sp.	Sculpin genus with at least one representative species in the Canadian Arctic.	1, 2, 7, 18, 25
Cnidaria				
Hydrozoa/ Trachymedusae	Ptychogastriidae	*Ptychogastria polaris*	Hydrozoan species with a documented range that includes the Canadian Arctic. Previously presumed to be observed in ROV footage during MEEMP surveys, this is the first confirmation of the species identification.	1, 2
Scyphozoa/-	-	Scyphozoa indet.*	Class of cnidarians with a global distribution, including multiple species with ranges within the Canadian Arctic. Previously presumed to be observed in ROV footage during MEEMP surveys, this is the first confirmation of the identification.	1, 2, 7, 9, 18
Scyphozoa/ Semaeostomae	Cyaneidae	*Cyanea capillata*	Jellyfish species distributed across the northern hemisphere, including the Canadian Arctic.	1, 2, 7, 18
Ctenophora				
Tentaculata/ Cydippida	Mertensiidae	*Mertensia ovum*	Common species of ctenophore with a broad distribution across the Arctic Ocean, including Arctic Canada	1, 2, 7, 18
Mollusca				
Cephalopoda/-	-	Cephalopoda indet.	Globally distributed class, with at least one representative species in the Canadian Arctic	1, 2, 9, 10, 18
Gastropoda/ Nudibranchia	Onchidorididae	*Onchidoris bilamellata*	Barnacle eating dorid, widely distributed across the northern hemisphere, including within the Canadian Arctic.	1, 2, 7
Ochrophyta				
Phaeophyceae/ Ectocarpales	Acinetosporaceae	*Pylaiella* sp.**	Globally distributed genus of brown algae, with at least one native representative in the Canadian Arctic.	1, 2, 24
Phaeophyceae/ Laminariales	Agaraceae	*Agarum clathratum*	Sieve kelp species with a broad range across the northern hemisphere, including in the Canadian Arctic.	2, 24
Phaeophyceae/ Laminariales	Laminariaceae	*Saccharina latissima***	Sugar kelp, is a globally common species of brown algae, including native distribution in the Canadian Arctic, unidentified bladed kelps observed in previous MEEMP and baseline surveys.	1, 2, 24
Phaeophyceae/ Sphacelariales	Sphacelariaceae	*Battersia* sp.	Genus of brown algae that includes at least one representative species with a distribution that includes the Canadian Arctic.	1, 2, 24

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Phaeophyceae/ Tilopteridales	Halosiphonaceae	*Halosiphon tomentosus*	Brown algae species with a distribution across the North Atlantic and the Arctic Ocean, including Western Greenland.	1, 2, 24
Phaeophyceae/ Fucales	Fucaceae	*Fucus distichus***	Small brown algae with a native distribution that includes the Canadian Arctic. Unidentified species within the genus seen in previous MEEMP surveys.	1, 2, 24
Porifera				
Demospongidae/-	-	Heteroscleromorpha indet.	Subclass of sponges with a global distribution that includes the Canadian Arctic around Baffin Island.	1, 2
Rhodophyta				
Florideophyceae/ Palmariales	Palmariaceae	*Palmaria palmata*	Foliose red algae species with a broad distribution, including the north Atlantic and Canadian Arctic.	1, 2, 24

Notes: Taxa identified to the lowest practical taxonomic level; *indicates non-unique taxa; **indicates also observed in quadrat surveys; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014.

All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.4.1.4 Zooplankton

Taxonomic data of zooplankton collected from twelve stations in Milne Port and six stations at Ragged Island are presented in Appendix C. Zooplankton taxa presence/absence from 2014 to 2020 is presented below in Table 8-6, with a complete list provided in Appendix 8C-3.

Table 8-6: Zooplankton Taxa Presence in Milne Inlet During AIS Monitoring in 2020 compared to previous survey years (2014-2019).

Taxa	2014	2015	2016	2017	2018	2019	2020
*Acartia sp.**	x		X	x	x	x	x
Acartia longiremis	x	x	X	x		x	x
Aglantha digitale	x			x	x	x	x
Ammodytes sp.					x		x
Arthropoda indet.*							x
Balanomorpha indet.*				x	x	x	x
Bivalvia indet.*	x	x	X	x	x	x	x
Bosminidae indet.**				x			x
***Bougainvillia* sp.**							x
Calanoida indet.*	x	x		x	x	x	x
Calanus finmarchicus	x	x	X	x	x	x	x
Calanus glacialis	x	x	X	x	x	x	x
Calanus hyperboreus	x	x	X	x	x	x	x
Calanus sp.*				x	x	x	x
Clione limacina	x	x		x	x	x	x
Cnidaria indet.*			X	x	x	x	x
Copepoda indet.*	x	x	X		x	x	x
Cyclopoida indet.*				x	x	x	x
Cyclops scutifer*							x
Daphnia sp.**		x					x
Echinoidea indet.*				x	x	x	x
Fritillaria sp.*		x	X		x	x	x
Gastropoda indet.*				x	x	x	x
Harpacticoida indet.*			X		x	x	x
Hyperoche medusarum				x			x
Isopoda indet.*				x	x	x	x
Limacina sp.*	x		X	x			x
Limacina helicina	x	x		x	x	x	x
Limnocalanus macrurus							x
***Liparis* sp.**							x
Microcalanus sp.				x	x	x	x
Microsetella norvegica	x	x	X	x	x	x	x
Mysis sp.*					x		x
Oikopleura sp.*		x		x	x	x	x
Oithona sp.*	x	x	X	x	x	x	x
Oithona similis	x	x	X	x	x	x	x

Taxa	2014	2015	2016	2017	2018	2019	2020
Oncaea sp.*	x	x		x	x	x	x
Pandeidae indet.*							x
Parasagitta elegans	x			x	x	x	x
Polychaeta indet.*	x	x	X	x	x	x	x
Pseudocalanus sp. *	x	x	X	x	x	x	x
Themisto libellula				x	x	x	x

Notes: Taxa in bold indicate the first observation of the taxa during MEEMP and NIS/AIS surveys. Taxa identified to the lowest practical taxonomic level; presence/absence for previous years taken from SEM 2015, 2016, 2017a, Golder 2018, Golder 2019a, Golder 2020a. *=Species or taxa from lower taxonomic levels identified in other survey years and/or in other survey methods; **=Freshwater taxon; ***= Incidental (benthic or terrestrial taxa or life stages); indet.= indeterminate (taxa could not be identified beyond the taxonomic level listed); sp.=species.

A list of newly observed (i.e., not encountered in previous surveys, thus not listed in Milne Inlet taxonomic inventory) zooplankton taxa in Milne Port is provided in Table 8-7 along with a brief description of the known geographic distribution of each taxon or its status as NIS/AIS. Of the 42 zooplankton taxa identified in samples collected during the 2020 AIS monitoring survey, four taxa had not been previously observed (Table 8-7). Two taxa were identified to species level and two were only identifiable to genus level. Each newly observed taxa was cross-checked against a global database of marine invasive species and none of the taxa were identified as a globally-recognized invasive species (Molnar et al. 2008) or an invasive species in Canada according to the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014). In addition to these databases, each new taxon was researched independently in the literature for their known habitats and distributions for signs of taxa that may be considered non-native to the Arctic region.

New species identified were *Limnocalanus macrurus*, a calanoid copepod from the family Centropagidae and *Cyclops scutifer*, a freshwater species of cyclopoid copepod. Both species were identified in samples from Milne Port. Neither of the newly observed zooplankton species in 2020 could be identified as non-native to the Arctic, despite not being previously identified in Milne Port (Table 8-7). At Ragged Island, an unidentified snailfish species from the genus *Liparis* was observed in zooplankton samples. Snailfish are a common taxon to the northern hemisphere. Species with ranges that are near to or incorporate the project area include *L. atlanticus, L. bathyarcticus, L. callyodon, L. fabricii, L. gibbus, L. mucosus* and, *L. tunicatus* (DFO 2019, WoRMS 2021, GBIF 2021). Lastly, a hydromedusan cnidarian from the family Bougainvillidae was identified to the genus *Bougainvillia*. Unidentified specimens from the same family have previously been observed in benthic infauna samples from Milne Port in 2017 and 2018 (Golder 2020a). *B. principis,* and *B. superciliaris* both have documented ranges that include the project area (WoRMS 2021, GBIF 2021). One species within the genus, *B. muscus*, native to Europe, is considered invasive to the Pacific and cryptogenic (native origins unknown) to the west Atlantic (Fofonoff et al. 2021). Further review of natural ranges and vectors of introduction are required to confirm NIS status; however, it is considered unlikely to be NIS considering there are at least two potential species within the genus with natural ranges that include the Project area.

Table 8-7: Newly Observed Zooplankton Taxa in Milne Inlet, 2020

Phylum Class/Order	Family	Taxa	Description	Distribution Reference
Arthropoda				
Hexanauplia/ Calanoida	Centropagidae	*Limnocalanus macrurus*	Copepod species with a documented distribution that includes the Canadian Arctic	1, 2, 18
Hexanauplia/ Cylopoida	Cyclopoidae	*Cyclops scutifer*	Freshwater copepod species from the North American Arctic, with collection records in the High Arctic on Ellesmere Island (McLaren 1964, Strecker et al. 2008)	21, 22, 23
Chordata				
Actinopterygii/ Scorpaeniformes	Liparidae	*Liparis* sp.	Snailfish genus with at least one representative species with a documented range that includes the Canadian Arctic	1, 2, 7, 18, 25
Cnidaria				
Hydrazoa/ Anthoathecata	Bougainvillidae	*Bougainvillia* sp. (medusa stage)	Hydromedusa genus with at least one representative species with a documented distribution that includes the Canadian Arctic	1, 2, 18

Notes: Taxa identified to the lowest practical taxonomic level; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014.

All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.4.1.5 Ship Hull Monitoring

Three ship hulls were evaluated using ROV-based video surveys conducted alongside three ore carriers docked at Milne Port between 31 July and 2 August 2020 (Table 8-8). A total of 173 minutes of video footage of the ship hulls was collected, which was analyzed to assess the presence or absence of NIS/AIS. All three vessels had extensive amounts of biofouling along the hulls, rudders, and propellers. On the *Golden Ruby,* most of the biofouling was contained to the area around the propeller, including a large area of encrusting barnacles interspersed with an unidentified filamentous taxa, at 2.5 – 2.9 m depth (Figure 8-5a); smaller patches of encrusting barnacles were also observed along the starboard hull from bow to stern at 1.6 – 3.1 m depth. The unidentifiable filamentous taxa had similar morphology to various algaes, bryzoans and cnidarians, and therefore could not be resolved to a single phylum. The encrusting barnacles could only be identified to the Suborder Balanomorpha (Steinerstauch 2020, pers. Comm.). *Golden Brilliant* and *Pabal* had a larger presence of biofouling organisms. *Golden Brilliant* had several large patches of unidentified calcareous tube worms (Serpulidae indet.) along the starboard stern by the rudder and propeller from 2.3 – 4.0 m depth (Figure 8-5b). Small patches of encrusting barnacles (Balanomorpha indet.) were observed at 4.0 m on the rudder. Another biofouling taxon was observed in small numbers on the hull at 4.0 m but could not be positively identified (Figure 8-5c). *Pabal* had extensive patches of encrusting barnacles (Balanomorpha indet.) and associated scars across the entire port section from 0.2 – 4.4 m. Unidentified calcareous tube worms (Serpulidae indet.) were observed in small numbers interspersed among the barnacles on the bow of the hull at 2.0 m. Other biofouling organisms observed included small patches of an unidentified filamentous taxa on the hull near the port hole at 2.2 m and several unidentifiable organisms along the hull from 2.3 – 4.3 m (Figure 8-5c, d). Overall, no species level identifications were made.

Table 8-8: Ship hull biofouling monitoring effort in 2020.

Date (2020)	Carrier	Location of Survey	Maximum depth (m)	Survey effort (h:mm:ss)	Evidence of biofouling
31 July	*Golden Brilliant*	Starboard stern section	6	0:35:22	Barnacles observed on the rudder; Unidentified calcareous tube worms observed on the draft marks, rudder, propeller grooves and bolts, side of the hull, and water intake port; Unidentified biofouling organisms observed on the side of the hull
2 August	*Pabal*	Port bow to stern section	4.4	1:36:00	Barnacles observed on the bow hull and on the propeller bolts; Unidentified calcareous tube worms observed on the bow hull; Unidentified biofouling organisms observed on the side of the hull; Unidentified filamentous taxa observed on the side of the hull
2 August	*Golden Ruby*	Starboard bow to stern section	8.8	0:41:36	Barnacles observed on the side of the hull from bow to stern and around the propeller; Unidentified filamentous taxa observed on the hull adjacent to the propeller

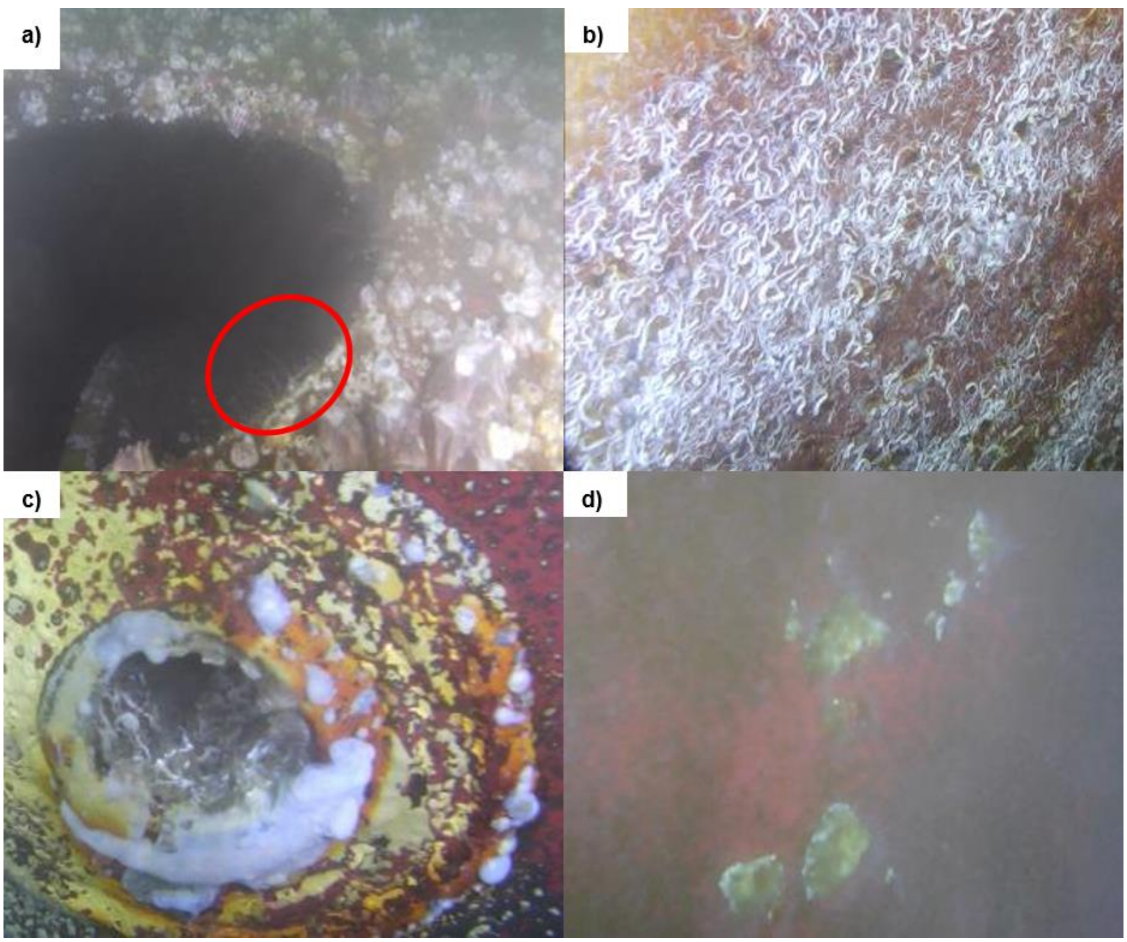


Figure 8-5: Biofouling observed during ship hull ROV monitoring in 2020, a) *Golden Ruby* propeller with encrusting barnacles and unidentified filamentous taxa (red circle), b) *Golden Brilliant* hull with unidentified calcareous tube worms, c) *Golden Brilliant* water intake port with unidentified biofouling organisms, d) *Pabal* hull with unidentified biofouling organisms.

8.4.2 Community Characterization

8.4.2.1 Benthic Infauna

The taxa accumulation curve for benthic infauna is shown in Figure 8-6; the curve reaching an asymptote (i.e., plateau or flat line) indicates that sampling was sufficient to fully characterize the benthic infaunal community. In 2019, the accumulation curve did not reach an asymptote, indicating the number of samples collected was not sufficient to fully characterize biodiversity, despite an increase in sample locations and sample volumes from previous years. Sampling increased again in 2020, and the accumulation curve reached an asymptote at 57 samples, indicating that the sampling effort (60 stations) was sufficient to characterize the biodiversity of the benthic infaunal community in Milne Port and at Ragged Island.

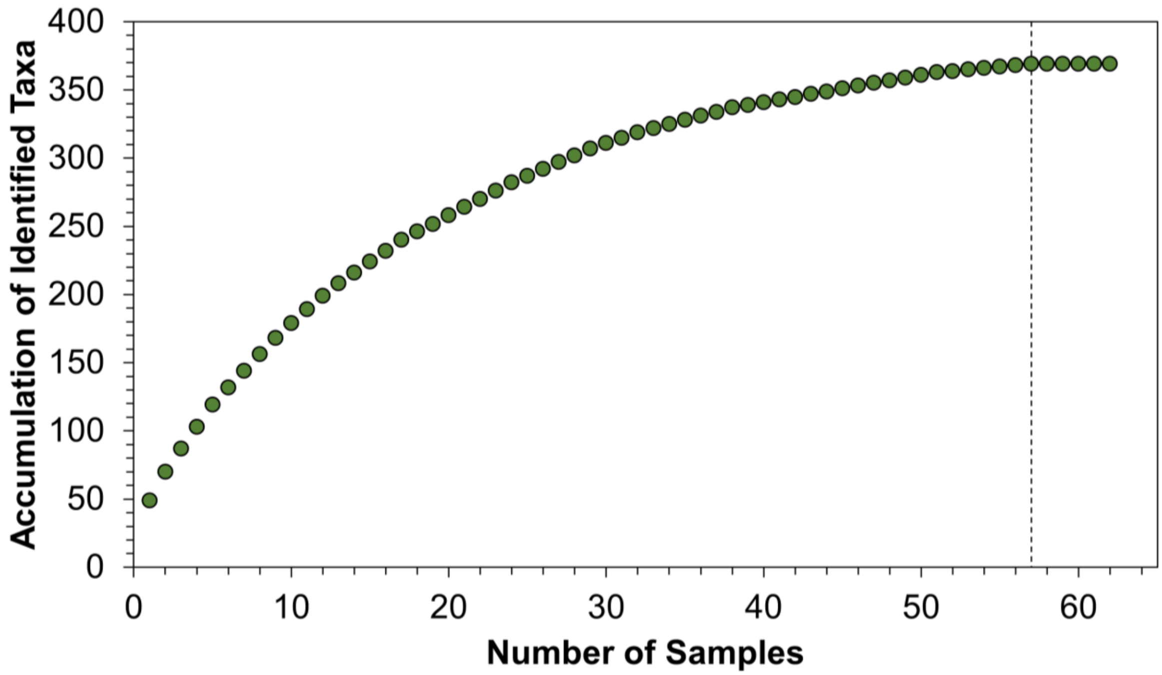


Figure 8-6: Taxa accumulation curve for benthic infauna collected at Milne Inlet, 2020. The dotted line indicates the point at which the curve reaches an asymptote.

The non-parametric species estimator Chao 2[1] was calculated for 2020 following the methods in SEM 2017a (Table 8-9) in order to estimate diversity in the population based on occurrence of rare taxa. For samples collected in 2020, the Chao 2 calculation provided an estimate of 439.7 taxa to be expected within samples, compared to the observed number of 369. The estimate exceeded the observed by 19% indicating that current sampling methodology is capturing approximately 80% of the estimated population.

[1] Chao 2 calculation: $S_1=S_{obs}+(Q_1^2/2Q_2)$

Table 8-9: Chao 2 Species Estimates for Benthic Infauna Samples Collected in Milne Inlet (2013, 2015 through 2020)

Year	S_{obs}	Q_1	Q_2	S_2	%S_2 Exceeds S_{obs}
2013	188	70	27	278.7	48
2015	181	56	25	246.3	36
2016	218	59	38	263.8	21
2017	235	92	47	324.0	38
2018	346	81	35	439.7	27
2019	319	89	43	411.1	29
2020	369	89	56	439.7	19

Notes: Values for 2013, 2015 through 2019 taken from SEM 2017a, Golder 2018, Golder 2019a and Golder 2020a. S_{obs}= # of taxa observed; Q_1= # of species occurring in only one sample; Q_2= # of species occurring in two samples; S_1= # of taxa expected to be observed based on Chao 2 estimates

8.4.2.2 Zooplankton

A total of 363,815 organisms were estimated from samples collected at Milne Port and Ragged Island in 2020. Adjusted for the total volume of water sampled during each vertical haul and oblique tow, the mean density[2] of organisms for each area and sampling method was 5,312 ± 637 (SD) organisms/m^3 in vertical hauls at Milne Port, 3.6 ± 2 (SD) organisms/m^3 in oblique tows at Milne Port, 2,534 ± 914 (SD) organisms/m^3 in vertical hauls at Ragged Island, and 396 ± 129 (SD) organisms/m^3 in oblique tows at Ragged Island (Figure 8-7). Species richness was similar between sampling locations and methodology, with averages ranging from nine to fourteen taxa per sample (Figure 8-7).

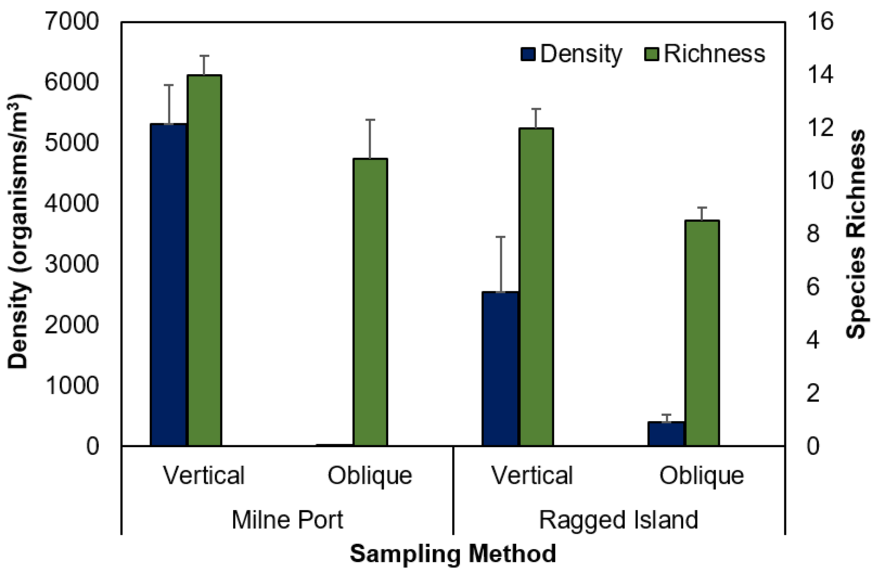


Figure 8-7: Mean density (primary axis) and species richness (secondary axis) of zooplankton collected during oblique tows and vertical hauls, Milne Port and Ragged Island, 2020. Error bars represent one standard deviation.

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[2] Calculated as the average density per sampling method ± one standard deviation of the mean.

A taxa accumulation curve was calculated for zooplankton samples collected in 2020 to compare sampling effort with previous AIS monitoring surveys in Milne Port and to provide an estimate of the effort required to fully characterize the zooplankton community (Figure 8-8). The taxa accumulation curve for the 2020 AIS sampling effort reached an asymptote at approximately twelve samples, after which no new taxa were identified in any additional samples up to a total of eighteen. This indicates that, similar to previous surveys, sampling was sufficient to characterize the biodiversity of the zooplankton community in Milne Port and at Ragged Island.

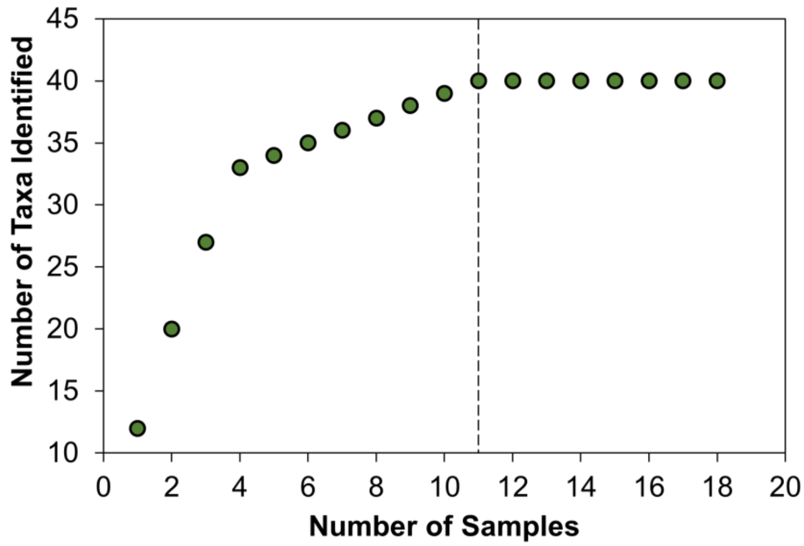

Figure 8-8: Taxa accumulation curve for zooplankton, Milne Inlet, 2020.

The non-parametric species estimator Chao 2 was calculated for 2020 following the methods used in SEM 2017a, and in previous MEEMP reports. For samples collected in 2020, the Chao 2 calculation provided an estimate of 61.3 taxa observed, which exceeded the actual observed number of taxa (41) by 50% (Table 8-10). The discrepancy between the observed and expected number of zooplankton taxa was larger than in previous years (8% to 21% discrepancy).

Table 8-10: Chao 2 Species Estimates for Zooplankton Samples Collected in Milne Inlet (2014-2020)

Year	S_{obs}	Q_1	Q_2	S_1	% S_1 exceeds S_{obs}
2014	34	7	6	38.1	12
2015	40	10	6	48.3	21
2016	37	8	5	43.4	17
2017	44	8	9	47.6	8
2018	44	10	6	52.3	19
2019	43	9	9	47.5	10
2020	41	8	2	61.3	50

Notes: Values for 2014 through 2018 taken from SEM 2017a, Golder 2018 and Golder 2019a. S_{obs}= # of taxa observed; Q_1= # of species occurring in only one sample; Q_2= # of species occurring in two samples; S_1= # of taxa expected to be observed based on Chao 2 estimate

8.4.3 DNA Analysis

Benthic infauna samples for DNA analysis were collected from five stations where potential NIS/AIS taxa were observed in previous surveys (e.g., *Marenzelleria viridis, Monocorophium insidiosum*). The samples were sorted for the potential presence of the target species (see Section 8.3.4.3), however, no target species were found in the samples.

The sample was further sorted to identify any other potential flagged taxa or taxa of interest. Two adult specimens were tentatively identified as *Pseudofabricia aberrans*, a taxa that has a limited range on record. Specimens sent for independent identification in previous years were largely inconclusive, or were not agreed upon under review. While no sequencing has been performed for the genus *Pseudofabricia,* records do exist for at least one of the potential alternative identifications (*Fabricia stellaris*), therefore the samples were sent for DNA barcoding to gain clarity on the identification. Results had not been received as of 21 April 2021 and therefore will be presented in the 2021 MEEMP and NIS/AIS annual report. Interim updates will be provided to the MEWG if information becomes available before the 2021 MEEMP NIS/AIS annual report is submitted to the NIRB.

One fish species collected incidentally was noted to be potentially non-indigenous. The specimen, a Pacific Sandlance (*Ammodytes hexapterus*), is a species known to be currently undergoing a range expansion within the Canadian Arctic archipelago (Falardeau et al. 2017). Due to morphological similarities with the native Northern Sandlance (*A. dubius*), the specimen was sent for genetic analysis at the Canadian Centre for DNA Barcoding at the University of Guelph, where the identification of the Pacific Sandlance was confirmed (Appendix 8D-2).

8.4.4 Independent Verification

The majority of newly observed taxa in 2020 surveys are known to occur in Arctic habitats or have representative species with Arctic distributions; however, during the 2020 NIS/AIS survey program, a number of species were flagged as potentially non-indigenous to the region or to Arctic waters. It is important to note that fauna of the Canadian Arctic are not thoroughly described, marine surveys have not been exhaustive, and distribution records for many species are incomplete. Therefore, it is possible that a species with a range on record that does not include an Arctic distribution may represent a first observation within a native range and not the introduction of a non-native species, or it may represent a record of a new or poorly described species.

Species that were determined as potentially non-indigenous or invasive underwent secondary taxonomic review by Biologica. Additionally, independent verifications of the samples were made by Philippe Archambault's Benthic Ecology Lab at Université Laval (Laval; Quebec), in order to confirm the identification. Samples were also sent for verification where new species descriptions[3] existed or there was uncertainty on the identification, whether or not the species are of concern as potentially NIS or AIS. In 2020, nine specimens were sent for independent verification. A record of specimens sent for verification is included in Appendix 8D-1.

A complete record of new taxa observations in 2020 and their risk status is available in Appendix 8E.

[3] New species descriptions occur when an update to the taxonomic record is accepted, this may be due to a variety of reasons including acceptance of a more senior description, DNA analysis combining or separating species descriptions, or the identification of features that match a different taxonomic group.

8.4.4.1 2019 Taxa Verification

In 2019, nine taxa were flagged for further review due to concerns regarding possible NIS/AIS status, limited descriptions of geographic range, or to gain clarity or confirmation of uncertain identifications. These specimens were sent to the taxonomic lab at Laval University. Due to lab closures during the COVID-19 pandemic, independent verifications were not able to be completed prior to completion of the 2019 report and, therefore, the results are presented here. Specimens sent for review and the rationale for review are presented in Table 8-11. Results of independent review are summarized in Table 8-12.

Table 8-11: Record of Taxa Flagged for Independent Review, 2019

Phylum Class/Order	Family	Taxa	Reason for Review
Annelida			
Polychaeta/-	Maldanidae	*Rhodine* sp.	Potential identification of a non-indigenous species within this genus occurred in 2018. This unidentified species was sent for review as a precaution and to gain clarity on similar Arctic species.
Polychaeta/ Phyllodocida	Hesionidae	*Nereimyra aphroditoides*	Specimens of this description had previously been identified as a similar species. Both taxa are distributed within the project area. Sent for verification to gain clarity on the id.
Polychaeta/ Phyllodocida	Syllidae	*Streptospinigera niuqtuut*	Specimens of this description had previously been identified as a similar species. Both taxa are distributed within the project area. Sent for verification to gain clarity on the id.
Polychaeta/ Sabellida	Fabriciidae	*Pseudofabricia aberrans*	Limited records indicate species may be endemic to Mediterranean. Tentative independent identification in 2018 as Manayunkia aesturiana not accepted by Biologica due to morphological and ecological differences.
Polychaeta/ Spionida	Spionidae	*Marenzelleria viridis*	Species of concern due to being listed as an invasive species, and potentially invasive to Canadian Arctic waters.
Polychaeta/ Terebellida	Ampharetidae	*Sosane* sp. nr. *wireni*	Limited taxonomic description does not include records of occurrence in the Canadian Arctic. Similar species within the genus have Canadian Arctic distributions.
Arthropoda			
Malacostraca/ Amphipoda	Corophiidae	*Monocorophium* sp.	No species within this genus have natural ranges that include the Canadian Arctic. Additionally, three species are described as invasive, although records of their presence in the Arctic exist.
Ostracoda/ Myodocopida	Philomedidae	*Euphilomedes* sp.	No species within this genus have described ranges that include the Canadian Arctic. Biologica confirmed the entry was a transcription error of *Philomedes* sp.
Bryozoa			
Stenolaemata/ Cyclostomatida	Oncousoeciidae	*Oncousoecia* sp.	Recent collection records for species within this genus are limited and described ranges do not include the Canadian Arctic.

Table 8-12: Record of Results of Independent Review of Taxa Identified in Milne Port, 2019

Biologica Identification	Independent Identification	Description	Distribution Reference
Rhodine sp.	*Rhodine* sp.	This genus contains species with distributions in the Canadian Arctic. Independent identification could not resolve to species, but indicated features suggested the specimen was *R. gracilior*, native to the Project area. Not considered a taxa of concern in Milne Port.	1, 2, 3, 7, 8, 9, 11
Nereimyra aphroditoides	*Nereimyra* sp.	Laval was unable to identify to the species level, due to confirmatory identifying characteristics being observable in living specimens only. Not considered a taxa of concern in Milne Port.	1, 2, 5, 7, 8, 10, 11, 18
Streptospinigera niuqtuut	*Streptospinigera niuqtuut*	Laval confirmed the updated identification of this species. Not considered a taxa of concern in Milne Port.	1, 2, 8, 11
Pseudofabricia aberrans	*Fabricia stellaris*	*F. stellaris* is in the same family as *P. aberrans*, but has a broad distribution that includes the Canadian Arctic in the vicinity of Baffin Island. Not considered a taxa of concern in Milne Port.	1, 2, 11
Marenzelleria viridis	*Marenzelleria viridis*	Confirmation of the identification of the listed invasive species, with a confirmed range in Atlantic Canada and USA, Indications of presence in the Canadian Arctic prior to project operations, and possibly cryptogenic. Considered a taxa of concern in Milne Port and a target for future monitoring efforts.	2, 7, 10, 29, 30
Sosane sp. nr. *wireni*	*Sosane wireni*	Confirmation of the identification of the original identification. Limited taxonomic record indicates species may be cryptogenic. Not listed as an invasive species, or considered a taxa of concern in Milne Port, but flagged for future monitoring.	2, 5
Monocorophium sp.	*Crassicorophium* sp.	*Crassicorophium* spp. have been observed in the project area since baseline surveys. The genus contains at least one species with a described range that includes the Canadian Arctic. Not considered a taxa of concern, but both genii are flagged for future monitoring due to morphological similarities and known invasive species within the *Monocorophium* genus.	1, 2, 7, 8
Euphilomedes sp.	*Philomedes* sp.	Multiple species from this genus have described ranges that include the Canadian Arctic. Additionally, unidentified species from this genus have been recorded in MEEMP surveys since 2017. Not considered a taxa of concern in Milne Port.	1, 2, 7, 8, 10
Oncousoecia sp.	Tubuliporina indet.	The Suborder Tubuliporina contains multiple species with distributions within the Canadian Arctic, including species observed in previous MEEMP surveys. Not considered a taxa of concern in Milne Port.	1, 2, 8

Notes: Taxa identified to the lowest practical taxonomic level; *indicates non-unique taxa; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014, 27: Jirkov 2020, 28: Carr 2010, 29: Sikorski and Bick 2004, 30: Blank and Bastrop 2008

All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.4.4.2 2020 Taxa Verification

Nine taxa were also flagged for review in 2020, again due to concerns regarding possible NIS/AIS status, limited descriptions of geographic range, or to gain clarity or confirmation of uncertain identifications. Of these, three taxa sent in 2019 were flagged for re-review in 2020 due to concerns regarding their described ranges or presence in invasive species databases, including: *Marenzelleria viridis*, *Sosane wireni*, and *Pseudofabricia* sp. nr. *aberrans* (Table 8-13). Results of independent review are summarized in Table 8-14.

Table 8-13: Record of Taxa sent for Independent Review, 2020

Phylum Class/Order	Family	Taxa	Reason for Review
Annelida			
Polychaeta/ Phyllodocida	Polynoidae	*Harmothoe propinqua*	Data poor species, the historic record uses multiple synonyms interchangeably for related species, leading to uncertainty with the range on record. Limited georeferenced collections with indications of an Arctic range. Sent for verification due to uncertainty in the name.
Polychaeta/ Phyllodocida	Polynoidae	*Harmothoe viridis*	Biologica confirmed the entry was a transcription error of *H. imbricata*, observed in previous years. The specimen was sent for independent verification as a precaution.
Polychaeta/ Phyllodocida	Polynoidae	*Hesperonoe* sp.	Poorly described genus with limited collection records. Indications of an Arctic distribution. Sent for verification due to uncertainty in the taxonomic record.
Polychaeta/ Sabellida	Fabriciidae	*Pseudofabricia aberrans*	Limited records indicate species may be endemic to Mediterranean. Tentative independent identification in 2018 as Manayunkia aesturiana not accepted by Biologica due to morphological and ecological differences. Tentative identification in 2019 as *Fabricia stellaris*.
Polychaeta/ Spionida	Spionidae	*Marenzelleria viridis*	Species of concern due to being listed as an invasive species, and potentially invasive to Canadian Arctic waters, verified identification in 2019 samples.
Polychaeta/ Terebellida	Ampharetidae	*Ampharete petersenae*	Recently described and data poor species with probable range that includes the Canadian Arctic. Sent for verification due to the recent description.
Polychaeta/ Terebellida	Ampharetidae	*Sosane* sp. nr. *wireni*	Limited taxonomic description does not include records of occurrence in the Canadian Arctic. Similar species within the genus have Canadian Arctic distributions. Verified identification in 2019 samples.
Polychaeta/ Terebellida	Terebellidae	*Paramphitrite birulai*	Limited taxonomic record with indication of a range that includes the Canadian Arctic. Sent for verification.
Chordata			
Actinopterygii/ Perciformes	Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance, undergoing documented range expansion into the Canadian Arctic. Morphologically similar to native *A. dubius*. Sent for DNA barcoding.

Table 8-14: Record of Results of Independent Review of Taxa Identified in Milne Port, 2020.

Biologica Identification	Independent Identification	Description	Distribution Reference
Harmothoe propinqua	*Harmothoe extenuata*	*H. propinqua* (or *Lagisca propinqua*) is considered a junior synonym. *H. extenuata* has a described range that includes the Canadian Arctic and has been observed in Milne Port since 2013	1, 2, 7, 10, 11, 18
Harmothoe viridis	*Harmothoe imbricata*	Agreement with the corrected identification. *H. imbricata* has a described range that includes the Canadian Arctic and has been observed in Milne Port since 2010	1, 2, 4, 5, 7, 8, 10, 11
Hesperonoe sp.	*Bylgides* sp.	There are multiple species of *Bylgides* that have described ranges that include the Canadian Arctic, including observations in Milne Port since baseline surveys.	1, 2, 5, 10, 11, 18
Pseudofabricia aberrans	*Fabricia stellaris*	*F. stellaris* is in the same family as *P. aberrans*, but has a broad distribution that includes the Canadian Arctic in the vicinity of Baffin Island. Not considered a taxa of concern in Milne Port.	1, 2, 11
Marenzelleria viridis	*Marenzelleria viridis*	Confirmation of the identification of the listed invasive species. Indications of presence in the Canadian Arctic prior to project operations, with a confirmed range in Atlantic Canada and USA, possibly cryptogenic. Considered a taxa of concern in Milne Port and a target for future monitoring efforts.	2, 7, 10, 29, 30
Ampharete petersenae	*Ampharete petersenae*	Recently described and data poor species with probable range that includes the Canadian Arctic.	13, 16
Sosane sp. nr. *wireni*	*Sosane wireni*	Confirmation of the identification of the original identification. Limited taxonomic record indicates species may be cryptogenic. Not listed as an invasive species, or considered a taxa of concern in Milne Port, but flagged for future monitoring.	2, 5
Paramphitrite birulai	*Amphitrite birulai*	Correction of the species to the accepted name. Poorly described species with indications of a wider range than previously accepted.	2, 11, 27, 28
Ammodytes hexapterus	*Ammodytes hexapterus*	DNA barcoding confirmed the identification of the Pacific Sandlance, currently experiencing climate change related range expansion into the Arctic.	20, 25, 26

Notes: Taxa identified to the lowest practical taxonomic level; *indicates non-unique taxa; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.

Taxa distribution references: 1: WoRMS 2021, 2: GBIF 2021, 3: Stewart et al. 1985, 4: OBIS 2011, 5: Sejr 2009, 6: Hopcroft 2019, 7: Miller et al. 2014, 8: Goldsmit 2016, 9: DFO 2019, 10: Cusson 2018, 11: Gagnon and Torgersen 2021, 12: Degan and Faultwetter, 2021, 13: Palomares and Pauly 2020, 14: Wesenberg-Lund 1950, 15: ETI 2021, 16: Parapar et al. 2012, 17: Carr 2011, 18: Stewart 2013, 19: Fleming 1826, 20: Falardeau et al. 2017, 21: Haney et al. 2020, 22: McLaren 1964, 23: Strecker et al. 2008, 24: Küpper et al. 2016, 25: Coad and Reist 2018, 26: Falardeau et al. 2014, 27: Jirkov 2020, 28: Carr 2010, 29: Sikorski and Bick 2004, 30: Blank and Bastrop 2008.

All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014.

8.5 Discussion

8.5.1 Limitations

It is important to note that it is not always possible to identify specimens to the species level due to a variety of limitations. Species descriptions are often based on adult samples, and immature specimens may lack the features present in the adult that are required for specific identification (Steinerstauch 2019, pers. comm.). Fragmented samples, or samples damaged during collection, may also be missing identifying features that would be used to determine species. Incomplete species records and descriptions also lead to limitations in species identification (Steinerstauch 2019, pers. comm.). Where taxa were not identifiable to the species level, it was confirmed that the higher taxonomic designation included at least one species with a probable native range that included the Project area.

Ranges on record are not complete for all taxa; recently described or uncommon taxa may have a limited range description based on where specimens have been found, with a broader range inferred based on biological characteristics and tolerances. However, with some taxa it can be difficult to determine if a species is originally from the area in which it is found, or if it was introduced from another location. In cases where the original native range cannot be conclusively determined a species is considered cryptogenic.

Fauna of the Canadian Arctic are not thoroughly described and surveys of species in the Canadian Arctic have not been performed as frequently as surveys in other Arctic and sub-Arctic regions, particularly in comparison to surveys in Northern Europe. This lowers the confidence in the ranges on record, particularly for less common or recently described species that may be cryptogenic to a broader area, but due to their rarity and the relative survey effort, have not yet been described outside the range on record.

Difficulties in determining the historic range of a species can be related to changes in a species description. The range on record may be linked to a previous name or description and databases are not always updated as new descriptions are accepted. New species descriptions occur when an update to the taxonomic record is accepted. This may be due to a variety of reasons including acceptance of a more senior description, DNA analysis combining (two species merging under one species name) or separating species descriptions (one species being divided into two distinct species or subspecies), or reclassification due to the identification of features that match a different taxonomic group (such as reclassification to a new genus or being considered a subspecies).

Availability of publications may impact descriptions, more recently published works may not be readily available or accepted by the larger taxonomic community, and updates may not be reflected in the identification keys used by the taxonomy labs.

8.5.2 Taxonomic Identification

8.5.2.1 Benthic Infauna

In 2020, the number of sampling locations for the benthic infauna component were increased to improve ability to detect potential Project-related changes and to update the NIS/AIS taxonomic inventory. A total of 369 taxa were identified in 60 benthic samples at Milne Port, 33 of which had not been observed in previous surveys in the Project area. An analysis of the available literature indicated 28 of the new records had clearly described ranges or collection records that included Arctic waters or were north Atlantic species with unknown northern limits that presumably could have ranges that extended into the Canadian Arctic. Results for the taxa sent for independent verification are discussed in Section 8.5.2.5.

8.5.2.2 Macroflora and Benthic Epifauna

Underwater video and dive surveys along the newly deployed permanent quadrats were analyzed for presence of macroflora and epifauna species. Three macroflora taxa (*Pylaiella* sp*., Fucus distichus* and *Saccharina latissima*) and one epifauna taxa (*Pandalus* sp.) were identified in the 2020 survey that had not been identified previously in surveys at Milne Port; each taxon is described in further detail below.

- *Pylaiella* is a globally common genus of brown algae with representative species found in Arctic waters, including the Canadian Arctic. During surveys at Cape Hatt, Baffin Island, *Pylaiella* species were common and found in many habitat types (Küpper et al. 2016).
  - ***Pylaiella* sp. is not considered a taxa of concern in Milne Port.**

- *Fucus distichus* is a foliose brown algae with a wide native range that includes the Canadian Arctic and Baffin Island (Elice and Wilce 1961, WoRMS 2021, GBIF 2021). During surveys at Cape Hatt, *F. distichus* was considered among the dominant canopy forming species at 3 m depth (Snow et al. 1987).
  - ***Fucus distichus* is not considered a taxa of concern in Milne Port.**
- *Saccharina latissima*, or sugar kelp, is a globally common species of bladed brown algae. The species range includes the Canadian Arctic. Observations of unidentified bladed kelp in previous MEEMP surveys are potentially this species. During surveys at Cape Hatt, this species was found to form dense canopies below 5 m, along with other bladed brown algae species (Küpper et al. 2016).
  - ***Saccharina latissima* is not considered a taxa of concern in Milne Port.**
- *Pandalus* is a globally distributed genus of prawn, with at least one species with a range that includes the Canadian Arctic. Observations of this genus near Baffin Island include *P. montagui*, collected in Hudson Strait and Davis Strait (DFO 2019, OBIS 2011, Miller et al. 2014) and *P. borealis* collected in Hudson Strait, Davis Strait and Baffin Bay (DFO 2019).
  - ***Pandalus* sp. is not considered a taxa of concern in Milne Port.**

Taxa collected during the MEEMP and NIS/AIS monitoring surveys should continue to be compared to the best available literature (e.g., check for additions to the Canadian and global invasive species databases on an annual basis) to confirm the geographic ranges of known invasive species.

8.5.2.3 Fish and Incidentals

All taxa observed during marine surveys at Milne Port are considered as part of the NIS/AIS program. This includes observations during habitat offset monitoring, or non-targeted captures such as invertebrate species during fishing efforts. During survey efforts for the MEEMP program, 106 taxa were caught or observed incidentally; of these, 26 were new observations (i.e., not on the Milne Inlet taxonomic inventory), including duplicate observations through other methodologies.

All taxa observed incidentally in MEEMP and NIS/AIS surveys were cross-checked against marine invasive species databases. None of the taxa observed were identified as globally recognized invasive species (Molnar et al. 2008) or as domestically recognized invasive species according to the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014). In addition to these databases, the distribution and habitat preferences of each taxa was researched independently in the literature for signs of NIS status in the Arctic region. For specimens that could not be resolved to species, review efforts focussed on confirming that the higher-level classification (e.g., genus) had at least one species with a distribution that included Arctic waters.

A sandlance species was found as a mortality on a beach in port and sent for identification (morphological similarities between sandlance species make them challenging to speciate in a field setting). Biologica tentatively identified it as the non-indigenous species *Ammodytes hexapterus*, or Pacific Sandlance. Due to morphological similarities with the native Northern Sandlance, *A. dubius*, the specimen was sent for DNA analysis at the Canadian Centre for DNA Barcoding at the University of Guelph, where the identification of the Pacific Sandlance was confirmed (more detail is presented in Section 8.5.4.4.1, Appendix 8D-2), representing the northernmost record for this species currently undergoing a documented range expansion (Falardeau et al. 2017).

8.5.2.4 Zooplankton

Higher zooplankton density in vertical hauls compared to the oblique tows was consistent with previous sampling years and likely a result of differences in the depth strata targeted by each sampling method. In general, zooplankton density, taxa richness, and overall community composition in 2020 were comparable to previous AIS monitoring years.

All zooplankton taxa were cross-checked against a global database of marine invasive species and none of the taxa were identified as a globally recognized invasive species (Molnar et al. 2008) or invasive species in Canada according to the National Risk Assessment for Introduction of Aquatic Nonindigenous Species to Canada by Ballast Water (Casas-Monroy et al. 2014). In addition to these databases, each taxon was researched independently in the literature for their known habitats and distributions for signs of taxa that may be considered non-native to the Arctic region. For specimens that could not be resolved to species, review efforts focussed on confirming that the higher-level classification (e.g., genus) had at least one species with a distribution that included Arctic waters.

Three invertebrate taxa from zooplankton samples (*Bougainvillia* sp*., Cyclops scutifer* and *Limnocalanus macrurus*) and one fish taxa (*Liparis* sp.) were identified in the 2020 survey that had not been identified previously in surveys at Milne Port, though no taxa from zooplankton samples were sent for independent review.

- *Bougainvillia* is a broadly distributed hydromedusan genus with representative species found in Arctic waters, including the Canadian Arctic. During species inventory surveys in the Beaufort Sea and zooplankton surveys of the Canadian Arctic, multiple species of *Bougainvillia* were observed (Stewart 2013, Nelson 2014).
  - ***Bougainvillia* sp. is not considered a taxa of concern in Milne Port.**
- *Cyclops scutifer* is a freshwater copepod species from North America, with a range that includes the Canadian Arctic, including collections at Ellesmere Island (McLaren 1964, Strecker et al. 2008). Phillips Creek is considered the possible source of this freshwater taxa to the marine environment.
  - ***Cyclops scutifer* is not considered a taxa of concern in Milne Port.**
- *Limnocalanus macrurus*, is a species of copepod with a described range in the Canadian Arctic, including collections in the Beaufort Sea (Stewart 2013, Galbraith 2013).
  - ***Limnocalanus macrurus* is not considered a taxa of concern in Milne Port.**
- *Liparis* is a broadly distributed genus of snailfish, with at least one species with a range that includes the Canadian Arctic. Observations of this genus in the near Baffin Island include L*. fabricii* and *L. gibbus* (Miller et al. 2014).
  - ***Liparis* sp. is not considered a taxa of concern in Milne Port.**

8.5.2.5 Ship Hull Monitoring

In addition to PC No. 87, this monitoring component also specifically addresses PC No. 91. Ship hull monitoring was conducted for the third time in 2020. Underwater video surveys were conducted over the hulls of three ore carriers, one berthed alongside the Ore Dock and two anchored in Milne Port. A large portion of each ship's surface below the waterline was found to be biofouled. On *Golden Brilliant, Pabal*, and *Golden Ruby*, widespread colonization by aquatic organisms included barnacles of indeterminate species (Figure 8-5a). Barnacles were also noted to be present in a band 6 – 8 inches high at the 14.2 m waterline on the hull of the *Golden Brilliant*, out of the water at the time of monitoring. Further biofouling organisms included calcareous tube worms of indeterminate species (Figure 8-5b) and unidentifiable encrusting organisms on the *Golden Brilliant* and *Pabal* (Figure 8-5c and d) and an unidentifiable filamentous taxon on the *Paba*l and *Golden Ruby* (Figure 8-5a). Overall, no species level identifications were made.

The survey effort per ship was higher in 2020 compared to 2019, but lower than in 2018, and largely focused on the full sides of the vessel hulls. The taxonomic resolution of biofouling organisms did not improve in the third year of monitoring, despite the introduction of a high-resolution camera in 2019 and having an additional biologist with local Arctic faunal expertise present onboard with the ROV operator while video data was being collected in 2020. Many taxa were not resolved to species level due to the difficulty of identification of encrusting or small bodied taxa without a specimen. Specimen collection cannot be performed by divers along the hulls, as these surveys occur in an active shipping port, where diving on a berthed vessel may be severely hazardous.

Moving forward, Baffinland will be working collaboratively with DFO to explore options to improve the methodology of hull fouling surveys so that data can be collected with greater resolution.

8.5.3 Community Characterization

For benthic infauna, unlike 2019, where an asymptote was not reached, in 2020 the taxa accumulation curve reached an asymptote at 57 samples, meaning that increasing sampling beyond 57 stations is unlikely to yield new taxa that have not been captured previously. This result shows that sampling effort in 2020 (62 stations) was sufficient to characterize the benthic infaunal community. Additionally, the Chao 2 estimator indicated a discrepancy of 19% between the estimated number of species and the actual number observed through field sampling. This result represents the lowest measured discrepancy since benthic infaunal surveys began, again indicating that the level of sampling effort is appropriate. A discrepancy of 19% suggests that field sampling is able to capture approximately 80% of the existing community and indicates that taxa richness is being appropriately characterized, or represented, by current sampling effort, including the capture of rarer taxa.

The taxa accumulation curve for the 2020 AIS zooplankton sampling effort is very similar to those generated for the 2017, 2018 and 2019 AIS sampling efforts (Golder 2018; 2019a; Golder 2020a), suggesting that the sampling effort in 2020 captured a proportion of the overall zooplankton community that was sufficient to generally describe, but not fully characterize, community structure. Chao 2 analysis[4] revealed relatively high discrepancy between the observed and expected number of taxa, suggesting that rarer taxa might not have been captured in zooplankton tows in Milne Port.

8.5.4 Independent Verifications

The NIS/AIS program is conducted at a surveillance level and designed to flag potential invasive or non-indigenous species; the independent verification process serves as evidence that this program is functioning as intended. This section describes the specimens sent for independent verification in 2019 and 2020 and provides rationale for why the verification was sought. A summary of specimens flagged for review is provided in Table 8-15, results of verifications and literature review for each taxa is described in detail below.

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[4] Chao 2 analysis provides an estimate of the number of taxa present in a population based on observations of rarity, the number of taxa that appear only once (singletons) or twice (doubletons).

Table 8-15: Summary of Taxa Verifications in 2019 and 2020

Original ID	Year(s) Present	Corrected ID (Year)	Risk[1]	Action	Rationale
Annelida					
Rhodine bitorquata (*Rhodine* sp.)	2018, 2019	*Rhodine loveni* (2018) *Rhodine gracilior* (2018) *Rhodine* sp. (2019)	No	None	*R. loveni* and *R. gracilior* have described ranges that include the Canadian Arctic and are not listed in AIS databases.
Nereimyra aphroditoides	2019	*Nereimyra* sp. (2019)	No	None	Taxa was not considered flagged. Sent for verification due to an update to the species description as part of internal QAQC. Species within the genus have described ranges that include the Canadian Arctic and are not listed in AIS databases.
Harmothoe propinqua	2020	*Harmothoe extenuata* (2020)	No	None	Correction of a transcription error in the initial identification to *Harmothoe extenuata*, which has a listed range in Canadian Arctic and is not listed in AIS databases. Observed in baseline surveys in Milne Port.
Harmothoe viridis	2020	*Harmothoe imbricata* (2020)	No	None	Independent verification corrected identification to *Harmothoe imbricata*, which has a documented range in Canadian Arctic and is not listed in AIS databases.
Hesperonoe sp.	2020	*Bylgides* sp. (2020)	No	None	Multiple species in the genus have ranges that include the Canadian Arctic, including three species observed in Milne Port during MEEMP surveys. No species in the genus are listed in AIS databases.
		Harmothoe sp. (2020)	Low	Watchlist	Poorly described taxa with a limited record of range. Considered Arctic-Boreal but collections are generally limited to Arctic waters outside of Canada. No species in the genus are listed in AIS databases.
Streptospinigera niuqtuut	2019	*Streptospinigera niuqtuut* (2019)	No	None	Taxa was not considered flagged. Sent for verification due to an update to the species description as part of internal QAQC. Species within the genus have described ranges that include the Canadian Arctic and are not listed in AIS databases.
Pseudofabricia aberrans	2018, 2019, 2020	*Pseudofabricia* sp. nr. *aberrans* (2018)	Low	Watchlist	Not listed in AIS databases but no documented Canadian Arctic range on record, though there is evidence to suggest the range of *P. aberrans* may be greater than described and include Arctic waters.
		Manayunkia aestruania (2018) *Fabricia stellaris* (2019 and 2020)	No	None	*M. aestruania* has an Arctic range, and *F. stellaris* has a range that includes the Canadian Arctic; neither species is listed in AIS databases.

Original ID	Year(s) Present	Corrected ID (Year)	Risk[1]	Action	Rationale
Marenzelleria viridis	2019, 2020	*Marenzelleria viridis* (2019 and 2020)	High	Watchlist	Possibly cryptogenic in Canadian Arctic. Listed on invasive species databases therefore considered High Risk, but biogeographic and ecological evidence does not support this characterization for Milne Inlet. Determined to not be a Project-related introduction.
Ampharete petersenae	2020	*Ampharete petersenae* (2020)	Low	Watchlist	Recently described taxa with no defined range on record. Indications of Arctic Range including waters around Greenland. Not listed in AIS databases.
Sosane sp. nr. *Wireni*	2019, 2020	*Sosane wireni* (2019 and 2020)	Low	Watchlist	Limited range on record, possibly cryptogenic. Not listed in AIS databases.
Paramphitrite birulai	2020	*Amphitrite birulai* (2020)	Low	Watchlist	Correction to accepted taxonomic designation. No described range on record, but indications that range includes Arctic waters. On NIS database, but not considered introduced to Canadian Arctic (potentially introduced to Adriatic Sea) (Rius et al. 2021).
Arthropoda					
Monocorophium sp.	2018, 2019	*Monocorophium* sp. (2018)	High	Watchlist	Presence of representative species in AIS databases and no documented Canadian Arctic range. In Project area prior to shipping operations (documented in baseline surveys). Uncertainties in the identification.
		Crassicorophium bonelli (2018) *Crassicorophium* sp. (2019)	Low	Watchlist	At least one species of *Crassicorophium* has a range within the Canadian Arctic. *C. bonelli* not listed in AIS databases but considered alien to South Atlantic and Australia. In Project area prior to shipping operations (documented in baseline surveys).
Euphilomedes sp.	2019	*Philomedes* sp. (2019)	No	None	Species within the genus have described ranges including the Canadian Arctic. No species in the genus are listed in AIS databases.
Bryozoa					
Oncousoecia sp.	2019	Tubuliporina indet. (2019)	No	None	Large suborder containing hundreds of species, including representatives with described ranges in the Canadian Arctic. Representative species in AIS databases are not listed as invasive to the Arctic.
Chordata					
Ammodytes sp.	2018, 2020	*Ammodytes* sp. (2018) *Ammodytes hexapterus* (2020)	Low	Watchlist	NIS taxa to the Canadian Arctic with a documented climate change related vector (not Project related). Not listed in AIS databases.

[1] Risk category refers to the most recent corrected ID listed

8.5.4.1 *Polychaetes*

8.5.4.1.1 *Rhodine* sp. (2019)

In 2018, specimens from the genus *Rhodine* were initially flagged for independent verification because the genus contains a species with a range that does not include Arctic waters. Biologica's review of the specimen from 2018 indicated the description closely matched that of *R. loveni*, a species with a range that includes the Canadian Arctic and had been observed previously in Milne Port (WoRMS 2021, Miller et al. 2014, Cusson 2018, Gagnon and Torgersen 2021, Golder 2020a). Independent review by Laval suggested this specimen may instead be *R. gracilior*, a species with a documented range in the Canadian Arctic, but new to MEEMP surveys (WoRMS 2021, Stewart et. al 1985, Gagnon and Torgersen 2021, Cusson 2018). Unidentified species in the genus were found again in 2019 samples. These specimens were not flagged but were sent for independent verification simply to gain clarity on the identification of these closely related species. Because both *R. loveni* and *R. gracilior* have documented ranges that include the Canadian Arctic and are not listed in AIS databases, they are considered No Risk.

***R. loveni* and *R. gracilior* are designated No Risk and are not considered taxa of concern in Milne Inlet.**

8.5.4.1.2 *Nereimyra* sp. (2019)

In 2019, specimens identified as *Nereimyra aphroditoides* were sent for verification to gain clarity on the identification because specimens with similar characteristics found in previous survey years were identified as *Nereimyra punctata*, a closely related species that also has an Arctic distribution (Sirenko et al. 2020, Sejr 2009, Gagnon and Torgersen 2021, GBIF 2021, WoRMS 2021). Taxonomic records for both species include collections at Baffin Island (Miller et al. 2014, Stewart 2013, Cusson 2018, WoRMS 2021, GBIF 2021). Laval was unable to resolve the identification to species level because distinguishing features are observable in living specimens only. Because both *N. aphroditoides and N. punctata* have documented ranges that include the Canadian Arctic and are not listed in AIS databases, they are considered No Risk.

***Nereimyra aphroditoides* and *Nereimyra punctata* are designated No Risk and are not considered species of concern in Milne Inlet.**

8.5.4.1.3 Harmothoe extenuata (2020)

The phyllodocid worm *Harmothoe propinqua* was identified in benthic infauna samples in 2020 and flagged, as it is poorly described with no defined geographic range on record, though general descriptions cite it as Arctic-Boreal in range based on a Norwegian Record (GBIF 2021, Degan and Faultwetter 2021). Redescriptions of the species within the genus and other similar species also lead to difficulty in confirming the distribution. Historically, *Lagisca extenuata, L. propinqua* and *H. extenuata* have all been used interchangeably, and may refer to *H. propinqua* (WoRMS 2021, GBIF 2021, Barnich and Fiege 2009). The specimens collected in benthic infauna samples from 2020 were sent for independent verification and Laval corrected the identification to the accepted synonym, *H. extenuata*. Because *H. extenuata* has a described range that includes the Canadian Arctic (WoRMS 2021, GBIF 2021), has been frequently observed in Milne Port since baseline surveys (Golder 2020a, Appendix 8A), and is not listed in AIS databases, it is considered No Risk.

***H. extenuata* is designated as No Risk and is not considered a species of concern in Milne Inlet.**

8.5.4.1.4 *Harmothoe imbricata* (2020)

The phyllodocid worm, *Harmothoe viridis* was identified in benthic infauna samples in 2020. While *H. viridis* is described as an Arctic-Boreal species, it was flagged because collection records are limited to waters around Norway and Sweden and no species range is defined (GBIF 2021, Degan and Faultwetter 2021). *H. viridis* is not listed in any databases or lists of invasive species or species of concern. Biologica reviewed the specimen and concluded the identification was a transcription error during data entry, correcting the identification to *Harmothoe imbricata,* a taxa with a range that includes the Canadian Arctic and has been observed in all baseline and MEEMP surveys in Milne Port (Golder 2020a, Appendix 8A). The specimen was sent for independent verification as a precaution and Laval agreed with the corrected identification. Because *H. imbricata* has a documented range that includes the Canadian Arctic and is not listed in AIS databases, it is considered No Risk.

***H. imbricata* is designated as No Risk and is not considered species of concern in Milne Inlet.**

8.5.4.1.5 *Hesperonoe* sp. / *Bylgides* sp. (2020)

Unidentified species from the genus *Hesperonoe* were flagged in benthic infauna samples in 2020 because it is a poorly described genus of phyllodocid worm with limited georeferenced collection records. Generally, the genus is considered Arctic-Boreal; however, collections are generally limited to Arctic waters near Alaska and Russia, including collections of an unidentified species within this genus from the Beaufort Sea and of *H. andriashevi* in the Laptev Sea (GBIF 2021, WoRMS 2021, Degan and Faultwetter 2021).

The specimen was sent for independent verification as a precaution due to uncertainty in the taxonomic record and Laval indicated that the specimens could instead be from the genus *Bylgides*. Multiple species from the genus *Bylgides* have ranges that include the Canadian Arctic and at least three species from the genus have been observed previously in Milne Port baseline and MEEMP surveys (WoRMS 2021, GBIF 2021, Golder 2020a, Appendix 8A). However, Biologica disagreed with the corrected identification, believing the specimens to have visible characteristics that differentiate them from the genus *Bylgides* and indicate *Hesperonoe* (MacDonald 2021, Pers. Comm.). Currently the identification is considered unresolved.

No species of *Hesperonoe* or *Bylgides* are listed in AIS databases. *Hesperonoe* is considered Low Risk because, although it is not listed in AIS databases, it does not have a documented distribution in the Canadian Arctic; therefore, it has been placed on the Watchlist. In contrast, *Bylgides* has a described range that includes the Canadian Arctic (WoRMS 2021, GBIF 2021), has been observed in Milne Port since baseline surveys (Golder 2020a, Appendix 8A), and is not listed in AIS databases so is therefore considered No Risk.

***Hesperonoe* sp. is designated Low Risk and will be placed on the Watchlist. *Bylgides* sp. is designated as No Risk and is not considered taxon of concern in Milne Inlet.**

8.5.4.1.6 *Streptospinigera niuqtuut* (2019)

In 2019, specimens within benthic infauna samples were identified as *Streptospinigera niuqtuut*, a recently described species with a range that includes the Canadian Arctic. Previously, specimens of the same description were identified as *Syllides longocirratus*, a species with similar features within the same subfamily that also has an Arctic distribution (WoRMS 2021). It was determined that the specimens found in Milne Port more closely matched *S. niuqtuut* and the taxonomic inventory for Milne Inlet was amended. Due to the updated descriptions for these species, the 2019 specimens were sent for verification at Laval where the identification of *S. niuqtuut* was confirmed.

Both *S. niuqtuut* and *S. longocirratus* have documented distributions in the Canadian Arctic and neither are listed in AIS databases and are therefore considered No Risk.

***S. niuqtuut* is designated No Risk and is not considered species of concern in Milne Inlet.**

8.5.4.1.7 *Pseudofabricia aberrans/ Fabricia stellaris* (2019 and 2020)

A sabellid polychaete worm was found in benthic infaunal samples in 2018 and tentatively classified to the *Pseudofabricia* genus. *P. aberrans* is currently the only described species in this genus and this species range has only been defined in the Mediterranean Sea and, therefore, is assumed to be endemic to that region (Giangrande and Cantone 1990, WoRMS 2021). However, specimens of *P. aberrans*, as well as unidentified specimens from the *Pseudofabricia* genus, have been identified in waters around the United Kingdom and the Black Sea indicating the range may extend further, or the genus is present outside of the Mediterranean Sea (OBIS 2021).

Only a limited description exists for *P. aberrans*, and polychaete surveys in the Canadian Arctic are not exhaustive. It is possible these specimens are a cryptic species related to *P. aberrans*, or that the range on record is incomplete. *P. aberrans* is not listed as an invasive species or a species of concern in Canadian or Arctic waters (Molnar et al. 2008, Casas-Monroy et al. 2014). As the samples collected from Milne Port matched the species description of *P. aberrans*, a temporary identification of *Pseudofabricia* sp. nr. *aberrans* was assigned to those specimens, indicating an inconclusive identification near to *P. aberrans*. The 2018 specimens were flagged and sent for independent verification at Laval where they were tentatively identified as *Manayunkia aesturiana*, which has a documented Arctic range (Miller et al. 2014) and is not listed in AIS databases and therefore considered to be No Risk.

In 2019, *Pseudofabricia* sp. nr. *aberrans* was again flagged in benthic samples. The specimens were all collected from sample sites ranging between approximately 65 m to 90 m water depth, which precluded the identification of *M. aesturiana*, which is limited to shallow, estuarine waters (MacDonald 2020, Pers. Comm.). The 2019 specimens were again sent to Laval for independent verification. Laval identified the specimens as *Fabricia stellaris*. *F. stellaris* and *P. aberrans* are both from Fabriciidae, a family of sabellid worms. *F. stellaris* has a fairly broad distribution that includes Pacific, Atlantic, Arctic and Southern Oceans; specimen collections have been made from Southern Baffin Island and Western Greenland (WoRMS 2021, GBIF 2021).

In 2020, specimens of *Pseudofabricia aberrans* were flagged for the third time in Milne Port, these specimens were sent for verification at Laval due to previous uncertainties related to the identification of this taxa. Laval again identified the specimens as *F. stellaris;* however, Biologica disagreed with the identification based on the fact that specimens lacked a distinguishing feature (i.e., pseudospatulate chaetae) that would indicate the genus *Fabricia.* Rather, in Biologica's professional opinion, the lack of the feature in question is characteristic of *Pseudofabricia* (MacDonald 2021, Pers. Comm.).

P. aberrans is considered Low Risk because, although it is not listed in AIS databases, it does not have a documented distribution in the Canadian Arctic; therefore, it has been placed on the Watchlist. Specimens tentatively identified as Pseudofabricia were sent for DNA analysis and, while there is no sequence on record for the genus *Pseudofabricia,* sequences are available for *Fabricia stellaris* and a comparison can be made to potentially resolve the identification. Results of DNA analysis have not been received and will be presented in the 2021 MEEMP and NIS/AIS annual report. Both *F. stellaris* and *M. aesturiana* have documented Canadian Arctic ranges and are not listed in AIS databases and are therefore considered no risk.

***P. aberrans* sp. is designated Low Risk and will be placed on the Watchlist.**

***F. stellaris and M. aesturiana* are designated as No Risk and are not considered species of concern in Milne Inlet.**

8.5.4.1.8 Marenzelleria viridis (2019 and 2020)

In 2019, specimens identified as *Marenzelleria viridis* were found in two benthic samples from Milne Port. The specimens were flagged and sent to Laval for independent verification, which confirmed the identification. Unidentified species from this genus have been identified previously in benthic samples prior to 2019 (2016, 2017 and 2018). In 2020, specimens of *Marenzelleria viridis* were again identified in benthic samples in Milne Port, these specimens were sent for verification at Laval due to previous concerns related to the identification of this taxa (Figure 8-9). Laval again confirmed the identification of *M. viridis*. Despite targeted sampling in areas previously found to have the species, no potential *M. viridis* specimens were found in benthic samples collected for DNA.

M. viridis was designated a High Risk species for Milne Inlet due to it being listed in the Global Database as invasive to areas outside of East Coast North America (Molnar et al. 2008). It is also listed in the National Risk Assessment as a potential invader to Canadian waters, including the Arctic region (Casas-Monroy et al. 2014). The primary invasion vector is considered to be transport through ballast water and sediments and once established, locally by currents (Molnar et al. 2008). Introduced to California, Scotland, the North Sea, and the Baltic Sea, *M. viridis* reaches high densities, in some locations replacing native infauna and altering sediment characteristics (Molnar et al. 2008, Fofonoff et al. 2021). Once established, management is considered highly difficult (Molnar et al. 2008).

A Multiple Lines of Evidence (MLE) test was performed for *M. viridis* to evaluate supporting information related to its potential invasiveness at Milne Port, given the limitations outlined for resolving taxonomic identifications and establishing native geographic ranges discussed in Section 8.5.1. *M. viridis* is described as native to east coast North America from Nova Scotia to Delaware, with a probable native range that includes waters around Newfoundland to Chesapeake Bay (Fofonoff et al. 2021). Its native range is shared with two cryptic *Marenzelleria* species; *M. neglecta*, which is also listed in the Global Database and the National Risk Assessment and *M. bastropi* (Fofonoff et al. 2021, Casas-Monroy et al. 2014, Molnar et al. 2008). There are two species of *Marenzelleria* that have ranges within Arctic waters. *M. arctia* is described in the Canadian Arctic (Beaufort Sea region) and *M. wireni* is described in the Barents Sea. Species of *Marenzelleria* are closely related and may be difficult to speciate due to the lack of single identifying features and overlapping traits, confused further by a historical record that had overlapping descriptions for multiple species (Sikorski and Bick 2004, Blank and Bastrop 2008).

The accepted natural range of *M. viridis* is cited as the western north Atlantic (i.e., likely including waters from Newfoundland to Maryland) but there are also documented occurrences around Baffin Island and other locations in the Canadian Arctic in the taxonomic record, indicating the currently listed range is likely incomplete. There are multiple records of occurrence of *M. viridis* in the Canadian Arctic prior to the start of Project activities in Milne Port, including specimens collected in Frobisher Bay and Davis Strait (Cusson 2018), as well as reported populations in Gjoa Haven (where it was described as a characteristic taxa in shallow grabs, Brown et al. 2011). Additionally, under the former identification for this species, *Scolecolepides viridis*, multiple specimens were collected in the western Canadian Arctic in the 1970s and 1980s (GBIF 2021, Miller et al. 2014). Collectively, this evidence confirms that *M. viridis* was established in the Canadian Arctic long before Baffinland began shipping operations. Rather than being invasive to the region, the species appears to either naturally exist or be cryptogenic, a term that refers to species that are not demonstrably native or introduced (Carlton 1996).

There is only one source that describes *M. viridis* as a potential invader to the Canadian Arctic (Casas-Monroy et al. 2014). Other sources limit their descriptions of invasion to European waters in the North and Baltic seas (Rius et al. 2021, ICES 2016, Molnar et al. 2008, Fofonoff et al. 2021) and consider the North Atlantic as part of the natural range. Notably, Casas-Monroy et al. cite Molnar et al. 2008 as the source for considering this species invasive to Arctic and Atlantic Canada, despite Molnar et al. not including the Canadian Arctic in their areas of invasion and describing East North America as the source of the population; in other words, Casas-Monroy et al. (2014) list this species as invasive within its accepted natural range.

Additionally, and more relevant to Baffinland operations, monitoring of benthic communities at Milne Port reveals no warning signs of invasion, even after sampling intensity was substantially increased (in response to a 2018 MEWG request). *M. viridis* is one of 258 polychaete species documented at Milne Port, and there is no indication that any of the other 257 species may be invasive. The species was observed in only 2 out of 32 sampled locations in 2019 (~6 % of locations) and in only 4 out of 62 sampled locations in 2020 (~6% of locations). There is no evidence of local geographic spread, as stations where the species was observed in 2020 are between stations where unidentified species from the genus were found in 2018 (see the response to Part (d) below for explanation of the challenges in resolving taxonomic identifications to species level). Due to DFO concerns regarding AIS status of *M. viridis*, targeted sampling was undertaken in 2020 in areas where it had previously been collected and no specimens were obtained, which reinforces the lack evidence of invasive behaviour. Lastly, review of benthic community monitoring data does not indicate that an invasion is underway at Milne Port. If this were the case, a decrease in benthic community indicators (e.g., diversity, richness, evenness) and an increase in the relative abundance of *M. viridis* would be expected. Rather, benthic infaunal communities were diverse and well established throughout Milne Port and, in isolated instances where indicators were significantly different between years, densities, diversity, and evenness were higher in 2020 relative to both 2018 and 2019 (see Chapter 4.0).

M. viridis is a known invader to European waters, mediated by ballast water, and is thus listed in AIS databases. Further, the range on record does not include the Canadian Arctic (though it is likely incomplete). Accordingly, this species is designated as High Risk. However, biogeographic evidence suggests it may be cryptogenic, if not indigenous to the Canadian Arctic while ecological evidence indicates it is not showing invasive behaviour in Milne Port nor compromising benthic community structure and function. Further, documented occurrences of the species in waters around Baffin Island prior to the commencement of shipping operations confirm this is not a Project-related introduction (if it is to be considered an introduction at all). For these reasons, *M. viridis* has proactively been placed on the Watchlist where it is subject to heightened monitoring efforts including, for example, independent review by a polychaete expert and targeted sampling to collect specimens for genetic barcoding.

Since submission of the draft MEEMP report, results from independent review from a global polychaete expert have been received and a technical memo describing the findings is provided as Appendix 8F.

M. viridis **is designated a 'High Risk' species of concern in the Project area. Its occurrence in Milne Inlet is not considered attributable to the Project. As a 'High Risk' species, it has been placed on the Project Watchlist.**

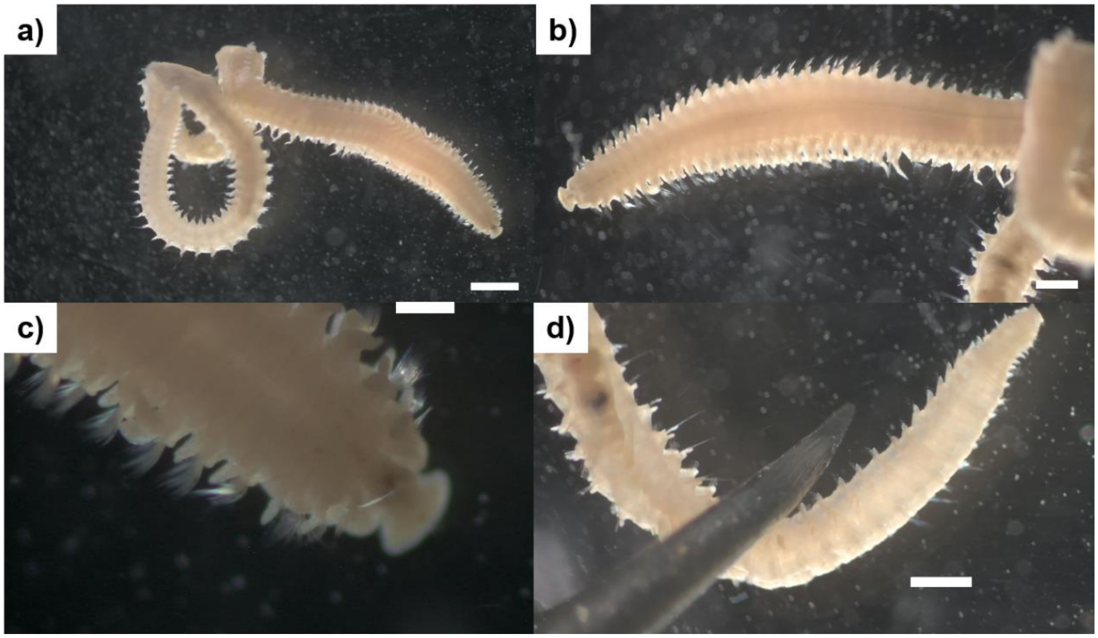

Figure 8-9: Specimen of *Marenzelleria viridis* identified in 2020 benthic infaunal samples. a) whole specimen view, dorsal surface (scale bar 1000 µm), b) anterior view, ventral surface (scale bar 500 µm), c) anterior, dorsal surface (scale bar 200 µm), d) posterior, dorsal surface (scale bar 500 µm).

8.5.4.1.9 Ampharete petersenae (2020)

The terebellid polychaete worm, *Ampharete petersenae* is a relatively recently described taxa. No description of its range is available, though specimen collection records indicate the range may include the North Atlantic as well as Arctic waters around Iceland, where the species was first described (Jirkov 1997; WoRMS 2021; Parapar et al. 2012). An anecdotal report indicates that this species may have been present in western Greenland (Parapar et al. 2012). *Ampharete petersenae* is not listed in AIS databases; the specimen was sent for independent verification as a precaution due to uncertainty in the described range on record. Laval confirmed the identification of *A. petersenae*.

***A. petersenae* is designated as No Risk and is not considered species of concern in Milne Inlet.**

8.5.4.1.10 Sosane wireni (2019 and 2020)

A terebellid polychaete worm was identified in 2019 samples that tentatively matched the identification of *Sosane wireni*. *S. wireni* is not listed on any of the available databases on invasive species and collection records indicate that this species may be cryptogenic to the area. This species was flagged because its described distribution is limited to New England, despite collection records existing outside of this area. For example, records exist documenting extensive collections of this species in Scandinavian waters, including under the former name *Sosanopsis wireni* (GBIF 2021; WoRMS 2021), as well as near Western Greenland and the Laptev Sea (GBIF 2021).

In 2020, specimens of *Sosane wireni* were again identified in benthic samples in Milne Port. These specimens were flagged and sent for verification at Laval due to previous concerns related to the identification of this taxa.

Laval confirmed the identification of *S. wireni*. Other species within the genus *Sosane* have Arctic or North Atlantic distributions. *S. bathyalis* is distributed within the European Arctic, *S. sulcate* and *S. wahrbergi* have North Atlantic and Scandinavian distributions, and *S. cinctus* is distributed through the North Atlantic.

No specimens from any species within the *Sosane* or *Sosanopsis* genii have been recorded in previous MEEMP or AIS surveys at Milne Port. *S. wireni* is considered Low Risk because, although it is not listed in AIS databases, it does not have a documented distribution in the Canadian Arctic; therefore, it has been placed on the Watchlist.

***S. wireni* is designated Low Risk and will be placed on the Watchlist.**

8.5.4.1.11 *Paramphitrite birulai* (2020)

The terebellid polychaete *Paramphitrite birulai* is poorly described with a limited taxonomic record. No range description exists for this species, but collection records indicate the range may be wide and include the European north Atlantic and high Arctic oceans (WoRMS 2021; Jirkov 2020). There are also indications of introductions in the Adriatic Sea, where it is described as non-indigenous, but not invasive (Rius et al. 2021). Uncertainty in the range of this taxa is compounded by disagreement in the accepted name, with some sources indicating the species is *Amphitrite birulai*, which has a narrower range on record, with type localities in Scandinavian waters (WoRMS 2021). Collection records for this species in North America are limited to a single specimen collected off the coast of Labrador in 1987 (Gagnon and Torgersen 2021).

The specimen was flagged for independent verification as a precaution due to uncertainty in the described range on record; however, the wide high Arctic range derived from a few collection events indicates this is unlikely to be a species of concern. Laval confirmed the identification under the alternative name *Amphitrite birulai*. *Amphitrite birulai* is considered Low Risk because, although it is not listed in AIS databases, it does not have a documented distribution in the Canadian Arctic; therefore, it has been placed on the Watchlist.

***Amphitrite birulai* is designated Low Risk and will be placed on the Watchlist.**

8.5.4.2 Arthropods

8.5.4.2.1 *Crassicorophium* sp. (2019)

An amphipod crustacean was identified in 2013 and 2017 samples as *Monocorophium insidiosum*. In 2018, individuals from the same genus were found with their identifying features missing and therefore only identified to the genus level. No species within this genus have confirmed distributions that include Arctic waters. *M. insidiosum* is a tube-building gammarid amphipod and a well-known fouling invasive species with a wide global distribution that is possibly non-indigenous to the Canadian Arctic (Molnar et al. 2008). The northern extent of the range of this species is unknown and it is considered cryptogenic on the North American east coast although it may be considered native to parts of the northern Atlantic Ocean (Palomares and Pauly 2020, NIMPIS 2018, Molnar et al. 2008). Populations of *M. insidiosum* have established in coastal regions of the north and south Pacific and Atlantic Oceans, the Mediterranean and the Indian Ocean (GBIF 2021). Vectors for introduction and spread are through biofouling of ship hulls and hard substrates in harbours and ports and possibly also through accidental transplant (Fofonoff et al. 2021, Molnar et al. 2008). In addition to *M. insidiosum*, two other species in this genus (*M. acherusicum* and *M. sextonae*) are also considered invasive (Molnar et al. 2008).

In 2019, specimens tentatively identified as *M. insidiosum* from samples in the 2017 and 2018 AIS programs at Milne Port were flagged and sent for independent taxonomic verification by Laval (the 2013 specimens were not available for re-review). Results suggested that the *M. insidiosum* identified in those years were actually *Crassicorophium bonelli*, although the identification was considered uncertain by Biologica (MacDonald 2020, Pers. Comm.). Further, an unknown species of gammarid amphipod was again identified from the *Monocorophium* genus in 2019 benthic infauna samples and sent to Laval for verification. Laval concluded the specimens were of the genus *Crassicorophium* but were unable to resolve to the species level.

C. bonelli has a known range similar to *M. insidiosum*, covering eastern North America and the northeastern Atlantic Ocean, but is not considered invasive in these locations (GBIF 2021, ETI 2021, Sirenko et al. 2020). No taxonomic record was found of this species in Arctic waters during review; however, similar to *M. insidiosum*, *C. bonelli* was also identified in Milne Port during baseline surveys in 2013. The genus *Crassicorophium* contains at least one species with a native range within Arctic Canada (GBIF 2021, WoRMS 2021). *C. bonelli* not listed in AIS databases but is considered alien to the South Atlantic and Australia.

No *Crassicorophium* or *Monocorophium* specimens were identified in 2020 samples, despite targeted benthic sampling at the locations where they had been observed previously. Due to uncertainties with the ranges and the potential for invasive behaviours in some species within the genus, targeted monitoring for *Crassicorophium* or *Monocorophium* specimens will continue in 2021. While uncertainty remains in the Arctic range, taxonomic identification, and NIS/AIS status of both *M. insidiosum* and *C. bonelli*, there is confidence that these do not represent Project-related introductions because of their presence in Milne Port prior to the commencement of shipping operations.

***Monocorophium* sp. is designated a 'High Risk' species of concern in the Project area. Its occurrence in Milne Inlet is not considered attributable to the Project. As a 'High Risk' species, it has been placed on the Project Watchlist.**

***Crassicorophium bonelli* is designated a 'Low Risk' species of concern in the Project area. Its occurrence in Milne Inlet is not considered attributable to the Project. This species has been placed on the Project Watchlist.**

8.5.4.2.2 *Philomedes* sp. (2019)

An ostracod within fish stomach samples from 2019 was identified as an *Euphilomedes* species. While species within this genus are found in a range of locations globally, there are no described species with Arctic or north Atlantic distributions (GBIF 2021, WoRMS 2021). Biologica re-examined the initial identification and confirmed the lab had made a transcription error while entering the identification. The specimen was corrected to *Philomedes* sp., a genus within the same subfamily as *Euphilomedes*. Multiple species of *Philomedes* have been described within the Canadian Arctic, including Baffin Island (GBIF 2021, WoRMS 2021). Additionally, unidentified species from this genus were observed in AIS surveys in Milne Port in 2017 and 2018. No *Philomedes* species are listed on any of the available databases on invasive species or species of concern. Because *Philomedes* sp, includes species with documented ranges that include the Canadian Arctic and are not listed in AIS databases, the genus is considered No Risk.

***Philomedes* sp. is designated No Risk and is not considered a taxa of concern for Milne Inlet.**

8.5.4.3 Bryozoans

8.5.4.3.1 *Oncousoecia* sp./ Tubuliporina (2019)

Among bryozoan species in 2019 benthic infauna samples was an unidentified species from the genus *Oncousoecia.* This genus includes species with ranges that extend into the northwest Atlantic, though recent specimen collection records within this region are solely from the New England area (WoRMS 2021). Two species within this genus have distributions that include Arctic waters, but are limited to the European Arctic, specifically the Barents Sea and Svalbard (*O. diastoporides* and *O. canadensis*; WoRMS 2021). A record of collection exists for *O. diastoporides* in Greenland; however, the identification was made from a preserved sample collected in 1875, and no recent records exist (GBIF 2021). No species within the genus *Oncousoecia* are listed on any of the available databases for invasive species or species of concern.

The specimen was flagged for independent verification at Laval, who were unable to confirm the identification to genus level. Rather, the specimen was classified to a higher taxonomic level, to the Suborder Tubuliporina – a taxonomic designation that contains the genus *Oncousoecia*, along with other species that have distributions within the Canadian Arctic (WoRMS 2021, GBIF 2021) and have been observed in previous MEEMP surveys. The Suborder also contains two species that have potentially established in areas outside of their native ranges, *Tubulipora flabellaris* and *T. misakiensis*, alien to European waters and parts of the north Pacific, respectively (Rius et al. 2021). However, as there are multiple species with Canadian Arctic distributions, it is considered probable that the Tubuliporina specimens do not represent the presence of an NIS/AIS taxa.

The indeterminate Tubuliporina specimens are designated No Risk and are not considered to be of concern for Milne Inlet.

8.5.4.4 Chordates

8.5.4.4.1 Ammodytes hexapterus (2020)

A sandlance species was found as a mortality washed up on a beach west of the Ore Dock and preserved for identification owing to the difficulty discerning between species in the field due to morphological similarities. Biologica tentatively identified the specimen as the Pacific Sandlance, *Ammodytes hexapterus*. Due to morphological similarities with the native Northern Sandlance (*A. dubius*) and the specimen being frozen, a tissue sample was also sent for DNA barcoding at the Canadian Centre for DNA Barcoding, where the fish was positively identified as the Pacific Sandlance.

Sandlance are common in Milne Port, occasionally captured in fish collection efforts or observed incidentally in other methods (Golder 2018, 2019a, b, 2020a). It was generally assumed that these were the Northern Sandlance, due to the range of that species being the only one that reliably included the Project area (Coad and Reist 2018). However, in 2017, sandlance found in benthic infaunal and zooplankton samples were initially identified as *A. hexapterus* and *A. personatus*, also commonly called the Pacific Sandlance. Due to uncertainties with the identifications, the specimens were considered *Ammodytes* spp. for this report.

The natural range of the Pacific Sandlance is considered to be the north Pacific, ranging from Southern California to the Chukchi Sea (Falardeau et al. 2017). However, in 2010, Pacific Sandlance began appearing in the Beaufort Sea, indicating a northward expansion of this species range, and were confirmed spawning in this location in 2011 (Falardeau et al. 2014). The apparent cause of the expansion is warming ocean temperatures and changing ice conditions due to climate change (Falardeau et al. 2017). As average temperatures are rising, the range of Pacific Sandlance has rapidly expanded, reaching the Canadian Arctic Archipelago by 2017 (Falardeau et al. 2017). The confirmation of this species in Milne Port represents the northernmost record for this species currently undergoing a documented range expansion due to climate change. Risks associated with sandlance range expansion include outcompeting juvenile life stages of cod species (*Boreogadus saida*) for limited food resources, as demonstrated by shifting communities in the Beaufort Sea (Fossheim et al. 2015; Falardeau et al. 2017). However, the behaviourally similar Northern Sandlance is already distributed within the Project area and local species may be adapted to compete. Further research is required to determine the extent of the dispersion within Milne Port relative to *A. dubius*. The observation of *Ammodytes hexapterus* in Milne Port represents a confirmed identification of an NIS taxa. However, invasion of this species is mediated by climate change and not Project vectors such as biofouling and ballast water.

***A. hexapterus* is designated Low Risk and will be placed on the Watchlist.**

8.6 Conclusions and Recommendations

The NIS/AIS program satisfies PC Nos. 87, 89, and 91. Detection is conducted at a surveillance level and designed to flag potential invasive or non-indigenous species introduced through Project-related vectors. Approximately 800 taxa have been identified in Milne Inlet through monitoring surveys to date, the vast majority of which have been designated as “No Risk” and are not considered to be of concern. Independent verification and directed literature review of flagged taxa have resulted in eight taxa being placed on a Project Watchlist for increased monitoring efforts, such as review by specialists or DNA analysis. As of yet, there has not been a Project-related introduction of an NIS/AIS species documented at Milne Port and no species have been placed on the Trigger List to initiate rapid response. Based on the number of specimens flagged and sent for independent verification, monitoring is considered to be effective and functioning as intended.

It is recommended that sampling across multiple trophic levels continues in 2021, that the taxonomic inventory for Milne Inlet continue to be expanded upon, and that all flagged specimens continue to be screened for known geographic ranges and AIS/NIS status. It is further recommended that increased efforts be made to collect and review genetic evidence for *Marenzelleria viridis* and *Monocorophium* sp. (both flagged as High Risk but not Project-related), including targeted sampling to obtain specimens for DNA barcoding.

8.7 Closure

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-296-7312.

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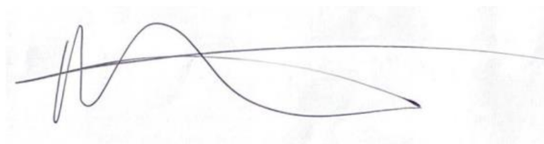
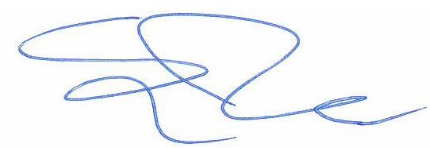


Christine Bylenga, PhD
Marine Scientist

Marina Winterbottom, BSc, MMM, RPBio
Senior Marine Biologist



Shawn Redden, RPBio
Associate, Senior Fisheries Biologist

CB/MW/SR/asd

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APPENDIX 8A

Benthic Infauna Presence/Absence (2010 through 2020)

Appendix 8A
Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Annelida	-	Clitellata	Hirudinea	-	-	-	Hirudinea indet.	-	-	-	-	-	-	Y	-
Annelida	-	Clitellata	Hirudinea	Rhynchobdellida	Piscicolidae	Platybdellinae	*Mysidobdella* sp.	-	-	-	-	X	-	-	X
Annelida	-	Clitellata	Oligochaeta	-	-	-	Oligochaete indet.	-	X	-	-	-	-	-	-
Annelida	-	Clitellata	Oligochaeta	Enchytraeida	Enchytraeidae	-	Enchytraeidae indet.	X	-	-	-	X	X	X	X
Annelida	-	Polychaeta	-	-	-	-	Polychaeta indet.	-	X	X	X	Y	-	-	-
Annelida	-	Polychaeta	Echiura	Echiuroidea	Echiuridae	-	*Echiurus echiurus*	-	X	X	-	X	X	-	X
Annelida	-	Polychaeta	Errantia	-	-	-	Errantia indet.	-	-	-	-	Y	-	-	-
Annelida	-	Polychaeta	Errantia	Eunicida	Dorvilleidae	-	*Ophryotrocha* sp.	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Eunicida	Dorvilleidae	-	*Parougia caeca*	-	-	-	-	-	X	X	X
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	Lumbrineridae indet.	-	-	-	-	-	-	Y	X
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	*Lumbrineris* sp.	X	X	X	X	-	X	-	-
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	*Scoletoma fragilis*	X	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	*Scoletoma impatiens*	-	-	-	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	*Scoletoma* sp.	-	-	-	-	-	X	Y	Y
Annelida	-	Polychaeta	Errantia	Eunicida	Lumbrineridae	-	*Scoletoma tenuis*	-	X	-	X	-	-	-	-
Annelida	-	Polychaeta	Errantia	Eunicida	Onuphidae	Hyalinoeciinae	*Nothria conchylega*	X	-	-	-	-	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Aphroditidae	-	Aphroditidae indet.	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Glyceridae	-	*Glycera capitata*	-	-	-	-	X	X	X	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Glyceridae	-	*Glycera* sp.	-	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Hesionidae	-	Hesionidae indet.	-	-	-	-	Y	-	Y	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Hesionidae	Ophiodrominae	*Gyptis* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Hesionidae	Psamathinae	Nereimyra aphroditoides	-	-	-	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Microphthalmidae	-	*Microphthalmus* sp.	-	-	-	-	-	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	Aglaophamus malmgreni	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Aglaophamus* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Micronephthys cornuta*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Nephtys bucera*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Nephtys ciliata*	X	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Nephtys paradoxa*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nephtyidae	-	*Nephtys* sp.	X	X	X	X	-	X	Y	Y
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nereididae	-	Nereididae indet.	X	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nereididae	Nereidinae	*Nereis* sp.	-	-	-	X	Y	-	Y	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Nereididae	Nereidinae	*Nereis zonata*	-	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Pholoidae	-	*Pholoe longa*	X	X	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Pholoidae	-	*Pholoe minuta*	-	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Pholoidae	-	*Pholoe* sp.	X	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Errantia	Phyllodocida	Pholoidae	-	*Pholoe tecta*	X	X	X	X	X	X	X	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	-	Phyllodocidae indet.	-	-	X	X	Y	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eteone barbata*	X	-	-	-	X	X	X	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eteone flava*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eteone longa* complex	-	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eteone* sp.	X	X	X	X	Y	X	Y	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eteone spilotus*	-	-	-	-	-	X		-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eulalia bilineata*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eulalia* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Eumida* sp.	-	-	-	-	-	-	X	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Eteoninae	*Hypereteone* sp.	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Phyllodocinae	*Phyllodoce groenlandica*	X	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Phyllodocinae	*Phyllodoce mucosa*	-	-	X	X	X	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Phyllodocidae	Phyllodocinae	*Phyllodoce* sp.	-	-	-	-	Y	X	Y	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	-	Polynoidae indet.	X	X	X	X	Y	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Bylgides groenlandicus*	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Bylgides promamme*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Bylgides sarsi*	-	X	X	X	X	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Bylgides* sp.	-	-	-	-	-	Y	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Bylgides* sp. A	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Gattyana cirrhosa*	X	X	X	-	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe extenuata*	-	X	X	X	X	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe fragilis*	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe imbricata*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe propinqua*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe rarispina*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe* sp.	X	X	X	X	Y	X	Y	X

Appendix 8A

Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Harmothoe viridis*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Hartmania moorei*	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Hartmania* sp.	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Hesperonoe* sp.	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Melaenis loveni*	-	-	-	-	-	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	*Neobylgides* sp.	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Polynoidae	Polynoinae	Polynoinae indet.	-	-	-	-	Y	-	Y	Y
Annelida	-	Polychaeta	Errantia	Phyllodocida	Sphaerodoridae	-	*Ephesiella* sp.	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Sphaerodoridae	-	*Sphaerodoropsis biserialis*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Sphaerodoridae	-	*Sphaerodoropsis minuta*	X	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Sphaerodoridae	-	*Sphaerodoropsis minutum*	-	-	-	-	-	-	X	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	-	Syllidae indet.	X	X	X	X	Y	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Anoplosyllinae	*Streptospinigera niuqtuut*	-	-	-	-	-	X	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Anoplosyllinae	*Syllides* sp.	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Eusyllinae	*Eusyllis* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Eusyllinae	*Pionosyllis compacta*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Eusyllinae	*Pionosyllis* sp.	-	-	-	-	-	X	-	Y
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Exogoninae	*Exogone naidina*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Exogoninae	*Exogone* sp.	-	X	-	-	X	X	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Exogoninae	*Exogone verugera*	X	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Errantia	Phyllodocida	Syllidae	Exogoninae	*Parexogone hebes*	-	X	-	-	-	X	X	-
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	*Galathowenia oculata*	-	-	X	-	X	X	X	X
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	*Myriochele danielsseni*	-	-	-	-	X	-	-	-
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	*Myriochele heeri*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	*Myriochele* sp.	-	-	-	-	Y	-	-	-
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	*Owenia fusiformis*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Oweniidae	-	Oweniidae indet.	-	-	X	X	-	X	Y	-
Annelida	-	Polychaeta	Polychaeta incertae sedis	-	Protodrilidae	-	*Protodrilus* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	*Capitella capitata* complex	X	X	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	Capitellidae indet.	-	-	-	X	Y	-	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	*Mediomastus ambiseta*	-	X	-	X	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	*Mediomastus* sp.	X	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	*Notomastus latericeus*	-	-	-	-	X	X	X	-
Annelida	-	Polychaeta	Sedentaria	-	Capitellidae	-	*Notomastus* sp.	-	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	-	Cossuridae	-	*Cossura longocirrata*	-	X	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	-	Cossuridae	-	*Cossura* sp.	X	-	X	X	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	-	Maldanidae indet.	X	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	-	Maldanidae sp. A	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	-	Maldanidae sp. B	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	-	Maldanidae sp. C	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Axiothella* sp.	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Clymenura polaris*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Clymenura* sp.	-	-	-	-	X	X	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Euclymene* sp.	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	Euclymeninae indet.	-	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Heteroclymene robusta*	-	-	X	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Microclymene* sp.	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Praxillella gracilis*	-	-	-	-	-	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Praxillella praetermissa*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Euclymeninae	*Praxillella* sp.	-	-	-	X	Y	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Maldaninae	*Maldane sarsi*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Nicomachinae	*Nicomache lumbricalis*	-	-	X	X	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Nicomachinae	*Nicomache* sp.	-	-	-	-	-	X	Y	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Nicomachinae	Nicomachinae indet.	-	-	-	-	-	-	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Nicomachinae	*Petaloproctus* sp.	-	-	-	-	-	-	Y	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Nicomachinae	*Petaloproctus tenuis*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Rhodininae	*Rhodine bitorquata*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Rhodininae	*Rhodine gracilior*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	-	Maldanidae	Rhodininae	*Rhodine loveni*	-	-	-	-	X	-	X	X
Annelida	-	Polychaeta	Sedentaria	-	Opheliidae	-	Opheliidae indet.	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Opheliidae	Opheliinae	*Ophelia limacina*	X	X	X	X	X	-	X	-
Annelida	-	Polychaeta	Sedentaria	-	Opheliidae	Ophelininae	*Ophelina acuminata*	X	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Opheliidae	Ophelininae	*Ophelina cylindricaudata*	-	-	-	-	-	X	X	X

Appendix 8A
Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Annelida	-	Polychaeta	Sedentaria	-	Opheliidae	Ophelininae	*Ophelina* sp.	-	-	-	-	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	-	Orbiniidae	-	Orbiniidae indet.	-	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Orbiniidae	Orbiniinae	*Leitoscoloplos acutus*	-	X	X	X	X	X	X	-
Annelida	-	Polychaeta	Sedentaria	-	Orbiniidae	Orbiniinae	*Leitoscoloplos* sp.	X	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	-	Orbiniidae	Orbiniinae	*Scoloplos armiger*	X	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Orbiniidae	Orbiniinae	*Scoloplos* sp.	-	X	X	-	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea (Acmira) catherinae*	-	-	-	-	-	-	X	-
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea (Strelzovia) antennata*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea catherinae*	-	X	-	-	X	-	-	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea hartmanae*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea minuta*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea nolani*	-	X	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea* sp.	X	X	-	X	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Aricidea* sp. A	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	Paraonidae indet.	-	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Paraonides* sp.	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	-	Paraonidae	-	*Paraonis* sp.	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	-	Scalibregmatidae	-	*Polyphysia baffinensis*	X	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	-	Scalibregmatidae	-	*Polyphysia crassa*	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	-	Scalibregmatidae	-	*Polyphysia* sp.	-	-	-	-	-	-	Y	-
Annelida	-	Polychaeta	Sedentaria	-	Scalibregmatidae	-	*Scalibregma inflatum*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	-	Scalibregmatidae	-	Scalibregmatidae indet.	-	-	-	-	Y	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Fabriciidae	-	Fabriciidae indet.	-	-	-	-	X	-	Y	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Fabriciidae	-	*Manayunkia aesturiana*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Fabriciidae	-	*Pseudofabricia* sp. nr. *aberrans*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellid sp. A	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellid sp. B	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellid sp. F	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellid sp. G	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae indet.	-	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae sp. 3	-	-	-	-	-	-	Y	Y
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae sp. 4	-	-	-	-	-	-	Y	Y
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae sp. H	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae sp. I	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	-	Sabellidae sp. J	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Myxicolinae	*Chone duneri*	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Myxicolinae	*Chone* sp.	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Bispira* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Branchiomma* sp.	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Dialychone* sp.	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Dialychone* sp. 1	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Dialychone* sp. 3	-	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Dialychone* sp. A	-	-	-	-	Y	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Dialychone* sp. B	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone analis*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone incolor*	-	X	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone papillosa*	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone rubrocincta*	-	-	-	-	X	X	X	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone* sp.	-	-	X	X	-	X	Y	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Euchone* sp. 1	-	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Hypsicomus* sp.	-	-	-	-	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Paradialychone harrisae*	-	-	-	-	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Potamilla neglecta*	-	-	X	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Sabellidae	Sabellinae	*Pseudopotamilla reniformis*	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Serpulidae	-	Serpulidae indet.	X	X	X	X	-	-	Y	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Serpulidae	Spirorbinae	*Bushiella (Jugaria) quadrangularis*	-	-	-	-	X	-	-	X
Annelida	-	Polychaeta	Sedentaria	Sabellida	Serpulidae	Spirorbinae	*Pileolaria* sp.	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Sabellida	Serpulidae	Spirorbinae	Spirorbinae indet.	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Apistobranchidae	-	*Apistobranchus* sp.	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Dipolydora caulleryi*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Dipolydora concharum*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Dipolydora quadrilobata*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Dipolydora socialis*	-	-	-	-	-	X	X	-

Appendix 8A
Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Dipolydora* sp.	-	-	-	-	Y	X	-	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Laonice cirrata*	-	-	-	-	-	X	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Marenzelleria* sp.	-	-	-	X	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Marenzelleria viridis*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Polydora* sp. complex	X	X	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Prionospio (Prionospio)* sp.	-	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Prionospio cirrifera*	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Prionospio* sp.	-	-	-	-	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Prionospio steenstrupi*	-	X	X	X	X	X	X	-
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Pygospio elegans*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Pygospio* sp.	-	X	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Scolelepis* sp.	-	-	-	-	-	X	-	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Spio filicornis*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	*Spio* sp.	-	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	Spionida	Spionidae	-	Spionidae indet.	X	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Spionida	Trochochaetidae	-	*Trochochaeta watsoni*	-	-	-	-	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	-	Ampharetidae indet.	X	X	X	X	Y	-	Y	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete borealis*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete finmarchica*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete oculata*	-	-	X	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete petersenae*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete* sp.	-	X	-	X	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Ampharete vega*	-	-	-	-	X	X	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	Ampharetid sp. B	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	Ampharetid sp. E	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Amphicteis gunneri*	-	X	X	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Amphicteis sundevalli*	X	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Anobothrus gracilis*	-	-	-	X	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Lysippe labiata*	-	-	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Samytha* sp.	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Ampharetidae	Ampharetinae	*Sosane* sp. nr. *wireni*	-	-	-	-	-	-	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Aphelochaeta marioni*	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Aphelochaeta* sp.	-	-	-	-	X	X	Y	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Chaetozone bathyala*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Chaetozone careyi*	-	-	-	-	X	X	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Chaetozone pigmentata*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Chaetozone setosa* complex	-	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Chaetozone* sp.	-	-	-	-	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	Cirratulidae indet.	X	X	X	X	Y	X	Y	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	Cirratulidae sp. A	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Kirkegaardia* sp.	-	-	-	-	-	X	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Cirratulidae	-	*Tharyx* sp.	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Flabelligeridae	-	*Brada villosa*	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Flabelligeridae	-	*Diplocirrus hirsutus*	-	-	X	X	-	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Flabelligeridae	-	*Flabelligera affinis*	-	-	-	X	-	-	X	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Flabelligeridae	-	Flabelligeridae indet.	-	-	X	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Melinnidae	-	*Melinna elisabethae*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Melinnidae	-	*Melinna* sp.	X	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	-	*Cistenides granulata*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	-	*Cistenides hyperborea*	X	-	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Pectinariidae	-	*Pectinaria* sp.	X	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	-	Terebellidae indet.	-	X	X	X	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Amaeana* sp.	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Lanassa* sp.	-	-	-	-	-	-	Y	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Lanassa venusta venusta*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Laphania boecki*	-	-	-	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Leaena ebranchiata*	-	-	-	-	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Neoamphitrite affinis*	-	-	-	-	X	X	X	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Nicolea venustula*	-	X	-	-	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Paramphitrite birulai*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Pista cristata*	-	-	-	X	-	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Pista maculata*	X	X	X	X	X	X	X	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Polycirrus medusa*	-	-	-	-	-	-	X	-

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Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Polycirrus* sp. complex	X	X	-	X	X	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Proclea graffii*	-	-	-	-	-	X	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Terebellidae	Terebellinae	*Amphitrite cirrata*	-	-	-	-	-	-	-	X
Annelida	-	Polychaeta	Sedentaria	Terebellida	Trichobranchidae	-	*Terebellides reishi*	-	-	-	-	X	-	-	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Trichobranchidae	-	*Terebellides* sp.	-	-	-	-	Y	X	Y	Y
Annelida	-	Polychaeta	Sedentaria	Terebellida	Trichobranchidae	-	*Terebellides stroemii*	X	X	X	X	X	-	X	-
Annelida	-	Polychaeta	Sedentaria	Terebellida	Trichobranchidae	-	Trichobranchidae indet.	X	-	-	-	-	-	-	Y
Annelida	-	Polychaeta	Sedentaria	Terebellida	Trichobranchidae	-	*Trichobranchus glacialis*	X	-	-	-	X	X	X	X
Annelida	-	Polychaeta/Archiannelida	Polychaeta incertae sedis	Archiannelida	-	-	Archiannelid indet.	-	X	-	-	-	-	-	-
Arthropoda	Chelicerata	Arachnida	Acari	-	-	-	Acari indet.	X	X	-	-	-	-	X	X
Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes	Halacaridae	-	Halacaridae indet.	-	-	-	-	X	X	X	X
Arthropoda	Chelicerata	Pycnogonida	-	-	-	-	Pycnogonida indet.	X	-	X	-	X	-	-	-
Arthropoda	Chelicerata	Pycnogonida	-	Pantopoda	Ammotheidae	-	*Achelia spinosa*	-	-	-	X	-	-	-	-
Arthropoda	Chelicerata	Pycnogonida	-	Pantopoda	Ammotheidae	-	*Achelia* sp.	-	-	-	-	X	-	-	-
Arthropoda	Chelicerata	Pycnogonida	-	Pantopoda	Nymphonidae	-	*Nymphon hirtipes*	-	-	-	-	-	-	X	X
Arthropoda	Chelicerata	Pycnogonida	-	Pantopoda	Nymphonidae	-	*Nymphon* sp.	-	-	-	-	X	X	-	X
Arthropoda	Crustacea	Hexanauplia	-	-	-	-	Cirripedia indet.	-	-	X	X	-	-	-	-
Arthropoda	Crustacea	Hexanauplia	Copepoda	-	-	-	Copepoda indet.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Hexanauplia	Copepoda	Cyclopoida	-	-	Cyclopoida indet.	-	-	-	-	X	X	X	X
Arthropoda	Crustacea	Hexanauplia	Copepoda	Harpacticoida	-	-	Harpacticoida indet.	X	X	-	X	X	X	X	X
Arthropoda	Crustacea	Hexanauplia	Thecostraca	Sessilia	-	-	Balanomorpha indet.	-	-	-	-	X	X	X	X
Arthropoda	Crustacea	Hexanauplia	Thecostraca	Sessilia	Archaeobalanidae	Semibalabinae	*Semibalanus balanoides*	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Hexanauplia	Thecostraca	Sessilia	Balanidae	Balaninae	*Balanus* sp.	X	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	-	Amphipoda indet.	X	X	X	X	Y	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Acanthonotozomatidae	-	Acanthonotozoma inflatum	-	-	-	-	-	-	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Ampelisca eschrichtii*	-	-	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Ampelisca* sp.	-	-	X	X	-	-	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	Ampeliscidae indet.	-	-	-	X	-	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Byblis gaimardii*	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Byblis* sp.	-	-	X	X	X	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Haploops* sp.	-	-	X	X	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ampeliscidae	-	*Haploops tubicola*	X	X	-	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Amphilochidae	-	Amphilochidae indet.	-	-	-	-	Y	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Amphilochidae	-	*Amphilochus hamatus*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Amphilochidae	-	*Amphilochus* sp.	-	-	-	-	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Aoridae	-	Aoridae indet.	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Atylidae	Atylinae	*Atylus carinatus*	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Atylidae	Atylinae	*Atylus* sp.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Atylidae	Nototropiinae	*Nototropis* sp.	-	-	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Calliopiidae	-	*Apherusa jurinei*	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Calliopiidae	-	*Apherusa megalops*	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Calliopiidae	-	Calliopiidae indet.	-	-	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	-	Corophiidae indet.	-	-	-	X	-	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Corophiinae	*Corophium* sp.	X	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Corophiinae	*Crassicorophium bonellii*	-	X	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Corophiinae	*Crassicorophium clarencense*	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Corophiinae	*Monocorophium insidiosum*	-	X	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Corophiinae	*Monocorophium* sp.	-	-	-	-	Y	X	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Protomedeiinae	*Protomedeia fasciata*	-	X	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Corophiidae	Protomedeiinae	*Protomedeia* sp.	-	-	-	-	X	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Dexaminidae	Dexamininae	*Dexamine* sp.	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Dexaminidae	Prophliantinae	*Guernea nordenskioldi*	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Dulichiidae	-	*Dulichia* sp.	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Dulichiidae	-	*Dyopedos* sp.	-	-	-	-	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Eusiridae	-	*Rhachotropis aculeata*	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Eusiridae	-	*Rhachotropis helleri*	-	-	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Eusiridae	-	*Rhachotropis oculata*	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Eusiridae	-	*Rhachotropis* sp.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	-	*Gammarus oceanicus*	-	X	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	-	*Gammarus setosus*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Gammaridae	-	*Gammarus* sp.	-	X	X	X	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Themisto libellula**	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Themisto* sp.	-	-	-	X	-	-	-	-

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Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ischyroceridae	-	Ischyroceridae indet.	X	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ischyroceridae	Ischyrocerinae	*Ischyrocerus anguipes*	-	X	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Ischyroceridae	Ischyrocerinae	*Ischyrocerus* sp.	-	-	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Lysianassidae	-	Lysianassidae indet.	X	-	X	-	Y	-	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Lysianassidae	-	Lysianassoidea indet.	-	-	-	-	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Melphidippidae	-	*Melphidippa* sp.	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Munnopsidae	Eurycopinae	*Eurycope* sp.	-	-	-	-	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	Aceroides latipes	-	-	-	-	-	-	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Aceroides* sp.	-	-	-	-	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Arrhis* sp.	-	-	-	-	-	X	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Bathymedon obtusifrons*	-	-	-	X	X	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Bathymedon* sp.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Deflexilodes* sp.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Deflexilodes tesselatus*	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Monoculodes latimanus*	-	X	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Monoculodes* sp.	X	X	X	X	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Monoculopsis longicornis*	-	X	-	X	X	-	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Monoculopsis* sp.	-	-	-	-	-	-	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Oediceros borealis*	-	X	X	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	Oedicerotidae indet.	X	X	X	X	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Paroediceros lynceus*	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Paroediceros* sp.	-	X	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Rostroculodes borealis*	-	-	X	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Rostroculodes kroyeri*	-	-	X	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Rostroculodes longirostris*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Rostroculodes* sp.	-	-	-	-	Y	X	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Westwoodilla caecula*	-	-	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Oedicerotidae	-	*Westwoodilla* sp.	-	X	-	X	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Opisidae	-	*Opisa eschrichti*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Phoxocephalidae	Harpiniinae	*Harpinia serrata*	X	-	X	X	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Phoxocephalidae	Harpiniinae	*Harpinia* sp.	-	-	X	X	Y	X	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Phoxocephalidae	Phoxocephalinae	*Phoxocephalus holbolli*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Podoceridae	-	Podoceridae indet.	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Pontoporeiidae	-	*Monoporeia affinis*	X	X	X	X	X	X	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Pontoporeiidae	-	*Pontoporeia femorata*	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Pontoporeiidae	-	Pontoporeiidae indet.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Scopelocheiridae	Scopelocheirinae	*Scopelocheirus hopei*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Stenothoidae	-	*Hardametopa nasuta*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Stenothoidae	-	*Metopa* sp.	-	X	-	-	-	-	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Stenothoidae	-	Stenothoidae indet.	X	-	-	X	Y	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Synopiidae	-	*Tiron spiniferus*	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Gronella groenlandica*	-	X	-	X	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Hippomedon denticulatus*	-	-	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Hippomedon serratus*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Hippomedon* sp.	-	-	-	-	-	-	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Orchomene macroserratus*	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Orchomene* sp.	-	-	-	-	X	X	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Orchomenella minuta*	-	X	-	X	-	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Orchomenella pinguis*	-	-	-	X	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	*Orchomenella* sp.	-	X	-	X	-	-	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Tryphosidae	-	Tryphosidae indet.	-	-	-	-	-	-	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx laticoxae*	-	-	-	-	-	-	X	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx lilljeborgi*	-	-	-	-	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx nugax*	X	X	X	X	X	-	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx ochoticus*	-	-	-	X	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx pacificus*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx sarsi*	-	-	X	X	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Anonyx* sp.*	-	X	X	X	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Menigrates obtusifrons*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus barentsi Group*	-	-	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus brevicaudatus*	-	-	-	-	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus litoralis*	-	-	X	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus normani*	-	-	X	-	-	-	-	-

Appendix 8A
Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus plautus*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus* sp.	X	-	-	-	Y	X	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	Uristidae indet.	-	-	-	-	Y	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	-	-	Cumacea indet.	-	X	X	X	Y	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Bodotriidae	Bodotriinae	*Cyclaspis longicaudata*	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Brachydiastylis resima*	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	Diastylidae indet.	-	-	-	-	Y	X	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis alaskensis*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis bradyi*	-	-	-	-	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis echinata*	-	-	X	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis goodsiri*	X	-	X	-	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis lucifera*	-	-	X	-	X	X	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis rathkei*	X	X	X	-	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis scorpiodes*	X	-	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis sculpta*	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis* sp.	-	X	-	X	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastylis spinulosa*	X	-	X	-	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Diastylidae	-	*Diastyloides biplicatus*	-	-	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Lampropidae	-	*Hemilamprops cristatus*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Lampropidae	-	Lampropidae indet.	-	-	X	-	Y	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Lampropidae	-	*Lamprops fuscatus**	X	X	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Lampropidae	-	*Lamprops* sp.	-	-	X	X	-	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Eudorella emarginata*	-	-	X	X	-	-	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Eudorella* sp.	X	-	X	X	Y	-	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Eudorella truncatula*	-	-	X	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Eudorellopsis* sp.	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Leucon nasica*	-	-	-	-	-	-	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Leucon nasicoides*	X	X	X	X	X	-	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	*Leucon* sp.	-	-	X	-	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Leuconidae	-	Leuconidae indet.	-	-	-	-	Y	X	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Nannastacidae	-	*Campylaspis rubicunda*	-	-	-	-	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Nannastacidae	-	*Campylaspis* sp.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Cumacea	Nannastacidae	-	Nannastacidae indet.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	Crangonidae indet.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	*Sabinea septemcarinata*	X	-	X	-	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	*Sclerocrangon boreas**	-	-	-	X	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	*Sclerocrangon* sp.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Thoridae	-	*Lebbeus polaris*	X	-	-	-	-	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Thoridae	-	*Lebbeus* sp.	-	-	-	-	-	-	Y	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	-	-	Asellota indet.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	-	-	Isopoda indet.	-	-	-	-	-	-	-	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	-	-	Isopoda sp. A	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Desmosomatidae	-	Desmosomatidae indet.	-	-	-	-	X	-	-	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Desmosomatidae	Desmosomatinae	*Desmosoma* sp.	-	X	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Desmosomatidae	Desmosomatinae	*Eugerda* sp.	X	-	-	-	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Gnathiidae	-	*Gnathia maxillaris*	-	-	-	X	-	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Gnathiidae	-	*Gnathia* sp.	X	X	-	-	X	-	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Gnathiidae	-	Gnathiidae indet.	-	-	-	-	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Paramunnidae	-	*Pleurogonium rubicundum*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Paramunnidae	-	*Pleurogonium* sp.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Isopoda	Paramunnidae	-	*Pleurogonium spinosissimum*	X	-	-	-	X	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	-	Mysida indet.	-	-	-	-	Y	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	Mysinae	*Mysis mixta*	-	X	-	X	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	Mysinae	*Mysis* sp.	-	X	-	-	-	X	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	-	-	Tanaidacea indet.	X	X	X	X	Y	X	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	Akanthophoreidae	-	*Akanthophoreus gracilis*	-	-	-	-	X	-	-	-
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	Akanthophoreidae	-	*Akanthophoreus* sp.*	-	-	-	-	Y	X	Y	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	Pseudotanaidae	Pseudotanainae	*Pseudotanais* sp.	-	-	-	-	X	X	Y	Y
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	Sphyrapodidae	Pseudosphyrapodinae	*Pseudosphyrapus anomalus*	X	-	-	X	X	X	X	X
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Tanaidacea	Typhlotanaidae	-	*Typhlotanais* sp.	-	-	-	-	X	X	X	X
Arthropoda	Crustacea	Ostracoda	-	-	-	-	Ostracoda indet.	-	-	-	-	Y	-	-	Y
Arthropoda	Crustacea	Ostracoda	Myodocopa	-	-	-	Myodocopa indet.	X	X	X	X	-	-	-	-
Arthropoda	Crustacea	Ostracoda	Myodocopa	Myodocopida	Philomedidae	Philomedinae	*Philomedes* sp.	-	-	-	-	X	X	X	X

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Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Arthropoda	Crustacea	Ostracoda	Podocopa	Podocopida	Cytheridae	-	Cytheridae indet.	-	-	-	-	-	-	X	-
Arthropoda	Crustacea	Ostracoda	Podocopa	Podocopida	Trachyleberididae	-	*Robertsonites tuberculatus*	-	-	-	-	X	-	-	-
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Curculionidae	-	Curculionidae indet.	-	-	-	-	-	X	-	-
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	-	-	Diptera indet.	-	-	-	-	Y	-	-	-
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	-	Chironomidae indet.	X	-	-	-	-	X	-	-
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Chironominae	Chironominae indet.	X	-	-	-	-	-	-	-
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Diamesinae	*Diamesa* sp.	-	-	-	-	-	-	-	X
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius* sp. Complex	-	-	-	-	-	-	-	X
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella* sp.	-	-	-	-	-	-	-	X
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Orthocladiinae	Orthocladiinae indet.	X	-	-	-	X	X	-	X
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Empididae	Clinocerinae	*Clinocera* sp.	-	-	-	-	-	-	-	X
Bryozoa	-	-	-	-	-	-	Bryozoa indet.	-	-	-	-	Y	X	-	X
Bryozoa	-	Gymnolaemata	-	-	-	-	Gymnolaemata indet.	-	-	-	-	-	-	Y	-
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	-	-	Cheilostomatida indet.	-	-	-	-	-	-	Y	X
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Calloporidae	-	Calloporidae indet.	-	-	-	-	-	X	X	X
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Candidae	-	*Scrupocellaria* sp.	-	-	-	-	-	X	-	-
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Epistomiidae	-	*Synnotum* sp.	-	-	-	-	X	-	-	-
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Escharellidae	-	*Escharella* sp.	-	-	-	-	-	-	X	X
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Eucrateidae	-	*Eucratea* sp.	-	-	-	-	-	-	-	X
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Hippothoidae	-	*Celleporella hyalina*	-	-	-	-	X	-	-	-
Bryozoa	-	Gymnolaemata	-	Cheilostomatida	Myriaporidae	-	*Leieschara* sp.	-	-	-	-	-	X	-	X
Bryozoa	-	Gymnolaemata	-	Ctenostomatida	-	-	Ctenostomatida indet.	-	-	-	-	X	X	-	-
Bryozoa	-	Gymnolaemata	-	Ctenostomatida	Alcyonidiidae	-	Alcyonidium sp.	-	-	-	-	-	X	X	X
Bryozoa	-	Gymnolaemata	-	Ctenostomatida	Triticellidae	-	*Triticella* sp.	-	-	-	-	-	X	-	-
Bryozoa	-	Gymnolaemata	-	Ctenostomatida	Vesiculariidae	-	Amathia sp.	-	-	-	-	X	-	X	-
Bryozoa	-	Stenolaemata	-	-	-	-	Stenolaemata indet.	-	-	-	-	-	-	Y	-
Bryozoa	-	Stenolaemata	-	Cyclostomatida	Crisiidae	-	*Crisia* sp.	-	-	-	-	X	X	X	X
Bryozoa	-	Stenolaemata	-	Cyclostomatida	Oncousoeciidae	-	*Oncousoecia* sp.	-	-	-	-	-	-	X	-
Bryozoa	-	Stenolaemata	-	Cyclostomatida	Tubuliporidae	-	*Tubulipora* sp.	-	-	-	-	-	-	X	X
Chordata	Tunicata	-	-	-	-	-	Tunicata indet.	-	-	-	X	-	-	-	-
Chordata	Tunicata	Ascidiacea	-	-	-	-	Ascidiacea indet.	-	-	-	-	Y	-	X	X
Chordata	Tunicata	Ascidiacea	-	Aplousobranchia	-	-	Aplousobranchia indet.	-	-	-	-	-	X	X	X
Chordata	Tunicata	Ascidiacea	-	Phlebobranchia	Ascidiidae	-	*Ascidia callosa*	-	X	-	-	-	-	-	-
Chordata	Tunicata	Ascidiacea	-	Phlebobranchia	Ascidiidae	-	*Ascidia* sp.	-	X	X	-	X	X	Y	X
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	-	-	Stolidobranchia indet.	-	-	-	-	-	-	-	Y
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Molgulidae	-	*Molgula* sp.	-	X	-	-	-	X	X	-
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Pyuridae	-	*Boltenia echinata*	-	-	X	-	X	X	X	X
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Pyuridae	-	*Boltenia* sp.	-	-	-	-	-	-	-	Y
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Styelidae	-	*Polycarpa fibrosa*	-	-	-	-	X	X	-	X
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Styelidae	-	*Polycarpa* sp.	-	-	-	-	-	-	Y	Y
Chordata	Tunicata	Ascidiacea	-	Stolidobranchia	Styelidae	-	Styelidae indet.	-	-	-	-	-	-	Y	-
Chordata	Vertebrata	-	-	-	-	-	Pisces indet.	-	-	-	-	X	-	-	-
Chordata	Vertebrata	Actinopterygii	-	Perciformes	Zoarcidae	-	Zoarcidae indet.	-	-	-	-	-	-	X	-
Chordata	Vertebrata	Actinopterygii	-	Scorpaeniformes	Cottidae	-	Cottidae indet.	-	-	-	-	-	-	X	X
Cnidaria	-	Anthozoa	-	-	-	-	Anthozoa indet.	-	-	-	-	-	-	-	Y
Cnidaria	-	Anthozoa	Ceriantharia	Spirularia	Cerianthidae	-	*Cerianthus lloydii*	-	-	-	-	-	-	-	X
Cnidaria	-	Anthozoa	Hexacorallia	Actiniaria	-	-	Actiniaria indet.	-	-	-	-	-	-	-	Y
Cnidaria	-	Anthozoa	Hexacorallia	Actiniaria	Actiniidae	-	*Urticina* sp.	-	-	-	-	X	-	-	-
Cnidaria	-	Anthozoa	Hexacorallia	Actiniaria	Edwardsiidae	-	Edwardsiidae indet.	-	-	-	-	-	-	X	X
Cnidaria	-	Anthozoa	Hexacorallia	Actiniaria	Halcampidae	-	*Halcampa* sp.	-	-	-	-	-	-	-	X
Cnidaria	-	Anthozoa	Hexacorallia	Actiniaria	Hormathiidae	-	*Hormathia digitata*	-	-	-	-	X	-	-	-
Cnidaria	-	Anthozoa	Hexacorallia	Zoantharia	Parazoanthidae	-	*Parazoanthus* sp.	-	-	-	-	X	-	-	-
Cnidaria	-	Hydrozoa	-	-	-	-	Hydrozoa indet.	-	-	-	-	Y	-	Y	X
Cnidaria	-	Hydrozoa	Hydroidolina	Anthoathecata	-	-	Anthoathecata indet.	-	-	-	-	-	-	Y	X
Cnidaria	-	Hydrozoa	Hydroidolina	Anthoathecata	Bougainvilliidae	-	Bougainvilliidae indet.	-	-	-	-	X	X	-	X
Cnidaria	-	Hydrozoa	Hydroidolina	Anthoathecata	Corynidae	-	Corynidae indet.	-	-	-	-	-	-	X	-
Cnidaria	-	Hydrozoa	Hydroidolina	Leptothecata	-	-	Leptothecata indet.	-	-	-	-	-	-	-	Y
Cnidaria	-	Hydrozoa	Hydroidolina	Leptothecata	Lafoeidae	-	Lafoea sp.	-	-	-	-	-	-	X	-
Cnidaria	-	Hydrozoa	Trachylinae	Limnomedusae	Monobrachiidae	-	*Monobrachium parasitum*	-	-	-	-	X	X	X	X
Echinodermata	Asterozoa	Asteroidea	-	Forcipulatida	Asteriidae	-	Asteriidae indet.	-	-	X	-	-	-	-	-
Echinodermata	Asterozoa	Ophiuroidea	-	-	-	-	Ophiuroidea indet.	-	-	X	-	-	-	Y	Y
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Amphilepidida	-	-	Amphilepidida indet.	-	-	-	-	-	-	-	X
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiopyrgidae	-	*Ophiopleura borealis*	-	-	-	-	-	-	X	X

Appendix 8A

Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	-	Ophiuridae indet.	-	-	-	-	-	-	Y	Y
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	*Ophiocten affinis*	-	-	-	-	-	X	X	X
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	*Ophiocten sericeum*	X	X	-	-	-	-	-	-
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	*Ophiura robusta*	X	-	X	X	X	X	X	X
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	*Ophiura sarsii*	X	X	X	X	X	X	X	X
Echinodermata	Asterozoa	Ophiuroidea	Myophiuroidea	Ophiurida	Ophiuridae	Ophiurinae	*Ophiura* sp.*	-	-	X	-	Y	-	Y	Y
Echinodermata	Echinozoa	Echinoidea	Euechinoidea	Camarodonta	Strongylocentrotidae	-	*Strongylocentrotus droebachiensis*	X	-	X	X	X	X	X	X
Echinodermata	Echinozoa	Echinoidea	Euechinoidea	Camarodonta	Strongylocentrotidae	-	*Strongylocentrotus pallidus*	-	-	-	-	-	-	-	X
Echinodermata	Echinozoa	Echinoidea	Euechinoidea	Camarodonta	Strongylocentrotidae	-	*Strongylocentrotus* sp.	-	X	-	-	Y	X	Y	Y
Echinodermata	Echinozoa	Holothuroidea	-	-	-	-	Holothuroidea sp. A	-	-	-	-	X	X	-	-
Echinodermata	Echinozoa	Holothuroidea	Actinopoda	Dendrochirotida	Psolidae	-	*Psolus phantapus*	-	-	-	-	X	X	-	-
Echinodermata	Echinozoa	Holothuroidea	Actinopoda	Dendrochirotida	Psolidae	-	*Psolus* sp.	-	-	-	-	-	-	Y	-
Echinodermata	Echinozoa	Holothuroidea	Actinopoda	Molpadida	-	-	Molpadida indet.	-	-	-	-	X	X	-	-
Echinodermata	Echinozoa	Holothuroidea	Actinopoda	Molpadida	Eupyrgidae	-	*Eupyrgus scaber*	-	-	-	-	-	-	X	X
Echinodermata	Echinozoa	Holothuroidea	Paractinopoda	Apodida	-	-	Apodida indet.	-	-	-	-	-	-	Y	Y
Echinodermata	Echinozoa	Holothuroidea	Paractinopoda	Apodida	Myriotrochidae	-	*Myriotrochus rinkii*	-	-	-	X	-	-	X	X
Entoprocta	-	-	-	-	-	-	Entoprocta indet.	-	-	-	-	-	-	-	X
Entoprocta	-	-	-	Coloniales	Barentsiidae	-	*Barentsia* sp.	-	-	-	-	-	-	-	X
Hemichordata	-	Enteropneusta	-	-	-	-	Enteropneusta indet.	-	-	-	-	-	-	-	X
Mollusca	-	Bivalvia	-	-	-	-	Bivalvia indet.	-	X	X	X	Y	-	X	X
Mollusca	-	Bivalvia	-	-	-	-	Bivalvia sp. A	-	-	-	X	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	-	Cuspidariidae	-	*Cuspidaria arctica*	-	-	X	-	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	-	Cuspidariidae	-	*Cuspidaria* sp.	X	-	-	-	-	X	-	X
Mollusca	-	Bivalvia	Autobranchia	-	Lyonsiidae	-	*Lyonsia arenosa*	-	-	-	-	X	X	X	-
Mollusca	-	Bivalvia	Autobranchia	-	Periplomatidae	-	*Periploma aleuticum*	X	-	-	-	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	-	Thraciidae	-	*Thracia myopsis*	-	-	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	-	Thraciidae	-	*Thracia* sp.	-	-	-	-	Y	X	Y	-
Mollusca	-	Bivalvia	Autobranchia	Adapedonta	Hiatellidae	-	*Hiatella arctica*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Arcida	Arcidae	-	*Bathyarca glacialis*	-	-	-	-	-	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Cardiidae	Clinocardiinae	*Ciliatocardium ciliatum*	X	-	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Cardiidae	Clinocardiinae	Clinocardiinae indet.	-	-	-	-	-	-	Y	-
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Cardiidae	Clinocardiinae	*Serripes groenlandicus*	-	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Cardiidae	Clinocardiinae	*Serripes* sp.	-	X	-	-	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Cardiidae	-	Cardiidae indet.	-	-	-	-	Y	-	-	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Tellinidae	Macominae	*Limecola balthica*	-	-	X	X	X	X	X	-
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Tellinidae	Macominae	*Macoma calcarea*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Tellinidae	Macominae	*Macoma moesta*	-	-	-	-	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Tellinidae	Macominae	*Macoma* sp.	-	-	-	-	Y	X	-	-
Mollusca	-	Bivalvia	Autobranchia	Cardiida	Tellinidae	Macominae	Macominae indet.	-	-	-	-	-	-	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Carditida	Astartidae	-	*Astarte borealis*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Carditida	Astartidae	-	*Astarte montagui*	X	-	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Carditida	Astartidae	-	*Astarte* sp.	X	X	X	X	Y	X	Y	X
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	*Axinopsida serricata**	-	-	-	-	X	-	X	-
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	*Axinopsida* sp.	-	-	-	-	-	-	Y	X
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	*Thyasira flexuosa*	-	X	X	X	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	*Thyasira gouldi*	X	-	-	-	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	*Thyasira* sp.	-	-	-	-	X	X	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Lucinida	Thyasiridae	-	Thyasiridae indet.*	-	-	-	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Myida	Myidae	-	*Mya arenaria*	-	-	X	X	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Myida	Myidae	-	*Mya* sp.	-	-	-	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Myida	Myidae	-	*Mya truncata*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	-	Mytilidae indet.	X	-	-	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Crenellinae	*Crenella faba*	X	X	X	X	X	X	-	-
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Crenellinae	*Crenella* sp.	-	X	-	-	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Dacrydiinae	*Dacrydium vitreum*	X	-	-	-	-	X	-	X
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Musculinae	*Musculus discors*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Musculinae	*Musculus niger*	-	X	-	-	X	-	X	X
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Musculinae	*Musculus* sp.	X	-	-	-	Y	-	Y	X
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Mytilinae	*Mytilus edulis*	-	X	-	-	-	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Mytilida	Mytilidae	Mytilinae	*Mytilus* sp.	-	-	-	-	X	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Pectinida	-	-	Pectinoidea indet.	-	-	-	-	Y	-	-	-
Mollusca	-	Bivalvia	Autobranchia	Pectinida	Pectinidae	-	Pectinidae indet.	-	-	-	-	Y	X	-	X
Mollusca	-	Bivalvia	Autobranchia	Pectinida	Pectinidae	Pedinae	*Chlamys islandica*	-	-	X	X	X	X	X	X

Appendix 8A

Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Mollusca	-	Bivalvia	Autobranchia	Pectinida	Propeamussiidae	-	Propeamussiidae indet.	-	-	-	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Autobranchia	Pectinida	Propeamussiidae	-	*Similipecten greenlandicus*	X	-	X	X	X	X	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	-	-	Nuculanida indet.	-	-	-	-	-	-	Y	-
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	-	-	Nuculanoidea indet.	-	-	-	-	Y	X	-	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Nuculanidae	Nuculaninae	*Nuculana minuta*	-	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Nuculanidae	Nuculaninae	*Nuculana pernula*	X	X	X	X	X	X	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Nuculanidae	Nuculaninae	*Nuculana* sp.	-	-	X	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	*Portlandia arctica*	X	X	X	X	X	-	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	*Yoldiella frigida*	-	-	-	-	-	X	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	*Yoldiella intermedia*	-	-	-	-	-	X	X	-
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	*Yoldiella lenticula*	X	-	-	-	-	X	-	-
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	*Yoldiella nana*	X	-	-	-	-	-	-	-
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	Yoldiella sp.	-	-	-	-	-	-	-	Y
Mollusca	-	Bivalvia	Protobranchia	Nuculanida	Yoldiidae	-	Yoldiidae indet.	-	-	-	-	Y	X	Y	Y
Mollusca	-	Bivalvia	Protobranchia	Nuculida	Nuculidae	-	*Ennucula tenuis*	X	-	-	-	X	X	X	X
Mollusca	-	Bivalvia	Protobranchia	Nuculida	Nuculidae	-	*Nucula* sp.	-	-	X	-	-	-	-	-
Mollusca	-	Bivalvia	Protobranchia	Nuculida	Nuculidae	-	*Pronucula tenuis*	-	X	X	X	-	-	-	-
Mollusca	-	Caudofoveata	-	-	-	-	Caudofoveata indet.	-	-	-	-	-	-	-	Y
Mollusca	-	Caudofoveata	-	Chaetodermatida	Chaetodermatidae	-	*Chaetoderma* sp.	-	-	X	X	X	X	X	X
Mollusca	-	Gastropoda	-	-	-	-	Gastropoda indet.	-	-	X	-	Y	X	Y	X
Mollusca	-	Gastropoda	-	-	-	-	Gastropoda sp. A	-	-	-	X	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Capulidae	-	*Ariadnaria borealis*	-	-	X	X	X	X	X	X
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Naticidae	-	*Naticidae (juvenile)*	-	-	X	-	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Naticidae	-	Naticidae indet.	-	-	-	-	-	-	Y	X
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Naticidae	Naticinae	*Cryptonatica affinis*	-	-	X	X	X	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Naticidae	Naticinae	*Euspira pallida*	X	-	-	-	X	X	X	X
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Naticidae	Polinicinae	*Bulbus* sp.	-	X	-	-	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Rissoidae	-	*Boreocingula castanea*	-	X	-	X	-	X	X	X
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Rissoidae	-	Rissoidae indet.	-	-	-	-	X	X	Y	Y
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Skeneopsidae	-	*Skeneopsis planorbis*	-	X	-	-	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Littorinimorpha	Velutinidae	-	Velutinidae indet.	-	-	-	-	X	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Buccinidae	-	Buccinidae indet.	-	-	-	-	Y	X	Y	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Buccinidae	-	*Buccinum ciliatum*	-	-	-	-	-	-	X	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Buccinidae	-	*Buccinum hydrophanum*	-	-	-	-	-	X	X	X
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Buccinidae	-	Colus sp.	-	-	-	-	X	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Buccinidae	-	*Volutopsius norwegicus*	-	-	-	-	X	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Cancellariidae	Admetinae	*Admete viridula*	-	-	-	X	-	X	X	X
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Columbellidae	-	Columbellidae indet.	-	-	-	-	-	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Mangeliidae	-	Mangeliidae indet.	-	-	-	-	-	-	Y	X
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Mangeliidae	-	*Oenopota* sp.	-	-	-	X	-	X	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Mangeliidae	-	*Oenopota violacea*	-	X	X	X	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Mangeliidae	-	*Propebela* sp.	-	-	-	-	X	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Mangeliidae	-	*Propepela nobilis*	-	-	-	X	-	-	-	-
Mollusca	-	Gastropoda	Caenogastropoda	Neogastropoda	Turridae	-	Turridae indet.	X	-	-	-	X	-	-	-
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	-	-	Cephalaspidea indet.	-	-	-	-	Y	X	Y	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Cylichnidae	-	*Cylichna alba*	X	-	X	X	-	X	X	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Cylichnidae	-	*Cylichna gouldi*	-	-	X	X	-	-	-	-
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Cylichnidae	-	*Cylichna* sp.	-	-	-	-	X	X	Y	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Cylichnidae	-	Cylichnidae indet.	-	-	-	-	Y	X	Y	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Cylichnidae	-	*Cylichnoides occultus*	X	-	-	-	X	X	X	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Philinidae	Philininae	Philininae indet.	-	-	-	-	-	-	X	X
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Retusidae	-	*Retusa obtusa*	-	X	-	-	-	-	-	-
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Retusidae	-	*Retusa* sp.	-	-	-	-	-	-	-	Y
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Retusidae	-	Retusidae indet.	-	X	-	-	-	-	-	-
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Tornatinidae	-	*Acteocina canaliculata*	X	-	-	-	-	-	-	-
Mollusca	-	Gastropoda	Heterobranchia	Cephalaspidea	Tornatinidae	-	Acteocina sp.	-	-	-	-	X	-	X	X
Mollusca	-	Gastropoda	Patellogastropoda	-	-	-	Patellogastropoda indet.	-	X	X	-	Y	-	-	X
Mollusca	-	Gastropoda	Patellogastropoda	-	Lepetidae	-	*Lepeta caeca*	X	X	X	X	X	X	X	X
Mollusca	-	Gastropoda	Patellogastropoda	-	Lottiidae	-	*Erginus rubellus*	-	-	-	-	-	-	X	-
Mollusca	-	Gastropoda	Patellogastropoda	-	Lottiidae	-	Lottiidae indet.	-	-	-	-	X	X	-	-
Mollusca	-	Gastropoda	Patellogastropoda	-	Lottiidae	-	*Testudinalia testudinalis*	X	X	X	-	-	X	-	-
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Colloniidae	Moelleriinae	*Moelleria costulata*	-	-	-	-	X	X	-	X
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Margaritidae	-	*Margarites groenlandicus*	-	X	X	X	X	X	X	-

Appendix 8A
Benthic Infauna Taxa Presence/Absence from Survey Years 2010-2020

Phylum	Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2010	2013	2015	2016	2017	2018	2019	2020
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Margaritidae	-	*Margarites helicinus*	-	-	-	-	X	X	X	X
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Margaritidae	-	*Margarites olivaceus*	X	-	-	-	-	X	-	X
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Margaritidae	-	*Margarites* sp.	-	-	-	-	Y	X	Y	Y
Mollusca	-	Gastropoda	Vetigastropoda	Trochida	Trochidae	-	Trochidae indet.	X	-	-	-	X	X	-	-
Mollusca	-	Polyplacophora	-	-	-	-	Polyplacophora indet.	-	-	-	-	Y	-	-	-
Mollusca	-	Polyplacophora	Neoloricata	Chitonida	Tonicellidae	Tonicellinae	*Tonicella marmorea*	X	-	X	X	X	X	X	X
Mollusca	-	Scaphopoda	-	Gadilida	Gadilidae	-	Gadilidae indet.							Y	X
Mollusca	-	Scaphopoda	-	Gadilida	Gadilidae	-	*Siphonodentalium lobatum*	-	-	-	-	-	-	X	X
Mollusca	Aculifera	Aplacophora	-	-	-	-	Aplacophora indet.	-	-	-	-	X	X	-	-
Nematoda	-	-	-	-	-	-	Nematoda indet.	-	-	-	-	-	-	-	X
Nemertea	-	-	-	-	-	-	Nemertea indet.	-	X	X	X	Y	X	Y	X
Nemertea	-	Hoplonemertea	-	-	-	-	Hoplonemertea indet.	-	-	-	-	-	-	Y	X
Nemertea	-	Hoplonemertea	-	Monostilifera	Amphiporidae	-	Amphiporus sp.	-	-	-	-	-	-	-	X
Nemertea	-	Hoplonemertea	-	Monostilifera	Tetrastemmatidae	-	Tetrastemma sp.	-	-	-	-	X	-	X	-
Nemertea	-	Hoplonemertea	-	Monostilifera	Tetrastemmatidae	-	Tetrastemmatidae indet.	-	-	-	-	-	-	-	Y
Nemertea	-	Nemertea incertae sedis	-	-	-	-	Nermertea incertae sedis indet. (Anopla)	-	-	-	-	Y	X	-	-
Nemertea	-	Nemertea incertae sedis	-	-	-	-	Nermertea incertae sedis indet. (Enopla)	-	-	-	-	Y	X	-	-
Nemertea	-	Palaeonemertea	-	Archinemertea	Cephalotrichidae	-	*Cephalothrix* sp.	-	-	-	-	X	X	X	X
Nemertea	-	Palaeonemertea	-	Carinomiformes	Carinomidae	-	*Carinoma* sp.	-	-	-	-	-	X	-	X
Nemertea	-	Palaeonemertea	-	Tubulaniformes	Tubulanidae	-	*Tubulanus* sp.	-	-	-	-	-	X	X	X
Nemertea	-	Pilidiophora	-	Heteronemertea	-	-	Heteronemertea indet.	-	-	-	-	-	-	Y	-
Nemertea	-	Pilidiophora	-	Heteronemertea	Lineidae	-	*Cerebratulus* sp.	-	X	X	-	X	X	X	X
Nemertea	-	Pilidiophora	-	Heteronemertea	Lineidae	-	Lineidae indet.	-	-	-	-	-	-	Y	X
Nemertea	-	Pilidiophora	-	Heteronemertea	Lineidae	-	*Lineus* sp.	-	-	-	-	-	-	X	X
Platyhelminthes	-	-	-	-	-	-	Platyhelminthes indet.	-	-	-	-	X	X	-	-
Porifera	-	Calcarea	-	-	-	-	Calcarea indet.*	-	-	-	-	X	X	X	X
Porifera	-	Demospongiae	-	-	-	-	Demospongiae indet.	-	-	-	-	-	-	-	X
Priapulida	-	-	-	-	-	-	Priapulida indet.	-	X	-	-	-	-	Y	Y
Priapulida	-	-	-	Prapulomorpha	Priapulidae	-	*Priapulus caudatus*	X	-	X	X	X	X	-	X
Priapulida	-	-	-	Prapulomorpha	Priapulidae	-	*Priapulus* sp.	-	-	-	-	Y	X	Y	Y
Sipuncula	-	-	-	-	-	-	Sipuncula indet.	-	-	X	X	-	-	-	-
Sipuncula	-	Sipunculidea	-	Golfingiida	Golfingiidae	-	*Golfingia* sp.	-	-	-	-	X	X	X	X
Sipuncula	-	Sipunculidea	-	Golfingiida	Golfingiidae	-	Golfingiidae indet.	-	-	-	-	-	-	Y	X
Sipuncula	-	Sipunculidea	-	Golfingiida	Golfingiidae	-	*Nephasoma* sp.	-	-	-	-	X	-	X	X
XXXX	-	-	-	-	-	-	Cyclostomatida indet.	-	-	-	-	-	-	Y	-
							# New Unique Taxa each year	135	84	53	50	113	47	41	34
							TOTAL # Taxa (COUNT)	135	147	156	188	237	320	318	370

APPENDIX 8B

Incidental Taxa Identifications

Appendix 8B
Incidental Taxa Identifications and Method of Collection

Phylum Class/Order	Family	Taxa	Method
Acanthocephala			
-/-	-	**Acanthocephala indet.**	Stomach Contents
Annelida			
Clitellata/Rhynchobdellida	Piscicolidae	***Oceanobdella* sp.**	Incidentals
Polychaeta/-	-	Polychaeta indet.	Stomach Contents, Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Polychaeta/Phyllodocida	Phyllodocidae	***Paranaitis* sp.**	Incidentals
Polychaeta/Phyllodocida	Phyllodocidae	*Phyllodoce groenlandica*	Incidentals
Polychaeta/Sabellida	Sabellidae	Sabellidae indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Polychaeta/Terebellida	Pectinariidae	*Cistenides granulata*	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Polychaeta/Terebellida	Terebellidae	Terebellida indet.	Ore Dock Offset Monitoring
Arthropoda			
Pycnogonida /Pantopoda	Nymphonidae	*Nymphon* sp.	Incidentals, Ore Dock Offset Monitoring
-/-	-	Crustacea indet.	Stomach Contents
Hexanauplia/-	-	Copepoda indet.	Ore Dock Offset Monitoring
Hexanauplia/Calanoida	-	Calanoida indet.	Stomach Contents
Hexanauplia/Calanoida	Calanidae	*Calanus glacialis*	Stomach Contents
Hexanauplia/Calanoida	Calanidae	*Calanus hyperboreus*	Stomach Contents
Hexanauplia/Calanoida	Calanidae	*Calanus* sp.	Stomach Contents
Hexanauplia/Sessilia	-	Balanomorpha indet.	Ore Dock Offset Monitoring
Hexanauplia/Sessilia	Balanidae	*Balanus* sp.	Incidentals
Malacostraca/Amphipoda	-	Amphipoda indet.	Stomach Contents
Malacostraca/Amphipoda	-	Hyperiidea indet.	Stomach Contents
Malacostraca/Amphipoda	-	Lysianassoidea indet.	Stomach Contents
Malacostraca/Amphipoda	Atylidae	*Atylus carinatus*	Stomach Contents
Malacostraca/Amphipoda	Gammaracanthidae	***Gammaracanthus loricatus***	Incidentals
Malacostraca/Amphipoda	Gammaridae	Gammaridae indet.	Stomach Contents
Malacostraca/Amphipoda	Gammaridae	*Gammarus oceanicus*	Incidentals
Malacostraca/Amphipoda	Gammaridae	*Gammarus* sp.	Stomach Contents
Malacostraca/Amphipoda	Hyperiidae	*Themisto libellula*	Stomach Contents
Malacostraca/Amphipoda	Hyperiidae	*Themisto* sp.	Stomach Contents
Malacostraca/Amphipoda	Pontoporeiidae	*Monoporeia affinis*	Stomach Contents
Malacostraca/Amphipoda	Uristidae	*Anonyx* sp.	Stomach Contents
Malacostraca/Amphipoda	Uristidae	*Onisimus* sp.	Stomach Contents
Malacostraca/Decapoda	-	Caridea indet.	Stomach Contents, Freight Dock Offset Monitoring
Malacostraca/Decapoda	Crangonidae	***Argis dentata***	Incidentals
Malacostraca/Decapoda	Crangonidae	*Sabinea septemcarinata*	Incidentals
Malacostraca/Decapoda	Thoridae	***Eualus gaimardii***	Stomach Contents
Malacostraca/Isopoda	Munnopsidae	***Munnopsis typica***	Incidentals
Malacostraca/Mysida	Mysidae	Mysida indet.	Stomach Contents, Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Malacostraca/Mysida	Mysidae	*Mysis litoralis*	Stomach Contents
Malacostraca/Mysida	Mysidae	*Mysis* sp.	Stomach Contents
Ostracoda/-	-	Ostracoda indet.	Ore Dock Offset Monitoring
Chaetognatha			
-/-	-	Chaetognatha indet.	Ore Dock Offset Monitoring, Stomach Contents
Sagittoidea/Aphragmophora	Sagittidae	*Parasagitta elegans*	Stomach Contents
Chlorophyta			
-/-	-	Chlorophyta indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Chordata			
-/-	-	Tunicata indet.	Freight Dock Offset Monitoring
Ascidiacea/Stolidobranchia	Styelidae	*Polycarpa* sp.	Ore Dock Offset Monitoring
-/-	-	Pisces indet.	Stomach Contents, Incidentals
Actinopterygii/Gadiformes	Gadidae	***Arctogadus glacialis***	Incidentals
Actinopterygii/Gadiformes	Gadidae	Gadidae indet.	Ore Dock Offset Monitoring
Actinopterygii/Gadiformes	Gadidae	*Gadus ogac*	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Actinopterygii/Perciformes	Ammodytidae	*Ammodytes hexapterus*	Incidentals
Actinopterygii/Perciformes	Ammodytidae	*Ammodytes* sp.	Stomach Contents, Ore Dock Offset Monitoring
Actinopterygii/Perciformes	Stichaeidae	Stichaeidae indet.	Ore Dock Offset Monitoring
Actinopterygii/Perciformes	Zoarcidae	***Lycodes mucosus***	Incidentals
Actinopterygii/Scorpaeniformes	Cottidae	Cottidae indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Actinopterygii/Scorpaeniformes	Cottidae	***Gymnocanthus tricuspis***	Incidentals
Actinopterygii/Scorpaeniformes	Cottidae	*Myoxocephalus quadricornis*	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Actinopterygii/Scorpaeniformes	Cottidae	*Myoxocephalus scorpioides*	Ore Dock Offset Monitoring
Actinopterygii/Scorpaeniformes	Cottidae	*Myoxocephalus scorpius*	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Actinopterygii/Scorpaeniformes	Cottidae	***Triglops* sp.**	Incidentals
Cnidaria			
Anthozoa/Spirularia	Cerianthidae	Cerianthidae indet.	Freight Dock Offset Monitoring
Anthozoa/Actiniaria	-	Actiniaria indet.	Freight Dock Offset Monitoring
Hydrozoa/-	-	Hydrozoa indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring, Incidentals
Hydrozoa/Anthoathecata	Corymorphidae	*Euphysa* sp.	Incidentals
Hydrozoa/Anthoathecata	Pandeidae	Pandeidae indet.	Incidentals
Hydrozoa/Trachymedusae	Ptychogastriidae	***Ptychogastria polaris***	Incidentals, Ore Dock Offset Monitoring
Scyphozoa/-	-	**Scyphozoa indet.**	Freight Dock Offset Monitoring
Scyphozoa/Semaeostomae	Cyaneidae	***Cyanea capillata***	Freight Dock Offset Monitoring
Ctenophora			
-/-	-	Ctenophora indet.	Ore Dock Offset Monitoring
Tentaculata/Cydippida	Mertensiidae	***Mertensia ovum***	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Echinodermata			
Ophiuroidea/Ophiurida	Ophiuridae	Ophiuridae indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Echinoidea/Camarodonta	Strongylocentrotidae	*Strongylocentrotus droebachiensi*	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Holothuroidea/Dendrochirotida	Psolidae	Psolidae indet.	Freight Dock Offset Monitoring
Holothuroidea/Dendrochirotida	Psolidae	*Psolus phantapus*	Incidentals
Mollusca			
Bivalvia/-	-	Bivalvia indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Bivalvia/Adapedonta	Hiatellidae	*Hiatella arctica*	Freight Dock Offset Monitoring
Bivalvia/Myida	Myidae	*Mya* sp.	Ore Dock Offset Monitoring

Appendix 8B
Incidental Taxa Identifications and Method of Collection

Phylum Class/Order	Family	Taxa	Method
Bivalvia/Myida	Myidae	*Mya truncata*	Freight Dock Offset Monitoring
Bivalvia/Mytilida	Mytilidae	Mytilida indet.	Incidentals
Bivalvia/Mytilida	Mytilidae	*Mytilus* sp.	Freight Dock Offset Monitoring
Bivalvia/Pectinida	Pectinidae	Pectinidae indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Bivalvia/Pectinida	Pectinidae	*Chlamys islandica*	Incidentals, Ore Dock Offset Monitoring
Bivalvia/Pectinida	Propeamussiidae	*Similipecten greenlandicus*	Stomach Contents
Cephalopoda/-	-	**Cephalopoda indet.**	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Gastropoda/-	-	Gastropoda indet.	Ore Dock Offset Monitoring
Gastropoda/Nudibranchia	Onchidorididae	***Onchidoris bilamellata***	Incidentals, Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Gastropoda/Pteropoda	Clionidae	*Clione limacina*	Stomach Contents
Gastropoda/Pteropoda	Clionidae	*Clione* sp.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Gastropoda/Pteropoda	Limacinidae	*Limacina helicina*	Freight Dock Offset Monitoring
Polyplacophora/Chitonida	Tonicellidae	*Tonicella* sp.	Stomach Contents, Ore Dock Offset Monitoring
Nemertea			
-/-	-	Nemertea indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Ochrophyta			
Phaeophyceae/-	-	Phaeophyceae indet.	Ore Dock Offset Monitoring
Phaeophyceae/Desmarestiales	Desmarestiaceae	*Desmarestia* sp.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Phaeophyceae/Ectocarpales	Acinetosporaceae	***Pylaiella* sp.**	Freight Dock Offset Monitoring
Phaeophyceae/Laminariales	Agaraceae	***Agarum clathratum***	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Phaeophyceae/Laminariales	Laminariaceae	***Saccharina latissima***	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Phaeophyceae/Sphacelariales	Sphacelariaceae	***Battersia* sp.**	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Phaeophyceae/Tilopteridales	Halosiphonaceae	***Halosiphon tomentosus***	Ore Dock Offset Monitoring
Phaeophyceae/Tilopteridales	Halosiphonaceae	**Heteroscleromorpha indet.**	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Phaeophyceae/Fucales	Fucaceae	***Fucus distichus***	Freight Dock Offset Monitoring
Porifera			
-/-	-	Porifera indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Rhodophyta			
-/-	-	Rhodophyta indet.	Ore Dock Offset Monitoring, Freight Dock Offset Monitoring
Florideophyceae/Corallinales	-	Corallinales indet.	Freight Dock Offset Monitoring
Florideophyceae/Palmariales	Palmariaceae	***Palmaria palmata***	Ore Dock Offset Monitoring

Notes: taxa identified to the lowest practical taxonomic level; indet.= indeterminate (taxa which could not be identified beyond the taxonomic level listed); sp.=species.
Taxa in bold indicate new observations in MEEMP and NIS/AIS programs
All taxa cross-referenced with NIS/AIS resources: Fofonoff et al. 2021, ISSG 2021, Rius et al. 2021, Molnar et al. 2008, Casas-Monroy et al. 2014

APPENDIX 8C

Zooplankton and Ichthyoplankton Data

Appendix 8C-1
Zooplankton Sampling Locations

Station Name	Sampling Date (2020)	UTM Zone	UTM Coordinates			
			Start		End	
			Easting	Northing	Easting	Northing
Milne Port						
Horizontal tows						
ZH-01	07-Aug	17W	502484	7976593	502278	7977327
ZH-02	07-Aug	17W	502888	7976532	502527	7977169
ZH-03	07-Aug	17W	502999	7976642	502425	7977013
ZH-04	07-Aug	17W	503604	7976846	502995	7977281
ZH-05	07-Aug	17W	504360	7978026	503850	7977723
ZH-06	07-Aug	17W	502247	7976849	503673	7977153
Vertical tows						
ZV-01	06-Aug	17W	502768	7976524	n/a	n/a
ZV-02	06-Aug	17W	502866	7976548	n/a	n/a
ZV-03	06-Aug	17W	503028	7976580	n/a	n/a
ZV-04	06-Aug	17W	503570	7976801	n/a	n/a
ZV-05	06-Aug	17W	503793	7976782	n/a	n/a
ZV-06	06-Aug	17W	502576	7976603	n/a	n/a
Ragged Island						
Horizontal tows						
ZH-07	05-Sep	17X	533913	8042529	533300	8041988
ZH-08	05-Sep	17X	534073	8041851	533466	8041329
Vertical tows						
BR1	16-Aug	17X	533494	8043032	n/a	n/a
BR2	16-Aug	17X	533668	8042953	n/a	n/a
BR3	05-Sep	17X	532428	8042298	n/a	n/a
BR4	16-Aug	17X	532336	8042130	n/a	n/a

Marine Zooplankton Enumeration and Identification Methods
Client: Golder
Project: Baffinland Iron Mine MEEMP

Sample Inventory

Sample arrival: 24-Aug-20
Number of samples: 18
Number of jars: 18
Field screen size: Horizontal Tows = 250 µm
Vertical Tows = 63 µm
Biologica project number: mz20-045

Upon arrival, the samples were examined and double-checked against the chain of custody to ensure that (1) all samples were accounted for, and (2) each sample had the appropriate number of jars as indicated on the COC. Any discrepancies were reported to the client and were resolved before further sample handling. Samples were transferred from formalin into 70% ethanol assigned a unique identification number.

Sample Processing

Marine zooplankton samples were analyzed in fractions as follows:

(1) A "Coarse" fraction comprised of large organisms (>1.0 cm) in the sample, identified in its entirety

(2) A "2nd Coarse" fraction comprised of organisms (0.1 cm to 1.0 cm) in the sample, identified in its entirety or to a minimum 100 count, and

(3) A "Fine" fraction (<0.1 cm), in which all other organisms were identified and enumerated. Processing of the fine fraction was completed to either a 200 or 300 count as specified by the client.

In some cases an additional "Fine" fraction was analyzed to account for rare taxa found in the sample.

The Coarse fraction was analyzed through a stereo microscope at 10–40x magnification. All organisms were identified by taxonomic experts to the lowest taxonomic level using a compound microscope (100–400x magnification), appropriate dissection tools, and standard taxonomic references. For copepods, the stage of development was also recorded (copepodite stages I–V) as is the sex for mature individuals (copepod stage VI).

Sub-sampling for all fractions was performed using a Folsom plankton splitter.

Zooplankton were identified to species wherever possible, although immature copepods lack differentiating features required for identification beyond order (e.g., Calanoida, Cyclopoida, or Harpacticoida). All identifications were performed using taxonomic references and collaborations with external experts, where necessary.

Table 1. Summary of zooplankton samples processed for Golder Baffinland Iron Mine MEEMP, 2020.

Client Sample ID	Date Sampled	Biologica Sample ID	Fraction	Split	Specimens Counted
ZH01	7-Aug-20	mz20-045-009	Whole	Whole	173
ZH02	7-Aug-20	mz20-045-010	Coarse	Whole	14
			Fine	3/4	300
ZH03	7-Aug-20	mz20-045-011	Coarse	Whole	53
			Fine	1/4	475
ZH04	7-Aug-20	mz20-045-012	Whole	Whole	221
ZH05	7-Aug-20	mz20-045-013	Coarse	Whole	15
			Fine	1/2	365
ZH06	7-Aug-20	mz20-045-014	Whole	Whole	209
ZV01	6-Aug-20	mz20-045-015	Coarse 1	Whole	58
			Coarse 2	1/4	31
			Fine 1	1/32	14
			Fine 2	1/128	227
ZV02	6-Aug-20	mz20-045-016	Coarse 1	Whole	2
			Coarse 2	1/2	88
			Fine 1	1/16	17
			Fine 2	1/64	282
ZV03	6-Aug-20	mz20-045-017	Coarse 1	Whole	52
			Coarse 2	1/4	56
			Fine 1	1/16	11
			Fine 2	1/128	222
ZV04	6-Aug-20	mz20-045-018	Coarse 1	Whole	31
			Coarse 2	1/2	98
			Fine 1	1/16	16
			Fine 2	1/128	341
ZV05	6-Aug-20	mz20-045-019	Coarse 1	Whole	29
			Coarse 2	3/8	61
			Fine 1	1/16	11
			Fine 2	1/128	284
ZV06	6-Aug-20	mz20-045-020	Coarse 1	Whole	32
			Coarse 2	1/2	91
			Fine 1	1/16	16
			Fine 2	1/128	294
ZH07	5-Sep-20	mz20-045-125	Coarse	Whole	16
			Fine	1/128	335
ZH08	5-Sep-20	mz20-045-126	Coarse	Whole	42
			Fine	1/256	322

Client Sample ID	Date Sampled	Biologica Sample ID	Fraction	Split	Specimens Counted
BR-1	16-Aug-20	mz20-045-127	Coarse	Whole	3
			Fine	1/16	429
BR-2	16-Aug-20	mz20-045-128	Coarse 1	Whole	34
			Coarse 2	1/4	5
			Fine	1/64	370
BR-3	5-Sep-20	mz20-045-129	Coarse	Whole	8
			Fine	1/4	507
BR-4	16-Aug-20	mz20-045-130	Coarse	Whole	11
			Fine	1/16	400

QA/QC

Ten percent (10%) of samples were reanalyzed to assess subsampling accuracy and consistency of enumeration. The sample(s) were chosen at random and processed at different times to reduce counting and identification bias. The percent agreement between QA samples is reported in Table 2.

Table 2. Summary of taxonomic QA/QC results for Golder Baffinland Iron Mine MEEMP, 2020.

Biologica Sample #	Client Sample #	Original Count	QA Count	Percent Agreement
mz20-045-011	ZH03	1,953	1,605	82.18
mz20-045-127	BR-1	6,867	6,643	96.74
			Average:	**89.46%**

Percent Agreement:
{100 – [(difference in abundance between samples/total abundance of original sample) x 100]} %

Data

Taxonomic data were recorded in Biologica’s custom database. Results were provided to the Golder project manager in Excel spreadsheets via email.

Methodological and Taxonomic References

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Appendix 8C-3
Zooplankton Taxa Presence/Absence from Survey Years 2014-2020

Phylum Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2014	2015	2016	2017	2018	2019	2020
-	Polychaeta	-	-	-	-	Polychaeta indet.*	x	x	x	x	x	x	x
-	Polychaeta	Sedentaria	-	Sabellariidae	-	Sabellariidae indet.				x			
-	-	-	-	-	-	Arthropoda indet.*							x
Chelicerata	Arachnida	Acari	Trombidiformes	-	-	Hydrachnidia indet		x					
Crustacea	-	-	-	-	-	Crustacea indet.				x	x	x	
Crustacea	Branchiopoda	Phyllopoda	Diplostraca	-	-	Cladocera indet.						x	
Crustacea	Branchiopoda	Phyllopoda	Diplostraca/Anomopoda	Bosminidae	-	*Bosmina longicornis*		x	x				
Crustacea	Branchiopoda	Phyllopoda	Diplostraca/Anomopoda	Bosminidae	-	*Bosmina* sp.	x						
Crustacea	Branchiopoda	Phyllopoda	Diplostraca/Anomopoda	Bosminidae	-	Bosminidae indet.**				x			x
Crustacea	Branchiopoda	Phyllopoda	Diplostraca/Anomopoda	Chydoridae	-	*Chydorus sphaericus*			x				
Crustacea	Branchiopoda	Phyllopoda	Diplostraca/Anomopoda	Daphniidae	-	*Daphnia* sp.***		x					x
Crustacea	Hexanauplia	-	-	-	-	Cirripedia indet.		x	x				
Crustacea	Hexanauplia	Copepoda	-	-	-	Copepoda indet.*	x	x	x		x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	-	-	Calanoida indet.*	x	x		x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Acartiidae	-	*Acarti sp.****							x
Crustacea	Hexanauplia	Copepoda	Calanoida	Acartiidae	-	*Acartia hudsonica*			x				
Crustacea	Hexanauplia	Copepoda	Calanoida	Acartiidae	-	*Acartia longiremis*	x	x	x	x		x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Acartiidae	-	*Acartia sp.**	x		x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	-	*Calanus finmarchicus*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	-	*Calanus glacialis*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	-	*Calanus hyperboreus*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Calanidae	-	*Calanus* sp.*				x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Centropagidae	-	*Centropages* sp.		x			x		
Crustacea	Hexanauplia	Copepoda	Calanoida	Centropagidae	-	***Limnocalanus macrurus***							x
Crustacea	Hexanauplia	Copepoda	Calanoida	Clausocalanidae	-	*Ctenocalanus* sp.					x		
Crustacea	Hexanauplia	Copepoda	Calanoida	Clausocalanidae	-	*Ctenocalanus vanus*				x	x		
Crustacea	Hexanauplia	Copepoda	Calanoida	Clausocalanidae	-	*Microcalanus* sp.				x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Clausocalanidae	-	*Pseudocalanus* sp. *	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Calanoida	Lucicutilidae	-	*Lucicutia longicornis*			x				
Crustacea	Hexanauplia	Copepoda	Calanoida	Lucicutilidae	-	*Lucicutia* sp	x						
Crustacea	Hexanauplia	Copepoda	Calanoida	Metridinidae	-	*Metridia* sp.		x		x	x		
Crustacea	Hexanauplia	Copepoda	Calanoida	Pontellidae	-	Pontellidae indet.	x						
Crustacea	Hexanauplia	Copepoda	Calanoida	Rathkeidae	-	*Rathkea* sp.				x			
Crustacea	Hexanauplia	Copepoda	Calanoida	Scolecitrichidae	-	*Scolecithricella* sp.				x	x		
Crustacea	Hexanauplia	Copepoda	Calanoida	Temoridae	-	*Eurytemora herdmani*		x					
Crustacea	Hexanauplia	Copepoda	Cyclopoida	-	-	Cyclopoida indet.*				x	x	x	x
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Corycaeidae	-	*Corycaeus* sp.		x					
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Cyclopoidae	-	***Cyclops scutifer****							x
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oithonidae	-	*Oithona atlantica*	x	x	x	x	x		
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oithonidae	-	*Oithona similis*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oithonidae	-	*Oithona* sp.*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oncaeidae	-	*Oncaea minuta*	x	x					
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oncaeidae	-	*Oncaea* sp.*	x	x		x	x	x	x
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oncaeidae	-	Oncaeidae indet.			x	x			
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Oncaeidae	-	*Triconia borealis*			x	x			
Crustacea	Hexanauplia	Copepoda	Cyclopoida	Sapphirinidae	-	*Sapphirina* sp.		x	x	x			
Crustacea	Hexanauplia	Copepoda	Harpacticoida	-	-	Harpacticoida indet.*			x		x	x	x
Crustacea	Hexanauplia	Copepoda	Harpacticoida	Ectinosomatidae	-	*Microsetella norvegica*	x	x	x	x	x	x	x
Crustacea	Hexanauplia	Copepoda	Harpacticoida	Ectinosomatidae	-	*Microsetella* sp.				x	x	x	
Crustacea	Hexanauplia	Copepoda	Harpacticoida	Peltidiidae	Clytemnestrinae	Clytemnestra scutellata	x		x				
Crustacea	Hexanauplia	Copepoda	Harpacticoida	Peltidiidae	Clytemnestrinae	Clytemnestra sp.				x			
Crustacea	Hexanauplia	Copepoda	Harpacticoida	Tachidiidae	-	*Euterpina acutifrons*		x	x	x			
Crustacea	Hexanauplia	Thecostraca	Sessilia	-	-	Balanomorpha indet.*				x	x	x	x
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	-	Amphipoda indet.		x	x	x			
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	-	-	Lysianassoidea indet.					x		
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Calliopiidae	-	*Apherusa* sp.					x		
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Hyperia medusarum*				x			
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	Hyperiidae indet.					x	x	
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Hyperoche medusarum*				x			x
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Themisto abyssorum*				x			
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Themisto libellula*				x	x	x	x
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyperiidae	-	*Themisto* sp.	x			x	x		
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus glacialis*						x	
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus litoralis*					x		
Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Uristidae	-	*Onisimus* sp.					x		
Crustacea	Malacostraca	Eumalacostraca	Decapoda	-	-	Caridea indet.					x		
Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	Cragonidae indet.					x		
Crustacea	Malacostraca	Eumalacostraca	Decapoda	Crangonidae	-	*Sabinea septemcarinata*				x	x		
Crustacea	Malacostraca	Eumalacostraca	Decapoda	Hippolytidae	-	Hippolytidae indet.					x		
Crustacea	Malacostraca	Eumalacostraca	Decapoda	Sapphirinidae	-	*Sapphirina opalina*		x					
Crustacea	Malacostraca	Eumalacostraca	Euphausiacea	-	-	Euphausiacea indet.					x		
Crustacea	Malacostraca	Eumalacostraca	Isopoda	-	-	Isopoda indet.*				x	x	x	x
Crustacea	Malacostraca	Eumalacostraca	Mysida	-	-	Mysida indet.	x						
Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	Mysinae	*Mysis litoralis*				x			
Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	Mysinae	*Mysis* sp.*					x		x
Crustacea	Malacostraca	Eumalacostraca	Mysida	Mysidae	Erythropinae	*Erythrops* sp.					x		
Crustacea	Ostracoda	-	-	-	-	Ostracoda indet.					x		
Hexapoda	Insecta	-	-	-	-	Insecta indet.***							x
Hexapoda	Insecta	Pterygota	Diptera	-	-	Diptera indet.***							x
Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	-	Chironomidae indet.***							x
-	-	-	-	-	-	Bryozoa indet.					x		
-	-	-	-	-	-	Chaetognatha indet.			x				
-	Sagittoidea	-	Aphragmophora	Sagittidae	-	*Parasagitta elegans*	x			x	x	x	x
-	Sagittoidea	-	Aphragmophora	Sagittidae	-	*Parasagitta* sp.				x	x		
-	Sagittoidea	-	Aphragmophora	Sagittidae	-	Sagittidae indet.	x	x	x				
-	Sagittoidea	-	Phragmophora	Eukrohniidae	-	*Eukrohnia hamata*	x						

Appendix 8C-3
Zooplankton Taxa Presence/Absence from Survey Years 2014-2020

Phylum Subphylum	Class	Subclass	Order	Family	Subfamily	Taxa	2014	2015	2016	2017	2018	2019	2020
Tunicata	Appendicularia	-	Copelata	Fritillariidae	Fritillariinae	*Fritillaria* sp.*		x	x		x	x	x
Tunicata	Appendicularia	-	Copelata	Oikopleuridae	Oikopleurinae	*Oikopleura* sp.*		x		x	x	x	x
Vertebrata	Actinopterygii	-	Gadiformes	Gadidae	-	Gadidae indet.				x	x	x	
Vertebrata	Actinopterygii	-	Perciformes	Ammodytidae	-	*Ammodytes* sp.					x		x
Vertebrata	Actinopterygii	-	Perciformes	Pholidae	-	*Pholis fasciata*				x			
Vertebrata	Actinopterygii	-	Scorpaeniformes	Cottidae	-	Cottidae indet.				x			
Vertebrata	Actinopterygii	-	Scorpaeniformes	Liparidae	-	***Liparis* sp.**							x
-	-	-	-	-	-	Cnidaria indet.*			x	x	x	x	x
-	Hydrozoa	Hydroidolina	Anthoathecata	-	-	Anthoathecata indet.		x					
-	Hydrozoa	Hydroidolina	Anthoathecata	Bougainvilliidae	-	***Bougainvillia* sp.**							x
-	Hydrozoa	Hydroidolina	Anthoathecata	Corymorphidae	-	*Euphysa* sp.		x			x	x	
-	Hydrozoa	Hydroidolina	Anthoathecata	Pandeidae	-	*Catablema vesicarium*				x	x		
-	Hydrozoa	Hydroidolina	Anthoathecata	Pandeidae	-	Pandeidae indet.*							x
-	Hydrozoa	Hydroidolina	Anthoathecata	Tubulariidae	-	*Hybocodon prolifer*						x	
-	Hydrozoa	Hydroidolina	Leptothecata	Campanulariidae	-	*Obelia* sp.						x	
-	Hydrozoa	Hydroidolina	Siphonophorae	-	-	Siphonophore indet.					x		
-	Hydrozoa	Trachylinae	Narcomedusae	Solmundaeginidae	-	*Aeginopsis laurentii*				x	x	x	
-	Hydrozoa	Trachylinae	Trachymedusae	Rhopalonematidae	-	*Aglantha digitale*	x			x	x	x	x
-	Hydrozoa	Trachylinae	Trachymedusae	Rhopalonematidae	-	*Aglantha sp.*				x	x		
-	-	-	-	-	-	Ctenophora indet.		x				x	
-	Nuda	-	Beroida	Beroidae	-	*Beroe cucumis*			x				
-	Nuda	-	Beroida	Beroidae	-	*Beroe gracilis*		x					
-	Nuda	-	Beroida	Beroidae	-	*Beroe* sp.					x		
-	-	-	-	-	-	Echinodermata indet.	x	x	x				
Echinozoa	Echinoidea	-	-	-	-	Echinoidea indet.*				x	x	x	x
-	Bivalvia	-	-	-	-	Bivalvia indet.*	x	x	x	x	x	x	x
-	Gastropoda	-	-	-	-	Gastropoda indet.*				x	x	x	x
-	Gastropoda	Heterobranchia	Pteropoda	-	-	Gymnosomata indet.	x						
-	Gastropoda	Heterobranchia	Pteropoda	Clionidae	-	*Clione limacina*	x	x		x	x	x	x
-	Gastropoda	Heterobranchia	Pteropoda	Limacinidae	-	*Limacina helicina*	x	x		x	x	x	x
-	Gastropoda	Heterobranchia	Pteropoda	Limacinidae	-	*Limacina* sp.*	x		x	x			x
-	-	-	-	-	-	Nemertea indet.				x			
-	-	-	-	-	-	Rotifera indet.				x			
-	Eurotatoria	Monogononta	Ploima	Synchaetidae	-	*Synchaeta hyperborea*			x				
-	Eurotatoria	Monogononta	Ploima	Synchaetidae	-	*Synchaeta* sp.				x			

APPENDIX 8D

Record of Independent Verification

Appendix 8D-1
Taxa Sent for Independent Verification of the Identifcation and Record of Independent Indentification 2018-2020

Original ID	Present in 2018 Samples	2018 Verification	Present in 2019 Samples	Sent for Verification (in 2020)	2019 Verification	Present in 2020 Samples	Sent for Verification (in 2021)?	2020 Verification	Comment
Polydora cornuta	Yes	*Polydora* sp.	No			No			-
Pseudofabricia aberrans	Yes	*Pseudofabricia* sp. nr. *aberrans* *Manayunkia aestruania*	Yes	Yes	*Fabricia stellaris*	Yes	Yes	-	Results not available for 2020 verifications
Rhodine bitorquata	Yes	*Rhodine loveni* *Rhodine gracilior*	Yes	Yes	*Rhodine* sp.	No			-
Styelidae indet.	Yes	*Polycarpa fibrosa*	No			Yes	No		Previously sent for verification to gain clarity on the ID. Verification in 2020 not necessary.
Ammodytes sp.	Yes	*Ammodytes* sp.	No			Yes	Yes	*Ammodytes hexapterus*	Verified through DNA barcoding
Eteone spilotus	Yes	*Eteone* sp.	Multiple species	No		No			-
Monocorophium insidosium	Yes	*Monocorophium insidosium* *Crassicorophium bonelli* (Laval)	No			No			-
Monocorophium sp.	Yes	*Monocorophium sp.* *Crassicorophium bonelli* (Laval)	Yes	Yes	*Crassicorophium* sp.	No			-
Mya arenaria	Yes	*Mya truncata* *Mya* sp. Imparientia (superorder)	No			No			-
Polycarpa pomaria	Yes	*Polycarpa fibrosa*	No			No			-
Marenzelleria viridis	No		Yes	Yes	*Marenzelleria viridis*	Yes	Yes	-	Results not available for 2020 verifications
Sosane sp. nr. *Wireni*	No		Yes	Yes	*Sosane wireni*	Yes	Yes	-	Results not available for 2020 verifications
Oncousoecia sp.	No		Yes	Yes	Tubuliporina	No			-
Euphilomedes sp.	No		Yes	No	*Philomedes* sp.	No			-
Nereimyra aphroditoides	Former name		Yes	Yes	*Nereimyra* sp.	Yes	No		Previously sent for verification to gain clarity on the ID. Verification in 2020 not necessary.
Streptospinigera niuqtuut	Former name		Yes	Yes	*Streptospinigera niuqtuut*	Yes	No		Previously sent for verification to gain clarity on the ID. Verification in 2020 not necessary.
Harmothoe propinqua	No		No			Yes	Yes	-	Results not available for 2020 verifications
Harmothoe viridis	No		No			Yes	Yes	-	Results not available for 2020 verifications
Hesperonoe sp.	No		No			Yes	Yes	-	Results not available for 2020 verifications
Ampharete petersenae	No		No			Yes	Yes	-	Results not available for 2020 verifications
Paramphitrite birulai	No		No			Yes	Yes	-	Results not available for 2020 verifications

CANADIAN CENTRE FOR DNA BARCODING
DNA Testing Laboratory Report

Date of issue: December 18, 2020

FORENSIC CASE INFORMATION

File Number: BIO-20-121_Biologica-Environmental-Services_2020-12-08
Accession Number: BIO-20-121

Client Name: Tara Macdonald, PhD, RPBio; President/CEO
Client Address: Biologica Environmental Services Ltd.
488-F Bay Street
Victoria, BC
V8T 5H2

Contact Name: Tara Macdonald (tara@biologica.ca)

ITEMS

Description: 1 fish tissue sample for species identification:
BAF20-045-226

Dates Received: December 7, 2020

Received From: Constantine Christopoulos – Laboratory Manager;
Purolator Express (TRK# 332627114397)

Dates of Analysis: December 16 - 17, 2020
Collector/Collection Site: Sarah Dolynskyj / Canadian Centre for DNA Barcoding, Biodiversity of Ontario, University of Guelph, 50 Stone Road East, Guelph

METHODS

To ascertain the identity of the species from the submitted sample, half of the submitted tissue from BAF20-045-226 was subsampled using sterile techniques. Total genomic DNA was extracted using a validated spin column DNA extraction protocol. The target genetic marker, barcode region of the mitochondrial DNA cytochrome c oxidase subunit I (COI), was amplified using the Polymerase Chain Reaction (PCR) using full length barcode primer cocktail: *C_FishF1t1/C_FishR1t1*; followed by cycle sequencing with a standardized commercially available BigDye Terminator v3.1 kit. Sequencing reactions were analyzed by high-voltage capillary electrophoresis on an automated ABI 3730xL DNA Analyzer. The DNA sequence recovered from the sample was compared against the species sequence reference library in the Barcode of Life Data System (BOLD) accessible at http://www.boldsystems.org/.

IMAGING

The item was photographed in the Photography Lab Area by Sarah Dolynskyj, using a Canon ELPH 300 HS, 12.1 megapixels. Pictures were uploaded to the BOLD website into the secure project called "CCDB forensic sampling [ABCBF]". See Appendix 1 for item images.

DNA SEQUENCING RESULTS

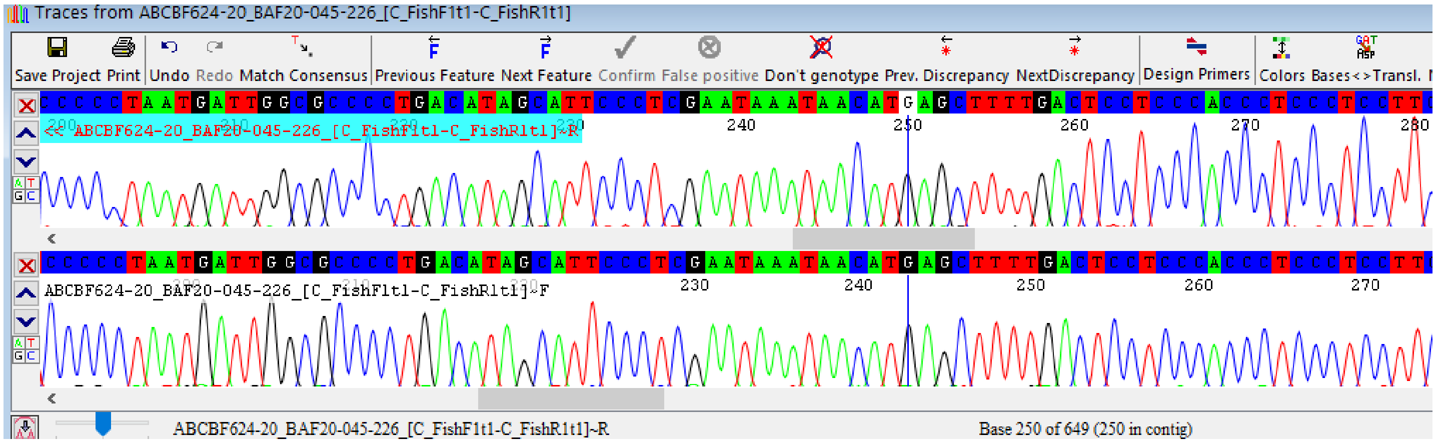


Figure 1 – Sequence trace files for sample BAF20-045-226.

INTERPRETATION

Bidirectional forward and reverse sequences were generated from the tissue sample. Resulting trace files were assembled into contigs and consensus sequences, and then manually edited in CodonCode Aligner (version 4.1.1.) software. Sequences of the mitochondrial DNA COI gene were compared against the Full Length Record Barcode Database available in BOLD, the Barcode of Life Data System. Based on a percentage of nucleotide sequence divergence (number of nucleotide substitutions) between a sequence from the test sample and a reference DNA barcode, the closest match was used to infer species identity of the DNA contributor in the corresponding test samples. Images, primers, sequences and their associated trace files with quality scores were uploaded to the secure BOLD project called "CCDB forensic sampling [ABCBF]".

DNA SPECIES IDENTIFICATION MATCH PERCENTAGE on BOLD

Query: ABCBF624-20_BAF20-045-226_[C_FishF1t1-C_FishR1t1]
Top Hit: Chordata Actinopterygii - Trachiniformes - *Ammodytes hexapterus* (100%)

Search Result:

The submitted sequence has been matched to *Ammodytes hexapterus*. This identification is solid unless there is a very closely allied congeneric species that has not yet been analyzed. Such cases are rare.

A species page is available for this taxon: SPECIES PAGE

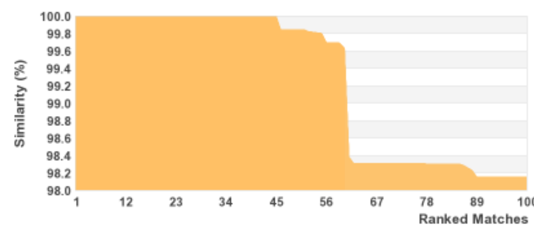
Closest matching BIN (within 3%): BIN PAGE

For a hierarchical placement - a neighbor-joining tree is provided: TREE BASED IDENTIFICATION

Identification Summary

Taxonomic Level	Taxon Assignment	Probability of Placement (%)
Phylum	Chordata	100
Class	Actinopterygii	100
Order	Trachiniformes	100
Family	Ammodytidae	100
Genus	*Ammodytes*	100
Species	*Ammodytes hexapterus*	100

Similarity Scores of Top 100 Matches



Top 20 Matches

Display: Top 20

Phylum	Class	Order	Family	Genus	Species	Subspecies	Similarity (%)	Status
Chordata	Actinopterygii	Trachiniformes	Ammodytidae	*Ammodytes*	*hexapterus*		100	Published
Chordata	Actinopterygii	Trachiniformes	Ammodytidae	*Ammodytes*	*hexapterus*		100	Published
Chordata	Actinopterygii	Trachiniformes	Ammodytidae	*Ammodytes*	*hexapterus*		100	Published
Chordata	Actinopterygii	Trachiniformes	Ammodytidae	*Ammodytes*	*hexapterus*		100	Published

Figure 2 – Species identification match results for sample BAF20-045-226 on BOLD COI Species Record Database.

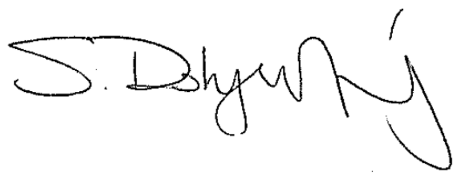
SUMMARY

A full length DNA barcode of 652 base-pairs (bp) was generated from the tissue sample BAF20-045-226. The sequence recovered from BAF20-045-226 was a 100% match to multiple BOLD reference records representing *Ammodytes hexapterus* (Pacific sand lace). Based on the inferred identity of the sequence recovered from BAF20-045-226, we can establish a species level match to *Ammodytes hexapterus* (Pacific sand lace).

CONCLUSIONS

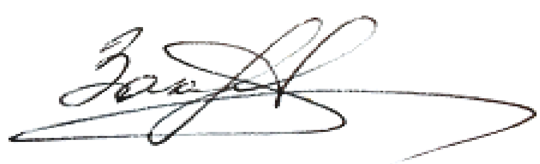
The present testing has provided a species level taxonomic identification of *Ammodytes hexapterus,* known as the Pacific sand lace, for tissue sample BAF20-045-226 submitted by Tara Macdonald from Biologica Environmental Services. Based on appropriate statistical BOLD match calculations and a reasonable degree of scientific certainty of the BOLD reference library, taxonomic identity of detected DNA source in this sample is considered practically proven.

RESULTS REPORTED BY:



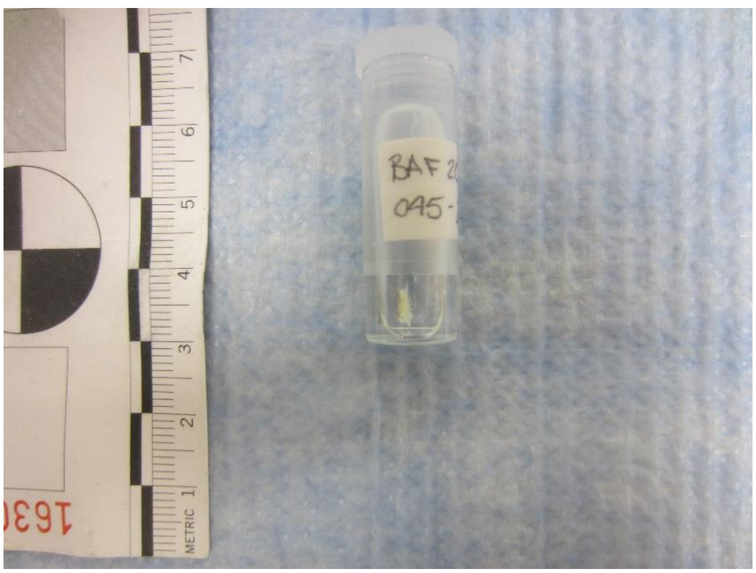
Sarah Dolynskyj, MSc, Forensic Scientist

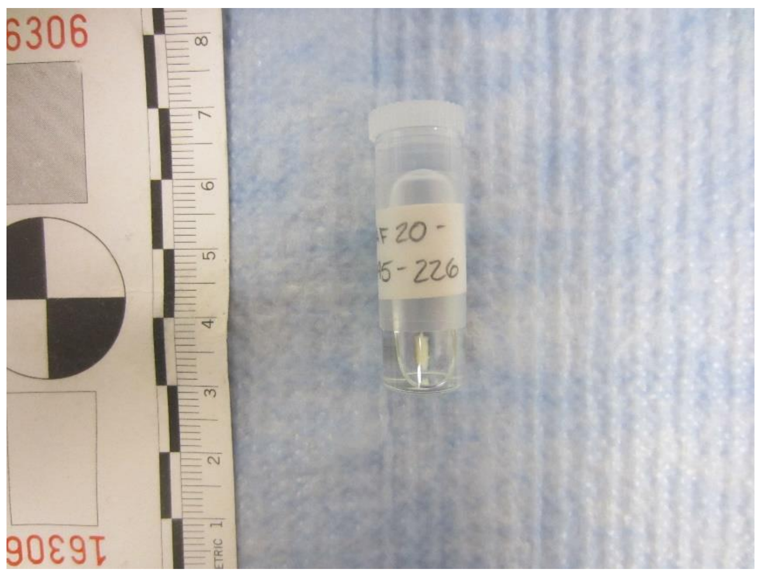
RESULTS REVIEWED BY:



Dr. Evgeny V. Zakharov, Director, CCDB

Appendix 1. Image Inventory





Non-Native & Invasive species *In Nunavut*

In 2010 the Canadian Endangered Species Conservation Council (CESCC) identified 17 species not normally found in Nunavut.

These are called "non-native species". Some of these plants and animals can become an "invasive species", which represents a potential major concern for the future health of the Arctic.

What is a non-native species?

A non-native species is defined as an organism that is not normally found in a region. They are introduced by human activities, which can be intentional (e.g. species introduced to control a pest species), accidental (e.g. shipping and ballast water exchange), or environmental (e.g. changes in climate leading to wildlife movements). An example of a non-native species in Nunavut is the European Starling *(Sturnus vulgaris)*, which was introduced to North America from Europe intentionally by humans.

What is an invasive species?

Not all non-native species are considered invasive. This term is reserved for species that do so well in their new habitat that they end up causing harm to the environment, other species, human health, or economic activity (ISAC, 2006). An example of an invasive species in southern Canada is the Zebra Mussel *(Dreissena polymorpha)*, which was introduced to North America by ships releasing their ballast water. The Zebra mussel reproduces quickly and establishes large colonies on any hard surface. In this way they take over habitat occupied by native species, reducing the availability of food for other species, and also attaching themselves in great numbers to boats and other infrastructure in the water. (Benson and Raikow, 2010).

Scott 2011

Species: Field Sow Thistle *(Sonchus arvensis)*

Impact: The Field Sow Thistle grows quickly, easily and when there are many of them they can reduce the water resources available to other plants. They have the potential to decrease native plant diversity by competing for space and water.

Introduction pathway: Accidently introduced from Europe into North America in a containment of agricultural crop seed. This plant has been able to spread long distances across Canada because the seeds can travel far in the wind.

Sohl 2005

Species: The European Starling *(Sturnus vulgaris)*

Impact: The European Starling can displace native bird species by taking over nesting sites and competing for food.

Introduction pathway: Introduced intentionally to North America from Europe. These birds then dispersed naturally into Canada through migration.

Why should you be concerned about invasive species?

When invasive species are introduced and survive, their populations can increase rapidly because there are no natural predators. Invasive species may feed on native species, compete for food and space, as well as expose native species to new parasites and disease. Invasive species are now widely recognized as a leading cause of endangerment and/or extinction of native species (Lassuy and Lewis, 2010).

** There are currently no known species in Nunavut that can be classified as aquatic or terrestrial invasive species.*

How can you help?

Report

Have you seen a different plant, animal or insect in Nunavut?

Everything you can do to help us identify these species is important. Report the **location** where you observed the species (GPS Coordinates are very helpful) and provide a **detailed description** of the plant, animal, or insect. If possible **take a photo**.

Remember that not all non-native species are considered invasive. If you see an unknown plant or animal, it is very important to report it.

Do not take any extreme actions; the first step is reporting the species so that territorial and federal agencies can respond appropriately. We will report our findings back to you and information about the species you have observed.

Share

Keep yourself informed and educate others about non-native and invasive species. Let them know what to do if they see an unknown or uncommon species.

This project was undertaken with the financial support of:

Environment Canada Environnement Canada

Report a species to your local Conservation Officer.

For More Information or if your CO is not available please contact:

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Sr. Science Advisor (Aquatic)
Department of Environment,
Fisheries and Sealing Division
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: kimberly.howland@dfo-mpo.gc.ca

Please call 867-975-7706 to request a French copy of this brochure.

How might invasive species get into Nunavut?

Species are transported throughout the world by human activities, like shipping, which allows species to move further distances and over barriers that they could not do on their own. Nunavut remains very remote compared to the rest of Canada and so the lack of major road systems, infrequent shipping and cold climate has limited their introduction and survival.

However, as climate change alters Arctic ecosystems, it creates conditions that are more favorable to the survival and reproduction of non-native species. It also enables greater human activity and development, which gives potential invasive species more opportunities to establish themselves. (Lassuy and Lewis, 2010).

Pathways of introduction for invasive species into Nunavut

* Ballast water exchange and hull fouling have the greatest potential for introducing invasive species into the aquatic ecosystems of Nunavut. Ballast water is used to stabilize ships. It is pumped aboard ships from different ports around the world and often exchanged far from the region it was obtained. This water can contain species that are not native, and may establish themselves locally.

Hull fouling occurs when organisms attach themselves to the outside of a ship's hull where they can then be transported around the world.

* Seeds, insects and even small mammals can be transported around the world through the shipping of grocery produce, lumber, construction supplies, and packing materials, even dirt from someone's footwear can contain plant seeds (IASC, 2010).

* As climate continues to change in the Arctic, many terrestrial and aquatic plants and animals will move further north looking for the food and habitat they desire. These wildlife movements are not a threat when it comes to invasive species, but it is important to note that some species, (especially rare or threatened ones) may not survive the transition. Others may do well, like flying insects, which are already increasing in number in some areas of Nunavut. (IASC, 2010).

Wildlife movements are often referred to as "range extensions" where a species expands the area they can live in when the habitat and climate is favorable for them.

The Migratory Grasshopper (Melanoplus sanguinipes) is a winged insect that is widely distributed across Canada and is one example of a species that may expand its range into Nunavut.

Non-Native Species in Nunavut

As of 2011, there are 17 species known to be non-native in Nunavut, these are listed below and are all terrestrial species. Please note that it is not currently known what the potential is for any of these species to become invasive and to what extent. Two species, the starling and the sow thistle are described in more detail below.

SCIENTIFIC NAME	COMMON NAME	ORGANISM TYPE
Carum carvi	Wild Caraway	Flowering Plant
Taraxacum officinale	Common Dandelion	Flowering Plant
Sonchus arvensis	Field Sow Thistle	Flowering Plant
Leucanthemum vulgare	Oxeye Daisy	Flowering Plant
Thlaspi arvense	Field Pennycress	Flowering Plant
Capsella bursa-pastoris	Shepherd's Purse	Flowering Plant
Barbarea vulgaris	Yellow Rocket	Flowering Plant
Amaranthus retroflexus	Green Amaranth	Flowering Plant
Hordeum vulgare	Common Barley	Flowering Plant
Puccinellia distans	Spreading Alkali Grass	Flowering Plant
Vicia cracca	Tufted Vetch	Flowering Plant
Papaver somniferum	Opium Poppy	Flowering Plant
Plantago major	Common Plantain	Flowering Plant
Polygonum aviculare	Prostrate Knotweed	Flowering Plant
Pieris rapae	Cabbage White	Butterfly
Sturnus vulgaris	European Starling	Passerine Bird
Passer domesticus	House Sparrow	Passerine Bird

*Species photo references available upon request. Images are not to scale.

Potential Invasive Species in Nunavut

As trade and shipping continues to increase, some aquatic invasive species known to commonly foul ship hulls and ballast waters, like the Chinese Mitten Crab, are more likely to arrive at ports around Nunavut.

A recent report commissioned by Fisheries and Oceans Canada identified a number of potential aquatic invasive species, mainly for the Hudson Bay region. The table below lists only those species considered as "High Risk" to Nunavut and they are found in freshwater & marine environments.

SCIENTIFIC NAME	COMMON NAME	ORGANISM TYPE
Osmerus mordax	Rainbow Smelt	Fish
Gymnocephalus cernuus	Ruffe	Fish
Caprella mutica	Skeleton Shrimp	Crustacean
Chelicorophium curvispinum	Data unavailable	Crustacean
Dikerogammarus villosus	Killer Shrimp	Crustacean
Gmelinoides fasciatus	Data unavailable	Crustacean
Pontogammarus robustoides	Data unavailable	Crustacean
Eriocheir sinensis	Chinese Mitten Crab	Crustacean
Hemimysis anomala	Data unavailable	Crustacean
Balanus improvisus	Acorn Barnacle	Crustacean
Corbicula fluminea	Asian Clam	Mollusc
Dreissena bugensi	Quagga Mussel	Mollusc
Bythotrephes longimanus	Spiny Water Flea	Zooplankton
Cercopagis pengo	Fishhook Water Flea	Zooplankton
Eubosmina maritima	Data unavailable	Zooplankton
Marenzelleria cf. viridis	Data unavailable	Worm
Marenzelleria cf. wireni	Data unavailable	Worm
Cordylophora caspia	Freshwater Hydroid	Hydrozoa
Coscinodiscus wailesii	Data unavailable	Phytoplankton
Odontella sinensi	Data unavailable	Phytoplankton
Prorocentrum minimum	Data unavailable	Phytoplankton
Codium fragile ssp. tomentosoides	Oyster Thief	Algae
Glugea hertwigi	Data unavailable	Protozoa
Amphilina foliacea	Data unavailable	Parasite

*Species photo references available upon request. Images are not to scale.

Nunavut

This project was undertaken with the financial support of:

Environment Canada Environnement Canada

APPENDIX 8E

Record of New Taxa Risk Status

Appendix 8E
New Taxa (2020) and Risk Category Assessment

Phylum Class/Order	Family	Subfamily	Taxa	Project Component	Sent for Independent Verification?	Flagged?	Risk Category	Watchlist or Trigger List?	Distribution References
Acanthocephala									
-/-			Acanthocephala indet.	Fish Stomachs	No	No	No Risk	N/A	2
Annelida									
Clitellata/Rhynchobdellida	Piscicolidae	Platybdellinae	*Oceanobdella* sp.	Incidentals	No	No	No Risk	N/A	1, 10
Polychaeta/Eunicida	Dorvilleidae		*Ophryotrocha* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 5, 8, 10, 11
Polychaeta/Phyllodocida	Hesionidae	Psamathinae	*Nereimyra* sp.	2019 Verifications	No	No	No Risk	N/A	1, 2, 5, 7, 8, 10, 11, 18
Polychaeta/Phyllodocida	Phyllodocidae	Eteoninae	*Eulalia bilineata*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 3, 4, 10, 11
Polychaeta/Phyllodocida	Phyllodocidae	Phyllodocinae	*Paranaitis* sp.	Incidentals	No	No	No Risk	N/A	1, 2, 7, 10
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Bylgides promamme*	Benthic Infauna	No	No	No Risk	N/A	1, 2
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Bylgides* sp.	2020 Verifications	Alternative ID for *Hesperonoe* sp.	No	No Risk	N/A	1, 2, 5, 10, 11, 18
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Harmothoe extenuata*	2020 Verifications	Corrected ID for *Harmothoe propinqua*	No	No Risk	N/A	1, 2, 7, 10, 11, 18
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Harmothoe imbricata*	2020 Verifications	Yes (ID Confirmed)	No	No Risk	N/A	1, 2, 4, 5, 7, 8, 10, 11
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Harmothoe propinqua*	Benthic Infauna	Yes (See *Harmothoe extenuata*)	Flagged	N/A	N/A	12, 13, 14
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Harmothoe viridis*	Benthic Infauna	Corrected to *Harmothoe imbricata*	Flagged	N/A	N/A	2, 12
Polychaeta/Phyllodocida	Polynoidae	Polynoinae	*Hesperonoe* sp.	Benthic Infauna	Yes (See *Bylgides* sp.)	Flagged	Low Risk	Watchlist	2
Polychaeta/Phyllodocida	Sphaerodoridae		*Ephesiella sp.*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 7, 10
Polychaeta/Phyllodocida	Syllidae	Anoplosyllinae	*Streptospinigera niuqtuut*	2019 Verifications	No	No	No Risk	N/A	1, 2, 8, 11
Polychaeta/Sabellida	Fabriciidae		*Fabricia stellaris*	2019 and 2020 Verifications	Corrected ID for *Pseudofabricia aberrans*	No	No Risk	N/A	1, 2, 11
Polychaeta/Sabellida	Fabriciidae		*Pseudofabricia* sp. nr. *aberrans*	Benthic Infauna	Yes (See *Fabricia stellaris*)	Flagged	Low Risk	Watchlist	-
Polychaeta/Sedentaria	Ampharetidae		*Ampharete finmarchica*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 5, 6, 8, 11
Polychaeta/Spionida	Spionidae		*Marenzelleria viridis*	Benthic Infauna, 2019 and 2020 Verifications	Yes (ID Confirmed)	Flagged	High Risk	Watchlist	2, 7, 10, 29, 30
Polychaeta/Terebellida	Ampharetidae	Ampharetinae	*Ampharete petersenae*	Benthic Infauna	Yes (ID Confirmed)	Flagged	Low Risk	Watchlist	13, 16
Polychaeta/Terebellida	Ampharetidae	Ampharetinae	*Sosane wireni*	Benthic Infauna, 2019 and 2020 Verifications	Yes (ID Confirmed)	Flagged	Low Risk	Watchlist	2, 5
Polychaeta/Terebellida	Terebellidae	Terebellinae	*Amphitrite cirrata*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 4, 7, 10, 11, 18
Polychaeta/Terebellida	Terebellidae		*Amphitrite birulai*	2020 Verifications	Corrected ID for *Paramphitrite birulai*	Flagged	Low Risk	Watchlist	2, 11, 27, 28
Polychaeta/Terebellida	Terebellidae		*Paramphitrite birulai*	Benthic Infauna	Yes (See *Amphitrite birulai*)	Flagged	N/A	N/A	11
Polychaeta/-	Maldanidae	Euclymeninae	*Axiothella* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 4, 5, 8, 10, 11
Polychaeta/-	Maldanidae	Rhodininae	*Rhodine* sp.	2019 Verifications	No	No	No Risk	N/A	1, 2, 3, 7, 8, 9, 11
Polychaeta/-	Paraonidae		*Paraonides* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 7, 8, 11
Arthropoda									
Hexanauplia/Calanoida	Centropagidae		*Limnocalanus macrurus*	Zooplankton	No	No	No Risk	N/A	1, 2, 18
Hexanauplia/Cyclopoida	Cyclopoidae		*Cyclops scutifer*	Zooplankton	No	No	No Risk	N/A	21, 22, 23
Insecta/Diptera	Chironomidae	Diamesinae	*Diamesa* sp.	Benthic Infauna	No	No	No Risk	N/A	17
Insecta/Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius* sp. Complex	Benthic Infauna	No	No	No Risk	N/A	2
Insecta/Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella* sp.	Benthic Infauna	No	No	No Risk	N/A	2
Insecta/Diptera	Empididae	Clinocerinae	*Clinocera* sp.	Benthic Infauna	No	No	No Risk	N/A	2
Malacostraca/Amphipoda	Aoridae		*Aoridae indet.*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 8, 10, 18
Malacostraca/Amphipoda	Corophiidae	Corophiinae	*Crassicorophium clarencense*	Benthic Infauna	No	No	No Risk	N/A	1, 7,
Malacostraca/Amphipoda	Corophiidae	Corophiinae	*Crassicorophium* sp.	2019 Verifications	No	No	Low Risk	Watchlist	1, 2, 7, 8
Malacostraca/Amphipoda	Corophiidae	Corophiinae	*Monocorophium* sp.	2019 Verifications	No	No	High Risk	Watchlist	1, 2, 7, 8
Malacostraca/Amphipoda	Dulichiidae		*Dulichia* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 4, 5, 6, 9, 10
Malacostraca/Amphipoda	Gammaracanthidae		*Gammaracanthus loricatus*	Incidentals	No	No	No Risk	N/A	1, 2, 7, 9, 10, 18
Malacostraca/Amphipoda	Melphidippidae		*Melphidippa* sp.	Benthic Infauna	No	No	No Risk	N/A	2, 6
Malacostraca/Amphipoda	Synopiidae		*Tiron spiniferus*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 3, 5, 6, 10
Malacostraca/Amphipoda	Uristidae		*Anonyx lilljeborgi*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 7, 10
Malacostraca/Decapoda	Cragonidae		*Argis dentata*	Incidentals	No	No	No Risk	N/A	1, 2, 4, 7, 8, 9, 18
Malacostraca/Decapoda	Pandalidae		*Pandalus* sp.	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 4, 7, 9
Malacostraca/Decapoda	Thoridae		*Eualus gaimardii*	Fish Stomachs	No	No	No Risk	N/A	1, 2, 4, 7, 9, 18
Malacostraca/Isopoda	Munnopsidae	Munnopsinae	*Munnopsis typica*	Incidentals	No	No	No Risk	N/A	1, 2, 7, 9, 18
Malacostraca/Amphipoda/	Podoceridae		Podoceridae indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 6, 10
Ostracoda/Myodocopida	Philomedidae		*Philomedes* sp.	2019 Verifications	Corrected ID for *Euphilomedes* sp.	No	No Risk	N/A	1, 2, 7, 8, 10
Bryozoa									
Gymnolaemata/Cheilostomat	Eucrateidae		*Eucratea sp.*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 8, 18
Stenolaemata/Cyclostomatida			Tubuliporina indet.	2019 Verifications	No	No	No Risk	N/A	1, 2, 8
Chordata									
Actinopterygii/Gadiformes	Gadidae		*Arctogadus glacialis*	Incidentals	No	No	No Risk	N/A	1, 2, 25
Actinopterygii/Perciformes	Ammodytidae		*Ammodytes hexapterus*	Incidentals	Yes	Flagged	Low Risk	Watchlist	20, 25, 26
Actinopterygii/Perciformes	Zoarcidae	Lycodinae	*Lycodes mucosus*	Incidentals	No	No	No Risk	N/A	1, 2, 7, 25

Appendix 8E
New Taxa (2020) and Risk Category Assessment

Phylum Class/Order	Family	Subfamily	Taxa	Project Component	Sent for Independent Verification?	Flagged?	Risk Category	Watchlist or Trigger List?	Distribution References
Actinopterygii/Scorpaeniform	Cottidae		*Gymnocanthus tricuspis*	Incidentals	No	No	No Risk	N/A	1, 2, 7, 9, 18, 25
Actinopterygii/Scorpaeniform	Cottidae		*Triglops* sp.	Incidentals	No	No	No Risk	N/A	1, 2, 7, 18, 25
Actinopterygii/Scorpaeniform	Liparidae		*Liparis* sp.	Zooplankton	No	No	No Risk	N/A	1, 2, 7, 18, 25
Cnidaria									
Anthozoa/Actiniaria	Halcampidae		*Halcampa* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 10
Anthozoa/Spirularia	Cerianthidae		*Cerianthus lloydii*	Benthic Infauna	No	No	No Risk	N/A	1, 2
Hydrozoa/Anthoathecata	Bougainvillidae		*Bougainvillia* sp.	Zooplankton	No	No	No Risk	N/A	1, 2, 18
Hydrozoa/Trachymedusae	Ptychogastriidae		*Ptychogastria polaris*	Ore Dock Habitat Offset Monitoring, Incidentals	No	No	No Risk	N/A	1, 2
Scyphozoa/-	-		Scyphozoa indet.	Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 7, 9, 18
Scyphozoa/-	Cyaneidae		*Cyanea capillata*	Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 7, 18
Ctenophora									
Tentaculata/-	Mertensiidae		*Mertensia ovum*	Ore Dock and Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 7, 18
Echinodermata									
Echinoidea/Camarodonta	Strongylocentrotidae		*Strongylocentrotus pallidus*	Benthic Infauna	No	No	No Risk	N/A	1, 2
Ophiuroidea/Amphilepidida			Amphilepidida indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2
Entoprocta									
-/Coloniales	Barentsiidae		*Barentsia* sp.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 19
-/-			Entoprocta indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 18
Hemichordata									
Enteropneusta/-			Enteropneusta indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2
Mollusca									
Cephalopoda/-			Cephalopoda indet.	Fish Stomachs	No	No	No Risk	N/A	1, 2, 9, 10, 18
Gastropoda/-	Onchidorididae		*Onchidoris bilamellata*	Ore Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 7
Nematoda									
-/-			Nematoda indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 8, 18
Nemertea									
Hoplonemertea/Monostilifera	Amphiporidae		*Amphiporus sp.*	Benthic Infauna	No	No	No Risk	N/A	1, 2, 8
Ochrophyta									
Phaeophyceae/Laminariales	Laminariaceae		*Saccharina latissima*	Ore Dock and Freight Dock Habitat Offset Monitoring, Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-	Acinetosporaceae		*Pylaiella* sp.	Ore Dock and Freight Dock Habitat Offset Monitoring, Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-	Agaraceae		*Agarum clathratum*	Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	2, 24
Phaeophyceae/-	Fucaceae		*Fucus distichus*	Ore Dock and Freight Dock Habitat Offset Monitoring, Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-	Halosiphonaceae		*Halosiphon tomentosus*	Ore Dock and Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-	Sphacelariaceae		*Battersia* spp.	Ore Dock and Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-			Phaeophyceae indet. 1	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-			Phaeophyceae indet. 2	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Phaeophyceae/-			Phaeophyceae indet. 3	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Porifera									
Demospongiae/-	-	-	Heteroscleromorpha indet.	Ore Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2
Demospongiae/-			Demospongiae indet.	Benthic Infauna	No	No	No Risk	N/A	1, 2, 10, 18
Rhodophyta									
Florideophyceae/Corallinales			Corallinales indet.	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
Florideophyceae/-	Palmariaceae		*Palmaria palmata*	Freight Dock Habitat Offset Monitoring	No	No	No Risk	N/A	1, 2, 24
-/-			Rhodophyta indet. 1	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
-/-			Rhodophyta indet. 2	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24
-/-			Rhodophyta indet. 3	Quadrat Surveys	No	No	No Risk	N/A	1, 2, 24

APPENDIX 8F

Technical Memorandum Update on the Status of *Marenzelleria* Species on Baffin Island

GOLDER
MEMBER OF WSP

TECHNICAL MEMORANDUM

DATE 17 August 2021 **Reference No.** 1663724-287-TM-Rev3-48000

TO Megan Lord-Hoyle, Vice-President, Sustainable Development
Baffinland Iron Mines Corp.

CC

FROM Marina Winterbottom **EMAIL marina_winterbottom@golder.com**

UPDATE ON THE STATUS OF *MARENZELLERIA* SPECIES ON BAFFIN ISLAND

This technical memorandum provides an update on the status of specimens from the genus *Marenzelleria*, collected in various locations within Milne Port as part of Baffinland Iron Mine Corporation's (Baffinland) Non-Indigenous Species and Aquatic Invasive Species (NIS/AIS) monitoring program. These specimens were initially identified as *M. viridis*, a species documented as invasive to European waters and placed on invasive species watchlists and flagged as High Risk for the Project area. **This update is provided** subsequent to an independent review of the specimens by a global expert on Spionidae (the order of marine worms that includes *Marenzelleria*), which resulted in the reclassification of the specimens as *M. arctia*. As suggested by its name, *M. arctia* is an arctic species, originally described from collections in North American arctic waters (Chamberlin 1920); accordingly, ***M. arctia* is not considered a potential NIS/AIS in the Regional Study Area including Milne Port.** Baffinland will continue to monitor for the presence of any *Marenzelleria* species in the Milne Port area and, as a precaution, Baffinland will treat all identified *Marenzelleria* specimens as having the potential to be invasive until the classification of *M. arctia* is confirmed through molecular methods. **This corrected classification confirms that, to date, no Project-related invasive species have been found through the AIS/NIS monitoring program.**

1.0 BACKGROUND

1.1 Taxonomic Identification

Conclusive taxonomic identification of collected specimens to species level and determination of NIS/AIS status in the Project area is challenging for a variety of reasons, including:

- Marine fauna in the Canadian Arctic are not thoroughly described in the existing literature and marine species inventories have not been undertaken in the Eastern Canadian Arctic as frequently as other Arctic regions, particularly in comparison to surveys in Northern Europe. This lowers the confidence in the species ranges on record, particularly for less common or more recently described species that may be cryptogenic to a broader area and not yet been described outside the range on record.
- Species ranges on record are not complete for all taxa. Recently described and/or rare taxa often have a limited range description, with a broader range inferred based on biological characteristics and tolerances.

- Redescriptions and reclassifications of species and taxonomic groups lead to difficulties in determining the historic range of a species. The range on record may be linked to a previous name or description and existing species inventories and databases are not always updated as new species descriptions are accepted. Archived samples are often no longer available for review following redescription, leading to uncertainty in the species identification prior to the redescription or reclassification.
- Many available species descriptions are based on adult samples, with limited description of immature, juvenile or larval characteristics. Non-adult specimens may lack features present in adults that allow for specific identification (Steinerstauch 2019, pers. comm.).
- Fragmented samples, or samples damaged during collection, may also be missing key features that would be used to determine species.
- Availability of publications may impact descriptions. More recently published works may not be readily available or accepted by the wider taxonomic community, and updates may not be reflected in the identification keys used by the taxonomy labs.

Due to these uncertainties, Baffinland has developed an AIS/NIS monitoring protocol aimed to assess risk of Project-related introductions. The initial stages of the protocol involve independent verification of the specimens by outside laboratories or experts in the relevant taxonomic groups to confirm or clarify the initial identification, where required.

1.2 Genus *Marenzelleria* – Species Description and Known Geographic Distributions

The genus *Marenzelleria* contains five recognized species, of which *M. bastropi* and *M. neglecta* are the most recently described (Bick 2005; Sikorski and Bick 2004). *Marenzelleria* sp. can be difficult to distinguish based simply on morphology due to a combination of limited descriptions, overlapping morphological traits, lack of differentiating features in immature specimens, and hybridization between species (Sikorski and Bick 2004; Bick 2005; Blank et al. 2005). *M. viridis*, *M. neglecta*, and *M. arctia,* in particular, are morphologically similar, resulting in the three species being part of a cryptic sibling species complex (Sikorski and Bick 2004; Bick 2005; Green 2015). The recent redescriptions of the genus, descriptions of new species based on historical collections (*M. bastropi* and *M. neglecta*), incorrect species denomination in reporting, and synonymization of the former description of *M. jonesi* with *M. viridis* lead to uncertainty in the historical specimen records, particularly where distributions overlap (Blank et al. 2008; Sikorski and Bick 2004). As many historically collected specimens are no longer available, there is an inherent uncertainty in the actual species that may be represented by these original collections. Despite morphological similarities between species, there are notable behavioral and ecological differences that may aid in species differentiation (Renz and Forster 2013; Sikorski and Bick 2004).

At present, recognized species in the genus include:

- ***M. arctia*** – an Arctic Basin species, first described in the Beaufort Sea, Alaska, USA (Chamberlin 1920). Generally found at depths from 0 to 30 m, with an apparent preference of depths between 20-30 m (Sikorski and Bick 2004; Green 2015). Tolerant of large fluctuations in temperature and salinity, with salinities of 3-16‰ being the most favourable range (5-7‰ for reproduction) (Sikorski and Bick 2004). Phylogenetic analysis of *Marenzelleria* suggests *M. arctia* is the most basal taxon in the genus and may represent the ancestral species (Blank and Bastrop 2008).

- ***M. bastropi* (*M.* sp. A, *M.* Type III[1])** – Most recently described species in genus. Current known distribution is limited to Currituck Sound, North Carolina, where it occurs sympatrically with *M. neglecta*. Closely related (morphologically) to *M. neglecta* and *M. viridis*.
- ***M. neglecta* (*M.* Type II)** – Indications of a broad range, including the Atlantic Ocean, the Baltic Sea, and the Arctic Ocean (Bastrop et al. 1997; Sikorski and Bick 2004). Morphologically similar to *M. viridis*, and having overlapping habitats, differentiation between *M. viridis* and *M. neglecta* may be made based on *M. neglecta* generally preferring lower salinities (0.5-10‰ compared to 16‰ for *M. viridis*) (Sikorski and Bick 2004).
- ***M*. *viridis* (*M.* Type I)** – natural range presumed to be the western coast of the north Atlantic – described as native to east coast North America from Nova Scotia to Delaware, with a probable native range that includes waters around Newfoundland to Chesapeake Bay (Fofonoff et al. 2021). *M. viridis* is apparently more sensitive to low salinities compared to other species of *Marenzelleria*, typically found in eulittoral habitats with brackish waters where salinities do not fall below 16‰ (Sikorski and Bick 2004; Bastrop and Blank 2006).
- ***M*. *wireni*** – distributed in arctic waters. Found in a range of depths between 1 m and 55 m, where salinities are not below 30‰ (Sikorski and Bick 2004).

1.2.1 History on the Classification of *Marenzelleria as Invasive*

The genus *Marenzelleria* (presumably *M. viridis*) was first detected in waters outside of its natural ranges in 1979 (Bastrop and Blank 2006; O'Reilly and Nowacki 2019). The initial introductions in the North Sea led to rapid expansion, with detections occurring in most North Sea estuaries in the following years, and the first detection in the Baltic Sea occurring in 1985 (Bastrop and Blank 2006). Since the genus was first confirmed in the North Sea, invasions of one or more species (including *M. viridis, M. neglecta* and *M. arctia*) have been confirmed in the Pacific Ocean, North Sea, Baltic Sea, Barents Sea, White Sea and Sea of Azov (Bastrop and Blank 2006; ICES 2016; Fofonoff et al. 2021). *Marenzelleria* spp. are considered to be among the most successful invasive species in the Baltic Sea (ICES 2016).

Native species and functional diversity are generally naturally low in areas where *Marenzelleria* spp. have successful invaded (Kauppi et al. 2015; Maximov et al. 2014). In particular, these areas are characterized by very low abundances of marine polychaete worms, especially larger burrowing forms functionally similar to *Marenzelleria* (Maximov 2015; Quintana et al. 2018). These ecosystems are generally adapted to an absence of bioturbators and, due to a lack of competition, *Marenzelleria* spp. were able to fill that void, disrupting the existing environment by changing sediment characteristics through burrowing behaviour. In addition to low diversity, increasing eutrophication has also caused these areas to be vulnerable to successful invasion by *Marenzelleria* and other invasive species (Kauppi et al. 2015; Maximov et al. 2014).

Accordingly, *M. viridis* and *M. neglecta* are listed in the Database of Global Marine Invasive Species Threats as 'invasive to areas outside of East Coast North America' (Molnar et al. 2008). They are also listed in the National Risk Assessment as a potential invader to Canadian waters, including the Arctic region (Casas-Monroy et al. 2014).

---

[1] Type I, II, and II, and sp. A were names assigned to specimens with features that differentiated them from currently described species. While descriptions now exist, these names are still used in some literature, or were used in literature relevant to this memo.

However, collections of *M. viridis* in Canadian waters, including the Canadian Arctic, may indicate the currently listed range or taxonomic record is incomplete (Stewart et al. 1985; Cusson 2018; Brown et al. 2011; GBIF 2021; Miller et al. 2014). A review of the literature indicates that while the known documented range of the species does not include the Canadian Arctic, available evidence via historical collections suggested the genus was present in the area prior to Project operations and that *M. viridis* may be cryptogenic, if not indigenous to the Canadian Arctic (Stewart et al. 1985; Cusson 2018; Brown et al. 2011; GBIF 2021; Miller et al. 2014; Golder 2021a). However, due to the morphological similarities between species and the lack of available specimens for review, these may represent instances of *M. arctia*, or possibly *M. wireni* or *M. neglecta* (Radashevsky 2021, pers. comm.)

The primary invasion vector is considered to be transport through ballast water and sediments and once established, locally by currents (Bastrop et al. 1997; Molnar et al. 2008). In locations where *Marenzelleria* has been introduced, it may reach high densities, in some locations replacing native infauna and altering sediment characteristics (Molnar et al. 2008; Fofonoff et al. 2021). Once established, management is considered highly difficult or impossible (Molnar et al. 2008).

1.3 History of *Marenzelleria* at Milne Port

Specimens from the genus *Marenzelleria* were identified in benthic samples collected in Milne Port between 2016 and 2020 (Figure 1, Table 1). These samples were all collected shallow waters (3 m to 35 m) along the southern shore, primarily in locations known to have considerable freshwater influence, either from Phillips Creek, or from other smaller watercourses flowing into Milne Port. In 2016, 2017 and 2018, the collected specimens were unable to be identified to species level. In 2019 and 2020, specimens were initially identified as *Marenzelleria viridis*. The specimens were flagged for further review due to this species' invasive status in Europe and their inclusion on several invasive species watchlists. At the recommendation of Fisheries and Oceans Canada (DFO), these specimens were sent to the Benthic Ecology Lab at Université Laval for independent verification, which agreed with the identification of *M. viridis*.

Subsequent to this initial identification, in 2020, locations where *M. viridis* was found in 2019 were targeted for resampling with a focus on collection of specimens for DNA barcoding to resolve the species identification. Despite targeted sampling in areas previously found to have the species, no potential *M. viridis* specimens were found in benthic samples collected for DNA (Golder 2021a). Most stations where *Marenzelleria* sp. were collected in 2016, 2017 and 2018 have not been directly resampled, due to changes in the design of the program when station numbers were increased to provide better coverage of the marine environment. However, the expanded program has stations in close proximity to the old locations, allowing for the general locations to be resampled in 2019 and 2020 (Table 1). Of the historic stations with updated locations, only SW-2 (equivalent to BM-7) has had *Marenzelleria* collected in more than one sample year, with no new collections in 2020, indicating that *Marenzelleria* is not displaying invasive behaviours in Milne Port (Table 1).

LEGEND

- *Marenzelleria sp.* (2017)
- *Marenzelleria sp.* (2018)
- *Marenzelleria viridis* (2019)
- *Marenzelleria viridis* (2020)

0 250 500

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REFERENCE(S)

MILNE PORT IMAGERY CAPTURED AUGUST 2020 © 2020 DIGITAL GLOBE. ADDITIONAL IMAGERY COPYRIGHT © 20190802 ESRI AND ITS LICENSORS. SOURCE: MAXAR VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 17 DATUM: NAD 83

CLIENT
BAFFINLAND IRON MINES CORPORATION

PROJECT
MARY RIVER PROJECT

TITLE
***Marenzelleria* OBSERVATIONS IN MILNE PORT OVER TIME**

CONSULTANT
GOLDER

YYYY-MM-DD	2021-08-17
DESIGNED	CB
PREPARED	AJA
REVIEWED	MW
APPROVED	MW

PROJECT NO.	CONTROL	REV.	FIGURE
1663724	48000-03	0	1

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25mm

Table 1: History of Marenzelleria Specimen Collection in Milne Port

Initial Identification	Year	Collected/ Identified By[1]	Locations	Collection Depth	Site Conditions	Comments
Marenzelleria sp.	2016	SEM/ Envirosphere	Not reported	Not Reported	Not reported	Single specimen identified in benthic samples, specific location not reported.
Marenzelleria sp.	2017	Golder/ Biologica	BM-7	3-15 m*	Estuarine	2 specimens collected at former station, close to current station SW-2 (sampled 2019, 2020)
Marenzelleria sp.	2018	Golder/ Biologica	BM-1, BM-7, BM-9, BM-10, BW-4, BW-5	3-35 m*	Fresh/ estuarine	Locations near or equivalent to current stations SW-5, SW-2, SE18-1, SE18-2 (sampled 2019, 2020), SW-10, SW-15 (sampled 2020)
Marenzelleria viridis	2019	Golder/ Biologica	SE-1, SW-2	12 m, 21 m	Salt/ estuarine	Targeted again for sampling in 2020, with no new *Marenzelleria* collections
Marenzelleria viridis	2020	Golder /Biologica	SW-11, SW-12, SW-13, SW-14	17.2 m, 17.7 m, 13.5 m, 18.2 m	Fresh/ estuarine	New stations, but within 50 m of some historic sampling locations

[1]SEM: Sikumiut Environmental Management Ltd, Envirosphere: Envirosphere Consultants Ltd., Biologica: Biologica Environmental Services Ltd.
*Notes: depth range reported only, specific depth at collection not available

2.0 INDEPENDENT VERIFICATION

Specimens collected in 2020 that were identified and independently verified as *M. viridis* by both Biologica and Laval were sent to Dr. Vasily Radashevsky of the Russian National Scientific Center of Marine Biology in Vladivostok. Biologica recommended Dr. Radashevsky review the identification due to his expertise on Spionidae, the order of marine worms that contains *Marenzelleria*, as well as his familiarity with Canadian spionids through collaborative research with the Canadian Museum of Nature in Ottawa. Dr. Radashevsky examined four specimens fixed in formalin. All specimens were determined to be in very good condition at the time of receipt (Radashevsky 2021, pers. comm.). At present, *M. arctia* and *M. viridis* can only be distinguished morphologically by their maximal size and number of branchiate chaetigers[2]. Based on morphological examination, Dr. Radashevsky concluded that all specimens sent to him from Milne Port matched features described for *M. arctia*. Further, while not a conclusive distinguishing trait, pigmentation in the head of the specimens closely matched specimens of *M. arctia* from the White Sea (Radashevsky 2021, pers. comm.). **For these reasons, Dr. Radashevsky was confident in the identification of the specimens as *M. arctia*, as opposed to the previously assumed *M. viridis* based on his experience in specific identification for this genus.**

The *M. arctia* specimens identified by Dr. Radashevsky were deposited in the public polychaete collection at the National Scientific Center of Marine Biology in Vladivostok, Russia and will be reported on in conjunction with other *Marenzelleria* specimens in upcoming review of the genus (Radashevsky et al. under review) and a description of *M. arctia* currently in preparation (Radashevsky et al. in prep).

[2] If a specimen has fewer than 120 chaetigers in total, and up to 40 branchiate chaetigers, it is classified as *M. arctia* whereas if a specimen has up to 250 chaetigers in total and up to 130 branchiate chaetigers, it is classified as *M. viridis* (Radashevsky 2021, pers. comm.)

2.1.1 Supporting Evidence to Independent Verification

As described in detail in Section 8.5.4.1.8 of the 2020 MEEMP report, a Multiple Lines of Evidence (MLE) test was performed for *M. viridis* to evaluate supporting information related to its potential invasiveness at Milne Port. Increased sampling effort in Milne Port indicated no warning signs of invasion such as a decrease in benthic community indicators (e.g., diversity, richness, evenness) in conjunction with an increase in the relative abundance of *M. viridis*. Rather, benthic infaunal communities were shown to be diverse and well established throughout Milne Port (Golder 2021a).

Benthic sampling (Golder 2021a) in Milne Port demonstrated a high abundance and diversity of polychaetes in this area. The local receiving environment is not subject to the degree of disturbance from eutrophication as observed in other areas such as the Baltic Sea. *Marenzelleria* spp. are not expected to have a competitive advantage in Milne Port as was observed during invasions in Europe. Should a non-indigenous species of the genus *Marenzelleria* be introduced to Milne Port, the risks of an invasion similar in scale to what has been observed in European waters is therefore not expected.

This corrected species identification is further supported by the environmental conditions at Milne Port. Oceanographic data collected at Milne Port indicates that the nearshore environment is subject to a wide range of salinity (from near zero to 30 PSU - approximately equivalent to 0-30‰),) and water temperature (0°C to 12°C) due to distinct water masses moving with tides, presumed to be influenced by freshwater input from Phillips Creek and melting sea ice in Milne Port (Golder 2021b). *Marenzelleria* specimens identified between 2016-2020 were collected in similar locations to the Ore Dock tide gauge and the mouth of Phillips Creek. The range of temperatures and salinities observed in the area support the identification of M. arctia, which is more tolerant of large fluctuations in temperature and salinity, and generally found in lower salinities compared to M. viridis, which is not typically found in areas where salinity falls below 16‰ (Sikorski and Bick 2004; Green 2015; Quintana et al. 2018).

3.0 NEXT STEPS

Due to the initial species level identification of *Marenzelleria* specimens as *M. viridis* and the difficulties in conclusively identifying *Marenzelleria* species by non-molecular methods, outlined in Section 1.1, Baffinland will continue to monitor for the presence of any *Marenzelleria* species in the Milne Port area. As a precaution, Baffinland will treat all identified *Marenzelleria* specimens as having the potential to be invasive until the classification of *M. arctia* is confirmed through molecular methods. *Marenzelleria* species are distinguishable through COI[3] sequences, and conclusive determination of species will be based on DNA barcoding of future *Marenzelleria* specimens collected in Milne Port (Radashevsky 2021, pers. comm.).

Baffinland will continue to undertake targeted monitoring for this genus in Milne Port, will send any specimens collected in summer 2021 for DNA analysis, and will continue to collaborate with federal and global specialists to resolve species. In addition, Baffinland is currently working with Biologica to retrieve and send all archived *Marenzelleria* samples from the NIS/AIS monitoring program to Dr. Radashevsky for taxonomic review

[3] COI refers to the mitochondiral cytochrome c oxidase subunit I gene. DNA barcoding involves sequencing a short fragment of the COI gene (which act as “DNA barcodes”) from taxonomically unknown specimens and performing comparisons with a library of DNA barcodes of known taxonomy.

4.0 CLOSURE

We trust this information is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact Marina Winterbottom, on behalf of the undersigned, at 604-296-7312.

Golder Associates Ltd.

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5.0 REFERENCES

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