REPORT

Additional Assessment - Steps 5 to 7 of the Federal Approach to Contaminated Sites

Former Burgeo Rifle Range, Burgeo, NL

Submitted to:

Defence Construction Canada (DCC)
6231 Engineer's Way, Bldg WL7
Halifax, NS
B3K 5M6

DCC Project #GR082101
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Submitted by:

WSP Canada Inc.
Ottawa, Ontario, K2H 5B7, Canada

+1 613 592 9600

22532464

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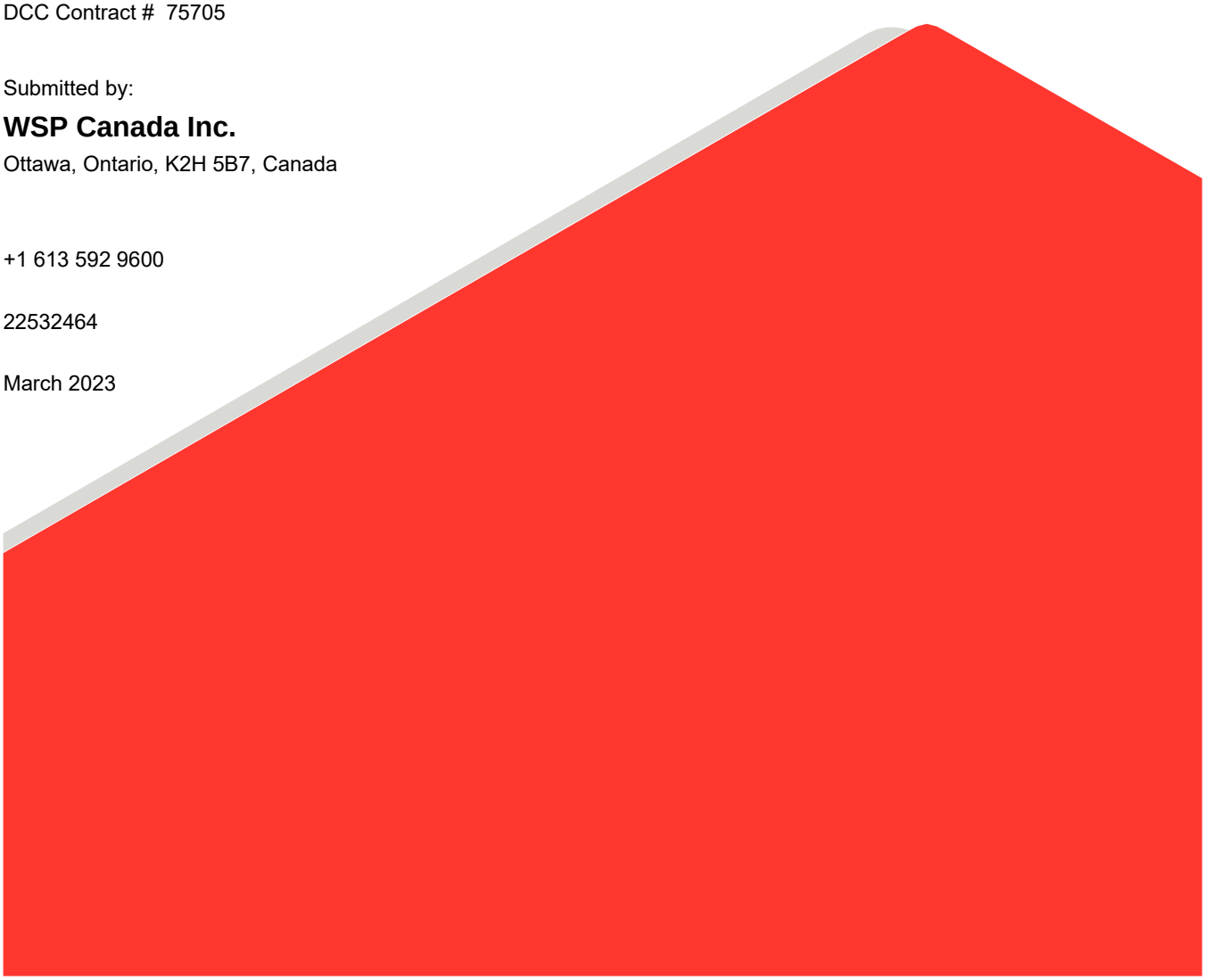

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Executive Summary

Golder Associates Ltd., now WSP Canada Inc. (WSP), was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to provide consulting services for completing Environmental Site Assessment (ESA) Steps 5 to 7 of the Federal Approach to Contaminated Sites (FACS) at the former Burgeo Range, Burgeo, Newfoundland and Labrador (NL), in accordance with the Contaminated Site Management Working Group's FACS, including ESAs and the National Classification System (NCS) for Contaminated Sites (CS). This report is based on Contemplated Change Notice 02 provided by DCC, dated May 26, 2022 (project number HQ082101), and Golder's proposal dated July 8, 2022.

The Department of National Defence is responsible for a former small arms rifle range set up near the Town of Burgeo (the former Burgeo range). The property was leased from the Government of Newfoundland and Labrador (Crown lands) for use by the 5th Canadian Ranger Patrol Group (5CRPG) in 2008 (Location 1). Use of the former Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Government of Newfoundland and Labrador (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required.

A second location (Location 2), near Location 1 but across the road, was also used as a firing range by 5CRPG. A DND Environmental Assessment Form from 2003, recently discovered, indicates this second location was planned to be used as a rifle range. Information on this form specifies that this range was originally put in place by the Local Wildlife Office and 5 CRPG planned to use a portion of this range. Photos from Location 2, taken in 2021, show evidence of range use. There is a small stream flowing through the area and a few small ponds and marshes.

In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Range. Assessment work was completed at Location 1 in 2020 (Golder, 2021) and findings indicated soil, groundwater, sediment and/or surface water impacts for various inorganic metals in comparison against representative background conditions and/or applicable guidelines for that time. The FY2021/22 field program included investigation to delineate impacts in soil and further characterize the Site across all sample media. As part of this investigation (FY2022/23), an additional field program with the purpose of addressing remaining data gaps (further delineation of impacts in the firing area and characterization of the Site to assist in risk assessment) was conducted from September 4th to September 12th 2022. Data gaps were addressed and reasonable delineation of metals impacts was achieved.

Based on the findings of the analytical program, metals concentrations in soil (Location 1), sediment (Locations 1 and 2), surface water (Locations 1 and 2), and groundwater (Location 1), as well as PAH concentrations in sediment (Locations 1 and 2), have been found to exceed the applicable guidelines, and are attributed or likely attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Based on the findings of the assessment, a NCSCS score of 74.4 was calculated for the former Burgeo Range. As such, the former Burgeo Range is identified as Site Letter Grade C, Class 1 site with a high priority for action. The NCSCS calculation sheet is provided in Appendix E.

Horizontal and vertical delineation of impacts in soil has been reasonably achieved. Given that the firing backstop material was found to contain hazardous concentrations of leachable lead, and that lead was elevated in the backstop locations, impacts were delineated around these two locations, and are recommended to be remediated through source removal. A discussion of the remediation of these impacted zones is presented in the Remedial Strategy. The remaining impacts in soil on-Site, are carried forward for Risk Assessment. A Site-Specific Human-Health Ecological Risk Assessment has been prepared under separate cover.

Concentrations of lead in surface water exceeding the NL DWQ and HC GCDWQ (indicating potential impacts on the provincially protected water supply for the Town of Burgeo) were only found in BFR_L1_SW4, which was collected from Pond 2 (one of the two small ponds adjacent to the firing area). Lead concentrations in Pond 1 were only marginally below the NL DWQ and HC GCDWQ. Lead concentrations in sediment in Ponds 1 and 2 were found up to 770 mg/kg, over 5 times as high as anywhere else on-Site. As such, it is recommended that the surface water and sediment in Ponds 1 and 2 be remediated, to remove all media potentially impacting the provincially protected water supply for the Town of Burgeo. A discussion of the remediation of the impacted sediment and surface water is presented in the Remedial Strategy. The remaining impacts in sediment and surface water on-Site are carried forward for Risk Assessment.

Given that there are no potable wells located in the vicinity of the Site, groundwater impacts are carried forward for Risk Assessment.

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1.0 INTRODUCTION

Golder Associates Ltd., now WSP Canada Inc. (WSP), was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to provide consulting services for completing Environmental Site Assessment (ESA) Steps 5 to 7 of the Federal Approach to Contaminated Sites (FACS) at the former Burgeo Range, Burgeo, Newfoundland and Labrador (NL), in accordance with the Contaminated Site Management Working Group's FACS, including ESAs and the National Classification System (NCS) for Contaminated Sites (CS). This report is based on Contemplated Change Notice 02 provided by DCC, dated May 26, 2022 (project number HQ082101), and Golder's proposal dated July 8, 2022.

2.0 BACKGROUND

2.1 Site Description

The Department of National Defence is responsible for a former small arms rifle range set up near the Town of Burgeo (the former Burgeo range). The property was leased from the Government of Newfoundland and Labrador (Crown lands) for use by the 5th Canadian Ranger Patrol Group (5CRPG) in 2008 (Location 1). Use of the former Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Government of Newfoundland and Labrador (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required.

A second location (Location 2), near Location 1 but across the road, was also used as a firing range by 5CRPG. A DND Environmental Assessment Form from 2003, recently discovered, indicates this second location was planned to be used as a rifle range. Information on this form specifies that this range was originally put in place by the Local Wildlife Office and 5 CRPG planned to use a portion of this range. Photos from Location 2, taken in 2021, show evidence of range use. There is a small stream flowing through the area and a few small ponds and marshes. Figure 1 shows the Site plan, including Locations 1 and 2.

In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Range. Assessment work was completed at Location 1 in 2020 (Golder, 2021) and findings indicated soil, groundwater, sediment and/or surface water impacts for various inorganic metals in comparison against representative background conditions and/or applicable guidelines for that time. A field program with the purpose of filling in data gaps was conducted from September 4th to September 12th 2022. The FY2021/22 field program had data gaps remaining with regards to site-specific background concentrations, potential leaching from soil to groundwater (which can accumulate at Long Pond). These data gaps were filled and reasonable delineation of localized metals contamination in soil, sediment, and surface water was achieved.

There is limited infrastructure on Site and no engineered controls.

2.2 2021 Golder Report on Steps 1 to 4 of the FACS

The Golder 2021 report entitled “Steps 1 to 4 of the Federal Approach to Contaminated Sites at the former Burgeo Range, NL” provided an initial testing program for the Site. The Site was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zone 3 is located approximately 1,150 m away from the zone 1 high-risk area and is considered to be representative of background conditions. Based on the findings of the analytical program, petroleum hydrocarbon (PHC) exceedances were identified in soil and sediment at the Site. However, additional analyses conducted by the lab indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several metal exceedances in soil, sediment, and surface water were identified and considered to have resulted due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggested the elevated concentrations of these metals are common to the Site and suggested that zone 3 can be considered representative of background conditions. However, presence of lead and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1, were attributed to bullets and casings from firing activities which included the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Soil, surface water and sediment data exceedances on the Site are located in the area of the former firing range. Lead and iron concentrations in surface water are present in the pond adjacent to the former firing range, which discharges to the south toward Long Pond (a drinking water source for the Town of Burgeo), located approximately 1.2 km hydraulically down-gradient of the Site. Elevated iron concentrations are noted in the source water database for Long Pond from the Government of Newfoundland and Labrador Department of Environment and Conservation Water Resources Management Division’s (WRMD) Newfoundland and Labrador Water Resources Portal (collected from 1998 to 2018) suggesting iron is associated with background concentrations in the region. Lead concentrations in Long Pond source water data have been below the Guidelines for Canadian Drinking Water Quality. However, field investigations indicated that there are lead concentrations in the pond located on the south portion of the Site and there is a potential for migration to the south.

Data gaps were identified with regards to site-specific background concentrations, potential leaching from soil to groundwater and delineation of localized metals contamination in soil, sediment, and surface water. As such, additional assessment was recommended to further assess the identified impacts at the Site including collection of soil samples to laterally delineate the identified impacts and evaluate potential leaching into groundwater. In order to evaluate groundwater quality at the Site, installation of monitoring wells was recommended. Additional soil, sediment and surface water samples to establish Site-specific background concentrations were also recommended. Species at risk public registry search was recommended to be completed to confirm if species at risk are documented on or near the Site and to identify if the Site is considered critical habitat. It was noted that mitigation measures may involve risk assessment followed by remedial option evaluation.

2.3 2022 Golder Report on Steps 5 to 7 of the FACS

The Golder 2022 report entitled “Steps 5 to 7 of the Federal Approach to Contaminated Sites at the former Burgeo Range, NL” provided an enhanced testing program for the Site. The Site remained divided into the three risk management zones originally discussed in the 2021 Steps 1 to 4 report. The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zones 2 and 3 are located outside the zone 1 high-risk area and were considered to be representative of background conditions. Based on the findings of the analytical program, petroleum hydrocarbon (PHC) exceedances were once more identified in soil and sediment at the Site. Similar to the FY2020/21 analytical program, additional analyses conducted by the lab indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several metal exceedances in soil, sediment, and surface water were identified and considered to have resulted due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggested the elevated concentrations of these metals are common to the Site and suggested that zone 3 can be considered representative of background conditions. However, presence of lead, tin and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1, were attributed to bullets and casings from firing activities which included the former DND firing range and shooting practice by town residents.

Data gaps were identified with regards to delineation of impacts in the soil in the firing area; delineation of impacts in sediment in the two small ponds located adjacent to the north of the firing range backstop; evaluation of hazardous/non-hazardous waste; depth of water in the two small ponds located adjacent to the north location 1; additional characterization of sediment and surface water in the waterbodies located to the south of the high activity firing area; additional sediment/surface water assessment of two waterbodies in the exposure area that are representative of the waterbodies on the Site (assessed as a “worst case” in a future aquatic ecological risk assessment); additional sediment/surface water assessment of a reference waterbody in support of a future aquatic ecological risk assessment; evaluation of groundwater and surface water quality; and a species at risk/habitat assessment.

The data gaps identified were to support a final remedial/risk management strategy and risk assessment of the Site.

2.4 Sampling Plan

A sampling and analytical plan (SAP) was developed in support of the follow-up work required to fill in data gaps identified in the FY2021/22 sampling program (at Location 1), re-classify the Site, and develop a remediation strategy consistent with Steps 5 to 7 of the FACS to aid in site closure. An initial SAP was developed prior to the Site visit, and, upon completion of the Site visit, the SAP was confirmed and finalized based on information gathered during the Site visit. The SAP included details of the proposed media to be sampled and proposed sample locations including sample IDs and associated figures. The SAP also outlined the technical procedures associated with the proposed sample collection methods (and backup collection methods should the first method not be used due to unforeseen circumstances), the analytical methods and laboratory detection limits, and the number and type of quality control (QC) samples (i.e., blind duplicates). The SAP identified a total of up to 105 shallow soil samples at 35 locations in Location 1 to be submitted for the analysis of metals. An additional two composite samples from the backstop were to be analyzed for a Toxic Characteristic Leachate Procedure (TCLP) and propellants. A total of 16 surface water samples at 14 locations in Location 1 were to be submitted for

analysis of PAH and metals while a select seven samples were also to be analyzed for general chemistry, toxicity and pH. A total of up to 46 sediment samples at 21 locations in Location 1 were to be submitted for analysis of metals, PAHs, TOC, grain size. An additional seven samples were to be tested for toxicity and two composite TCLP samples were also collected. One groundwater sample at 1 location in Location 1 was to be collected and analyzed for inorganics, petroleum hydrocarbon, metals and polycyclic aromatic hydrocarbons.

3.0 REGULATORY FRAMEWORK

The Site land use classification is based on current land use as a protected public water supply and future use as Crown Land. Federal guidance (CCME A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines, 2006), considers agricultural land use classification appropriate for sensitive land use scenarios for natural areas. Non-potable groundwater conditions are considered to be applicable to the Site as no potable wells are located in the vicinity of the Site; however, surface water from the Site likely discharges to the protected water conservation area (provides a water supply to the Town of Burgeo) located on the south portion of the Site and south of the Site.

Guidelines associated with agricultural land use, non-potable groundwater and coarse-grained soil (as a conservative approach) will be used for screening purposes. Given the Site will be divested to the Government of Newfoundland and Labrador, provincial regulatory guidance was followed. The applicable guidelines are detailed in the following sections.

3.1 Soil

Atlantic Risk-Based Corrective Action (RBCA) Tier I Environmental Quality Standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil are protective of human health pathways, while the Atlantic RBCA Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil, agricultural land use, coarse-grained soil are protective of ecological health. These are applicable for screening criteria for PHCs, BTEX, metals and PAHs.

In the absence of criteria from the Atlantic RBCA EQS, the Canadian Council of Ministers of the Environment (CCME) guidelines were considered as applicable screening criteria. The CCME defines generic guidelines to assess contaminant impacts in soil. The *CCME Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health* are risk-based numerical guidelines that are divided into categories based on land use. These CCME SQGs will be used to screen soil quality for human and ecological health effects for non-hydrocarbon parameters such as metals (CCME, 2021). For PAHs, CCME (2010), presents a single human health soil quality guideline (SQGHH) for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs. The B[a]P TPE for a soil sample is calculated by multiplying the concentration of each of these PAHs in the sample by its B[a]P potency equivalence factor (PEF) and summing these products on the basis that the PAHs have similar modes of toxic action but different potencies. The PEFs are order of magnitude estimates of carcinogenic potency relative to benzo(a)pyrene outlined in the CCME (2010) factsheet on PAH guidelines. For the purposes of this assessment, guidelines will be based on an incremental lifetime cancer risk (ILCR) of 10^{-5} for human receptors as this risk level is considered to be acceptable for receptors on federal properties (Health Canada, 2021). CCME only provides PEFs for benz[a]anthracene, benzo[b/j]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene. Therefore, these parameters were assessed for only carcinogenic effects for human health through the B[a]P TPE.

In the absence of RBCA EQS or CCME SQGs, the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) were used as the applicable screening criteria.

For the screening of hazardous waste, to evaluate the toxicity characteristic leachate procedure (TCLP) samples analyzed, there are no province-specific screening criteria that exist. Therefore, for comparison purposes, TCLP data were screened against the Ontario, Regulation 347 (O.Reg. 347) — Waste Management Schedule 4 Leachate Quality Criteria guidelines.

For the screening of propellants in soil, there are no province-specific screening criteria that exist for Newfoundland and Labrador. Therefore, for comparison purposes, propellant data were screened against the Soils Concentrations for Ensuring Military Training Sustainability (SCMTSE) (National Research Council, for active Ranges and Training Areas, protective of ecological and human health, Updated 2011) and the British Columbia (BC) Environmental Management Act, Contaminated Sites Regulation 375/96 (July 19, 2016) - Schedule 10 for a Commercial/Industrial Site. These are the only known standards in Canada for propellants in soil.

3.2 Sediment

The Atlantic RBCA Sediment Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for the protection of freshwater aquatic life were used as the primary applicable screening criteria for PHCs, BTEX, metals and PAHs. In the absence of Atlantic RBCA EQS, the CCME Sediment Quality Guidelines for the Protection of Aquatic Life (CCME SEQG) were considered as applicable screening criteria. These are numerical guidelines derived for the protection of aquatic ecological receptors (CCME, 2021). The guidelines are divided into freshwater and marine water categories within which interim sediment quality guidelines (ISQGs) and probable effect levels (PELs) are provided. The ISQG and PEL represent the lower and upper range of concentrations respectively for sediment concentrations associated with adverse biological effects. As a conservative approach, and given that the Site will be remediated to agricultural land use, the ISQGs were used, however the PELs will be presented for information purposes only.

Note that since the above sediment screening criteria are only protective of ecological health, potential exposure to human receptors should be mitigated through risk management measures.

In the absence of Atlantic RBCA EQS or CCME SEQG, applicable screening criteria from NSE EQS for freshwater sediment from the Notification of Contamination Protocol PRO-100 (NSE, 2021) were considered.

For the screening of hazardous waste, to evaluate the toxicity characteristic leachate procedure (TCLP) samples analyzed, there are no province-specific screening criteria that exist. Therefore, for comparison purposes, TCLP data were screened against the Ontario, Regulation 347 (O.Reg. 347) — Waste Management Schedule 4 Leachate Quality Criteria guidelines.

3.3 Surface Water

The Atlantic RBCA Surface Water Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) protective of freshwater aquatic life were used as the primary applicable screening criteria for PHCs, BTEX, metals and PAHs. In the absence of Atlantic RBCA EQS, the CCME Water Quality Guidelines for the Protection of Aquatic Life (CCME WQG-PAL) were considered as applicable screening criteria. These WQGs are numerical guidelines derived for the protection of aquatic ecological receptors (CCME, 2021). The guidelines are divided into freshwater and marine water categories within which values for short- and long-term exposure are provided.

With respect to the Site, CCME WQG for the Protection of Fresh Aquatic Life (CCME WQG PAL) for long term exposure in freshwater were considered to be most applicable.

In the absence of Atlantic RBCA EQS or CCME WQG-PAL, applicable screening criteria from NSE EQS for surface water for freshwater environments from the Notification of Contamination Protocol PRO-100 (NSE, 2021) were considered.

Note that since the above surface water screening criteria are only protective of ecological health, potential exposure to human receptors should be mitigated through risk management measures.

In addition to the surface water criteria noted above, and given that surface water on Site drains to Long Pond, a provincially protected water supply for the town of Burgeo, surface water quality was compared to drinking water criteria, to screen for the potential to affect the aforementioned water supply. The Guidelines for Drinking Water Quality in Newfoundland & Labrador (NL DWQ) as well as the Health Canada Drinking Water Standards (HC GCDWQ) were used.

3.4 Groundwater

For PHCs, BTEX, metals, inorganics and PAHs, the Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater with discharge to Fresh Water closer than 10 m from Surface Water Body are the primary applicable screening criteria.

In the absence of Atlantic RBCA EQS, the Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines (FIGQGs) were considered as applicable screening criteria. The FIGQGs are presented in the document entitled Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (FCSAP, 2016). These are risk-based guidelines developed to protect against the potential adverse effects to human health and the environment, and are developed into categories based on land use and the grain size of soil. The FIGQGs for agricultural land use and coarse-grained soils were considered for screening purposes.

4.0 METHODOLOGY

The 2022 field sampling program was completed between September 4th and September 12th, 2022. The objective of the field program was to address data gaps identified as part of FY2021/22 work. All sampling locations and sample IDs of the sampled media were in accordance with industry accepted field methods and sampling protocols. Location 1 was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Location 1 sample locations are found on Figures 2 through 7. Location 2 sample locations are found on Figures 8 and 9. The 2022 field program focused on zone 1 of Location 1 – for soil delineation purposes and further site characterization to support the remedial strategy.

The sampling program was completed in compliance with guidelines provided in WSP's Standard Operating Procedures (SOP), which maintain the industry standards and provincial/federal requirements. Throughout the program, the Site characteristics, and field observations were recorded. Spatial coordinates of all sampling locations were taken with a Garmin GLO 2, which has an accuracy of 3 m. Photographs collected at the Site can be found in Appendix A.

4.1 Soil Sampling

A total of 25 soil sample locations were advanced in the firing area (See Figure 10B). A jackhammer with a split spoon attachment was used, where possible, to collect samples at depth intervals of 0.6 m. The jackhammer with split spoon attachment was advanced until refusal on inferred bedrock was reached. Given that the jackhammer was unable to be transported safely to all areas, some samples had to be hand dug with a stainless-steel trowel and shovel. Hand dug samples were dug to a maximum depth of 1 mbgs, or until refusal. Hand-dug soil samples were collected at a variable depth based on the thickness of the vegetated moss (not sampled).

Ten shallow soil sample locations (hand-dug) were collected in the area outside of the firing area (See Figure 10A). Hand-dug shallow soil samples were collected at a variable depth based on the thickness of the vegetated moss. Shallow soil samples were collected in intervals of 0.1 – 0.2 m. Unless refusal on bedrock was reached within the first 0.2 m, a deeper sample was collected at each location. The second set of samples was submitted to the laboratory on-hold, for vertical delineation purposes. In addition, a total of six blind field duplicates were also collected.

Soil samples were obtained using a stainless-steel trowel and shovel. The trowel and shovel were decontaminated prior to sampling activities and before each subsequent sample location, in accordance with WSP's SOPs, using Alconox cleaner. Care was taken to exclude any deleterious materials (i.e., grass, roots, and foreign materials) from the sample. When handling the soil samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location.

Each sample was placed into labelled, pre-cleaned, laboratory-supplied sample containers and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Soil descriptions, including visual and olfactory observations, and results of the soil headspace measurements were recorded in the field.

Table 1, appended to this report, details the soil samples that were collected, including their spatial coordinates, depth, description, and location information. Some samples were unable to be collected from their original planned locations due to no soil being present at said location (e.g. bedrock outcrop or refusal on bedrock). These samples were moved to the nearest location with soil present.

4.2 Sediment Sampling

Sediment samples were collected at 14 locations in Location 1 (Figure 5-7). Seven of the sample locations (BFR_L1_SED51 to BFR_L1_SED57) were located south of the firing area, for the purposes of additional Site characterization. Seven of the sample locations (BFR_L1_SED58 to BFR_L1_SED64) were collected for additional Site characterization and for toxicity testing. At each location, the sediment sample was collected from Canoe using an Eckman grab sampler. The Ekman grab sampler was decontaminated prior to sampling activities and before each subsequent sample location, in accordance with WSP's SOPs, using Alconox cleaner. Care was taken to exclude any deleterious materials (i.e., leaves, roots, organics, and foreign materials) from the sample and free water was allowed to flow out of the sampler or trowel once retrieved. When handling the sediment samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. The grab sampler collected the first 0.15 m of sediment. Three field duplicates (two at Location 1 and one from an off-Site location used for background conditions) were also collected at the Site. For the toxicity testing, 8L plastic pails were washed with Alconox cleaner and rinsed prior to sampling. The plastic pails were filled with sediment collected by the Ekman grab sampler and after sample collection were sealed with a plastic lid.

An additional eight locations were sampled in Pond 1 and Pond 2 (located within the firing area), four per pond, were collected using a manual pressure split spoon. The split spoon was advanced into the sediment to a depth of 0.6 m.

Each of the sediment samples was placed directly into labelled, pre-cleaned, laboratory-supplied sample containers upon collection and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Sediment descriptions, including visual (i.e., sediment material, texture, and colour) and olfactory observations were recorded in the field.

Table 2, appended to this report, details the sediment samples that were collected, including their spatial coordinates and description. Some samples were unable to be collected from their original planned sample locations due to no sediment being present at said location (e.g. on bedrock). These samples were moved to the nearest location where sediment was present.

4.3 Surface Water Sampling

Surface water samples were collected at 14 locations in Location 1 (Figure 5-7). Three field duplicates were also collected (two at Location 1 and one at a location off-Site for background concentration) at the Site. At each location, the surface water sample was collected, followed directly by the measurement of field parameters including temperature, pH, electrical conductivity, dissolved oxygen and oxidation reduction potential (ORP). Parameters were measured using a YSI ProPLUS. Seven of the sample locations (BFR_L1_SW58 to BFR_L1_SW64) were collected for additional Site characterization and for toxicity testing. For the toxicity testing, 8 L plastic pails were washed with Alconox cleaner and rinsed prior to sampling. The plastic pails were lowered into the water and after sample collection were sealed with a plastic lid.

Surface water grab samples were collected by canoe or from the shore of the waterbody. The grab surface water samples were collected by submerging pre-cleaned, laboratory-supplied sample bottles in the water while wearing a pair of clean, disposable nitrile gloves to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. In cases where a sample bottle contained a preservative, a similar, clean, laboratory-supplied bottle with no preservative was used to collect the sample and it was then immediately transferred to the bottle with the preservative. The samples were collected just below the water surface to avoid excessive introduction of re-suspended solids from the sediment bed. Once the sample bottle was resealed and labelled, it was placed in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Field observations, including color, odor, turbidity, and sheen were recorded in the field along with the measured field parameters.

Table 3, appended to this report, details the surface water samples that were collected, including their spatial coordinates, measured field parameters, and description.

4.4 Monitoring Well Installation and Groundwater Sampling

Monitoring well GW5 was installed in bedrock, using a CME55 Track-Mounted drill and coring methods, in an attempt to evaluate the hydraulic connection of Ponds 1 and 2 to the surrounding aquifer. After the installation of GW5, based on the water level in the monitoring well being well below the water level in the pond, it was apparent that the bedrock aquifer was not connected to the water in the pond, and that to evaluate the hydraulic connection of the Ponds 1 and 2 to the surrounding aquifer, a monitoring well should be installed in the overburden, which held groundwater atop the bedrock in low-lying areas. Therefore, no sample or hydraulic conductivity test was conducted at GW5. A second monitoring well, GW4 was installed via jackhammer with split-spoon attachment

directly into the overburden/bog material adjacent to Pond 1. The locations of the newly installed monitoring wells are shown on Figure 5.

Due to low hydraulic conductivity in the silty peat, monitoring well GW4 was developed by removing one well volume. Groundwater sampling was done using low-flow sampling methods and equipment (peristaltic pump). As a result of the low yield from the well, not enough water was able to be purged to collect field parameters. The sample was placed directly into labelled, pre-cleaned, laboratory-supplied sample containers upon collection and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis of metals, PHCs, VOCs, and inorganics. Field observations, including color, odor, turbidity, and sheen were recorded in the field along with the measured field parameters.

A rising-head hydraulic conductivity test was conducted on GW4.

Table 4, appended to this report, details the groundwater samples that were collected, including their spatial coordinates and measured field parameters.

4.5 Analytical Program

The laboratory analyses of the soil, groundwater, sediment, and surface water samples collected during the field program were sent to AGAT Laboratories (AGAT) in Dartmouth, NS. AGAT is also accredited by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA).

4.5.1 Soil

Of the 59 soil samples collected in Location 1, 38 were submitted to the laboratory and analyzed for metals. Six field duplicates were also collected for QA/QC and two were submitted for the analysis of metals. The remaining samples (collected for delineation purposes) were sent to the laboratory on hold, but were not analyzed. An additional two composite samples from the backstop material were submitted for TCLP and propellants analyses.

Table 5, appended to this report, summarizes the analyses completed on each soil sample.

4.5.2 Sediment

All 14 sediment samples in Location 1 along with three field duplicates (two at Location 1 and one at a location outside of the site for background reference) were analyzed for PAHs and metals. Of the 14 sediment samples, seven (BFR_L1_SED51 to BFR_L1_SED57) were collected to evaluate the previously unevaluated ponds to the south of the firing area. Four of the 14 samples (BFR_L1_SED58 to BFR_L1_SED61) were collected to evaluate worst-case waterbodies (Ponds 3 and 4). The remaining three of the 14 samples (BFR_L1_SED62 to BFR_L1_SED64) were collected to evaluate a reference waterbody located off-Site to the northwest. Toxicity testing was undertaken on seven samples (BFR_L1_SED58 to BFR_L1_SED64).

An additional 22 sediment samples, from eight locations, including one duplicate, were collected from the firing area (Ponds 1 and 2). All 22 samples were submitted for analysis of metals. A composite sample from each of the eight locations was additionally submitted for grain size analysis. In addition, two composited samples, from all of the sediment in Ponds 1 and 2 were submitted for TCLP analysis.

Table 6, appended to this report, summarizes the analyses completed on each sediment sample.

4.5.3 Surface Water

All 14 surface water samples in Location 1 along with three field duplicates (two at Location 1 and one at a location outside of the site for background reference) were analyzed for PAHs and metals. Of the 14 sediment samples, seven (BFR_L1_SW51 to BFR_L1_SW57) were collected to evaluate the previously unevaluated ponds to the south of the firing area. Four of the 14 samples (BFR_L1_SW58 to BFR_L1_SW61) were collected to evaluate worst-case waterbodies (Ponds 3 and 4). The remaining three of the 14 samples (BFR_L1_SW62 to BFR_L1_SW64) were collected to evaluate a reference waterbody located off-Site to the northwest. Toxicity testing was undertaken on seven samples (BFR_L1_SED58 to BFR_L1_SED64) and these samples were additionally analyzed for general chemistry parameters to assist in the evaluation of toxicity results.

Table 7, appended to this report, summarizes the analyses completed on each surface water sample.

4.5.4 Groundwater

One groundwater sample was analyzed for metals, PHCs/BTEX, VOCs and general chemistry.

Table 8, appended to this report, summarizes the analyses completed on each groundwater sample.

4.6 Survey

During the FY2020/21 field program, a drone survey of Location 1 was completed using a Sensefly eBee+ survey grade, autonomous fixed wing unmanned aerial vehicle (UAV), operated by SEM, on November 30, 2020, as part of the previous field investigation. During the FY2021/22 field investigation, a similar drone survey of Location 2 was conducted on November 18, 2021. The survey area was input into the drone flight software and a flight plan was created automatically. After take-off, the UAV flew in a gridded pattern taking still images at a pre-defined interval, ensuring coverage for the entire Site. The images captured during the flight as well as the flight data from the GPS and inertial measurement unit (IMU) of the UAV were used as inputs in eMotion and Pix4D software packages to produce georeferenced, orthomosaic imagery with a resolution of 5cm/pixel (drone survey plan). The drone survey plan is included in Appendix B.

During the FY2020/21 field program a legal survey and description of the current License to Occupy (LTO) (at Location 1) was completed by the land surveyor, Yates & Woods Ltd in 2020. The survey identified the current lease boundary of the Site to encompass an area of 318.569 Ha. Upon completion of the survey, it became apparent that the portion of the Site to the southwest containing the access road, Rangers firing location, and backstop were not actually a part of the lease area. The survey highlights this portion as proposed additional land to be included in the lease area. As part of the FY2021/22 field program, Yates & Woods conducted a survey of Location 2. The legal survey plans are included in Appendix B. The additional land proposed to be included in the lease is highlighted in pink on the survey plan.

4.7 Quality Assurance / Quality Control (QA / QC)

WSP uses an internal quality management program which controls the quality of each step of the project. Specific quality control measures applied include:

- Sampling was performed according to WSP's written SOPs. The purpose of these procedures is to minimize uncertainties and biases by obtaining representative samples.
- Field notes were recorded throughout the field program.

As well, to ensure that the samples and analytical results can be considered valid, representative, and reproducible, the field QA/QC program includes the collection of field duplicate samples for soil and groundwater. In addition, the analytical laboratory (AGAT) has its own quality assurance program, including laboratory replicate samples and control standards. The laboratory QA/QC results are included in the laboratory analytical reports provided in Appendix D.

5.0 GEOLOGY

Details of the subsurface conditions encountered during the field program are provided in Table 1, appended to this report. It should be noted that the subsurface conditions encountered may vary between and beyond soil sampling locations.

Based on area mapping, the surficial geology in the vicinity of the Site is expected to consist predominantly of exposed bedrock with little or no sediment or vegetation cover and with rare patches of till and other surficial sediment (Liverman and Taylor, 1994). The bedrock geology in the vicinity of the Site consists of weakly foliated to massive, coarse grained, variably K-feldspar porphyritic, biotite granite and adamellite (Gander Zone, Burgeo Granite) (O'Brien and Dickson, 1986).

Based on observations made during the various field programs completed at the Site, the surficial geology at Location 1 and Location 2 typically consisted of dark brown silt to sand, with significant covering of silty peat and bog.

Based on field investigation locations advanced with jackhammer, soil depth varied highly from non-existent (bedrock outcrops) to 2.4 mbgs.

6.0 HYDROGEOLOGY & HYDROLOGY

Non-potable groundwater conditions are applicable to the Site as no potable wells are located in the vicinity of the Site; however, surface water bodies on the Site (such as Ponds 1 and 2) are located within the provincially protected water supply area (see Figure 1). Surface water from the Site is hydraulically connected (through a series of creeks and ponds) to Long Pond, located approximately 1.2 km south of the Site. Long Pond is the water supply for the town of Burgeo. Based on topography and Site observations, surface water is generally inferred to flow from north to south across the Site.

Table 29, appended to this report includes water levels collected in the monitoring wells installed on-Site. Bedrock groundwater (monitoring wells GW1, GW2, GW3) varied in depth from 1.51 mbgs to 5.82 mbgs. Overburden groundwater (in monitoring well GW4, in the low-lying area adjacent to Pond 1, in the peat bog material) was 1.17 mbgs.

A hydraulic conductivity (rising head) test was conducted at monitoring well GW4 on September 12, 2022. The test consisted of rapidly purging the monitoring well dry and monitoring recharge. The horizontal hydraulic conductivity was determined to be 9.2×10^{-9} m/s.

7.0 RESULTS

Results of the analyses for soil, groundwater, sediment, and surface water at the Site, along with screening of applicable guidelines, are provided in Tables 9-27 following the report. Results provided in Tables 9-27, as well as the below discussion, include samples collected as part of the 2020, 2021 and 2022 field investigations. Laboratory certificates of analysis are provided in Appendix D.

The analytical results are discussed in the following sections.

7.1 Soil Results

The laboratory results for the bulk soil analyses are found in Tables 9 to 11. The analysis of TCLP samples is found in Tables 25 and 26. The analysis of propellants is found in Table 27. The laboratory certificates of analyses are provided in Appendix D.

The PHC and PAH concentrations in all soil samples analyzed are below the applicable guidelines.

Various metals exceeded the applicable guidelines.

Boron was found to exceed the CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR_SS6, BFR_SS7, BFR_SS8, BFR_SS12, BFR_SS13, BFR_SS16, BFR_SS28, BFR_L1_SS58 and BFR_L1_SS65

Cadmium was found to exceed the Atlantic RBCA EQS_{HH} and CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR_SS8, BFR_SS12, BFR_SS16, BFR_SS16, BFR_SS23, BFR_SS24, BFR_L2_SS15

Iron was found to exceed the Atlantic RBCA EQS_{HH} at the following locations (in either the original sample or associated step-out sample(s):

- BFR_SS1, BFR_SS2, BFR_SS12, BFR_SS13, BFR_SS25, BFR_L1_SS34, BFR_L1_SS38, BFR_L1_SS47, BFR_L1_SS48, BFR_L1_SS59 and BFR_L1_GW5

Selenium was found to exceed the Atlantic RBCA EQS_{ECO} and CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR_SS1, BFR_SS4, BFR_SS5, BFR_SS6, BFR_SS7, BFR_SS8, BFR_SS9, BFR_SS10, BFR_SS11, BFR_SS12, BFR_SS13, BFR_SS14, BFR_SS15, BFR_SS16, BFR_SS18, BFR_SS19, BFR_SS20, BFR_SS21, BFR_SS22, BFR_SS23, BFR_SS24, BFR_SS25, BFR_L1_SS26, BFR_L1_SS27, BFR_L1_SS28, BFR_L1_SS29, BFR_L1_SS30, BFR_L1_SS35, BFR_L1_SS53, BFR_L1_SS54, BFR_L1_SS55, BFR_L1_SS58, BFR_L1_SS61, BFR_L1_SS62, BFR_L1_SS63, BFR_L1_SS65, BFR_L1_GW5 and in all locations in Location 2 (BFR_L2_SS1 to BFR_L2_SS16)

Exceedances of boron, cadmium, iron and selenium were found across the Site, including in Site-specific background sample locations (i.e. Samples collected in Location 1 – Zone 1, Location 1 – Zone 2, and in Location 2 – Site-specific background as noted in Table 5, appended to the text). Concentrations of the aforementioned metals found in non-Site-specific background areas of the Site were generally within the background range, or on the same order of magnitude. It did not appear that any of the aforementioned metals showed a correlation with

other elevated contaminants of concern (COCs) (e.g. lead) in the firing area. As such, exceedances of boron, cadmium, iron, and selenium were inferred to be due to naturally elevated background concentrations.

Other select metals exceeded the applicable guidelines, primarily in the firing area, as follows:

- Antimony was found to exceed the applicable guidelines (Atlantic RBCA EQS_{ECO}, Atlantic RBCS EQS_{HH}, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s)):
  - BFR_SS3 and BFR_SS7
- Aluminum was found to exceed the applicable guideline (Atlantic RBCS EQS_{HH}) at the following locations:
  - BFR_L1_SS38, BFR_L1_SS48 and BFR_L1_GW5
- Copper was found to exceed the applicable guidelines (Atlantic RBCA EQS_{ECO} or CCME SQG) at the following location (in either the original sample or associated step-out sample(s)):
  - BFR_SS7
- Lead was found to exceed the applicable guidelines (Atlantic RBCA EQS_{ECO}, Atlantic RBCS EQS_{HH}, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR_SS2, BFR_SS3, BFR_SS7, BFR_SS12, and BFR_SS13
- Manganese was found to exceed the applicable guideline (Atlantic RBCS EQS_{HH}) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR_SS2, BFR_L1_SS47, BFR_L1_SS48, BFR_L1_GW5
- Tin was found to exceed the Atlantic RBCA EQS_{ECO} and the CCME SQG at the following locations (in either the original sample or associated step-out sample(s):
  - BFR_SS6, BFR_L1_SS31, BFR_L1_SS33, BFR_L1_SS36, BFR_L1_SS38, BFR_L1_SS39, BFR_L1_SS44, BFR_L1_SS45, BFR_L1_SS47, BFR_L1_SS58, BFR_L1_SS63, BFR_L1_GW5
- Vanadium was found to exceed the Atlantic RBCA EQS_{ECO} or Atlantic RBCS EQS_{HH} at the following locations (in either the original sample or associated step-out sample(s):
  - BFR_SS1, BFR_SS2, BFR_SS3, BFR_SS4, BFR_SS13, BFR_SS16, BFR_L1_SS33, BFR_L1_SS34, BFR_L1_SS35, BFR_L1_SS37, BFR_L1_SS38, BFR_L1_SS44, BFR_L1_SS46, BFR_L1_SS47, BFR_L1_SS48, BFR_L1_SS49, BFR_L1_SS50, BFR_L1_SS54, BFR_L1_SS57, BFR_L1_SS59, BFR_L1_SS60, BFR_L1_GW5
- Zinc was found to exceed the Atlantic RBCA EQS_{ECO} and CCME SQG at the following location (in either the original sample or associated step-out sample(s)_:
  - BFR_SS7

The soil concentrations exceeding applicable guidelines are presented on Figures 10 to 12 (Location 1) and Figure 20 (Location 2).

All above metals exceedances of the applicable guidelines are found in Location 1 – Zone 1, with the majority found in the firing area. Given their elevated presence in the firing area (including the backstops), exceedances of antimony, copper, lead, and zinc are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possibly hunting). Exceedances of lead outside of the firing area (BFR_SS12 and BFR_SS13) may be due to firing activities at the Site (e.g. due to wind deposition of particulate/contaminants downwind), however, this is not confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, or other sources (including naturally occurring metals, hunting, etc.) may be the source of these exceedances. Exceedances of aluminum and manganese are not likely to be associated with firing practices, as they were not found in the backstops; however, they are likely due to human activity in the firing area as they were above background concentrations. Numerous exceedances of tin and vanadium are found across Zone 1, in both the firing area and outlying areas. Concentrations of tin and vanadium are not elevated in the firing backstops or firing points, and are found at roughly the same magnitude in the firing area or outlying areas. Therefore, it is inferred that tin and vanadium are not likely elevated due to firing activities. The exact source of elevated tin and vanadium is unknown, however may be due to naturally elevated tin and vanadium in the immediate area.

During the 2022 field program, two (2) composite samples were collected from the firing backstop to evaluate if the backstop material was considered hazardous (using TCLP results) and if the backstop contained elevated concentrations of propellants. Given that there are not any guidelines or standards applicable to Newfoundland to evaluate the TCLP results, O.Reg 347 Schedule 4 was used for comparative purposes. The leachable lead was reported at 283 mg/L and 57.7 mg/L in the two samples, which exceeded the O.Reg. 347 Schedule 4 standard of 5 mg/L. The propellant analysis was compared to the SCMTSE and BC presented in section 3.1. There were no exceedances of propellants identified.

Lateral and vertical delineation samples were collected in 2021 and 2022 within the firing area. Given that the backstop material was found to contain hazardous concentrations of leachable lead, and that lead was elevated in the backstop locations (concentrations of lead at BFR_L1_SS3 and BFR_L1_SS7 were up to 30 times and 11 times higher than the applicable screening criteria at these locations, compared to less than 2 times higher at any other location where exceedances were identified), impacts were delineated around these two locations, and are proposed to be remediated through source removal. These proposed source removal zones are shown on Figure 10C, 10D, and 10E. Figure 10D and 10E present cross-sections and vertical delineation of impacts.

7.2 Sediment Results

The laboratory results for the sediment samples collected are compiled in Tables 12 to 14, appended to this report. The laboratory analytical results reports are provided in Appendix D.

Exceedances of mTPH of the applicable Atlantic RBCA ESLs were reported in 22 of the 27 samples analyzed in 2020 (including two field duplicates). Upon recommendation from BV Labs, a silica gel cleanup was performed on these samples, and they were then re-analyzed. The silica gel cleanup serves to remove biogenic organics from the sample, in turn providing more accurate results. The mTPH concentrations in 16 of the re-analyzed samples were still above the Atlantic RBCA ESL for the diesel/no. 2 fuel oil or lube oil/no. 6 oil range. The other four re-analyzed samples also still had mTPH concentrations, but they were below the Atlantic RBCA ESL. BV Labs indicated that the concentrations remaining in the samples did not appear to resemble any petroleum products, but rather appear to be of natural and organic origin and not petrogenic in nature; they appeared to mainly be a mixture of peaks around the C32 marker that is normally attributed to highly organic detections. BV Labs also indicated that there were still a few detections for higher molecular weight alkanes, but these levels could not be

attributed to any petroleum product as there was no pattern resemblance and there is a lack of secondary indicators (biomarkers). The mTPH concentrations in the sediment samples from the areas of the Site considered to be background (i.e., Location 1 - Zones 2 and 3) ranged from <15 to 690 mg/kg. The mTPH concentrations in the sediment samples from Location 1 - Zone 1 ranged from <15 to 540 mg/kg, except for BFR_SED13 which had a concentration of 790 mg/kg. The BTEX concentrations in all 27 samples were below the RDL. Based on the results of the 2020 sampling program, 2021 samples were also run with silica gel clean-up. Similarly, 20 of the 33 samples analyzed (including field duplicates) had mTPH exceedances of the applicable Atlantic RBCA ESLs. AGAT similarly commented that the majority (and all those exceeding the applicable guideline) 2021 sediment samples had peaks eluting around the C32 marker, with random peaks throughout the fuel and lube range. No biomarkers were present. As such, all mTPH exceedances were considered to be due to naturally occurring mTPH.

The PAH concentrations in all samples analyzed were below the applicable guidelines, with the following exceptions:

- BFR_SED6: Chrysene, Fluoranthene, and Pyrene exceeded the CCME ISQGs
- BFR_SED13: Chrysene and Pyrene exceeded the CCME ISQGs
- BFR_L1_SED29: Pyrene exceeded the CCME ISQGs
- BFR_L2_SED6: Acenapthene exceeded the CCME ISQGs.

BFR_SED6 and BFR_L1_SED29 are located within approximately 150 m of the firing range, however are also in close proximity to the highway. BFR_SED13 is located approximately 850 m from the firing range. BFR_L2_SED6 is located in the area of a natural backstop to the west of the firing location in Location 2. In all locations, it is possible that the source of PAHs is historical activities that occurred at the DND firing range.

Select metals also exceeded the applicable guidelines (Atlantic RBCA EQS, CCME PELs, and/or CCME ISQGs) at the Site, including:

- Exceedances of the applicable guidelines for chromium were found in the following locations:
  - BFR_SED8, BFR_SED18, BFR_SED50, BFR_SED62, BFR_SED64 and BFR_L2_SED2,

  Five of six (BFR_SED18, BFR_SED50, BFR_SED62, BFR_SED64 and BFR_L2_SED2) are found in locations representative of Site-specific background conditions. BFR_SED8 is located approximately 550 m east of the firing area in Location 1. There are no exceedances of chromium in sediment nearer the firing area in either Location 1 or Location 2. Therefore, exceedances of chromium are considered elevated background concentrations that are not associated with historical activities at the Site.
- Exceedances of the applicable guidelines for selenium (26 of 99 samples collected in 2020, 2021, 2022) were found across the Site, including in sampling locations selected for the purposes of assessing Site-specific background conditions. Selenium was also found to be naturally occurring in soil. Therefore, exceedances of selenium are considered elevated background concentrations that are not associated with historical activities at the Site.
- Exceedances of the applicable guidelines for cadmium were found in the following locations:
  - BFR_SED6, BFR_L1_SED69

Cadmium exceeded the CCME ISQG, but not the Atlantic RBCA EQS or the CCME PELs (which were adopted by Atlantic RBCA). The elevated concentrations of cadmium are marginal, 1.7 to 1.8 times higher than the ISQG. The exceedances are also not correlated with exceedances of lead, a COC known to be associated with Site activities. For example, the highest concentrations of lead in sediment were within the firing area (Ponds 1 and 2) (250 to 770 m/kg of lead) and cadmium concentrations within these samples were below RDLs (<0.3 mg/kg). Further, the sediment concentrations of cadmium measured on the Site are also within the range of soil concentrations measured, which were associated with natural background. Therefore, cadmium exceedances in sediment are considered elevated background concentrations that are not associated with historical activities at the Site.

- Exceedances of the applicable guidelines for mercury were found in the following locations:
  - BFR_SED2, BFR_SED3, BFR_SED4, BFR_SED6, BFR_SED12, BFR_SED13, BFR_L1_SED30, BFR_L1_SED42, BFR_L1_SED59, BFR_L1_SED66

  Mercury exceeded the CCME ISQG, but not the Atlantic RBCA EQS or the CCME PELs (which were adopted by Atlantic RBCA). The elevated concentrations of mercury are marginal, 1.7 to 1.8 times higher than the ISQG. The exceedances are also not correlated with exceedances of lead, a COC known to be associated with Site activities. Further, the sediment concentrations of mercury measured on the Site are also within the range of soil concentrations measured on the Site. Therefore, mercury exceedances in sediment are considered elevated background concentrations that are not associated with historical activities at the Site.

- Exceedances of the applicable guidelines for iron was found in the following location:
  - BFR_L1_SED30

  Iron exceeded the Atlantic RBCA EQS (there are no CCME guidelines for iron). The elevated concentration of iron is marginal, 1.7 times higher than the EQS and the maximum background concentration. Elevated iron concentrations in soil were associated with natural background. The exceeding iron concentration in sediment is also not corelated to the highest lead concentrations, a COC known to be associated with site activities. Instead, it likely that the elevated iron concentration (measured as an acid extractable form) is due to an anoxic environment, where iron is reduced to more soluble forms as Fe(II) under low oxygen conditions. The iron exceedance in sediment (BFR_L1_SED30) was collected from a boat in the middle of a large pond, whereas the sample collected nearer the shoreline from the same pond was much lower (17,200 mg/kg at sample BFR_L1_SED 31). The higher iron concentration found within the middle of the pond is likely because it is deeper and more suspectable to anoxic conditions. Therefore, iron in sediment is considered to be due to elevated background concentrations that are not associated with historical activities at the Site.

- Exceedances of the applicable guidelines for arsenic were found in the following locations:
  - BFR_L1_SED29, BFR_L1_SED30, BFR_L1_SED33, BFR_L1_SED42, BFR_L1_SED61, BFR_L1_SED62, BFR_L1_SED64, BFR_L1_SED66, BFR_L1_SED71, BFR_L1_SED72 and BFR_L2_SED8

Exceedances of arsenic at BFR_L1_SED62 and BFR_L1_SED64 (background/reference water body samples) are likely not due to firing activities, based on their proximity to the firing area. The source of arsenic in these samples is unknown.

- Exceedances of the applicable guidelines for lead were found in the following locations:
  - HFR_SED4, BFR_SED6, BFR_SED12, BFR_SED13, BFR_SED16, BFR_L1_SED28, BFR_L1_SED29, BFR_L1_SED30, BFR_L1_SED33, BFR_L1_SED42, BFR_L1_SED58, BFR_L1_SED59, BFR_L1_SED68, and BFR_L2_SED4

Sediment exceedances of arsenic and lead in samples collected from waterbodies in the vicinity of the firing area in Location 1 – Zone 1 and Location 2 are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possible hunting). The source of the metals exceedances in areas outside the immediate vicinity of the firing area may be related to firing area activity (e.g., due to wind deposition of particulate/contaminants downwind), however this cannot be confirmed. Given the distance from the firing area, it is also possible that firing activity not related to the DND firing range, or other sources (e.g. locally naturally occurring metals or hunting by local residents, etc.) may be the cause of impacts.

Grain size analysis was conducted on sediment samples collected from Ponds 1 and 2 in the firing area (BFR_L1_SED66 to BFR_L1_SED72). Grain size was determined to be fine grained in seven of the eight samples. Results are tabulated in Table 24.

Seven sediment samples, BFR_L1_SED58 through BFR_L1_SED64 were collected and had toxicity testing conducted. Sediment toxicity was conducted on *Chironomus dilutus* and *Hyalalla azteca* for 14-day survival and 14-day growth. A result summary of samples sent for toxicity testing are presented in Table A below. Toxicity reports can be found in Appendix D. The sediment toxicity results are discussed under separate cover within the Site-Specific Human-Health Ecological Risk Assessment.

Table A – Sediment Toxicity Samples Result Summary

Sample Location	Location on the Site	Sediment Field Description	Exceedances of Applicable Guidelines		
			PHC	PAH	Metals
SED58	Pond 4, north of firing area.	Black silt, muck	None	None	Lead Selenium
SED59	Pond 4, north of firing area.	Black silt, muck	None	None	Lead Selenium Mercury
SED60	Pond 3, east of firing area.	Black silt, muck	None	None	None
SED61	Pond 3, east of firing area.	Black & Brown silt, muck	None	None	Arsenic
SED62	Reference Water Body across Highway 480	Black Silt	None	None	Arsenic Chromium
SED63	Reference Water Body across Highway 480	Brown Silt	None	None	No
SED64	Reference Water Body across Highway 480	Black silt	None	None	Arsenic Chromium

The sediment concentrations exceeding applicable guidelines are presented on Figures 13 to 15 (Location 1) and Figure 21 (Location 2).

7.3 Surface Water

The laboratory results for the surface water samples collected are compiled in Tables 15 to 18 appended to this report. The laboratory analytical results reports are provided in Appendix D.

The PHC and PAH concentrations in all surface water samples analyzed were below the applicable surface water guidelines, the Atlantic RBCA EQS and CCME WQGs. All PHC and PAH concentrations were also below the drinking water guidelines used to screen for potential effects to downgradient water users, the NL DWQ and HC GCDWG.

Numerous metals and/or general chemistry parameters exceeded the applicable Atlantic RBCA EQS, CCME WQG, and/or NL DWG and HC GCDWQ at the following locations:

- Aluminum in all 27 samples analyzed in 2020 (including two blind field duplicates), all 38 samples analyzed in 2021 (including three blind field duplicates) and all 17 samples analyzed in 2022 (including three blind field duplicates) exceeded the Atlantic RBCA EQS and CCME WQGs. Given that all samples, including all background samples exceeded, and the maximum concentration found was only 19% above the maximum concentration found in the site-specific background samples (and not co-located with lead, a known elevated COC), aluminum in surface water is considered to be due to elevated background concentrations that are not associated with historical activities at the Site .
- Iron in BFR_SW1, BFR_SW2, BFR_SW5, BFR_SW18, BFR_L1_SW26, BFR_L1_SW27, BFR_L1_SW28, BFR_L1_SW36, BFR_L1_SW37, BFR_L1_SW42, BFR_L1_SW43, BFR_L1_SW44, BFR_L1_SW47, BFR_L1_SW48, BFR_L1_SW49, BFR_L1_SW51, BFR_L1_SW_DUP1, BFR_L1_SW_DUP2, BFR_L1_SW52, BFR_L1_SW53, BFR_L1_SW54, BFR_L1_SW55, BFR_L1_SW56, BFR_L1_SW57, BFR_L1_SW60, BFR_L1_SW61, BFR_L1_SW62, BFR_L1_SW63, BFR_L1_SW64, BFR_L2_SW1, BFR_L2_SW2, BFR_L2_SW4, BFR_L2_SW8, BFR_L2_SW10 exceeded the Atlantic RBCA EQS, CCME WQGs, NL DWQ, and HC GCDWQ.

  Iron exceedances identified are considered background concentrations for the region based on the source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal, where 14 out of 28 samples between 1988 and 2018 exceeded the CCME WQG for iron.
- Zinc in BFR_L2_SW1, BFR_L2_SW3, BFR_L2_SW4, BFR_L2_SW6, BFR_L2_SW7, BFR_L2_SW9 exceeded the Atlantic RBCA EQS and CCME WQGs.

  Zinc exceedances identified in Location 2 (in seven of 11 surface water samples collected, including one blind field duplicate) are also considered background concentrations, as they were found across Location 2 (including in surface water bodies upgradient of Location 2), and not found to be elevated in surface soil.
- Mercury in BFR_L1_SW51, BFR_L1_SW_DUP1, BFR_L1_SW_DUP3, BFR_L1_SW52, BFR_L1_SW53, BFR_L1_SW54, BFR_L1_SW55, BFR_L1_SW56, BFR_L1_SW57, BFR_L1_SW58, BFR_L1_SW62, BFR_L1_SW64 exceeded the Atlantic RBCA EQS and CCME WQGs.

Mercury exceedances identified include those collected from samples taken from the reference water body northwest of the Site (BFR_L1_SW62, BFR_L1_SW63, and BFR_L1_SW64). Mercury does not appear elevated above these background concentrations nearer the firing area, and as such, exceedances of mercury are not considered to be due to the firing area. The exact source is unknown. No previous exceedance of mercury were identified on Site during the FY2020/21 or FY2021/22 sampling events.

- Copper in BFR_SW4 exceeded the Atlantic RBCA EQS and CCME WQGs.
- Lead in BFR_SW4, BFR_SW5, BFR_SW16, BFR_L1_SW28, BFR_L1_SW29, BFR_L1_SW45, BFR_L1_SW51, BFR_L1_SW52, BFR_L1_SW54, BFR_L1_SW55, BFR_L1_SW60, BFR_L1_SW61, and BFR_L2_SW6 exceeded the Atlantic RBCA EQS and CCME WQGs. Additionally, lead in BFR_SW4 exceeded the NL DWQ and HC GCDWQ.

The exceedances of lead and copper in the firing area, and to the south of the firing area (inferred to be hydraulically downgradient) are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice. The exceedance of lead farthest away from the firing area was found at BFR_L1_SW45 (approximately 800 m from the firing area) and may be related to firing area activity (e.g. due to wind deposition of particulate/contaminants downwind), however this cannot be confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, or other sources (including naturally occurring metals, hunting, etc.) may be the source of this exceedance. The exceedance of lead at Location 2, collected from a waterbody between the firing spot and bullet catch, is considered to have resulted from firing activities associated with the former DND firing range.

All 28 samples analyzed for general chemistry (including six blind field duplicates) have a pH lower than the acceptable range in the CCME WQGs, RBCA EQS, NL DWQ, and HC GCDWQ; however, this is understood to be consistent with surface water data from the region based on the review of source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal. All 27 samples collected between 1988 and 2018 from Long Pond (water supply source for the Town of Burgeo), located approximately 1.2 km south of the Site (hydraulically downgradient), had pH values below the applicable guidelines.

Seven sediment samples, BFR_L1_SW58 through BFR_L1_SW64 were collected and had toxicity testing conducted. Sediment toxicity was conducted on *Ceriodaphnia dubia* and *Pimephales promelas* for survival and reproduction. A result summary of samples sent for toxicity testing are presented in Table B below. Toxicity reports can be found in Appendix D. The surface water toxicity results are discussed under separate cover within the Site-Specific Human-Health Ecological Risk Assessment.

Table B – Surface Water Toxicity Samples Result Summary

Sample Location	Location on the Site	Temp °C	pH	Dissolved Oxygen (mg/L)	Exceedances of Applicable Guidelines			
					PHC	PAH	pH	Metals
SW58	Pond 4, north of firing area.	16.6	3.71	7.58	None	None	Yes	Aluminium Mercury
SW59	Pond 4, north of firing area.	16.6	3.29	8.8	None	None	Yes	Aluminium Mercury
SW60	Pond 3, east of firing area.	17.3	3.88	7.33	None	None	Yes	Aluminium Iron Lead
SW61	Pond 3, east of firing area.	17.3	3.47	6.71	None	None	Yes	Aluminium Iron Lead
SW62	Reference Water Body across Highway 480	15.8	4.78	9.98	None	None	Yes	Aluminium Iron Mercury
SW63	Reference Water Body across Highway 480	17.4	4.28	8.61	None	None	Yes	Aluminium Iron Mercury
SW64	Reference Water Body across Highway 480	17.8	4.55	8.48	None	None	Yes	Aluminium Iron Mercury

The surface water concentrations exceeding applicable guidelines are presented on Figures 16 to 18 (Location 1) and 22 (Location 2).

7.4 Groundwater

The laboratory results for the groundwater samples collected are compiled in Tables 19 to 23, appended to this report. The laboratory analytical results reports are provided in Appendix D. The groundwater samples were analyzed for PHCs, PAHs, metals, VOCs, and/or general chemistry.

The PHCs, VOCs and PAHs concentrations in all groundwater samples analyzed were below the applicable guidelines, with most below the RDL.

Several of the groundwater samples have total metals concentrations which exceed the Atlantic RBCA EQS. These include:

- Aluminum in BFR_L1_GW1, BFR_L1_GW_DUP1 (field duplicate of BFR_L1_GW1), BFR_L1_GW2, BFR_L1_GW3 and BFR_L1_GW4.
- Copper, iron and zinc in BFR_L1_GW2 and BFR_L1_GW4
- Cadmium in BFR_L1_GW2, and BFR_L1_GW3
- Cobalt in BFR_L1_GW2
- Lead in BFR_L1_GW4

Several of the samples also have total metals concentrations which exceed the FCSAP FIGQGs in addition to the Atlantic RBCA EQS. These includes:

- Aluminum in BFR_L1_GW2, BFR_L1_GW3 and BFR_L1_GW4
- Cadmium in BFR_L1_GW2 and BFR_L1_GW3
- Copper, iron and BFR_L1_GW2 and BFR_L1_GW4
- Lead in BFR_L1_GW4
- Manganese and Zinc in BFR_L1_GW2

In addition, pH exceeded the Atlantic RBCA EQS and FCSAP FIGQGs in BFR_L1_GW2 and BFR_L1_GW4

The groundwater concentrations exceeding applicable guidelines are presented on Figure 19.

During the 2022 sampling event, a monitoring well (GW4) was installed directly within the silty peat bog, adjacent to Pond 1. This monitoring well was screened within the overburden, which held perched water atop the bedrock. Metals impacts (including lead and copper) were identified in BFR_L1_GW4 and are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice.

Monitoring wells were not installed in Location 2, and therefore, groundwater quality was not assessed in Location 2.

7.5 Debris Survey

During the Site visit on November 17, 2021, a survey of debris present on Site was conducted. The results of the debris survey are presented on Figures 23 (Location 1) and 24 (Location 2). Figures 23 and 24 include the location of each debris feature and a corresponding photograph.

Table C is a log of debris that was found on Site. Debris feature IDs correspond with those found on Figures 23 and 24.

Table C – Debris Log

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1 m^3
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1 m^3
L1_DEB_3	Wooden stakes and cardboard target	~1 m^3
L1_DEB_4	Rusted drum used as target. Includes spent ammunition, spent rifle cartridges, and spent ammunition.	~1 m^3
L1_DEB_5	Rusted sink used as target. Includes spent ammunition.	<1 m^3
L2_DEB_1	Wooden stake target and spent ammunition.	<1 m^3
L2_DEB_2	Wooden stakes and spent shotgun shells	<1 m^3

Debris ID	Description	Approximate Quantity
L2_DEB_3	Wooden stakes and cardboard target.	<1 m^3
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1 m^3
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1 m^3
L2_DEB_6	Wooden plank target	<1 m^3
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1 m^3
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1 m^3
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1 m^3
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1 m^3
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1 m^3
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1 m^3
L2_DEB_13	Wooden stake and spent shot gun shells	~1 m^3

Created by: AB
Checked by: JTD

7.6 Quality Assurance/Quality Control Results

7.6.1 Blind Field Duplicates

The quality assurance assessment of the field duplicate sample results was conducted according to the document entitled Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004 (Ontario Ministry of the Environment, Conservation, and Parks) amended in July 2009 and effective as of July 1, 2011) (Analytical Protocol).

Field duplicate samples were collected as part of the sampling program (soil, groundwater, sediment, and surface water). Analytical results for the field duplicate samples are provided in the analytical tables following this report, where the duplicate information is presented along with the primary sample data for comparison. The purpose was to assess the integrity of the samples. The relative percent difference (RPD) between the sample and its duplicate is expressed as an absolute value and is calculated using the following formula:

$$RPD\ (\%) = \frac{|C_o - C_{dup}|}{\frac{(C_o + C_{dup})}{2}}\ x\ 100$$

Where:
C_o = Detected concentration in the original sample
C_{dup} = Detected concentration in the field duplicate sample

RPDs are calculated only if the concentrations of a parameter are greater than the laboratory reported detection limit (RDL) in both the duplicate and original samples. In addition, lower precision in the RPD calculation is expected when concentrations of the analytes are less than five (5) times the RDL. Therefore, RPDs were

calculated for the original and duplicate groundwater and soil samples only in cases where the measured concentrations of analytes in both samples were five (5) times greater than the RDL.

The following RPD limits were considered reasonable and are based on Analytical Protocol: RPDs in soil/sediment, 50% for metals, 30% for PHCs and PAHs, and in groundwater/surface water, 20% for metals, 30% for VOCs and 30% for PHCs and PAHs.

Calculated RPDs are provided in Table 28, appended to this report. A summary of RPDs for samples and their corresponding duplicate samples are provided in Table D, below.

Table D – Relative Percent Differences between the Original and Duplicate Samples

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)		
		PHC	PAH	Metals
Soil				
DUP6	BFR_L1_SS2_D_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	9.8 - 106.5 %
DUP5	BFR_L1_SS3_C_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	3.6 - 21.7%
DUP4	BFR_L1_SS4_SA2	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0.7 - 47.2%
DUP1	BFR_L1_SS6_A_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	24.3 - 56.1%
DUP2	BFR_L1_SS13_A_SA1	4%	Not calculated due to parameters being equal or less than 5 times RDL	15.5 - 32.7 %
DUP3	BFR_L1_SS28_SA1	79.6 - 83.3%	Not calculated due to parameters being equal or less than 5 times RDL	13.6 - 91.5%
DUP2	BFR_L2_SS10_SA1	61.1 - 65.2%	Not calculated due to parameters being equal or less than 5 times RDL	6.2 - 114.1%
BFR_L1_SS38_DUP1	BFR_L1_SS38_SA1	Not analysed by the laboratory	Not analysed by the laboratory	0.0 - 169.9%
BFR_L1_SS44_DUP1	BFR_L1_SS44_SA1	Not analysed by the laboratory	Not analysed by the laboratory	0.0 - 68.45%
BFR_L1_SS55_DUP1	BFR_L1_SS55_SA1	Not analysed by the laboratory	Not analysed by the laboratory	0.0 - 33.3%

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)		
		PHC	PAH	Metals
Sediment				
BFR_L1_SED_DUP1	BFR_L1_SED28	45.4 %	Not calculated due to parameters being equal or less than 5 times RDL	7.12 - 54.5%
BFR_L1_SED_DUP2	BFR_L1_SED29	27.0 – 27.0%	48%	9.30 - 55.9%
BFR_L2_SED_DUP1	BFR_L2_SED9	18.7%	72.8%	23.2 - 166.9%
BFR_L1_SED_DUP1	BFR_L1_SED59	Not analysed by the laboratory	20%	45.8 - 141.2%
BFR_L1_SED_DUP2	BFR_L1_SED51	Not analysed by the laboratory	11.0 – 18.2%	11.8 - 45.3%
BFR_L1_SED_DUP3	BFR_L1_SED63	Not analysed by the laboratory	Not calculated due to parameters being equal or less than 5 times RDL	7.4 - 25.1%
Surface water				
BFR_L1_SW_DUP1	BFR_L1_SW28	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	2.3 - 7.4%
BFR_L1_SW_DUP2	BFR_L1_SW29	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	1.7- 2.3%
BFR_L2_SW_DUP1	BFR_L2_SW9	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0.8 - 8.7%
BFR_L1_SW_DUP1	BFR_L1_SW63	Not analysed by the laboratory	Not calculated due to parameters being equal or less than 5 times RDL	0.0 - 3.2%
BFR_L1_SW_DUP2	BFR_L1_SW51	Not analysed by the laboratory	Not calculated due to parameters being equal or less than 5 times RDL	0.2 - 52.1%
BFR_L1_SW_DUP3	BFR_L1_SW59	Not analysed by the laboratory	Not calculated due to parameters being equal or less than 5 times RDL	0.0 - 5.5%
Groundwater				
BFR_L1_DUP2	BFR_L1_GW1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	1.5 - 13.3%

RPDs for several metals in soil and sediment were above the 50% threshold. The heterogenous nature of metals in soil and sediment can result in RPDs exceeding the 50% threshold.

The RPD for iron in one duplicate sample set (BFR_L1_SW51 and its duplicate) was above the 20% threshold. Iron was below the applicable guideline in both the parent sample and duplicate sample. Surface water samples above the 20% threshold are associated with the heterogeneity of the water body and water turbulence associated with windy conditions during sampling.

No exceedances of RPD thresholds were found in groundwater.

As such, the results obtained from the WSP and the laboratory QA/QC programs are acceptable and the data collected during this investigation are considered acceptable for the purposes of this project.

7.6.2 Laboratory QA/QC

The laboratory QA/QC includes internal checks such as analytical duplicates, reference materials, analytical blanks, spiked standards, surrogate recoveries, etc. The results are provided in the Laboratory Certificates of Analysis provided in Appendix D. The calculated RPDs and recoveries for the internal laboratory QA/QC sample results are within the laboratory defined QC limits.

Based on the above, the laboratory analytical results are considered to be valid and reliable.

8.0 SPECIES AT RISK AND HABITAT ASSESSMENT

A desktop SAR screening was completed for the Site in March 2022 (Golder 2022). To confirm the results of this screening, and to provide additional information characterizing terrestrial and aquatic habitat on the Site, a qualitative assessment was carried out on-Site. In addition, as part of this assessment, two waterbodies, that are representative of the Site (Ponds 3 and 4, see Figure 1 for location plan), and a candidate reference waterbody off-Site, were identified and confirmed as suitable sampling locations. A summary of the results of the assessment can be found in Appendix F.

No Species at Risk (SAR) were observed during the field survey. The likelihood of occurrence of the Boreal felt lichen (*Erioderma pedicellatum)* was considered low. The likelihood of occurrence of the Short-eared owl (*Asio flammeus*), American eel (*Anguilla rostrata*) and Branded killifish (*Fundulus diaphanous*) was considered moderate. During the habitat assessment, the field ecologist also confirmed the two worst case waterbodies identified for sediment and surface water sampling, Ponds 3 and 4, were considered representative of the typical water bodies found across the Site. The field ecologist also confirmed the reference water body was representative of the typical water bodies found across the Site and could be used as a reference location for sediment and surface water sampling.

9.0 CCME NATIONAL CLASSIFICATION SYSTEM FOR CONTAMINATED SITES

The CCME National Classification System for Contaminated Sites (NCSCS) ranks sites based on their individual characteristics. The descriptions of each class as described in the NCSCS Guideline Document (CCME NCSCS Guidance Document, 2008) are as follows:

Class 1 – High Priority for Action: Available information indicates that action (e.g., further site characterisation, risk management remediation, etc.) is required to address existing concerns. Typically, Class 1 sites show a propensity to high concern for several factors, and measured or observed impacts have been documented.

Class 2 – Medium Priority for Action: The available information indicates that there is a high potential for adverse offsite impacts, although the threat to human health and the environment is generally not imminent.

There is probably no indication of offsite contamination; however, the potential for this was rated high and therefore some action is likely required.

Class 3 – Low Priority for Action: The available information indicates that this site is currently not a high concern. However additional investigation may be carried out to confirm the site classification, and some degree of action may be required.

Class N – Not a Priority for Action: The available information indicates there is probably no significant environmental impact of human health threats. There is likely no need for action unless new information becomes available indicating greater concerns, in which case the site should be re-examined.

Class INS – Insufficient Information: There is insufficient information to classify the site. In this event, additional information is required to address data gaps.

Based on the findings of the assessment, a NCSCS score of 74.4 was calculated for the former Burgeo Range. As such, the former Burgeo Range is identified as Site Letter Grade C, Class 1 site with a high priority for action. The NCSCS calculation sheet is provided in Appendix E.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the analytical program, metals concentrations in soil (Location 1), sediment (Locations 1 and 2), surface water (Locations 1 and 2), and groundwater (Location 1), as well as PAH concentrations in sediment (Locations 1 and 2), have been found to exceed the applicable guidelines, and are attributed or likely attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Horizontal and vertical delineation of impacts in soil has been reasonably achieved. Given that the firing backstop material was found to contain hazardous concentrations of leachable lead, and that lead was elevated in the backstop locations, impacts were delineated around these two locations, and are recommended to be remediated through source removal. These proposed source removal zones are shown on Figure 10C, 10D, and 10E. Figure 10D and 10E present cross-sections and vertical delineation of impacts. A discussion of the remediation of these impacted zones is presented in the Remedial Strategy, found in Appendix G. The remaining impacts in soil on-Site, are carried forward for Risk Assessment. A Site-Specific Human-Health Ecological Risk Assessment has been prepared under separate cover.

Concentrations of lead in surface water exceeding the NL DWQ and HC GCDWQ (indicating potential impacts on the provincially protected water supply for the Town of Burgeo) were only found in BFR_L1_SW4, which was collected from Pond 2 (one of the two small ponds adjacent to the firing area). Lead concentrations in Pond 1 were only marginally below the NL DWQ and HC GCDWQ. Lead concentrations in sediment in Ponds 1 and 2 were found up to 770 mg/kg, over 5 times as high as anywhere else on-Site. As such, it is recommended that the surface water and sediment in Ponds 1 and 2 be remediated, to remove all media potentially impacting the provincially protected water supply for the Town of Burgeo. A discussion of the remediation of the impacted sediment and surface water is presented in the Remedial Strategy. The remaining impacts in sediment and surface water on-Site are carried forward for Risk Assessment.

Given that there are no potable wells located in the vicinity of the Site, groundwater impacts are carried forward for Risk Assessment.

11.0 LIMITATIONS

This report (the “Report”) was prepared for the exclusive use of DCC and DND for the express purpose of providing advice with respect to the environmental condition of the Site. In evaluating the Site, WSP Canada Inc. has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties. If a third party require reliance on this Report, written authorization from WSP is required. Failing such authorization, WSP disclaims responsibility to third parties of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The scope and the period of WSP’s assessment are described in this Report, and are subject to the restrictions, assumptions and limitations described herein. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within WSP’s proposal. WSP did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Report. Conditions may therefore exist which were not detected given the limited nature of the assessment WSP was retained to undertake with respect to the Site and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. WSP’s opinions are based upon information that existed at the time of the writing of the Report. It is understood that the services provided for in the scope of work allowed WSP to form no more than an opinion of the actual conditions at the Site at the time the Site was visited, and cannot be used to assess the effect of any subsequent changes in any laws, regulations, the environmental quality of the Site or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Site is free from any and all contamination from past or current practices.

12.0 REFERENCES

Golder, 2021. Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL. Golder Project Number 20439355. March 5, 2021.

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Liverman, D. and Taylor, D., 1994. Surficial Geology of the Burgeo Map Area (NTS 11P). Government of Newfoundland and Labrador, Department of Mines and Energy, Geological Survey Open File 11P (163), Map 94-235. Scale 1:250,000.

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Signature Page

WSP Canada Inc.

Philippe Chevrette, B.Eng., EIT
Environmental Consultant

James Doyle, P.Eng., M.A.Sc.
Environmental Engineer

Stefano Marconetto, P.Eng., M.Sc.
Senior Principal Environmental Engineer

JTD/PC/SM/sg
https://golderassociates.sharepoint.com/sites/164365/project files/6 deliverables/2. report/final/22532464-r-rev1-burgeo report march 2023_final.docx

Tables

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_SS1	Dec 1/20	451668.18 E, 5277431.50 N	BFR_SS1_SA1	0 - 0.15	19.75	(SW) SAND, some silt, trace gravel and organics; light brown to grey, odorless; moist.	Surrounded by bedrock. Possible to step out to the north, east, or south.
			BFR_SS_DUP1		8.83		
			BFR_SS1_SA2	0.15 - 0.30	8.93		
BFR_SS2	Dec 1/20	451678.51 E, 5277402.03 N	BFR_SS2_SA1	0 - 0.15	10.68	(SW) gravelly SAND, some silt and organics; dark brown, odorless, contains cobbles; moist.	At the top of a hill. Possible to step out in any direction.
			BFR_SS2_SA2	0.15 - 0.30	19.91	(SW) gravelly SAND, some silt, trace organics; dark brown, odorless, contains cobbles and boulders; moist.	
BFR_SS3	Dec 1/20	451767.10 E, 5277399.78 N	BFR_SS3_SA1	0 - 0.15	7.79	(SM) SILTY SAND, trace gravel and organics; light brown to light grey, odorless, contains cobbles; moist.	In front of backstop. Possible to step out in any direction, easiest to the south.
			BFR_SS3_SA2	0.15 - 0.30	9.58	(SM) gravelly SILTY SAND; brown, odorless, contains cobbles; moist.	
BFR_SS4	Dec 1/20	451713.46 E, 5277423.55 N	BFR_SS4_SA1	0 - 0.15	9.18	(PT) PEAT; black to brown, odorless; wet.	Open area with bedrock outcrop to south. Possible to step out in any direction.
			BFR_SS4_SA2	0.15 - 0.30	8.36		
BFR_SS5	Dec 1/20	451771.09 E, 5277489.13 N	BFR_SS5_SA1	0 - 0.15	9.34	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; moist.	Boggy area with bedrock outcrops. Possible to step out.
			BFR_SS5_SA2	0.15 - 0.30	7.95		
BFR_SS6	Dec 1/20	451770.37 E, 5277369.42 N	BFR_SS6_SA1	0 - 0.15	11.61	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Boggy area with bedrock outcrop to east.
			BFR_SS6_SA2	0.15 - 0.30	9.37		
BFR_SS7	Dec 1/20	451851.07 E, 5277395.04 N	BFR_SS7_SA1	0 - 0.15	8.43	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, contains broken dinner plate fragments; wet.	In front of rock wall where former wooden targets were located. Possible to step out to south, east, or west.
			BFR_SS_DUP2		10.63		
			BFR_SS7_SA2	0.15 - 0.30	8.17	(PT) PEAT; black, odorless; wet.	
BFR_SS8	Dec 1/20	452003.45 E, 5277375.31 N	BFR_SS8_SA1	0 - 0.15	16.27	(PT) PEAT; orange to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS8_SA2	0.15 - 0.30	11.44		
BFR_SS9	Dec 1/20	451935.37 E, 5277533.75 N	BFR_SS9_SA1	0 - 0.15	28.17	(PT) PEAT; reddish brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS9_SA2	0.15 - 0.30	14.51		
BFR_SS10	Dec 1/20	452007.60 E, 5277686.97 N	BFR_SS10_SA1	0 - 0.15	11.94	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; wet.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS10_SA2	0.15 - 0.30	16.73		
BFR_SS11	Dec 1/20	451932.91 E, 5277824.57 N	BFR_SS11_SA1	0 - 0.15	8.7	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS11_SA2	0.15 - 0.30	13.41		
BFR_SS12	Dec 2/20	452229.33 E, 5277818.33 N	BFR_SS12_SA1	0 - 0.15	226	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet. Water seeping into and filling hole.	Low lying boggy area near waterbody.
			BFR_SS12_SA2	0.15 - 0.30	344.3		
BFR_SS13	Dec 2/20	452507.40 E, 5277898.05 N	BFR_SS13_SA1	0 - 0.15	226	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area, small bedrock outcrop adjacent to hole.
			BFR_SS13_SA2	0.15 - 0.30	252.2		

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_SS14	Dec 2/20	452654.37 E, 5277558.82 N	BFR_SS14_SA1	0 - 0.15	391.5	(PT) PEAT; orange brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area near bottom of hill.
			BFR_SS14_SA2	0.15 - 0.30	5.24		
BFR_SS15	Dec 2/20	452313.20 E, 5277348.96 N	BFR_SS15_SA1	0 - 0.15	241.3	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, earthy odor; wet.	Open boggy area.
			BFR_SS15_SA2	0.15 - 0.30	335.5		
BFR_SS16	Dec 2/20	452190.51 E, 5277571.06 N	BFR_SS16_SA1	0 - 0.15	196.2	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, earthy odor, boulder at bottom of hole; wet.	Open boggy area.
			BFR_SS16_SA2	0.15 - 0.30	5.13		
BFR_SS17	Dec 4/20	453069.75 E, 5277435.93 N	BFR_SS17_SA1	0 - 0.15	20.6	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	On top of and amongst area of bedrock outcrops.
			BFR_SS17_SA2	0.15 - 0.30	40.84	(PT) PEAT; some sand; dark brown to gray, 0.1 m of moss/rootlets at surface, odorless; moist. Bedrock encountered at 0.25 m.	
BFR_SS18	Dec 4/20	452926.99 E, 5277450.02 N	BFR_SS18_SA1	0 - 0.15	42.78	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Boggy area with some bedrock outcrops in vicinity.
			BFR_SS_DUP3		44.75		
			BFR_SS18_SA2	0.15 - 0.30	42.53	(SM) gravelly SILTY SAND, some organics; brown to dark brown, odorless contains cobbles and boulders; moist.	
BFR_SS19	Dec 4/20	453751.56 E, 5277540.57 N	BFR_SS19_SA1	0 - 0.15	34.84	(PT) PEAT; dark brown, 0.1 m of red/orange moss/rootlets at surface, odorless; wet. Water seeping into hole at bottom.	Open boggy area near waterbody. Difficult to access – surrounded by dense tree cover.
			BFR_SS19_SA2	0.15 - 0.30	27.67		
BFR_SS20	Dec 3/20	454105.10 E, 5277584.29 N	BFR_SS20_SA1	0 - 0.15	9.62	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet. Water seeping into and filling hole.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS20_SA2	0.15 - 0.30	16.96		
BFR_SS21	Dec 3/20	455114.92 E, 5277739.31 N	BFR_SS21_SA1	0 - 0.15	15.9	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS21_SA2	0.15 - 0.30	15.75	(OL) ORGANIC SILT; black, layer of gravelly silty sand at bottom of hole, odorless; moist.	
BFR_SS22	Dec 3/20	454989.61 E, 5278636.23 N	BFR_SS22_SA1	0 - 0.15	15.18	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area between two large bedrock outcrops.
			BFR_SS22_SA2	0.15 - 0.30	12.43	(OL) ORGANIC SILT; black, odorless; wet. Water seeping into and filling hole.	
BFR_SS23	Dec 3/20	454157.57 E, 5278495.27 N	BFR_SS23_SA1	0 - 0.15	16.75	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS23_SA2	0.15 - 0.30	7.98		
BFR_SS24	Dec 4/20	453860.43 E, 5278426.56 N	BFR_SS24_SA1	0 - 0.15	25.15	(PT) PEAT; dark brown to black, 0.1 m of orange moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS24_SA2	0.15 - 0.30	27.93		
BFR_SS25	Dec 4/20	453002.91 E, 5278242.03 N	BFR_SS25_SA1	0 - 0.15	38.1	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet. Water seeping into and filling hole.	Open boggy area.
			BFR_SS25_SA2	0.15 - 0.30	46.57		

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS1	Nov 27/21	451668.534765 E, 5277429.10591 N	BFR_L1_SS1_SA2	0.15 - 0.30	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		451668.326453 E, 5277434.00235 N	BFR_L1_SS1_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451673.743462 E, 5277428.99931 N	BFR_L1_SS1_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451664.486186 E, 5277422.58872 N	BFR_L1_SS1_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS2	Nov 27/21	5277400.37958 N	BFR_L1_SS2_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451678.363289 E, 5277395.08235 N	BFR_L1_SS2_C_SA1	0 - 0.15	ND		ND
		451673.490929 E, 5277400.28981 N	BFR_L1_SS2_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS3	Nov 27/21	451770.221824 E, 5277397.17084 N	BFR_L1_SS3_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451770.639991 E, 5277401.59289 N	BFR_L1_SS3_A_SA1	0 - 0.15	ND		ND
		451773.252521 E, 5277396.81198 N	BFR_L1_SS3_B_SA1	0 - 0.15	ND		ND
		451769.624654 E, 5277391.99047 N	BFR_L1_SS3_C_SA1	0 - 0.15	ND		ND
		451764.912663 E, 5277397.57367 N	BFR_L1_SS3_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS4	Nov 27/21	451715.615615 E, 5277422.90289 N	BFR_L1_SS4_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451714.130007 E, 5277430.75139 N	BFR_L1_SS4_A_SA1	0 - 0.15	ND		ND
		451721.13933 E, 5277422.64998 N	BFR_L1_SS4_B_SA1	0 - 0.15	ND		ND
		451715.182435 E, 5277418.48973 N	BFR_L1_SS4_C_SA1	0 - 0.15	ND		ND
		451710.265125 E, 5277422.96448 N	BFR_L1_SS4_D_SA1	0 - 0.15	ND		ND

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS6	Nov 18/21	451770.365007 E, 5277374.42403 N	BFR_L1_SS6_A_SA1	0 - 0.15	ND	DUP1 taken here. Moist, dark brown silt with lots of organics mixed in bands of light brown, medium grained sand, odorless, no stain.	ND
		451775.365007 E, 5277369.42403 N	BFR_L1_SS6_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451770.365007 E, 5277364.42403 N	BFR_L1_SS6_C_SA1	0 - 0.15	ND		ND
		451765.365007 E, 5277369.42403 N	BFR_L1_SS6_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS7	Nov 18/21	451854.465736 E, 5277404.72678 N	BFR_L1_SS7_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451862.432806 E, 5277398.63367 N	BFR_L1_SS7_B_SA1	0 - 0.15	ND		ND
		451851.068759 E, 5277390.04455 N	BFR_L1_SS7_C_SA1	0 - 0.15	ND		ND
		451862.417 E, 5277396.72188 N	BFR_L1_SS7_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS8	Nov 18/21	452003.450935 E, 5277380.3082 N	BFR_L1_SS8_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452008.450935 E, 5277375.3082 N	BFR_L1_SS8_B_SA1	0 - 0.15	ND		ND
		452003.450935 E, 5277370.3082 N	BFR_L1_SS8_C_SA1	0 - 0.15	ND		ND
		451998.450935 E, 5277375.3082 N	BFR_L1_SS8_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS12	Nov 27/21	452229.58457 E, 5277819.11891 N	BFR_L1_SS12_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452229.752674 E, 5277823.89367 N	BFR_L1_SS12_A_SA1	0 - 0.15	ND		ND
		452233.091666 E, 5277819.00229 N	BFR_L1_SS12_B_SA1	0 - 0.15	ND		ND
		452229.511244 E, 5277814.1952 N	BFR_L1_SS12_C_SA 1	0 - 0.15	ND		ND
		452224.414538 E, 5277818.90441 N	BFR_L1_SS12_D_SA 1	0 - 0.15	ND		ND
BFR_L1_SS13	Nov 17/21	452507.403266 E 5277903.047 N	BFR_L1_SS13_A_SA1	0 - 0.15	ND	DUP2 Taken here. Moist, dark brown silt, high organics, odorless, no stain.	ND
		452512.403266 E, 5277898.04657 N	BFR_L1_SS13_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452507.403266 E, 5277893.04657 N	BFR_L1_SS13_C_SA 1	0 - 0.15	ND		ND
		452502.403266 E, 5277898.04657 N	BFR_L1_SS13_D_SA 1	0 - 0.15	ND		ND

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[a]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS16	Nov 27/21	452190.478471 E, 5277571.32374 N	BFR_L1_SS16_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452190.356238 E, 5277576.27159 N	BFR_L1_SS16_A_SA1	0 - 0.15	ND		ND
		452196.625849 E, 5277571.58811 N	BFR_L1_SS16_B_SA1	0 - 0.15	ND		ND
		452190.355709 E, 5277566.28273 N	BFR_L1_SS16_C_SA 1	0 - 0.15	ND		ND
		452185.436738 E, 5277571.35526 N	BFR_L1_SS16_D_SA 1	0 - 0.15	ND		ND
BFR_L1_SS26	Nov 17/21	451658.115956 E, 5277535.125916 Y	BFR_L1_SS26_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS27	Nov 17/21	451786.968414 E, 5277672.180389 Y	BFR_L1_SS27_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS28	Nov 17/21	452029.631752 E, 5277311.026059 Y	BFR_L1_SS28_SA1	0 - 0.15	ND	DUP3 taken here. Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS29	Nov 17/21	451962.969935 E, 5277484.278632 Y	BFR_L1_SS29_SA1	0 - 0.15	ND	Moist, dark brown silt with lots of organics mixed in, odorless, no stain.	ND
BFR_L1_SS30	Nov 17/21	452083.732212 E, 5277655.568423 Y	BFR_L1_SS30_SA1	0 - 0.15	ND	Moist, dark brown silt with lots of organics mixed in, odorless, no stain.	ND
BFR_L1_SS31	Sept 5/22	451704.2185 E, 5277479.3625 Y	BFR_L1_SS31_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	ND
			BFR_L1_SS31_SA2	0.3 - 0.6	ND		
			BFR_L1_SS31_SA3	0.6 - 0.9	ND		
BFR_L1_SS32	Sept 5/22	451747.4014 E, 5277456.4183 Y	BFR_L1_SS32_SA1	0 - 0.43	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS33	Sept 5/22	451783.0743 E, 5277446.822 Y	BFR_L1_SS33_SA1	0 - 0.43	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS34	Sept 6/22	451821.3621 E, 5277417.5575 Y	BFR_L1_SS34_SA1	0 - 0.13	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS35	Sept 6/22	451879.202 E, 5277376.1936 Y	BFR_L1_SS35_SA1	0 - 0.25	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS36	Sept 6/22	451868.9406 E, 5277406.8292 Y	BFR_L1_SS36_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS36_SA2	0.3 - 0.6	ND		
			BFR_L1_SS36_SA3	0.6 - 0.9	ND		

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[a]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS37	Sept 6/22	451832.9953 E, 5277360.9535 Y	BFR_L1_SS37_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS37_SA2	0.3 - 0.46	ND		
BFR_L1_SS38	Sept 5/22	451783.5488 E, 5277417.8748 Y	BFR_L1_SS38_SA1	0 - 0.6	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS38_SA2	0.6 - 1.2	ND		
			BFR_L1_SS38_SA3	1.2 - 1.8	ND		
			BFR_L1_SS38_SA4	1.8 - 2.4	ND		
			BFR_L1_SS38_DUP1	0 - 0.6	ND		
BFR_L1_SS39	Sept 5/22	451741.6419 E, 5277442.6604 Y	BFR_L1_SS39_SA1	0 - 0.6	ND	See Borehole Logs in Appendix C	ND
			BFR_L1_SS39_SA2	0.6 - 1.2	ND		
			BFR_L1_SS39_SA3	1.2 - 1.8	ND		
BFR_L1_SS40	Sept 6/22	451656.3289 E, 5277483.5762 Y	BFR_L1_SS40_SA1	0 - 0.2	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS41	Sept 5/22	451692.8576 E, 5277451.7587 Y	BFR_L1_SS41_SA1	0 - 0.2	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS42	Sept 5/22	451734.84 E, 5277427.8562 Y	BFR_L1_SS42_SA1	0 - 0.6	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS42_SA2	0.6 - 1.12	ND		
BFR_L1_SS43	Sept 5/22	451773.519 E, 5277401.2297 Y	BFR_L1_SS43_SA1	0 - 0.6	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS43_SA2	0.6 - 1.2	ND		
			BFR_L1_SS43_SA3	1.2 - 1.8	ND		
			BFR_L1_SS43_SA4	1.8 - 2.4	ND		
BFR_L1_SS44	Sept 5/22	451769.5098 E, 5277369.8631 Y	BFR_L1_SS44_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS44_DUP1	0 - 0.3	ND		
BFR_L1_SS45	Sept 5/22	451742.0327 E, 5277396.4281 Y	BFR_L1_SS45_SA1	0 - 0.61	ND	See Borehole Logs in Appendix C	Refusal on Bedrock

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS46	Sept 4/22	451685.9837 E, 5277408.8465 Y	BFR_L1_SS46_SA1	0 - 0.33	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS47	Sept 5/22	451618.5991 E, 5277449.1835 Y	BFR_L1_SS47_SA1	0 - 0.04	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS48	Sept 5/22	451583.4933 E, 5277438.4131 Y	BFR_L1_SS48_SA1	0 - 0.05	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS49	Sept 5/22	451619.191 E, 5277408.968 Y	BFR_L1_SS49_SA1	0 - 0.04	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS50	Sept 5/22	451681.0281 E, 5277375.7999 Y	BFR_L1_SS50_SA1	0 - 0.48	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS51	Sept 5/22	451736.3167 E, 5277352.6672 Y	BFR_L1_SS51_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS52	Sept 5/22	451775.9937 E, 5277331.9169 Y	BFR_L1_SS52_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS52_SA2	0.3 - 0.58	ND		
BFR_L1_SS53	Sept 5/22	451738.3123 E, 5277317.4564 Y	BFR_L1_SS53_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS53_SA2	0.3 - 0.6	ND		
			BFR_L1_SS53_SA3	0.6 - 0.9	ND		
BFR_L1_SS54	Sept 5/22	451674.4042 E, 5277298.5758 Y	BFR_L1_SS54_SA1	0 - 0.28	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_L1_SS55	Sept 5/22	451628.5173 E, 5277340.7335 Y	BFR_L1_SS55_SA1	0 - 0.33	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS55_DUP1	0 - 0.33	ND		
BFR_L1_SS56	Sept 8/22	452058.7435 E, 5277517.1931 Y	BFR_L1_SS56_SA1	0.3 - 0.44	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS56_SA2	0.44 - 0.56	ND		
BFR_L1_SS57	Sept 8/22	452394.1532 E, 5277364.5596 Y	BFR_L1_SS57_SA1	0.15 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS57_SA2	0.3 - 0.41	ND		
BFR_L1_SS58	Sept 8/22	452531.1298 E, 5277413.3223 Y	BFR_L1_SS58_SA1	0.3 - 0.39	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS58_SA2	0.39 - 0.48	ND		
BFR_L1_SS59	Sept 8/22	452506.0602 E, 5277572.6043 Y	BFR_L1_SS59_SA1	0.15 - 0.25	ND	See Borehole Logs in Appendix C	Refusal on Bedrock

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[a]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS60	Sept 8/22	452274.0428 E, 5277689.3954 Y	BFR_L1_SS60_SA1	0.25 - 0.35	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS60_SA2	0.35 - 0.51	ND		
BFR_L1_SS61	Sept 8/22	452097.1324 E, 5277733.182 Y	BFR_L1_SS61_SA1	0.25 - 0.35	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS61_SA2	0.35 - 0.51	ND		
BFR_L1_SS62	Sept 8/22	452020.5113 E, 5277906.0776 Y	BFR_L1_SS62_SA1	0 - 0.3	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS62_SA2	0.3 - 0.61	ND		
BFR_L1_SS63	Sept 8/22	452207.6561 E, 5277955.1973 Y	BFR_L1_SS63_SA1	0.15 - 0.25	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS63_SA2	0.25 - 0.36	ND		
BFR_L1_SS64	Sept 8/22	452332.5777 E, 5277812.7291 Y	BFR_L1_SS64_SA1	0.1 - 0.22	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS64_SA2	0.22 - 0.36	ND		
BFR_L1_SS65	Sept 8/22	452608.3457 E, 5277762.7024 Y	BFR_L1_SS65_SA1	0.1 - 0.20	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
			BFR_L1_SS65_SA2	0.20 - 0.30	ND		
BFR_L1_GW_5	Sept 5/22	-	BFR_L1_GW_5	0.0 - 0.15	ND	See Borehole Logs in Appendix C	Refusal on Bedrock
BFR_SS_TCLP	Sept 8/22	451773.519 E, 5277401.2297 Y	BFR_SS_TCLP_SA1	0.0 - 0.15	ND	See Borehole Logs in Appendix C	No refusal, Backstop TCLP sample
			BFR_SS_TCLP_SA2	0.0 - 0.15	ND		
BFR_L2_SS1	Nov 25/21	451895.208043 E, 5279387.06957 N	BFR_L2_SS1_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451895.208043 E, 5279387.06957 N	BFR_L2_SS1_SA2	0.15 - 0.3	ND		ND
		451895.346312 E, 5279392.29951 N	BFR_L2_SS1_A_SA1	0 - 0.15	ND		ND
		451899.692412 E, 5279388.76252 N	BFR_L2_SS1_B_SA1	0 - 0.15	ND		ND
		451895.225511 E, 5279381.76666 N	BFR_L2_SS1_C_SA1	0 - 0.15	ND		ND
		451889.974505 E, 5279387.32055 N	BFR_L2_SS1_D_SA1	0 - 0.15	ND		ND

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS2	Nov 25/21	451997.257495 E, 5279436.32189 N	BFR_L2_SS2_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451997.257495 E, 5279436.32189 N	BFR_L2_SS2_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		451997.790614 E, 5279441.01028 N	BFR_L2_SS2_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452002.584956 E, 5279436.29334 N	BFR_L2_SS2_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451997.102387 E, 5279431.01816 N	BFR_L2_SS2_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451992.151699 E, 5279436.21642 N	BFR_L2_SS2_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS3	Nov 25/21	451981.219415 E, 5279427.69733 N	BFR_L2_SS3_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451981.219415 E, 5279427.69733 N	BFR_L2_SS3_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		451981.698696 E, 5279433.20743 N	BFR_L2_SS3_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451986.688831 E, 5279429.10423 N	BFR_L2_SS3_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451981.378458 E, 5279422.20622 N	BFR_L2_SS3_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451975.909735 E, 5279426.20405 N	BFR_L2_SS3_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS4	Nov 26/21	452144.775851 E, 5279458.4812 N	BFR_L2_SS4_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452144.775851 E, 5279458.4812 N	BFR_L2_SS4_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452144.581161 E, 5279463.37951 N	BFR_L2_SS4_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452150.328364 E, 5279458.40474 N	BFR_L2_SS4_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452139.395352 E, 5279458.59398 N	BFR_L2_SS4_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS5	Nov 26/21	452111.260091 E, 5279392.48472 N	BFR_L2_SS5_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452111.260091 E, 5279392.48472 N	BFR_L2_SS5_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452100.533691 E, 5279388.36627 N	BFR_L2_SS5_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452105.475902 E, 5279383.09672 N	BFR_L2_SS5_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452100.25663 E, 5279378.21588 N	BFR_L2_SS5_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452095.315251 E, 5279383.34079 N	BFR_L2_SS5_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS6	Nov 26/21	452112.904811 E, 5279451.74992 N	BFR_L2_SS6_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452112.904811 E, 5279451.74992 N	BFR_L2_SS6_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452114.328174 E, 5279456.11845 N	BFR_L2_SS6_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452117.753025 E, 5279451.66793 N	BFR_L2_SS6_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452113.056199 E, 5279446.70685 N	BFR_L2_SS6_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452107.731579 E, 5279451.52851 N	BFR_L2_SS6_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS7	Nov 26/21	452064.787611 E, 5279434.99991 N	BFR_L2_SS7_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452064.787611 E, 5279434.99991 N	BFR_L2_SS7_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452064.901925 E, 5279440.14044 N	BFR_L2_SS7_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452069.647406 E, 5279434.79096 N	BFR_L2_SS7_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
	Nov 26/21	452060.152794 E, 5279435.36192 N	BFR_L2_SS7_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS8	Nov 26/21	452064.61305 E, 5279430.995 N	BFR_L2_SS8_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452064.61305 E, 5279430.995 N	BFR_L2_SS8_SA2	0.15 - 0.3	ND		ND
	Nov 26/21	452069.501011 E, 5279431.02002 N	BFR_L2_SS8_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
	Nov 26/21	452059.794661 E, 5279431.30178 N	BFR_L2_SS8_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[a]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS9	Nov 26/21	452063.696034 E, 5279425.46536 N	BFR_L2_SS9_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452063.696034 E, 5279425.46536 N	BFR_L2_SS9_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
	Nov 26/21	452069.251679 E, 5279425.1347 N	BFR_L2_SS9_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452063.311944 E, 5279419.9162 N	BFR_L2_SS9_C_SA1	0 - 0.15	ND		ND
		452058.839051 E, 5279425.47613 N	BFR_L2_SS9_D_SA1	0 - 0.15	ND		ND
BFR_L2_SS10	Nov 25/21	452027.481345 E, 5279430.54125 N	BFR_L2_SS10_SA1	0 - 0.15	ND	Dup 2 taken here. Moist, dark brown silt, high organics, odorless, no stain.	ND
		452027.481345 E, 5279430.54125 N	BFR_L2_SS10_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452027.68439 E, 5279435.12139 N	BFR_L2_SS10_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452032.558664 E, 5279430.54125 N	BFR_L2_SS10_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452027.481345 E, 5279424.89987 N	BFR_L2_SS10_C_SA 1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452022.93515 E, 5279429.43415 N	BFR_L2_SS10_D_SA 1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS11	Nov 23/21	451985.035589 E, 5279231.73444 N	BFR_L2_SS11_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
			BFR_L2_SS11_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	ND
		451984.979483 E, 5279236.23951 N	BFR_L2_SS11_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451991.471058 E, 5279231.59077 N	BFR_L2_SS11_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451985.46951 E, 5279226.98902 N	BFR_L2_SS11_C_SA 1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451979.990826 E, 5279231.5927 N	BFR_L2_SS11_D_SA 1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS12	Nov 23/21	451751.453601 E, 5279370.2404 N	BFR_L2_SS12_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451751.453601 E, 5279370.2404 N	BFR_L2_SS12_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS13	Nov 23/21	451693.821155 E, 5279237.71195 N	BFR_L2_SS13_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451693.821155 E, 5279237.71195 N	BFR_L2_SS13_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2

Table 1: Soil Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[a]	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS14	Nov 23/21	451526.753627 E 5279327.38094 N	BFR_L2_SS14_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451526.753627 E 5279327.38094 N	BFR_L2_SS14_SA2	0.15 - 0.3	ND	Dup 1 taken here. Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS15	Nov 23/21	451502.370642 E 5279177.26787 N	BFR_L2_SS15_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451502.370642 E 5279177.26787 N	BFR_L2_SS15_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS16	Nov 23/21	451722.508108 E, 5279608.71118 N	BFR_L2_SS16_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451722.508108 E, 5279608.71118 N	BFR_L2_SS16_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2

Notes:
[a] All coordinates are in UTM NAD83 Zone 21
ND = No Data

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Description
BFR_SED1	Dec 1/20	451696.77 E, 5277481.98 N[b]	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED2	Dec 1/20	451756.45 E, 5277569.38 N[b]	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED3	Dec 1/20	451870.22 E, 5277557.07 N[b]	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED4	Dec 1/20	451758.98 E, 5277420.43 N[b]	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED_DUP1				
BFR_SED5	Dec 2/20	451860.87 E, 5277343.06 N	Shore	Light brown fine and coarse grain sand with fine and coarse grain quartz and some black organics, odorless, no sheen. Moved sample location near river outlet because there were too many rocks near the shore to get a sample.
BFR_SED_DUP2				
BFR_SED6	Dec 1/20	451970.76 E, 5277648.35 N[b]	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED7	Dec 2/20	452765.48 E, 5277405.30 N	Shore	Dark brown, muddy/silty with coarse and fine grain white sand and quartz, odorless, no sheen.
BFR_SED8	Dec 2/20	452360.81 E, 5277462.07 N	Shore	Brown and white fine grain sand mixed with light brown silty sand, dark brown mud/silt, and some organics/roots, odorless, no sheen.
BFR_SED9	Dec 2/20	452362.85 E, 5277345.31 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED10	Dec 1/20	452101.09 E, 5278004.86 N	Shore	Coarse and fine grain orange sand with brown silty sand, some quartz and larger (~1") black and orange and white and black rocks, odorless, no sheen.
BFR_SED11	Dec 1/20	452406.29 E, 5277825.93 N	Shore	Coarse and fine grain white and black sand mixed with dark brown muddy/silty sand, trace organic roots and one large rock with black and white grains, odorless, no sheen. Moved sample location away from surface water sample location because there were too many boulders to get a sample.
BFR_SED12	Dec 1/20	452610.74 E, 5277853.83 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED13	Dec 2/20	452654.52 E, 5277447.53 N	Shore	Dark brown, muddy/silty, some organics/roots, odorless, no sheen.
BFR_SED14	Dec 2/20	452679.50 E, 5278117.72 N	Shore	Dark brown, muddy/silty with fine and trace coarse grain sand (mostly white, but some rare orange fine grain bits), trace quartz (very fine grain), some organics/roots, odorless, no sheen.
BFR_SED15	Dec 2/20	452798.11 E, 5277878.77 N	Shore	Dark brown, muddy/silty with organics and fine grain white sandy bits, odorless, no sheen.
BFR_SED16	Dec 1/20	451743.18 E, 5277431.34 N[b]	Boat	Dark brown, muddy/silty, earthy odor, no sheen.

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[(a)]	Collected from Boat or Shore	Description
BFR_SED17	Dec 4/20	453159.43 E, 5277434.22 N	Shore	Fine and coarse grain sand, mostly white with some pale orange, dark brown mud/silt, some organics/roots and quartz, odorless, no sheen.
BFR_SED_DUP3				
BFR_SED18	Dec 4/20	453741.99 E, 5277532.60 N	Shore	Fine grain with very little coarse grain sand, mostly white with some pale orange, dark brown muddy with some organics, odorless, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.
BFR_SED19	Dec 4/20	454016.48 E, 5277538.41 N	Shore	Dark brown muddy/silty with white coarse and fine grain sand, some quartz and organics/roots, odorless, no sheen.
BFR_SED20	Dec 3/20	454559.72 E, 5277750.44 N	Shore	Light brown fine and coarse grain sand with orange and black fine grain sand mixed in, some fine grain quartz, trace organics, odorless, no sheen.
BFR_SED21	Dec 3/20	455044.99 E, 5277705.31 N	Shore	Fine grain sand with coarse grain mixed in (light brown and white), dark brown silty/muddy with some organics/roots, odorless, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.
BFR_SED22	Dec 3/20	454983.11 E, 5278619.48 N	Shore	Dark brown muddy/silty with minimal fine grain white sand, earthy odor, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SED23	Dec 3/20	454115.62 E, 5278512.37 N	Shore	Dark brown muddy/silty with organics/roots, fine grain white sand mixed in throughout, odorless, no sheen.
BFR_SED24	Dec 4/20	453881.19 E, 5278415.01 N	Shore	White, grey, yellow, orange fine and coarse grain sand, larger (~1/2" – 1") rocks with white and black spots and some minor orange staining on them, small amount of dark brown mud and organic roots, odorless, no sheen.
BFR_SED25	Dec 4/20	452959.88 E, 5278219.03 N	Shore	Dark brown muddy/silty with organics/roots, odorless, no sheen.
BFR_L1_SED26	Nov 21/21	451657.8227 E, 5277534.0281 N	Boat	Medium brown silty sand, fine to medium grained, no staining, odorless.
BFR_L1_SED27	Nov 21/21	451786.6751 E, 5277671.0826 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.
BFR_L1_SED28 (BFR_L1_SED_DUP1)	Nov 21/21	452029.631752 E, 5277311.02606 N	Shore	Dark brown silt with lots of organics.
BFR_L1_SED29 (BFR_L1_SED_DUP2)	Nov 21/21	451962.969935 E, 5277484.27863 N	Shore	Dark brown silt with lots of organics.
BFR_L1_SED30	Nov 21/21	452083.4389 E, 5277654.4706 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.
BFR_L1_SED31	Nov 21/21	452142.5646 E, 5277603.1325 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.
BFR_L1_SED32	Nov 21/21	452200.381224 E, 5277660.77477 N	Shore	Dark brown silt with light brown sand mixed in.

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[(a)]	Collected from Boat or Shore	Description
BFR_L1_SED33	Nov 21/21	452128.9738 E, 5277467.8199 N	Boat	Medium brown sandy silt, fine grained, no staining, odorless, lots of organics.
BFR_L1_SED34	Nov 21/21	452208.64 E, 5277359.7771 N	Boat	Dark brown sandy silt, fine grained, no staining, odorless, lots of organics.
BFR_L1_SED35	Nov 20/21	452471.592022 E, 5277316.99079 N	Shore	Light brown, medium grained sand mixed with dark brown silt and organics
BFR_L1_SED36	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	Medium brown, medium grained sand with trace gravel and dark brown silt. Some organics.
BFR_L1_SED39	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	Dark brown, sandy silt, organic odour, no staining, lots of organics.
BFR_L1_SED40	Nov 20/21	452545.004454 E, 5277559.8861 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED41	Nov 21/21	452133.00932 E, 5277760.96413 N	Shore	Medium to coarse grained sand, light brown, trace of dark silt, trace organics.
BFR_L1_SED42	Nov 20/21	452364.550325 E, 5277703.67725 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED44	Nov 20/21	452303.576928 E, 5277831.67246 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED45	Nov 20/21	452370.132325 E, 5277903.45553 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED46	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED47	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED48	Nov 20/21	453551.259787 E, 5277596.96692 N	Shore	Grey, medium grained silty sand.
BFR_L1_SED49	Nov 20/21	453907.259859 E, 5277590.40298 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED50	Nov 20/21	453964.339248 E, 5277966.8263 N	Shore	Medium brown sandy silt, fine grained, no staining, odorless.
BFR_L1_SED51	Sept 9/22	451690.9574 E, 5277344.2171 N	Boat	Black Silt, ketchup muck
BFR_L1_SED_DUP2				
BFR_L1_SED52	Sept 9/22	452157.7845 E, 5277194.8106 N	Boat	Black, Thick silt, trace sand
BFR_L1_SED53	Sept 9/22	451986.3799 E, 5277127.3437 N	Boat	Cold, black gray, silt, organics

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[(a)]	Collected from Boat or Shore	Description
BFR_L1_SED54	Sept 9/22	451939.2228 E, 5277037.2546 N	Boat	Black Gray, silt, ketchup muck
BFR_L1_SED55	Sept 9/22	452721.4215 E, 5277153.7249 N	Boat	Black/Brown, mucky clay, organic smell
BFR_L1_SED56	Sept 9/22	452689.7688 E, 5277090.2636 N	Boat	Black, Clay & Silt, muck
BFR_L1_SED57	Sept 9/22	452503.4559 E, 5276952.0875 N	Boat	Black, Clay & Silt, muck
BFR_L1_SED58	Sept 9/22	451904.5517 E, 5277664.2203 N	Boat	Black silt, muck
BFR_L1_SED59	Sept 9/22	451953.3761 E, 5277658.0647 N	Boat	Black silt, muck
BFR_L1_SED_DUP1				
BFR_L1_SED60	Sept 9/22	451900.2023 E, 5277327.3327 N	Boat	Black silt, muck
BFR_L1_SED61	Sept 9/22	452015.1116 E, 5277290.1114 N	Boat	Black & Brown silt, muck
BFR_L1_SED62	Sept 11/22	451535.422 E, 5278298.3646 N	Boat	Black Silt
BFR_L1_SED63	Sept 11/22	451307.3058 E, 5278264.5523 N	Boat	Just grass, had to move spots
BFR_L1_SED_DUP3				
BFR_L1_SED64	Sept 11/22	451298.9386 E, 5278188.0547 N	Boat	Black silt
BFR_L1_SED65_SA1	Sept 6/22	451750.5721 E, 5277433.8337 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.04mbgs
BFR_L1_SED65_SA2				
BFR_L1_SED66_SA1	Sept 6/22	451741.3387 E, 5277431.6567 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.04mbgs
BFR_L1_SED66_SA2				
BFR_L1_SED66_SA3				

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[(a)]	Collected from Boat or Shore	Description
BFR_L1_SED67_SA1	Sept 6/22	451748.0174 E, 5277429.7812 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.04mbgs
BFR_L1_SED67_SA2				
BFR_L1_SED68_SA1	Sept 6/22	451756.9699 E, 5277427.8733 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.04mbgs
BFR_L1_SED68_SA2				
BFR_L1_SED68_SA3				
BFR_L1_SED69_SA1	Sept 6/22	451758.6116 E, 5277421.4025 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 1.99mbgs
BFR_L1_SED69_SA2				
BFR_L1_SED70_SA1	Sept 6/22	451763.8854 E, 5277423.0923 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.37mbgs
BFR_L1_SED70_SA2				
BFR_L1_SED70_SA3				
BFR_L1_SED71_SA1	Sept 6/22	451764.1814 E, 5277416.8494 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.07mbgs
BFR_L1_SED71_SA2				
BFR_L1_SED72_SA1	Sept 6/22	451745.1141 E, 5277436.1324 N	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.23mbgs
BFR_L1_SED72_SA2				
BFR_L1_SED72_SA3				
BFR_L1_SED72_SA4				
BFR_L1_SED72_DUP1				
BFR_SED_TCLP_SA1	Sept 6/22	Composite	Shore	(PT) SILTY PEAT, trace sand, fine; black; cohesive, wet, very soft; Manual-Pressure Split Soon, estimated depth 2.04mbgs
BFR_SED_TCLP_SA2				

Table 2: Sediment Sample Details and Field Observations
Burgeo Firing Range, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Description
BFR_L2_SED1	Nov 22/21	452161.44796 E, 5279514.48413 N	Shore	Medium brown coarse grained sand, no odour, no staining.
BFR_L2_SED2	Nov 21/21	452042.251743 E, 5279605.43347 N	Shore	Medium brown silty sand, medium grained.
BFR_L2_SED4	Nov 21/21	452207.880343 E, 5279209.67254 N	Boat	Dark brown silt with light brown sand mixed in, and lots of organics.
BFR_L2_SED5	Nov 21/21	452169.357543 E, 5279372.05157 N	Shore	Dark brown sandy silt, bands of light brown fine grained sand.
BFR_L2_SED6	Nov 22/21	451909.506722 E, 5279413.44075 N	Shore	Dark brown sandy silt, with lots of organics, no staining, odorless.
BFR_L2_SED7	Nov 22/21	451940.619434 E, 5279169.19728 N	Shore	Dark brown silt, with lots of organics, no staining, odorless.
BFR_L2_SED8	Nov 21/21	452138.233183 E, 5279019.85376 N	Shore	Medium brown sand, with gravely sized pieces mixed in, no staining, odorless.
BFR_L2_SED9 (BFR_L2_SED_DUP1)	Nov 22/21	451999.242067 E, 5279271.05433 N	Shore	Dark brown sandy silt, high organics, no staining, odorless.

Notes:

[a] All coordinates are in UTM NAD83 Zone 21

[b] Point taken at shoreline from closest point to sample location.

Table 3: Surface Water Sample Details and Field Observations
Burgeo Firing Rang, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	DO (mg/L)	ORP	Description
BFR_SW1	Dec 1/20	451696.77 E, 5277481.98 N[b]	Boat	3.1	6.64	0.08	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW2	Dec 1/20	451756.45 E, 5277569.38 N[b]	Boat	3.4	6.54	0.08	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW3	Dec 1/20	451870.22 E, 5277557.07 N[b]	Boat	3.2	6.35	0.06	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW4	Dec 1/20	451758.98 E, 5277420.43 N[b]	Boat	2.7	8.65	0.07	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW_DUP1							-	-	
BFR_SW5	Dec 2/20	451861.75 E, 5277340.03 N	Shore	5.4	5.27	0.05	-	-	Yellow hue, odorless, clear, no sheen. Moved sample location near river outlet to coincide with sediment sample location.
BFR_SW_DUP2							-	-	
BFR_SW6	Dec 1/20	451970.76 E, 5277648.35 N[b]	Boat	3.4	6.70	0.04	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW7	Dec 2/20	452762.45 E, 5277406.64 N	Shore	7.3	4.94	0.06	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW8	Dec 2/20	452361.10 E, 5277463.78 N	Shore	6.4	5.49	0.04	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW9	Dec 2/20	452359.92 E, 5277344.95 N	Shore	6.1	6.15	0.06	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW10	Dec 1/20	452102.05 E, 5278001.93 N	Shore	3.4	5.84	0.06	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW11	Dec 1/20	452406.56 E, 5277818.31 N	Shore	3.6	5.44	0.06	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW12	Dec 1/20	452614.55 E, 5277852.42 N	Shore	4.1	4.80	0.06	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW13	Dec 2/20	452656.03 E, 5277445.33 N	Shore	6.1	5.20	0.06	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW14	Dec 2/20	452678.93 E, 5278119.35 N	Shore	5.3	5.20	0.05	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW15	Dec 2/20	452796.83 E, 5277878.59 N	Shore	5.5	5.40	0.05	-	-	Dull yellow hue, odorless, clear, no sheen.
BFR_SW16	Dec 1/20	451743.18 E, 5277431.34 N[b]	Boat	2.9	6.82	0.06	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW17	Dec 4/20	453154.94 E, 5277432.32 N	Shore	5.9	5.00	0.07	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW_DUP3							-	-	
BFR_SW18	Dec 4/20	453737.62 E, 5277536.07 N	Shore	5.2	5.29	0.06	-	-	Yellow hue, odorless, clear, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.
BFR_SW19	Dec 4/20	454011.41 E, 5277541.00 N	Shore	4.7	5.06	0.08	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW20	Dec 3/20	454557.35 E, 5277753.10 N	Shore	7.4	5.79	0.07	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW21	Dec 3/20	455046.66 E, 5277701.19 N	Shore	7.3	5.65	0.07	-	-	Yellow hue, odorless, clear, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.

Table 3: Surface Water Sample Details and Field Observations
Burgeo Firing Rang, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	DO (mg/L)	ORP	Description
BFR_SW22	Dec 3/20	454980.19 E, 5278620.97 N	Shore	7.7	5.04	0.07	-	-	Slight yellow hue, odorless, clear, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SW23	Dec 3/20	454111.56 E, 5278513.50 N	Shore	7.2	4.89	0.06	-	-	Yellow hue, odorless, clear, no sheen.
BFR_SW24	Dec 4/20	453883.12 E, 5278416.35 N	Shore	5.6	5.54	0.06	-	-	Slight yellow hue, odorless, clear, no sheen.
BFR_SW25	Dec 4/20	452963.04 E, 5278221.17 N	Shore	6.2	5.75	0.07	-	-	Yellow hue, odorless, clear, no sheen.
BFR_L1_SW26	Nov 21/21	451657.8227 E, 5277534.0281 N	Boat	4.5	5.34	30	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW27	Nov 21/21	451786.6751 E, 5277671.0826 N	Boat	4.4	5.08	30.8	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW28 (BFR_L1_DUP1)	Nov 21/21	452029.631752 E, 5277311.02606 N	Shore	5.2	6.61	66	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW29 (BFR_L1_DUP2)	Nov 21/21	451962.969935 E, 5277484.27863 N	Shore	4.3	6.43	65	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW30	Nov 21/21	452083.4389 E, 5277654.4706 N	Boat	4.8	5.07	19.1	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW31	Nov 21/21	452142.5646 E, 5277603.1325 N	Boat	4.6	5.09	18.3	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW32	Nov 21/21	452200.381224 E, 5277660.77477 N	Shore	7.1	5.56	42	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L1_SW33	Nov 21/21	452128.9738 E, 5277467.8199 N	Boat	4.6	4.87	20.2	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW34	Nov 21/21	452208.64 E, 5277359.7771 N	Boat	3.5	4.49	23.3	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW35	Nov 20/21	452484.8497 E, 5277322.3755 N	Shore	7.1	5.56	42	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW36	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	6.6	4.65	35	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW37	Nov 20/21	452368.666848 E, 5277576.68676 N	Shore	6.7	5.37	44	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity. NO SEDIMENT COLLECTED.
BFR_L1_SW38	Nov 20/21	452415.100836 E, 5277549.6969 N	Shore	6.7	5.57	38	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity. NO SEDIMENT COLLECTED.
BFR_L1_SW39	Nov 20/21	452464.396959 E, 5277543.74777 N	Shore	6.5	6.55	45	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW40	Nov 20/21	452545.004454 E, 5277559.8861 N	Shore	6.8	7.3	47	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW41	Nov 21/21	452129.494302 E, 5277760.55654 N	Shore	3.6	5.73	41	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW42	Nov 20/21	452364.550325 E, 5277703.67725 N	Shore	6.4	4.99	42	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW43	Nov 20/21	452578.444569 E, 5277650.07002 N	Shore	6.8	8.7	87	-	-	Clear with orange tinge, odorless, no sheen, pond stagnant, low turbidity boulder base. NO SEDIMENT COLLECTED.

Table 3: Surface Water Sample Details and Field Observations
Burgeo Firing Rang, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	DO (mg/L)	ORP	Description
BFR_L1_SW44	Nov 21/21	452303.576928 E, 5277831.67246 N	Shore	5.9	5.23	28.5	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW45	Nov18/21	452370.132325 E, 5277903.45553 N	Shore	6.1	4.52	24.7	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW46	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	6.3	4.26	29.2	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW47	Nov 20/21	453296.644209 E, 5277905.73497 N	Shore	6.1	4.83	22.9	-	-	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW48	Nov 20/21	453551.259787 E, 5277596.96692 N	Shore	5.5	4.71	27.2	-	-	Clear water with brown tinge, low turbidity, stagnant.
BFR_L1_SW49	Nov 20/21	453907.259859 E, 5277590.40298 N	Shore	5.7	4.52	28	-	-	Clear water with brown tinge, low turbidity, stagnant.
BFR_L1_SW50	Nov 20/21	453964.339248 E, 5277966.8263 N	Shore	6.3	4.3	33.6	-	-	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW51	Sept 9/22	451690.9574 E, 5277344.2171 N	Boat	16.3	4.09	0.0302	6.020	280.1	Yellow hue, odorless, clear, no sheen
BFR_L1_SW_DUP 2									
BFR_L1_SW52	Sept 9/22	452157.7845 E, 5277194.8106 N	Boat	16.4	3.81	0.0255	6.75	275	Yellow hue, odorless, clear, no sheen
BFR_L1_SW53	Sept 9/22	451986.3799 E, 5277127.3437 N	Boat	17.5	3.58	0.0295	6.91	326	Yellow hue, odorless, clear, no sheen
BFR_L1_SW54	Sept 9/22	451939.2228 E, 5277037.2546 N	Boat	15.1	3.27	0.0383	6.73	328.5	Yellow hue, odorless, clear, no sheen
BFR_L1_SW55	Sept 9/22	452721.4215 E, 5277153.7249 N	Boat	16.3	3.77	0.0309	5.93	278.7	Yellow hue, odorless, clear, no sheen
BFR_L1_SW56	Sept 9/22	452689.7688 E, 5277090.2636 N	Boat	16.5	3.50	0.0286	6.94	300.2	Yellow hue, odorless, clear, no sheen
BFR_L1_SW57	Sept 9/22	452503.4559 E, 5276952.0875 N	Boat	16.8	3.78	0.0289	7.26	306	Yellow hue, odorless, clear, no sheen
BFR_L1_SW58	Sept 9/22	451904.5517 E, 5277664.2203 N	Boat	16.6	3.71	0.0266	7.58	266.3	Yellow hue, odorless, clear, no sheen
BFR_L1_SW59	Sept 9/22	451953.3761 E, 5277658.0647 N	Boat	16.6	3.29	0.0263	8.80	316	Yellow hue, odorless, clear, no sheen
BFR_L1_SW_DUP 3									
BFR_L1_SW60	Sept 9/22	451900.2023 E, 5277327.3327 N	Boat	17.3	3.88	0.0254	7.33	262	Yellow hue, odorless, clear, no sheen
BFR_L1_SW61	Sept 9/22	452015.1116 E, 5277290.1114 N	Boat	17.3	3.47	0.0253	6.71	293	Yellow hue, odorless, clear, no sheen
BFR_L1_SW62	Sept 11/22	451484.2250 E, 5278353.5303 N	Boat	15.8	4.78	0.0215	9.98	220.3	Yellow hue, odorless, clear, no sheen

Table 3: Surface Water Sample Details and Field Observations
Burgeo Firing Rang, NL

Sample ID	Date	Coordinates[a]	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	DO (mg/L)	ORP	Description
BFR_L1_SW63 / BFR_L1_SW_DUP 1	Sept 11/22	451387.8716 E, 5278283.6023 N	Boat	17.4	4.28	0.0219	8.610	290.4	Yellow hue, odorless, clear, no sheen
BFR_L1_SW64	Sept 11/22	451291.800 E, 5278189.1900 N	Boat	17.8	4.55	0.0223	8.48	278.3	Yellow hue, odorless, clear, no sheen
BFR_L2_SW1	Nov 22/21	452161.44796 E, 5279514.48413 N	Shore	4.8	6.62	29	-	-	Clear rushing water, odorless, no sheen, pond stagnant, low turbidity NO SEDIMENT SAMPLE.
BFR_L2_SW2	Nov 21/21	452042.251743 E, 5279605.43347 N	Shore	5.4	6.58	37	-	-	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L2_SW3	Nov 22/21	451879.374502 E, 5279479.87942 N	Shore	4.5	6	32	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW4	Nov 21/21	452207.880343 E, 5279209.67254 N	Boat	4.1	5.61	28.4	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW5	Nov 21/21	452169.357543 E, 5279372.05157 N	Shore	4.8	6.57	37	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW6	Nov 22/21	451909.506722 E, 5279413.44075 N	Shore	4.4	4.8	55	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW7	Nov 22/21	451940.619434 E, 5279169.19728 N	Shore	5.3	4.8	53	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW8	Nov 21/21	452138.233183 E, 5279019.85376 N	Shore	4	5.41	20.4	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW9 (BFR_L2_SW_DUP 1)	Nov 22/21	451999.242067 E, 5279271.05433 N	Shore	4.4	3.96	45	-	-	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW10	Nov 27/21	452187.194812 E, 5279558.75658 N	Shore	12.5	6.14	29.1	-	-	Clear rushing water, odorless, no sheen, pond stagnant, low turbidity NO SEDIMENT SAMPLE.

Notes:

[a] All coordinates are in UTM NAD83 Zone 21.

[b] Point taken at shoreline from closest point to sample location.

Table 4: Groundwater Sample Details and Field Observations
Burgeo Firing Range, NL

Location	Date	Coordinates[(a)]	Sample ID	Water Level (mbTOP)	Time	pH	Conductivity (mS/cm)	DO (mg/L)	Temperature (°C)
BFR_L1_GW1	Dec 19/21	451668.18 E, 5277431.50 N	BFR_L1_GW1	7.75	13:18	5.9	0.094	8.61	8.05
			BFR_L1_GW_DUP1						
BFR_L1_GW2	Dec 19/21	451770.37 E, 5277369.42 N	BFR_L1_GW2	3.76	15:37	5.27	0.066	1.63	7.20
BFR_L1_GW3	Dec 19/21	451851.06 E, 5277390.04 N	BFR_L1_GW3	3.75	17:13	4.69	0.083	2.26	3.65
BFR_L1_GW4	Sept 12/22	451741.00 E, 5277443.00 N	BFR_L1_GW4	1.77	10:48	-	-	-	-
BFR_L1_GW5	Sept 04/22	451758.00 E, 5277408.00 N	BFR_L1_GW5	-	-	-	-	-	-

Notes:
[(a)] All coordinates are in UTM NAD83 Zone 21.
DO= Dissolved Oxygen

Table 5: Soil Sample Analyses Completed
Burgeo Firing Range, NL

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SS1	BFR_L1_SS1_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS1_A	BFR_L1_SS1_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS1_B	BFR_L1_SS1_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS1_C	BFR_L1_SS1_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_B	BFR_L1_SS2_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_C	BFR_L1_SS2_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_D	BFR_L1_SS2_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3	BFR_L1_SS3_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS3_A	BFR_L1_SS3_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_B	BFR_L1_SS3_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_C	BFR_L1_SS3_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_D	BFR_L1_SS3_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4	BFR_L1_SS4_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS4_A	BFR_L1_SS4_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_B	BFR_L1_SS4_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_C	BFR_L1_SS4_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_D	BFR_L1_SS4_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS6_A	BFR_L1_SS6_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_B	BFR_L1_SS6_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_C	BFR_L1_SS6_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_D	BFR_L1_SS6_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_A	BFR_L1_SS7_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_B	BFR_L1_SS7_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_C	BFR_L1_SS7_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_D	BFR_L1_SS7_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_A_	BFR_L1_SS8_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_B	BFR_L1_SS8_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_C	BFR_L1_SS8_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_D	BFR_L1_SS8_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS12	BFR_L1_SS12_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS12_A	BFR_L1_SS12_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_B	BFR_L1_SS12_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_C	BFR_L1_SS12_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_D	BFR_L1_SS12_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS13_A	BFR_L1_SS13_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_B	BFR_L1_SS13_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_C	BFR_L1_SS13_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_D	BFR_L1_SS13_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS16	BFR_L1_SS16_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS16_A	BFR_L1_SS16_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_B	BFR_L1_SS16_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_C	BFR_L1_SS16_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_D	BFR_L1_SS16_D_SA1	0-0.15	High (zone 1)	X		X	

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SS26	BFR_L1_SS26_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS27	BFR_L1_SS27_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS28_	BFR_L1_SS28_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS29	BFR_L1_SS29_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS30	BFR_L1_SS30_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS31	BFR_L1_SS31_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS31_SA2	0.3 - 0.6					
	BFR_L1_SS31_SA3	0.6 - 0.91					
BFR_L1_SS32	BFR_L1_SS32_SA1	0 - 0.43	High (zone 1)			X	
BFR_L1_SS33	BFR_L1_SS33_SA1	0 - 0.43	High (zone 1)			X	
BFR_L1_SS34	BFR_L1_SS34_SA1	0 - 0.13	High (zone 1)			X	
BFR_L1_SS35	BFR_L1_SS35_SA1	0 - 0.25	High (zone 1)			X	
BFR_L1_SS36	BFR_L1_SS36_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS36_SA2	0.3 - 0.6					
	BFR_L1_SS36_SA3	0.6 - 0.91					
BFR_L1_SS37	BFR_L1_SS37_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS37_SA2	0.3 - 0.46					
BFR_L1_SS38	BFR_L1_SS38_SA1	0 - 0.6	High (zone 1)			X	
	BFR_L1_SS38_SA2	0.6 - 1.2					
	BFR_L1_SS38_SA3	1.2 - 1.8					
	BFR_L1_SS38_SA4	1.8 - 2.4					
	BFR_L1_SS38_DUP1	0 - 0.6					
BFR_L1_SS39	BFR_L1_SS39_SA1	0 - 0.6	High (zone 1)			X	
	BFR_L1_SS39_SA2	0.6 - 1.2					
	BFR_L1_SS39_SA3	1.2 - 1.83					
BFR_L1_SS40	BFR_L1_SS40_SA1	0 - 0.2	High (zone 1)			X	
BFR_L1_SS41	BFR_L1_SS41_SA1	0 - 0.2	High (zone 1)			X	
BFR_L1_SS42	BFR_L1_SS42_SA1	0 - 0.6	High (zone 1)			X	
	BFR_L1_SS42_SA2	0.6 - 1.12					
BFR_L1_SS43	BFR_L1_SS43_SA1	0 - 0.6	High (zone 1)			X	
	BFR_L1_SS43_SA2	0.6 - 1.2					
	BFR_L1_SS43_SA3	1.2 - 1.8					
	BFR_L1_SS43_SA4	1.8 - 2.44					
BFR_L1_SS44	BFR_L1_SS44_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS44_DUP1	0 - 0.3				X	
BFR_L1_SS45	BFR_L1_SS45_SA1	0 - 0.61	High (zone 1)			X	
BFR_L1_SS46	BFR_L1_SS46_SA1	0 - 0.33	High (zone 1)			X	
BFR_L1_SS47	BFR_L1_SS47_SA1	0 - 0.04	High (zone 1)			X	
BFR_L1_SS48	BFR_L1_SS48_SA1	0 - 0.05	High (zone 1)			X	
BFR_L1_SS49	BFR_L1_SS49_SA1	0 - 0.04	High (zone 1)			X	
BFR_L1_SS50	BFR_L1_SS50_SA1	0 - 0.48	High (zone 1)			X	
BFR_L1_SS51	BFR_L1_SS51_SA1	0 - 0.3	High (zone 1)			X	

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SS52	BFR_L1_SS52_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS52_SA2	0.3 - 0.58					
BFR_L1_SS53	BFR_L1_SS53_SA1	0 - 0.3	High (zone 1)			X	
	BFR_L1_SS53_SA2	0.3 - 0.6					
	BFR_L1_SS53_SA3	0.6 - 0.91					
BFR_L1_SS54	BFR_L1_SS54_SA1	0 - 0.28	High (zone 1)			X	
BFR_L1_SS55	BFR_L1_SS55_SA1	0 - 0.33	High (zone 1)			X	
	BFR_L1_SS55_DUP1	0 - 0.33				X	
BFR_L1_SS56	BFR_L1_SS56_SA1	0.3 - 0.44	Medium (outisde high activity)			X	
	BFR_L1_SS56_SA2	0.44 - 0.56					
BFR_L1_SS57	BFR_L1_SS57_SA1	0.15 - 0.3	Medium (outisde high activity)			X	
	BFR_L1_SS57_SA2	0.3 - 0.41					
BFR_L1_SS58	BFR_L1_SS58_SA1	0.3 - 0.39	Medium (outisde high activity)			X	
	BFR_L1_SS58_SA2	0.39 - 0.48					
BFR_L1_SS59	BFR_L1_SS59_SA1	0.15 - 0.25	Medium (outisde high activity)			X	
BFR_L1_SS60	BFR_L1_SS60_SA1	0.25 - 0.35	Medium (outisde high activity)			X	
	BFR_L1_SS60_SA2	0.35 - 0.51					
BFR_L1_SS61	BFR_L1_SS61_SA1	0.25 - 0.35	Medium (outisde high activity)			X	
	BFR_L1_SS61_SA2	0.35 - 0.51					
BFR_L1_SS62	BFR_L1_SS62_SA1	0 - 0.3	Medium (outisde high activity)			X	
	BFR_L1_SS62_SA2	0.3 - 0.61					
BFR_L1_SS63	BFR_L1_SS63_SA1	0.15 - 0.25	Medium (outisde high activity)			X	
	BFR_L1_SS63_SA2	0.25 - 0.36					
BFR_L1_SS64	BFR_L1_SS64_SA1	0.1 - 0.22	Medium (outisde high activity)			X	
	BFR_L1_SS64_SA2	0.22 - 0.36					
BFR_L1_SS65	BFR_L1_SS65_SA1	0.1 - 0.20	Medium (outisde high activity)			X	
	BFR_L1_SS65_SA2	0.20 - 0.30					
BFR_L1_GW_5	BFR_L1_GW_5	0.0 - 0.15	Medium (outisde high activity)			X	
BFR_SS_TCLP	BFR_SS_TCLP_SA1	0.0 - 0.15	Medium (outisde high activity)	PAH and Metals Toxicity Characteristic Leaching Procedure			
	BFR_SS_TCLP_SA2	0.0 - 0.15					
n/a	BFR_L1_SS_DUP1	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP2	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP3	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP4	0-0.15	n/a	X		X	
n/a	BFR_L1_SS_DUP5	0-0.15	n/a	X		X	
n/a	BFR_L1_SS_DUP6	0-0.15	n/a	X		X	
BFR_L2_SS1	BFR_L2_SS1_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS1_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS1_A_SA1	BFR_L2_SS1_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS1_B_SA1	BFR_L2_SS1_B_SA1	0-0.15	High (near area of firing activity)	X			

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L2_SS1_C_SA1	BFR_L2_SS1_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS1_D_SA1	BFR_L2_SS1_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2	BFR_L2_SS2_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS2_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS2_A_SA1	BFR_L2_SS2_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_B_SA1	BFR_L2_SS2_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_C_SA1	BFR_L2_SS2_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_D_SA1	BFR_L2_SS2_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3	BFR_L2_SS3_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS3_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS3_A_SA1	BFR_L2_SS3_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_B_SA1	BFR_L2_SS3_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_C_SA1	BFR_L2_SS3_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_D_SA1	BFR_L2_SS3_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4	BFR_L2_SS4_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS4_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS4_A_SA1	BFR_L2_SS4_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4_B_SA1	BFR_L2_SS4_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4_D_SA1	BFR_L2_SS4_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5	BFR_L2_SS5_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS5_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS5_A_SA1	BFR_L2_SS5_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_B_SA1	BFR_L2_SS5_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_C	BFR_L2_SS5_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_D	BFR_L2_SS5_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6	BFR_L2_SS6_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS6_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS6_A	BFR_L2_SS6_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6_B	BFR_L2_SS6_B_SA1	0-0.15	High (near area of firing activity)	X			

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L2_SS6_C	BFR_L2_SS6_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6_D	BFR_L2_SS6_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7	BFR_L2_SS7_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS7_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS7_A_SA1	BFR_L2_SS7_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7_B_SA1	BFR_L2_SS7_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7_D_SA1	BFR_L2_SS7_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS8	BFR_L2_SS8_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS8_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS8_B_SA1	BFR_L2_SS8_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS8_D_SA1	BFR_L2_SS8_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9	BFR_L2_SS9_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS9_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS9_B	BFR_L2_SS9_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9_C	BFR_L2_SS9_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9_D	BFR_L2_SS9_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10	BFR_L2_SS10_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS10_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS10_A	BFR_L2_SS10_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10_B	BFR_L2_SS10_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10_C	BFR_L2_SS10_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10_D	BFR_L2_SS10_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11	BFR_L2_SS11_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS11_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS11_A	BFR_L2_SS11_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_B	BFR_L2_SS11_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_C	BFR_L2_SS11_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_D	BFR_L2_SS11_D_SA1	0-0.15	High (near area of firing activity)	X			

Table 5: Soil Sample Analyses Completed
Burgeo Firing Range, NL

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX[(a)]	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L2_SS12	BFR_L2_SS12_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS12_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS13	BFR_L2_SS13_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS13_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS14	BFR_L2_SS14_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS14_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS15	BFR_L2_SS15_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS15_SA2	0.15 - 0.3	Low (site-specific background)	X		X	
BFR_L2_SS16	BFR_L2_SS16_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS16_SA2	0.15 - 0.3	Low (site-specific background)	X			
n/a	BFR_L2_SS_DUP1	0.15 - 0.3	n/a	X			
n/a	BFR_L2_SS_DUP2	0-0.15	n/a	X	X	X	X

Table 6: Sediment Sample Analyses Completed
Burgeo Firing Range, NL

Sample ID	Risk Ranking	Field Parameters	Required Analysis		
		Moisture	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SED26	High (zone 1)	X	X	X	X
BFR_ L1_SED27	High (zone 1)	X	X	X	X
BFR_ L1_SED28	High (zone 1)	X	X	X	X
BFR_ L1_SED29	High (zone 1)	X	X	X	X
BFR_ L1_SED30	High (zone 1)	X	X	X	X
BFR_ L1_SED31	High (zone 1)	X	X	X	X
BFR_ L1_SED32	High (zone 1)	X	X	X	X
BFR_ L1_SED33	High (zone 1)	X	X	X	X
BFR_ L1_SED34	High (zone 1)	X	X	X	X
BFR_ L1_SED35	High (zone 1)	X	X	X	X
BFR_ L1_SED36	High (zone 1)	X	X	X	X
BFR_ L1_SED39	High (zone 1)	X	X	X	X
BFR_ L1_SED40	High (zone 1)	X	X	X	X
BFR_ L1_SED41	High (zone 1)	X	X	X	X
BFR_ L1_SED42	High (zone 1)	X	X	X	X
BFR_ L1_SED44	High (zone 1)	X	X	X	X
BFR_ L1_SED45	High (zone 1)	X	X	X	X
BFR_ L1_SED46	Medium (zone 2)	X	X	X	X
BFR_ L1_SED47	Medium (zone 2)	X	X	X	X
BFR_ L1_SED48	Medium (zone 2)	X	X	X	X
BFR_ L1_SED49	Medium (zone 2)	X	X	X	X
BFR_ L1_SED50	Medium (zone 2)	X	X	X	X
BFR_ L1_SED_DUP1	n/a	X	X	X	X
BFR_ L1_SED_DUP2	n/a	X	X	X	X
BFR_L1_SED51	South High Activity			X	X
BFR_L1_SED_DUP2	South High Activity			X	X
BFR_L1_SED52	South High Activity			X	X
BFR_L1_SED53	South High Activity			X	X
BFR_L1_SED54	South High Activity			X	X
BFR_L1_SED55	South High Activity			X	X
BFR_L1_SED56	South High Activity			X	X
BFR_L1_SED57	South High Activity			X	X
BFR_L1_SED58	Worst Case			X	X
BFR_L1_SED59	Worst Case			X	X
BFR_L1_SED_DUP1	Worst Case			X	X

Sample ID	Risk Ranking	Field Parameters	Required Analysis		
		Moisture	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SED60	Worst Case			X	X
BFR_L1_SED61	Worst Case			X	X
BFR_L1_SED62	Off-Site Background			X	X
BFR_L1_SED63	Off-Site Background			X	X
BFR_L1_SED_DUP3	Off-Site Background			X	X
BFR_L1_SED64	Off-Site Background			X	X
BFR_L1_SED65_SA1	High (zone 1)			X	
BFR_L1_SED65_SA2	High (zone 1)			X	
BFR_L1_SED66_SA1	High (zone 1)			X	
BFR_L1_SED66_SA2	High (zone 1)			X	
BFR_L1_SED66_SA3	High (zone 1)			X	
BFR_L1_SED67_SA1	High (zone 1)			X	
BFR_L1_SED67_SA2	High (zone 1)			X	
BFR_L1_SED68_SA1	High (zone 1)			X	
BFR_L1_SED68_SA2	High (zone 1)			X	
BFR_L1_SED68_SA3	High (zone 1)			X	
BFR_L1_SED69_SA1	High (zone 1)			X	
BFR_L1_SED69_SA2	High (zone 1)			X	
BFR_L1_SED70_SA1	High (zone 1)			X	
BFR_L1_SED70_SA2	High (zone 1)			X	
BFR_L1_SED70_SA3	High (zone 1)			X	
BFR_L1_SED71_SA1	High (zone 1)			X	
BFR_L1_SED71_SA2	High (zone 1)			X	
BFR_L1_SED72_SA1	High (zone 1)			X	
BFR_L1_SED72_SA2	High (zone 1)			X	
BFR_L1_SED72_SA3	High (zone 1)			X	
BFR_L1_SED72_SA4	High (zone 1)			X	
BFR_L1_SED72_DUP1	High (zone 1)			X	
BFR_SED_TCLP_SA1	High (zone 1)	PAH and Metals Toxicity Characteristic Leaching Procedure			
BFR_SED_TCLP_SA2	High (zone 1)				
BFR_L2_SED1	n/a	X	X	X	X
BFR_ L2_SED2	n/a	X	X	X	X
BFR_ L2_SED4	n/a	X	X	X	X
BFR_ L2_SED5	n/a	X	X	X	X
BFR_ L2_SED6	n/a	X	X	X	X

Table 6: Sediment Sample Analyses Completed
Burgeo Firing Range, NL

Sample ID	Risk Ranking	Field Parameters	Required Analysis		
		Moisture	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_ L2_SED7	n/a	X	X	X	X
BFR_ L2_SED8	n/a	X	X	X	X
BFR_ L2_SED9	n/a	X	X	X	X
BFR_ L2_SED_DUP1	n/a	X	X	X	X

Table 7: Surface Water Sample Analyses Completed
Burgeo Firing Range, NL

Sample ID	Risk Ranking	Field Parameters	Required Analysis			
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry
BFR_ L1_SW26	High (zone 1)	X	X	X	X	
BFR_ L1_SW27	High (zone 1)	X	X	X	X	
BFR_ L1_SW28	High (zone 1)	X	X	X	X	
BFR_ L1_SW29	High (zone 1)	X	X	X	X	X
BFR_ L1_SW30	High (zone 1)	X	X	X	X	
BFR_ L1_SW31	High (zone 1)	X	X	X	X	
BFR_ L1_SW32	High (zone 1)	X	X	X	X	
BFR_ L1_SW33	High (zone 1)	X	X	X	X	
BFR_ L1_SW34	High (zone 1)	X	X	X	X	
BFR_ L1_SW35	High (zone 1)	X	X	X	X	
BFR_ L1_SW36	High (zone 1)	X	X	X	X	
BFR_ L1_SW37	High (zone 1)	X	X	X	X	
BFR_ L1_SW38	High (zone 1)	X	X	X	X	X
BFR_ L1_SW39	High (zone 1)	X	X	X	X	
BFR_ L1_SW40	High (zone 1)	X	X	X	X	
BFR_ L1_SW41	High (zone 1)	X	X	X	X	
BFR_ L1_SW42	High (zone 1)	X	X	X	X	
BFR_ L1_SW43	High (zone 1)	X	X	X	X	
BFR_ L1_SW44	High (zone 1)	X	X	X	X	
BFR_ L1_SW45	High (zone 1)	X	X	X	X	
BFR_ L1_SW46	Medium (zone 2)	X	X	X	X	
BFR_ L1_SW47	Medium (zone 2)	X	X	X	X	
BFR_ L1_SW48	Medium (zone 2)	X	X	X	X	
BFR_ L1_SW49	Medium (zone 2)	X	X	X	X	
BFR_ L1_SW50	Medium (zone 2)	X	X	X	X	
BFR_L1_SW51	South High Activity	X		X	X	
BFR_L1_SW_DUP2	South High Activity	X		X	X	
BFR_L1_SW52	South High Activity	X		X	X	
BFR_L1_SW53	South High Activity	X		X	X	
BFR_L1_SW54	South High Activity	X		X	X	
BFR_L1_SW55	South High Activity	X		X	X	
BFR_L1_SW56	South High Activity	X		X	X	
BFR_L1_SW57	South High Activity	X		X	X	
BFR_L1_SW58	Worst Case	X		X	X	X
BFR_L1_SW59	Worst Case	X		X	X	X

Table 7: Surface Water Sample Analyses Completed
Burgeo Firing Range, NL

Sample ID	Risk Ranking	Field Parameters	Required Analysis			
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry
BFR_L1_SW_DUP3	Worst Case	X		X	X	X
BFR_L1_SW60	Worst Case	X		X	X	X
BFR_L1_SW61	Worst Case	X		X	X	X
BFR_L1_SW62	Off-Site Background	X		X	X	X
BFR_L1_SW63	Off-Site Background	X		X	X	X
BFR_L1_SW_DUP1	Off-Site Background	X		X	X	X
BFR_L1_SW64	Off-Site Background	X		X	X	X
BFR_ L1_SW_DUP1	n/a	X	X	X	X	
BFR_ L1_SW_DUP2	n/a	X	X	X	X	X
BFR_L2_SW1	n/a	X	X	X	X	
BFR_ L2_SW2	n/a	X	X	X	X	
BFR_ L2_SW3	n/a	X	X	X	X	
BFR_ L2_SW4	n/a	X	X	X	X	X
BFR_ L2_SW5	n/a	X	X	X	X	
BFR_ L2_SW6	n/a	X	X	X	X	
BFR_ L2_SW7	n/a	X	X	X	X	
BFR_ L2_SW8	n/a	X	X	X	X	
BFR_ L2_SW9	n/a	X	X	X	X	
BFR_ L2_SW10	n/a	X	X	X	X	X
BFR_ L2_SW_DUP1	n/a	X	X	X	X	

Table 8: Groundwater Sample Analyses Completed
Burgeo Firing Range, NL

Sample ID	Risk Ranking	Field Parameters	Required Analysis				
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry	Volatile Organic Compounds (VOCs)
BFR_L1_GW1	High (zone 1)	X	X	X	X	X	
BFR_L1_GW2	High (zone 1)	X	X	X	X		
BFR_L1_GW3	High (zone 1)	X	X	X	X		
BFR_L1_GW4	High (zone 1)		X	X		X	X
BFR_L1_GW_DUP1	n/a	X	X	X	X	X	
BFR_L2_GW1	TBD	X	X	X	X	X	
BFR_L2_GW2	TBD	X	X	X	X		
BFR_L2_GW3	TBD	X	X	X	X	X	
BFR_L2_GW_DUP1	n/a	X	X	X	X		

Exceedance Identification:
Bold and shaded = Exceedance of applicable guidelines

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 1							
								Location 1							
								BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4		BFR_SS5	
Sample ID								BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1 (original)	BFR_SS4_SA1 (revised)	BFR_SS5_SA1 (original)	BFR_SS5_SA1 (revised)
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<10	<10	<10	<10	94	<10	85	<10
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	<10	<10	<10	<10	190	<10	190	<10
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	<15	<15	56	<15	1900	240	1000	43
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	<15	<15	56***	<15	2200**	240***	1300**	43***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg								
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg								
Reached Baseline at C32								NA	NA	Yes	NA	No	No	No	Yes
Hydrocarbon Resemblance								NA	NA	Possible lube oil fraction.	NA	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range. Lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 1						
								Location 1						
								BFR_SS6		BFR_SS6				
Sample ID								BFR_SS6_SA1 (original)	BFR_SS6_SA1 (revised)	BFR_L1_SS6A	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6_A_SA1)	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	120	<10	<15	<15	16	47	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	200	<10	<15	<15	16	<15	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	1200	47	312	192	532	191	845
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	1500**	47***	312	192	564	238	845
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								No	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 1					
								Location 1					
								BFR_SS7				BFR_SS7	
Sample ID								BFR_SS7_SA1 (original)	BFR_SS7_SA1 (revised)	BFR_SS_DUP2 (original)	BFR_SS_DUP2 (revised)	BFR_L1_SS7A	BFR_L1_SS7B
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2020-12-01	2020-12-01	2021-11-18	2021-11-18
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	76	<10	61	<1	<15	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	190	<10	200	<10	<15	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	850	37	1300	270	554	466
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	1100**	37***	1500**	270***	554	466
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg						
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg						
Reached Baseline at C32								No	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Zone 1							
								Location 1							
								BFR_SS7		BFR_SS8					
Sample ID								BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1 (original)	BFR_SS8_SA1 (revised)	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-18	2021-11-18	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.04	<0.10	<0.10	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.05	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<3	<5.0	<5.0	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	53	<10	<10	<15	25	102	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	<15	21	230	<10	16	15	21	21
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	250	290	1300	34	504	283	268	502
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	250	364	1500**	34***	520	323	391	523
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg								
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg								
Reached Baseline at C32								Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Zone 1						
								Location 1						
								BFR_SS9		BFR_SS10		BFR_SS11		BFR_SS12
Sample ID								BFR_SS9_SA1 (original)	BFR_SS9_SA1 (revised)	BFR_SS10_SA1 (original)	BFR_SS10_SA1 (revised)	BFR_SS11_SA1 (original)	BFR_SS11_SA1 (revised)	BFR_SS12_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	<10	65	<10	130	<10	<10
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	<15	<10	120	<10	290	<10	<10
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	192	17	810	51	1600	38	590
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	860**	17***	990**	51***	2000**	38***	590***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								Yes	Yes	No	Yes	No	Yes	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Possible lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction[(c)].	Lube oil range[(c)].	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Possible lube oil fraction.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Orange Shaded = exceedance is within or below background range

Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 1						
								Location 1						
								BFR_SS13		BFR_SS13				
Sample ID								BFR_SS13_SA1 (original)	BFR_SS13_SA1 (revised)	BFR_L1_SS13A_SA1	BFR_L1_SS_DUP 2 (Duplicate of BFR_L1_SS13_A_SA1)	BFR_L1_SS13B_SA1	BFR_L1_SS13C_SA1	BFR_L1_SS13D_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-02	2020-12-02	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	**160**	<10	<15	<15	<15	22	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	240	<10	<15	<15	<15	<15	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	1300	33	586	610	240	117	151
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	1700**	33***	586	610	240	139	151***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								No	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 1					
								Location 1					
								BFR_SS14		BFR_SS15		BFR_SS16	
Sample ID								BFR_SS14_SA1 (original)	BFR_SS14_SA1 (revised)	BFR_SS15_SA1 (original)	BFR_SS15_SA1 (revised)	BFR_SS16_SA1 (original)	BFR_SS16_SA1 (revised)
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<10	<10	<10	<10	120	<10
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	190	<10	230	<10	290	<10
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	1300	250	2200	550	**3400**	850
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	1500***	250***	<u>2400***</u>	550***	<u>3900**</u>	850***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg						
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg						
Reached Baseline at C32								No	Yes	No	Yes	No	No
Hydrocarbon Resemblance								Lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

<u>Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup</u>

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Zone 2 (Background)					
								Location 1					
								BFR_SS17		BFR_SS18		BFR_SS19	
Sample ID								BFR_SS17_SA1 (original)	BFR_SS17_SA1 (revised)	BFR_SS18_SA1 (original)	BFR_SS18_SA1 (revised)	BFR_SS19_SA1 (original)	BFR_SS19_SA1 (revised)
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	110	61	57	<10	91	<10
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	140	<10	150	<10	270	<10
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	1200	160	1100	120	2500	450
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	1500**	220**	1300**	120***	2900**	450***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg						
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg						
Reached Baseline at C32								No	Yes	No	Yes	No	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Zone 3 (Background)					
								Location 1					
								BFR_SS20	BFR_SS20	BFR_SS21		BFR_SS22	
Sample ID								BFR_SS20_SA1 (original)	BFR_SS20_SA1 (revised)	BFR_SS21_SA1 (original)	BFR_SS21_SA1 (revised)	BFR_SS22_SA1 (original)	BFR_SS22_SA1 (revised)
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	98	<10	100	56	66	<10
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	290	<10	190	<10	120	<10
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	2200	480	1200	240	980	140
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	2600**	480***	1500**	300**	1200**	140***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg						
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg						
Reached Baseline at C32								No	Yes	Yes	Yes	No	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
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Exceedance Identification:
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Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 3 (Background)	Zone 2 (Background)				
								Location 1					
								BFR_SS23		BFR_SS24		BFR_SS25		BFR_L1_SS26
Sample ID								BFR_SS23_SA1 (original)	BFR_SS23_SA1 (revised)	BFR_SS24_SA1 (original)	BFR_SS24_SA1 (revised)	BFR_SS25_SA1 (original)	BFR_SS25_SA1 (revised)	BFR_L1_SS26_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-03	2020-12-03	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2021-11-17
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<10	<10	<10	<10	<10	<10	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	250	<10	<10	<10	230	<10	17
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	2100	410	500	<15	1900	470	480
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	2300**	410***	500***	<15	2100**	470***	497***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								Yes	Yes	Yes	NA	Yes	Yes	Yes
Hydrocarbon Resemblance								Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	NA	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Zone 2 (Background)						
								Location 1					Location 2	
								BFR_L1_SS27	BFR_L1_SS28		BFR_L1_SS29	BFR_L1_SS30	BRF_L2_SS1	BRF_L2_SS2
Sample ID								BFR_L1_SS27_SA1	BFR_L1_SS28_SA1	BFR_L1_SS_DUP3 (Duplicate of BFR_L1_SS28_SA1)	BFR_L1_SS29_SA1	BFR_L1_SS30_SA1	BRF_L2_SS1_SA1	BRF_L2_SS2_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-25	2021-11-25
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	<15	<15	22	<15	<15	27
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	21	19	<15	29	15	24	24
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	322	418	180	1050	339	492	572
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	343***	437***	180***	1100***	354***	516***	623***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG/CWS [c]	Background Range [e]		Units	Location 2						
								BRF_L2_SS3	BRF_L2_SS4	BRF_L2_SS5	BRF_L2_SS6	BRF_L2_SS7	BRF_L2_SS8	BRF_L2_SS9
Sample ID								BRF_L2_SS3_SA1	BRF_L2_SS4_SA1	BRF_L2_SS5_SA1	BRF_L2_SS6_SA1	BRF_L2_SS7_SA1	BRF_L2_SS8_SA1	BRF_L2_SS9_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-25	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	<15	<15	40	<15	<15	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	16	18	18	31	24	32	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	361	512	639	420	824	786	448
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	377***	530***	657***	491***	848***	818***	448***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg							
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg							
Reached Baseline at C32								Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds, Product in Fuel Oil Range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 9: Analytical Results - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Location 2					
								BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12	BRF_L2_SS13	BRF_L2_SS14
Sample ID								BRF_L2_SS10_SA1	BFR_L2_SS_DUP2	BRF_L2_SS11_SA1	BRF_L2_SS12_SA1	BRF_L2_SS13_SA1	BRF_L2_SS14_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-25	2021-11-25	2021-11-23	2021-11-23	2021-11-23	2021-11-23
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	19	<15	<15	<15	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	15	42	15	<15	<15	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	359	675	332	245	252	400
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	374***	736***	347***	245***	252***	400***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg						
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg						
Reached Baseline at C32								Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance								Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Location		Atlantic RBCA EQS_{Eco}[a]	Atlantic RBCA EQS_{HH}[b]	CCME SQG/CWS[c]	Background Range[e]		Units	Location 2	
								BRF_L2_SS15	BRF_L2_SS16
Sample ID								BRF_L2_SS15_SA1	BRF_L2_SS16_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15
Date Collected								2021-11-23	2021-11-23
Benzene		18	0.021	0.03	<0.025	<0.025	mg/kg	<0.02	<0.02
Toluene		75	47	0.082	<0.050	<0.10	mg/kg	<0.04	<0.04
Ethylbenzene		55	60	0.37	<0.025	<0.025	mg/kg	<0.03	<0.03
Total Xylenes		95	4.9	11	<0.050	<0.10	mg/kg	<0.05	<0.05
C6 - C10 (less BTEX)		210	NGA	30	<2.5	<5.0	mg/kg	<3	<3
>C10-C16 Hydrocarbons		150	NGA	150	<10	110	mg/kg	<15	<15
>C16-C21 Hydrocarbons		300	NGA	300	<10	290	mg/kg	<15	<15
>C21-<C32 Hydrocarbons		2800	NGA	2800	120	2500	mg/kg	230	250
Modified TPH	Gasoline	NGA	75*	NGA	<15	2900**	mg/kg	230***	250***
	Diesel/No. 2 Fuel Oil	NGA	3200**	NGA			mg/kg		
	Lube oil/No. 6 Oil	NGA	1800***	NGA			mg/kg		
Reached Baseline at C32								Yes	Yes
Hydrocarbon Resemblance								Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
No Guideline Available
tres below ground surface
low Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Environmental Quality Standards (EQS_{HH}) for Soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and Canada Wide Standards (CWS) for soil, agricultural land use, coarse-grained soil, 10-5 incremental risk for surface soils (where applicable)
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA EQS_{ECO}, prior to Silica Gel Cleanup

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I EQS_{HH}, prior to Silica Gel Cleanup

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	Zone 1									
								Location 1									
								BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4	BFR_SS5	BFR_SS6	BFR_SS6		
Sample ID								BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6_A_SA1)	BFR_L1_SS6A	BFR_L1_SS6B
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004	<0.004
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	0.036	<0.010	<0.010	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	0.047	<0.010	<0.010	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	0.03	<0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	0.078	<0.010	<0.010	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.060	<0.010	<0.010	<0.05	<0.05	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.03	<0.03	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	Zone 1									
								Location 1									
								BFR_SS6		BFR_SS7						BFR_SS8	
Sample ID								BFR_L1_SS6C	BFR_L1_SS6D	BFR_SS7_SA1	BFR_SS_DUP2	BFR_L1_SS7A	BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1	BFR_L1_SS8A
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-18	2021-11-18	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2021-11-18
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.00671	<0.00671	<0.010	<0.010	<0.00671	<0.00671	<0.00671	<0.00671	<0.010	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.004	<0.004	<0.010	<0.010	<0.004	<0.004	<0.004	<0.004	<0.010	<0.004
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.03	<0.03	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.010	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	-	-	<0.020	<0.020	-	-	-	-	<0.020	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	-	-	<0.010	<0.010	-	-	-	-	<0.010	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	-	-	<0.010	<0.010	-	-	-	-	<0.010	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	-	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.006	<0.006	<0.010	<0.010	<0.006	<0.006	<0.006	<0.006	<0.010	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	0.02	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	0.02
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.03	<0.03	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.010	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.03	<0.03	<0.02	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Location								Zone 1									
								Location 1									
								BFR_SS8			BFR_SS9	BFR_SS10	BFR_SS11	BFR_SS12	BFR_SS13		
Sample ID	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_SS9_SA1	BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1	BFR_SS13_SA1	BFR_L1_SS13A_SA1	BFR_L1_SS_DUP2 (Duplicate of BFR_L1_SS13_A_SA1)
					Min	Max											
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-18	2021-11-18	2021-11-18	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2021-11-17	2021-11-17
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.00671	<0.00671	<0.00671	<0.010	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.004	<0.004	<0.004	<0.010	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	-	-	-	-	<0.05	<0.05	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.006	<0.006	<0.006	<0.010	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.03	0.03
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.01	<0.01	<0.01	<0.010	0.041	<0.010	<0.010	<0.010	<0.01	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.03	<0.03	<0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

								Zone 1						Zone 2 (Background)			Zone 3
Location								Location 1									
								BFR_SS13			BFR_SS14	BFR_SS15	BFR_SS16	BFR_SS17	BFR_SS18	BFR_SS19	BFR_SS20
Sample ID	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	BFR_L1_SS13B_SA1	BFR_L1_SS13C_SA1	BFR_L1_SS13D_SA1	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1	BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1	BFR_SS20_SA1
					Min	Max											
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-17	2021-11-17	2021-11-17	2020-12-02	2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04	2020-12-03
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.060	<0.010	<0.010	<0.010
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.00671	<0.00671	<0.00671	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.004	<0.004	<0.004	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.32	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	-	-	-	-	-	-	-
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.006	<0.006	<0.006	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	1.1	<0.010	<0.010	<0.010	<0.010
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.03	<0.03	<0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

								Zone 3 (Background)			Zone 2 (Background)				
Location								Location 1							
								BFR_SS21	BFR_SS22	BFR_SS23	BFR_SS24	BFR_SS25	BFR_L1_SS26	BFR_L1_SS27	BFR_L1_SS28
Sample ID	**Atlantic RBCA EQS_{Eco} [a]**	**Atlantic RBCA EQS_{HH} [b]**	**CCME SQG_{Eco} [c]**	**CCME SQG_{HH} [c]**	**Background Range [f]**		**Units**	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS24_SA1	BFR_SS25_SA1	BFR_L1_SS26_SA1	BFR_L1_SS27_SA1	BFR_L1_SS28_SA1
					Min	Max									
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-17	2021-11-17	2021-11-17
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004	<0.004
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	-	-	-	-	-	<0.05	<0.05	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.010	0.054	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.02	0.03	<0.02	<0.02	<0.02	<0.03	<0.03	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs

(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	Zone 2 (Background)									
								Location 1			Location 2						
Sample ID								BFR_L1_SS28	BFR_L1_SS29	BFR_L1_SS30	BFR_L2_SS1	BFR_L2_SS2	BFR_L2_SS3	BFR_L2_SS4	BFR_L2_SS5	BFR_L2_SS6	BFR_L2_SS7
								BFR_L1_SS_DUP3 (Duplicate of BFR_L1_SS28_SA1)	BFR_L1_SS29_SA1	BFR_L1_SS30_SA1	BFR_L2_SS1_SA1	BFR_L2_SS2_SA1	BFR_L2_SS3_SA1	BFR_L2_SS4_SA1	BFR_L2_SS5_SA1	BFR_L2_SS6_SA1	BFR_L2_SS7_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-17	2021-11-17	2021-11-17	2021-11-25	2021-11-25	2021-11-25	2021-11-26	2021-11-26	2021-11-26	2021-11-26
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	0.023	0.010	0.008	0.005
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.03
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)
(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Table 10: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG_{Eco} [c]	CCME SQG_{HH} [c]	Background Range [f]		Units	Location 2									
								BRF_L2_SS8	BRF_L2_SS9	BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12	BRF_L2_SS13	BRF_L2_SS14	BRF_L2_SS15	BRF_L2_SS16
Sample ID								BRF_L2_SS8_SA1	BRF_L2_SS9_SA1	BRF_L2_SS10_SA1	BFR_L2_SS_DUP2	BRF_L2_SS11_SA1	BRF_L2_SS12_SA1	BRF_L2_SS13_SA1	BRF_L2_SS14_SA1	BRF_L2_SS15_SA1	BRF_L2_SS16_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-26	2021-11-26	2021-11-25	2021-11-25	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23
1-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	NGA	<0.00671	<0.010	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	NGA	<0.004	<0.010	mg/kg	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	2.5	24000	2.5	NGA	<0.03	<0.010	mg/kg	<0.05	0.18	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	NGA	<0.01	<0.010	mg/kg	<0.03	<0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	NGA	<0.01	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.010	mg/kg	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	6.2	NGA	0.1	NGA	<0.020	<0.020	mg/kg	-	-	-		-	-	-	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-	-	-	-	-	-
Benzo(j/k)fluoranthene	6.2	NGA	0.1	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	6.2	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	NGA	<0.006	<0.010	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	50	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	NGA	<0.010	<0.010	mg/kg	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	NGA	<0.010	0.054	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	0.013	NGA	<0.010	<0.010	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	0.11	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	NGA	<0.010	<0.010	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	7.7	2100	0.1	NGA	<0.010	<0.010	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B[a]P TPE	NGA	5.3	NGA	5.3	<0.02	0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) CCME (2010) presents a single SQGHH for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
'Yellow Shaded = exceedance is within or below background range
Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of CCME SQG (None reported)

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG[c]	NSE EQS Tier 1[d]	Background Range[e]		Units	Zone 1										
								Location 1										
								BFR_SS1						BFR_SS2				
Sample ID					Min	Max		BFR_SS1_SA1	BFR_SS_DUP 1	BFR_L1_SS1_ SA2	BFR_L1_SS1_ A_SA1	BFR_L1_SS1_ B_SA1	BFR_L1_SS1_ C_SA1	BFR_SS2_SA1	BFR_L1_SS2_ B_SA1	BFR_L1_SS2_ C_SA1	BFR_L1_SS2_ D_SA1	BFR_L1_SS_DUP6 (Duplicate of BFR_L1_SS2_D_SA1)
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0.15 - 0.30	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	5500	5700	5210	4520	12100	2640	7800	7800	7310	10900	9880
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	<0.8	<0.8	<0.8	<0.8	<2.0	<0.8	<0.8	0.9	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.5	3.2	3.0	4.0	3.0	2.0	5.7	7.0	5.0	6.0	7.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	21	21	19	19	10	38	34	38	28	84	58
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<0.4	<0.4	<0.4	<0.4	<2.0	0.5	0.4	0.5	0.6
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	-	-	-	-	<2.0	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	<0.50	<0.50	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50	<0.50
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	10	10	11	10	11	10	20	24	28	28	25
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2.8	3.1	2.9	2.8	2.5	2.9	5.6	6.6	7.2	9.4	7.9
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	4.5	4.9	5.6	5.3	2.9	8.4	12	14.4	12.5	16.7	14.4
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	8700	9500	8540	8180	**13500**	9550	**16000**	**15000**	**14100**	**20800**	**18000**
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	3.8	4.1	27	6.0	29	30	17	20	18	*82*	25
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	8.6	9.3	8.2	7.9	8.1	4.5	12.0	12.2	13.6	22.8	19.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	130	130	143	125	116	88	330	**449**	**387**	**560**	**435**
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.10	<0.10	0.06	0.07	0.14	0.19	<0.10	0.09	0.06	0.05	<0.03
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<0.5	<0.5	0.5	<0.5	<2.0	0.6	0.6	<0.5	<0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	6.6	7.3	6.0	6.0	4.0	6.0	11	11	13	14	14
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	8.0	8.9	-	-	-	-	17	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<0.50	<0.50	<0.8	<0.8	*4.2*	*1.9*	<0.50	<0.8	<0.8	<0.8	<0.8
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	11	9.3	15	14	10	8.0
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.10	<0.10	<0.50	<0.50	<0.50	<0.50	0.12	<0.50	<0.50	<0.50	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	<1.0	<1.0	<1.0	2.0	1.0	<1.0	<1.0	<1.0	1.0	1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.68	0.52	0.92	0.74	1.87	1.07	0.95	1.38	1.17	1.32	1.14
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	18.0	20.0	18.9	17.8	36.5	26.5	34.0	35.6	**42.0**	**62.0**	**48.1**
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	14	14	14	14	21	23	38	59	40	62	53

Notes:
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"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG[c]	NSE EQS Tier 1[d]	Background Range[e]		Units	Zone 1												
								Location 1												
								BFR_SS3							BFR_SS4					
Sample ID					Min	Max		BFR_SS3_SA1	BFR_L1_SS3_SA2	BFR_L1_SS3_A_SA1	BFR_L1_SS3_B_SA1	BFR_L1_SS3_C_SA1	BFR_L1_SS_DUP5 (Duplicate of BFR_L1_SS3_C_SA1)	BFR_L1_SS3_D_SA1	BFR_SS4_SA1	BFR_L1_SS4_SA2	BFR_L1_SS_DUP4 (Duplicate of BFR_L1_SS4 SA2)	BFR_L1_SS4_A_SA1	BFR_L1_SS4_B_SA1
Sample Depth (mbgs)								0 - 0.15	0.15 - 0.30	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.30	0.15 - 0.30	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	6000	5880	7160	5490	4670	4840	5610	13000	4890	7910	5850	2280
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	2.8	***21.8***	***33.1***	**10**	2.0	2.3	<0.8	<2.0	<0.8	<0.8	<0.8	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3.5	4.0	5.0	3.0	3.0	3.0	4.0	<2.0	2.0	2.0	2.0	3.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	24	20	23	15	18	16	21	15	13	14	15	23
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2.0	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<2.0	<0.4	<0.4	<0.4	<0.4
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	-	-	-	-	-	-	<2.0	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50	0.60
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	10	12	12	10	8.0	7.0	10	13	9.0	8.0	9.0	<5.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2.9	3.2	3.3	2.4	2.3	2.0	3.8	1.0	0.9	1.0	1.2	<0.5
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	8.7	37.9	57.5	18	8.6	9.2	8.2	4.2	5.0	4.3	4.8	4.7
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	8700	9320	10500	8400	6870	6010	8980	5000	3450	3620	7170	1140
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	13	***1820***	***2130***	***384***	41	51	15	52	32	33	36	30
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	8.3	10.2	10.5	6.9	6.4	6.0	11.5	3.8	2.3	2.2	2.3	<0.5
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	140	157	168	138	127	104	384	47	46	49	82	38
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.10	0.04	0.03	<0.03	<0.03	<0.03	<0.03	0.17	0.20	0.17	0.15	0.22
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	5.6	7.0	7.0	4.0	4.0	4.0	6.0	4.5	3.0	3.0	3.0	2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	9.7	-	-	-	-	-	-	5.3	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<0.50	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	*2.2*	*4.7*	*3.8*	*2.9*	*3.0*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	<5.0	<5.0	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	35
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.50	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	2.0	2.0	1.0	<1.0	<1.0	<1.0	1.4	3.0	1.0	1.0	<1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	1.20	2.93	0.83	1.13	1.36	1.12	0.98	2.50	1.29	1.15	0.99	<0.50
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	17	20.9	22.4	19.0	15.5	13.8	16.8	25.0	14.1	14.2	18.9	4.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	15	22	29	15	12	11	26	25	9.0	9.0	12	32

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Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1											
								Location 1											
								BFR_SS4		BFR_SS5	BFR_SS6			BFR_SS6				BFR_SS7	
Sample ID								BFR_L1_SS4_C_SA1	BFR_L1_SS4_D_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_SS6_SA2	BFR_L1_SS6A	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6_A_SA)	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_SS7_SA1	BFR_SS_DUP 2
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-27	2021-11-27	2020-12-01	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2020-12-01
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	12000	7990	840	5800	9700	888	1580	519	937	6340	1600	1200
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<0.8	<0.8	<2.0	<2.0	<2.0	<1.0	<1.0	2.0	1.0	<1.0	**9.3**	5.9
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.0	2.0	<2.0	<2.0	<2.0	2.0	3.0	2.0	3.0	2.0	2.8	2.1
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	23	14	33	19	6.3	6.0	11	15	20	5.0	220	63
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	0.5	<0.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	<2.0	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<5.0	<50	<50	<50	<2.0	<2.0	*10*	*7.0*	*3.0*	<50	<50
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.50	<0.50	<0.30	0.42	<0.30	<0.30	<0.30	0.30	0.60	<0.30	0.85	0.64
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	17	9.0	<2.0	3.8	5.7	<2.0	3.0	<2.0	<2.0	3.0	<2.0	<2.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2.0	2.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	1.3
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	38.2	3.6	2.4	6.2	2.3	<2.0	<2.0	7.0	3.0	3.0	42	31
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	6800	7110	690	4600	1500	399	721	507	435	286	2000	1200
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	61	19	17	16	8.9	4.7	6.0	60.4	11.6	3.6	***640***	***420***
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	7.4	8.1	<2.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	104	119	13	26	18	11	15	19	9.0	<2.0	22	14
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.14	0.08	0.25	0.31	0.15	0.04	0.07	0.12	0.16	0.08	0.49	0.32
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	0.5	<0.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	5.0	3.0	<2.0	2.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.5	3.8
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	<2.0	2.8	3.2	-	-	-	-	-	<2.0	<2.0
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*4.1*	*1.8*	*1.8*	*2.3*	*1.9*	<1.0	<1.0	<1.0	*2.0*	*5.0*	*1.7*	*1.4*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	7.0	<5.0	36	12	<5.0	<5.0	8.0	14	57	<5.0	76	110
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.50	<0.50	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	0.11
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	2.0	1.0	<1.0	*16*	<1.0	3.0	3.0	<2.0	4.0	3.0	2.2	<1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	2.59	1.41	0.11	0.70	1.30	0.20	0.20	<0.10	<0.10	1.00	0.17	0.10
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	*32.2*	*22.7*	2.5	7.5	8.8	6.0	9.0	4.0	5.0	4.0	8.1	3.9
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	59	31	27	18	<5.0	<5.0	5.0	27	28	7.0	*270*	90

Notes:
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NGA = No Guideline Available
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mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1

Italicised and shaded = Exceedance of CCME SQG

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range or considered naturally occurring

Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG[c]	NSE EQS Tier 1[d]	Background Range[e]		Units	Zone 1												
								Location 1												
								BFR_SS7					BFR_SS8							BFR_SS9
Sample ID								BFR_SS7_SA2	BFR_L1_SS7A	BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1	BFR_SS8_SA2	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_SS9_SA1
Sample Depth (mbgs)					Min	Max		0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	2500	1950	2010	1320	650	700	2600	3550	724	2710	2530	5800
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	**20**	<1.0	4.0	3.0	<1.0	<2.0	<2.0	<1.0	1.0	<1.0	<1.0	<2.0
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	<2.0	2.0	3.0	2.0	3.0	2.7	<2.0	2.0	4.0	3.0	3.0	2.3
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	44	<5.0	7.0	32	6.0	17	7.9	9.0	13.0	6.0	6.0	23
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	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
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	-	-	-	-	<2.0	<2.0	-	-	-	-	<2.0
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	*4.0*	*4.0*	*3.0*	*3.0*	<50	<50	<2.0	*3.0*	<2.0	<2.0	<50
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	0.42	<0.30	<0.30	0.40	0.80	***1.5***	<0.30	0.40	1.1	<0.30	<0.30	0.42
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2.0	<2.0	3.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	46	<2.0	*71*	11	5.0	2.5	2.5	<2.0	<2.0	<2.0	3.0	3.1
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1800	566	874	479	306	1600	130	401	1390	2040	471	2800
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	***780***	8.1	***148***	56	22	28	1.4	6.9	28.6	5.6	15.6	58
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<2.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<2.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	24	21	7.0	8.0	3.0	7.9	<2.0	3.0	10	13	3.0	8.2
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.29	<0.03	0.09	<0.03	0.03	0.23	0.12	<0.03	0.10	0.09	0.09	0.16
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	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
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	4.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	<2.0	-	-	-	-	<2.0	<2.0	-	-	-	-	<2.0
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*1.7*	1.0	*2.0*	*2.0*	*2.0*	*1.8*	*2.6*	*3.0*	*2.0*	<1.0	*2.0*	*1.5*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	57	<5.0	<5.0	41	27	46	7.0	11.0	30.0	14.0	12.0	23
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	0.11
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	3.0	3.0	<2.0	<2.0	1.9	<1.0	<2.0	4.0	4.0	4.0	1.2
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.18	0.40	0.80	0.10	<0.10	<0.10	0.88	0.40	<0.10	0.20	0.30	0.22
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	4.9	5.0	8.0	4.0	4.0	2.8	<2.0	5.0	5.0	11.0	4.0	<2.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	110	6.0	7.0	41	55	33	<5.0	8.0	23	9.0	7.0	16

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(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1											
								Location 1											
								BFR_SS10	BFR_SS11	BFR_SS12						BFR_SS13			
Sample ID								BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1	BFR_L1_SS12_SA2	BFR_L1_SS12_A_SA1	BFR_L1_SS12_B_SA1	BFR_L1_SS12_C_SA1	BFR_L1_SS12_D_SA1	BFR_SS13_SA1	BFR_SS13_SA2	BFR_L1_SS13A_SA1	BFR_L1_SS_DUP2 (Duplicate of BFR_L1_SS13_A_SA1)
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.30	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15
Date Collected								2020-12-01	2020-12-01	2020-12-02	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2020-12-02	2020-12-02	2021-11-17	2021-11-17
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	3700	1000	6700	7510	4370	6820	4560	7710	9800	13000	1190	1390
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0	<2.0	<2.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	<2.0	<2.0	2.7	5.0	3.0	6.0	5.0	5.0	2.9	<2.0	2.0	2.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	7.9	16	27	15	22	18	22	15	34	17	<5.0	6.0
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	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
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	<50	*4.0*	*3.0*	*3.0*	*6.0*	*3.0*	<50	<50	*12*	<2.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	0.48	0.36	0.50	***1.6***	0.80	0.80	0.80	0.54	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	5.8	<2.0	3.7	4.0	<2.0	4.0	3.0	4.0	3.0	11	<2.0	<2.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	<2.0	2.1	7.4	7.0	5.0	10	5.0	8.0	7.1	2.7	<2.0	<2.0
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1100	930	**12000**	4180	2400	2520	7150	2820	4900	3400	450	573
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	7.3	5.9	45	45	36	*76*	22	*74*	*120*	9.6	4.6	6.4
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<2.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	4.4	5.0	32	26	19	23	29	24	27	6.0	12	9.0
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.12	0.15	0.26	0.18	0.14	0.17	0.18	0.17	0.31	0.21	0.07	0.08
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	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
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	3.3	2.0	<2.0	2.0	<2.0	2.0	3.8	2.8	<2.0	<2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	<2.0	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*1.1*	*2.3*	*3.3*	*4.0*	*2.0*	*5.0*	*3.0*	*5.0*	*3.4*	*3.7*	1.0	*2.0*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	27	22	21	25	22	26	18	17	6.1	<5.0	<5.0
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	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
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	1.5	4.1	1.3	4.0	3.0	5.0	4.0	4.0	1.5	<1.0	3.0	3.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.97	0.19	1.40	1.20	0.60	1.20	0.60	1.50	1.10	2.30	0.40	0.40
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	6.4	<2.0	11	10.0	6.0	10.0	10.0	13.0	5.0	8.6	4.0	4.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	<5.0	15	19	12	14	14	16	13	15	<5.0	16	<5.0

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(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
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Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1										
								Location 1										
								BFR_SS13			BFR_SS14	BFR_SS15	BFR_SS16					
Sample ID								BFR_L1_SS13_B_SA1	BFR_L1_SS13_C_SA1	BFR_L1_SS13_D_SA1	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1	BFR_L1_SS16_SA2	BFR_L1_SS16_A_SA1	BFR_L1_SS16_B_SA1	BFR_L1_SS16_C_SA1	BFR_L1_SS16_D_SA1
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.30	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected					Min	Max		2021-11-17	2021-11-17	2021-11-17	2020-12-02	2020-12-02	2020-12-02	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	7470	3340	639	860	2900	8400	7850	1080	3000	12100	4720
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<1.0	2.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3.0	3.0	3.0	<2.0	<2.0	<2.0	2.0	5.0	2.0	3.0	2.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	61	7.0	22	16	33	9.0	<5.0	14	<5.0	6.0	<5.0
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	<2.0	<2.0	<2.0	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	*6.0*	*4.0*	*3.0*	<50	<50	<50	<2.0	*6.0*	<2.0	<2.0	*3.0*
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	<0.30	0.78	0.54	0.46	0.40	0.80	<0.30	***1.7***	<0.30
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	7.0	3.0	<2.0	<2.0	<2.0	9.2	9.0	<2.0	3.0	4.0	2.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	6.0	<2.0	3.0	<2.0	3.7	3.4	4.0	5.0	<2.0	14	<2.0
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	**11500**	4790	369	880	770	350	3570	581	492	2390	406
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	5.2	15	4.7	17	8.0	37	19	13	12	59	4.1
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	5.0	<5.0	<5.0	<2.0	<2.0	<2.0	6.0	<5.0	<5.0	<5.0	<5.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	111	23	5.0	4.2	2.6	5.8	81	5.0	29	41	3.0
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.09	0.11	0.09	0.15	0.20	0.16	0.04	0.12	0.03	0.09	0.06
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	6.0	<2.0	<2.0	<2.0	2.6	<2.0	2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	<2.0	<2.0	<2.0	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	1.0	*2.0*	*2.0*	*1.8*	*1.9*	*3.7*	*2.0*	*3.0*	1.0	*8.0*	*3.0*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	8.0	5.0	54	36	26	<5.0	<5.0	37	<5.0	14	11
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	4.0	3.0	4.0	1.2	<1.0	<1.0	4.0	4.0	5.0	3.0	4.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.20	0.40	<0.10	0.11	0.20	10.0	1.90	0.10	0.50	9.80	0.50
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	**49.0**	10.0	4.0	2.1	<2.0	15	21.0	6.0	12.0	8.0	4.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	27	9.0	19	31	11	<5.0	12	39	<5.0	7.0	<5.0

Notes:
NA = Not Applicable
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 2 (Background)			Zone 3 (Background)					Zone 2	Zone 2 (Background)	
								Location 1										
								BFR_SS17	BFR_SS18	BFR_SS19	BFR_SS20	BFR_SS21	BFR_SS22	BFR_SS23		BFR_SS24		BFR_SS25
Sample ID								BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1	BFR_SS20_SA1	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS23_SA2	BFR_SS24_SA1	BFR_SS24_SA2	BFR_SS25_SA1
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected					Min	Max		2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	640	5700	1800	3000	720	6600	1100	8200	1100	12000	8100
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	<2.0	2.0	<2.0	4.3
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	8.1	15	31	27	20	10	24	13	37	15	17
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	0.70	0.45	0.38	<0.30	***3.1***	<0.30	***1.8***	<0.30	0.33
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2.0	5.6	<2.0	<2.0	<2.0	4.1	<2.0	4.4	<2.0	3.2	2.6
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	2.4	<1.0	<1.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	2.8	<2.0	3.2	4.4	2.7	<2.0	4.6	2.3	4.3	7.1	4.6
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1100	1900	960	1300	820	3700	2400	550	3500	210	**29000**
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	19	13	34	18	5.3	7.7	57	4.2	29	3.9	41
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	15	22	6.0	6.0	5.8	19	25	5.3	13	<2.0	11
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.16	0.18	0.22	0.38	0.18	0.13	0.25	0.17	0.15	0.17	0.24
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	2.3	2.0	<2.0	<2.0	2.3	<2.0	2.1	2.9	2.1
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	<2.0	3.5	<2.0	<2.0	<2.0	2.3	2.7	<2.0	2.6	<2.0	<2.0
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	0.80	*1.4*	*2.0*	*2.0*	*2.2*	*1.5*	*2.0*	*1.8*	*1.5*	*3.4*	*2.8*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<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
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	13	6.6	24	13	63	<5.0	32	5.4	33	<5.0	12
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	0.46	<0.10	<0.10
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	1.7	<1.0	1.4
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.28	0.94	0.39	0.79	0.12	0.60	0.20	0.82	<0.10	5.60	0.81
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	4.7	12.0	2.6	5.0	2.7	10.0	3.5	11.0	<2.0	6.4	11.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	12	6.2	16	11	27	<5.0	28	6.0	31	<5.0	13

Notes:
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(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

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Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 2 (Background)						Zone 1					
								Location 1											
Sample ID					Min	Max		BFR_L1_SS26	BFR_L1_SS27	BFR_L1_SS28		BFR_L1_SS29	BFR_L1_SS30	BFR_L1_SS31	BFR_L1_SS32	BFR_L1_SS33	BFR_L1_SS34	BFR_L1_SS35	BFR_L1_SS36
								BFR_L1_SS26_SA1	BFR_L1_SS27_SA1	BFR_L1_SS28_SA1	BFR_L1_SS_DUP3 (Duplicate of BFR_L1_SS28_SA1)	BFR_L1_SS29_SA1	BFR_L1_SS30_SA1	BFR_L1_SS31_SA1	BFR_L1_SS32_SA1	BFR_L1_SS33_SA1	BFR_L1_SS34_SA1	BFR_L1_SS35_SA1	BFR_L1_SS36_SA1
Sample Depth (mbgs)								0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2022-09-05	2022-09-05	2022-09-05	2022-09-06	2022-09-06	2022-09-06
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	2290	2160	3210	1200	3410	2910	2630	7580	6980	10400	8910	4890
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.0	3.0	3.0	2.0	2.0	2.0	4	4	4	4	4	7
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	18	13	13	5.0	8.0	13	11	7	6	26	27	15
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	2.0	<2.0	*5.0*	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	0.3
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	3.0	2.0	10	<2.0	6.0	2.0	3	8	6	16	13	3
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	1	<1	5	2	<1
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	3.0	<2.0	10	2.0	<2.0	3.0	<2	3	<2	6	14	3
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	487	374	634	274	952	226	641	3320	5250	**19200**	7680	678
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	7.9	16	8.2	9.4	7.9	6.8	2.2	5.4	6.3	25.4	41.3	4.5
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	8	<5	9	<5	<5
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	8.0	4.0	3.0	5.0	5.0	3.0	12	98	36	222	102	6
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.03	<0.03	0.06	<0.03	0.06	<0.03	0.04	<0.03	0.04	0.06	0.08	0.06
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	4.0	<2.0	<2.0	<2.0	<2	2	<2	8	4	<2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*2.0*	*2.0*	*3.0*	<1.0	*2.0*	*3.0*	<1	<1	<1	<1	*2.0*	<1
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	8.0	7.0	9.0	<5.0	<5.0	7.0	8	<5	<5	<5	<5	7
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<2.0	<2.0	3.0	3.0	4.0	<2.0	*6*	5	*6*	5	5	*13*
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.40	0.20	0.70	0.10	0.70	0.50	0.4	0.8	0.5	0.7	1.0	1.5
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	5.0	6.0	7.0	3.0	13.0	4.0	8	17	25	**79**	35	12
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	6.0	<5.0	10	7.0	<5.0	5.0	<5	13	7	28	16	8

Notes:
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(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
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(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

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Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1											
								Location 1											
								BFR_L1_SS37	BFR_L1_SS38		BFR_L1_SS39	BFR_L1_SS40	BFR_L1_SS41	BFR_L1_SS42	BFR_L1_SS43	BFR_L1_SS44		BFR_L1_SS45	BFR_L1_SS46
Sample ID								BFR_L1_SS37_SA1	BFR_L1_SS38_SA1	BFR_L1_SS38_DUP1	BFR_L1_SS39_SA1	BFR_L1_SS40_SA1	BFR_L1_SS41_SA1	BFR_L1_SS42_SA1	BFR_L1_SS43_SA1	BFR_L1_SS44_SA1	BFR_L1_SS44_DUP1	BFR_L1_SS45_SA1	BFR_L1_SS46_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2022-09-06	2022-09-05	2022-09-05	2022-09-05	2022-09-06	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-04
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	14400	2060	**16900**	4190	3380	952	5580	4820	8360	8750	3500	8500
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3	3	4	4	3	3	3	4	3	3	4	4
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	9	16	25	8	19	8	6	10	7	5	24	8
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	10	5	23	2	3	<2	4	5	9	7	16	8
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2	<1	6	<1	1	<1	<1	2	1	<1	1	2
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	2	5	10	<2	3	<2	<2	7	<2	<2	10	5
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	10000	1220	**15000**	603	4530	658	1730	4100	4510	2210	8390	5120
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	10.2	25.7	5.5	1.7	8.9	4.5	9.8	10.3	7.6	6.9	40.0	3.7
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	8	<5	26	<5	<5	<5	<5	7	5	<5	<5	10
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	99	147	335	3	59	8	75	89	76	53	156	99
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.04	0.04	<0.03	0.05	0.05	0.04	<0.03	<0.03	<0.03	<0.03	0.07	<0.03
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	3	<2
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	3	<2	13	<2	2	<2	<2	3	3	2	3	4
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5	17	<5	5	7	10	<5	<5	<5	<5	16	<5
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	4	*6*	*6*	*7*	5	4	5	4	*6*	*6*	*14*	5
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.4	0.1	0.9	0.6	0.2	0.1	0.6	0.7	0.6	0.7	0.3	0.6
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	28	5	**54**	8	15	9	16	12	22	17	10	21
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	13	10	40	<5	13	11	5	9	9	6	49	13

Notes:
NA = Not Applicable
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1											
								Location 1											
								BFR_L1_SS47	BFR_L1_SS48	BFR_L1_SS49	BFR_L1_SS50	BFR_L1_SS51	BFR_L1_SS52	BFR_L1_SS53	BFR_L1_SS54	BFR_L1_SS55		BFR_L1_SS56	BFR_L1_SS57
Sample ID								BFR_L1_SS47_SA1	BFR_L1_SS48_SA1	BFR_L1_SS49_SA1	BFR_L1_SS50_SA1	BFR_L1_SS51_SA1	BFR_L1_SS52_SA1	BFR_L1_SS53_SA1	BFR_L1_SS54_SA1	BFR_L1_SS55_SA1	BFR_L1_SS55_DUP1	BFR_L1_SS56_SA1	BFR_L1_SS57_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-08	2022-09-08
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	14600	**15600**	8980	4780	4260	764	6670	7810	11700	13100	1640	6910
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3	4	3	2	2	3	3	3	3	3	2	2
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	63	35	19	<5	6	19	12	20	9	8	19	37
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<2	<2	<2	<2	<2	2	<2	<2	<2	<2	<2	<2
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	21	20	11	8	4	<2	2	9	10	14	2	12
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	10	10	3	<1	<1	<1	<1	1	<1	<1	<1	3
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	9	26	3	<2	<2	4	<2	3	6	6	<2	<2
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	**25100**	**17800**	10300	1090	1730	440	148	5180	2870	2640	252	7300
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	4.4	3.5	6.4	10.5	6.1	6.6	1.8	13.4	9.2	6.8	1.4	7.2
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	33	34	11	<5	<5	<5	<5	<5	<5	<5	<5	7
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	**566**	**538**	158	23	31	13	<2	101	46	42	<2	146
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	0.03	0.09	0.06	0.05	0.09	<0.03
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	13	13	5	<2	<2	<2	<2	3	2	<2	<2	4
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<1	<1	<1	<1	<1	<1	*2.0*	*2.0*	*4*	*4*	1	<1
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5	<5	<5	<5	<5	53	6	<5	<5	<5	11	<5
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	6	5	5	5	4	4	4	4	4	3	5	4
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.7	1.0	0.9	0.5	0.4	<0.1	0.2	0.8	1.5	1.5	0.5	0.4
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	**77**	**75**	39	21	15	6	5	25	15	17	4	30
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	58	56	18	<5	<5	27	<5	14	8	7	<5	17

Notes:
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(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Zone 1									Location 2		
								Location 1											
Sample ID								BFR_L1_SS58	BFR_L1_SS59	BFR_L1_SS60	BFR_L1_SS61	BFR_L1_SS62	BFR_L1_SS63	BFR_L1_SS64	BFR_L1_SS65	BFR_L1_GW5_SA1	BRF_L2_SS1	BRF_L2_SS2	BRF_L2_SS3
								BFR_L1_SS58_SA1	BFR_L1_SS59_SA1	BFR_L1_SS60_SA1	BFR_L1_SS61_SA1	BFR_L1_SS62_SA1	BFR_L1_SS63_SA1	BFR_L1_SS64_SA1	BFR_L1_SS65_SA1	BFR_L1_GW5_SA1	BRF_L2_SS1_SA1	BRF_L2_SS2_SA1	BRF_L2_SS3_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-05	2021-11-25	2021-11-25	2021-11-25
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	7840	9400	6960	11600	3300	6850	5340	8000	**16700**	1980	2610	2190
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	1	<0.8	<0.8	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3	3	2	3	3	3	2	4	5	1.0	2.0	1.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	29	22	6	6	13	9	6	32	139	17	25	18
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<0.4	<0.4	<0.4
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	*5*	<2	<2	<2	2	<2	<2	*4.0*	<2	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.6	0.6	<0.50	<0.50	<0.50
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2	8	10	6	4	3	14	3	24	<5.0	5.0	5.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1	3	2	<1	<1	<1	<1	<1	10	<0.5	<0.5	<0.5
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	3	2	<2	6	4	3	3	10	10	2.5	43.6	4.5
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1840	**12700**	5850	343	633	486	290	2640	**27600**	462	1460	352
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	8.3	11.3	5.9	6.5	3.5	6.3	7.5	39.7	48.5	7.0	64	10
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<5	9	7	<5	<5	<5	<5	<5	25	<0.5	<0.5	<0.5
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	9	172	71	2	4	3	4	40	**557**	5.6	8.5	6.1
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.10	0.03	<0.03	0.07	0.07	0.06	<0.03	0.10	0.08	0.12	0.36	0.18
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<0.5	<0.5	<0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2	4	4	<2	2	<2	<2	2	16	2.0	2.0	1.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*2*	<1	<1	*4*	*4*	*3*	<1	*2*	*1*	*2.8*	*4.2*	*4.4*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	18	<5	<5	<5	15	<5	<5	16	8	16	12	10
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.4	<0.5	<0.5	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	*15*	5	4	4	4	*6*	4	5	*8*	1.0	<1.0	<1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.5	0.7	0.4	2.2	0.6	1.8	0.6	0.9	0.6	<0.50	0.70	1.17
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	5	**59**	23	13	6	8	16	8	**88**	1.5	3.2	3.3
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	11	22	12	<5	11	<5	<5	17	63	10	23	16

Notes:
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(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
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Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG [c]	NSE EQS Tier 1 [d]	Background Range [e]		Units	Location 2											
								BRF_L2_SS4	BRF_L2_SS5	BRF_L2_SS6	BRF_L2_SS7	BRF_L2_SS8	BRF_L2_SS9	BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12	BRF_L2_SS13	BRF_L2_SS14
Sample ID								BRF_L2_SS4_SA1	BRF_L2_SS5_SA1	BRF_L2_SS6_SA1	BRF_L2_SS7_SA1	BRF_L2_SS8_SA1	BRF_L2_SS9_SA1	BRF_L2_SS10_SA1	BFR_L2_SS_DUP2 (Duplicate of BFR_L2_SS10 SA1)	BRF_L2_SS11_SA1	BRF_L2_SS12_SA1	BRF_L2_SS13_SA1	BRF_L2_SS14_SA1
Sample Depth (mbgs)					Min	Max		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected								2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-25	2021-11-25	2021-11-23	2021-11-23	2021-11-23	2021-11-23
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	4330	3000	5620	2550	3290	3670	6570	6990	2910	3830	3570	3190
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	2.0	<1.0	<0.8	<0.8	<0.8	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	1.0	2.0	1.0	<1.0	2.0	3.0	2.0	3.0	2.0	<1.0	1.0	<1.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	47	21	38	21	35	21	11	13	16	9.1	31	22
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<2.0	<2.0	<0.4	<0.4	<0.4	<0.4
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-		-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	0.60	<0.50	<0.50	<0.50	<0.50	<0.50	<0.30	<0.30	<0.50	<0.50	<0.50	<0.50
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<5.0	5.0	<5.0	<5.0	<5.0	<5.0	4.0	3.0	5.0	<5.0	<5.0	<5.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	0.6	0.6	<0.5	0.6	1.0	<0.5	<1.0	<1.0	<0.5	<0.5	0.5	0.6
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	8.2	15	27.8	29.8	36.5	55.2	14.0	6.0	4.9	2.5	4.3	3.3
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	848	1190	767	871	837	682	594	489	1050	397	688	713
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	11	19	14	8.0	7.0	14	29	7.9	33	4.0	7.0	7.0
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	<0.5	<0.5	<0.5	<0.5
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	5.6	7.8	10	<5.0	5.3	7.3	5.0	4.0	11	6.2	5.4	<5.0
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.20	0.17	0.17	0.13	0.13	0.15	0.04	<0.03	0.22	0.11	0.19	0.13
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	0.7	<0.5	0.5	<0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	1.0	2.0	1.0	2.0	3.0	2.0	<2.0	<2.0	2.0	2.0	1.0	1.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-		-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*2.1*	*3.3*	*2.2*	*1.7*	*2.5*	*3.4*	*2.0*	*2.0*	*2.7*	*2.1*	*2.7*	*1.7*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	14	11	10	11	12	18	9.0	9.0	10	<5.0	11	10
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.10	<0.50	<0.50	<0.50	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0	3.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	1.11	<0.50	1.37	<0.50	<0.50	<0.50	0.70	0.80	0.53	0.79	0.87	<0.50
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	4.4	4.2	6.0	4.1	3.2	5.2	9.0	9.0	5.3	3.1	3.2	3.1
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	7.0	15	7.0	28	37	32	6.0	7.0	10	6.0	9.0	7.0

Notes:
NA = Not Applicable
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1
Italicised and shaded = Exceedance of CCME SQG
Double underline and shaded = Exceedance of NSE Tier 1
Yellow Shaded = exceedance is within or below background range or considered naturally occurring
Orange shaded = exceedance above maximum background range but naturally occurring

Table 11: Analytical Results - Metals in Soil
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	CCME SQG[c]	NSE EQS Tier 1[d]	Background Range[e]		Units	Location 2		
								BRF_L2_SS15		BRF_L2_SS16
Sample ID								BRF_L2_SS15_SA1	BRF_L2_SS15_SA2	BRF_L2_SS16_SA1
Sample Depth (mbgs)								0 - 0.15	0.15- 0.3	0 - 0.15
Date Collected					Min	Max		2021-11-23	2021-11-23	2021-11-23
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	3540	2920	2760
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<0.8	2.0	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	1.0	4.0	1.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	24	21	26
Acid Extractable Beryllium (Be)	5	75	4	NR	<2.0	<2.0	mg/kg	<0.4	<2.0	<0.4
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<2.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	***1.5***	***1.7***	0.50
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<5.0	3.0	<5.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	0.5	<1.0	0.5
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	4.2	5.0	4.3
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1180	1760	696
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	12	24	16
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<0.5	<5.0	mg/kg	<0.5	<5.0	<0.5
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	6.9	23	7.5
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.15	-	0.17
Acid Extractable Molybdenum (Mo)	4	110	5	NR	<2.0	<2.0	mg/kg	<0.5	<2.0	<0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	1.0	3.0	1.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	*1.6*	*2.0*	*2.9*
Acid Extractable Silver (Ag)	20	77	20	NR	<0.5	<0.50	mg/kg	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	11	12	15
Acid Extractable Thallium (Tl)	1	1	1	NR	<0.10	<0.50	mg/kg	<0.50	<0.10	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	4.0	<1.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	<0.50	0.40	<0.50
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	2.9	7.0	3.3
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	8.0	11	12

Notes:
NA = Not Applicable
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for soil - coarse agricultural soils (2021)
(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS_{HH}) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1

Italicised and shaded = Exceedance of CCME SQG

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range or considered naturally occurring

Orange shaded = exceedance above maximum background range but naturally occurring

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1					
						Location 1					
						BFR_SED1		BFR_SED2		BFR_SED3	
Sample ID						BFR_SED1 (original)	BFR_SED1 (revised)	BFR_SED2 (original)	BFR_SED2 (revised)	BFR_SED3 (original)	BFR_SED3 (revised)
Date Collected			Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	<10	110	<10	170	<10
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	510	160	880	300	2300	640
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	510**	160***	990**	300***	2500**	640***
	Diesel/No. 2 Fuel Oil**	25			mg/kg						
	Lube oil/No. 6 Oil***	43			mg/kg						
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	No
Hydrocarbon Resemblance						Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment
(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
						BFR_SED4				BFR_SED5		
Sample ID						BFR_SED4 (original)	BFR_SED4 (revised)	BFR_SED_DUP1 (original)	BFR_SED_DUP1 (revised)	BFR_SED5 (original)	BFR_SED5 (revised)	BFR_SED_DUP2 (original)
Date Collected			Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02
Benzene		1.2	<0.025	<0.025	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<5.0	<5.0	<5.0	<5.0	7.9	7.9	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	170	<10	<10	<10	18	<10	23
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	950	390	880	290	120	26	120
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	1100**	390***	880***	290***	150**	34***	140**
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						No	Yes	No	Yes	Yes	Yes	No
Hydrocarbon Resemblance						Fuel/lube range[(b)].	Lube oil range.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Orange Shaded = exceedance is within or below background range

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
						BFR_SED5	BFR_SED6		BFR_SED7		BFR_SED8	BFR_SED9
Sample ID						BFR_SED_DUP2 (revised)	BFR_SED6 (original)	BFR_SED6 (revised)	BFR_SED7 (original)	BFR_SED7 (revised)	BFR_SED8	BFR_SED9 (original)
Date Collected			Minimum	Maximum		2020-12-02	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10	55
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	<10	<10	190	<10	<10	170
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	23	1000	290	1300	370	36	2300
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	23***	1000***	290***	1400**	370***	36***	2500**
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes	No
Hydrocarbon Resemblance						Lube oil range.	Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment
(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
						BFR_SED9	BFR_SED10	BFR_SED11		BFR_SED12		BFR_SED13
Sample ID						BFR_SED9 (revised)	BFR_SED10	BFR_SED11 (original)	BFR_SED11 (revised)	BFR_SED12 (original)	BFR_SED12 (revised)	BFR_SED13 (original)
Date Collected			Minimum	Maximum		2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	<10	17	<10	160	<10	210
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	550	<15	160	42	1700	540	2800
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	550***	<15	180**	42***	1800**	540***	3000**
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						No	NA	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment
(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
						BFR_SED13	BFR_SED14		BFR_SED15		BFR_SED16	
Sample ID						BFR_SED13 (revised)	BFR_SED14 (original)	BFR_SED14 (revised)	BFR_SED15 (original)	BFR_SED15 (revised)	BFR_SED16 (original)	BFR_SED16 (revised)
Date Collected			Minimum	Maximum		2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	25	<10	110	<10	230	<10
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	790	210	54	1100	310	900	370
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	790***	240**	54***	1200**	310***	1100**	370***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						No	No	Yes	No	Yes	No	Yes
Hydrocarbon Resemblance						Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range.	Lube oil range.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment
(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 2 (Background				Zone 3 (Background)		
						Location 1						
						BFR_SED17	BFR_SED18	BFR_SED19		BFR_SED20	BFR_SED21	
Sample ID						BFR_SED17	BFR_SED18	BFR_SED19 (original)	BFR_SED19 (revised)	BFR_SED20	BFR_SED21 (original)	BFR_SED21 (revised)
Date Collected			Minimum	Maximum		2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	<10	44	<10	<10	<10	<10
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	34	<15	270	85	<15	120	32
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	34***	<15	320**	85***	<15	120***	32***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	NA	No	Yes	NA	No	Yes
Hydrocarbon Resemblance						Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	NA	Lube oil range. Possible lube oil fraction.	Lube oil range.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment
(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 3 (Background)				Zone 2 (Background)		
						Location 1						
						BFR_SED22		BFR_SED23		BFR_SED24		BFR_SED25
Sample ID						BFR_SED22 (original)	BFR_SED22 (revised)	BFR_SED23 (original)	BFR_SED23 (revised)	BFR_SED24 (original)	BFR_SED24 (revised)	BFR_SED25 (original)
Date Collected			Minimum	Maximum		2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2020-12-04
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	76	<10	62	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	150	52	110	<10	<10	<10	220
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	2000	630	1000	280	69	27	2700
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	2200**	690**	1200**	280***	69***	27***	2900**
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						No	Yes	No	Yes	Yes	Yes	No
Hydrocarbon Resemblance						Fuel/lube range. Lube oil fraction.	Fuel/lube range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 2 (Background)	Zone 1					
						Location 1						
						BFR_SED25	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28		BFR_L1_SED29	
Sample ID						BFR_SED25 (revised)	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28	BFR_L1_SED_DUP1	BFR_L1_SED29	BFR_L1_SED_DUP2
Date Collected			Minimum	Maximum		2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Benzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		1.4	<0.050	<0.050	mg/kg	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<2.5	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<10	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<10	<15	<15	<15	<15	41	54
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	690	55	59	160	254	468	614
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	690***	55***	59***	160***	254***	509***	668***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
Sample ID						BFR_L1_SED30	BFR_L1_SED31	BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36
Date Collected			Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20
Benzene		1.2	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		1.4	<0.050	<0.050	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<15	<15	<15	<15	<15	<15	<15
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	29	<15	122	24	606	<15	62
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	29***	<15	122***	24***	606***	<15	62***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						Lube oil range.	No Resemblance.	Lube range, Unidentified Compounds.	Lube oil range.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Orange Shaded = exceedance is within or below background range

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Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Zone 1						
						Location 1						
Sample ID						BFR_L1_SED39	BFR_L1_SED40	BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44	BFR_L1_SED45	BFR_L1_SED46
Date Collected			Minimum	Maximum		2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20
Benzene		1.2	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		1.4	<0.050	<0.050	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<15	27	<15	<15	<15	<15	<15
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	343	428	<15	82	121	<15	54
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	343***	455***	<15	82***	121***	<15	54***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

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Exceedance Identification:
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Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 12: Analytical Results - Petroleum Hydrocarbson (PHCs) in Sediment
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	Background Range[c]		Units	Zone 2 (Background)						
						Location 1				Location 2		
Sample ID						BFR_L1_SED47	BFR_L1_SED48	BFR_L1_SED49	BFR_L1_SED50	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4
Date Collected			Minimum	Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-21
Benzene		1.2	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		1.4	<0.050	<0.050	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	<15	<15	<15	<15	<15	<15	<15
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	<15	<15	<15	76	<15	<15	39
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	<15	<15	<15	76***	<15	<15	39***
	Diesel/No. 2 Fuel Oil**	25			mg/kg							
	Lube oil/No. 6 Oil***	43			mg/kg							
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						No Resemblance.	No Resemblance.	No Resemblance.	Lube range, Unidentified Compounds.	No Resemblance.	No Resemblance.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

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(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Orange Shaded = exceedance is within or below background range
Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO}[a] (background concentration)
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Location		Atlantic RBCA EQS_{Eco} [a]	Background Range [c]		Units	Location 2					
Sample ID						BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	
						BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED_DUP1
Date Collected			Minimum	Maximum		2021-11-21	2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22
Benzene		1.2	<0.025	<0.025	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene		1.4	<0.050	<0.050	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene		1.2	<0.025	<0.025	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes		1.3	<0.050	<0.050	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)		NGA	<2.5	<2.5	mg/kg	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons		NGA	<10	76	mg/kg	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons		NGA	<10	220	mg/kg	19	37	20	<15	<15	<15
>C21-<C32 Hydrocarbons		NGA	<15	2700	mg/kg	333	620	320	<15	266	321
Modified TPH	Gasoline*	15	<15	2900**	mg/kg	352***	657***	340***	<15	266***	321***
	Diesel/No. 2 Fuel Oil**	25			mg/kg						
	Lube oil/No. 6 Oil***	43			mg/kg						
Reached Baseline at C32						Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance						Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

Notes:
NA = Not Applicable
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Sediment - Freshwater Sediment

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(c) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Orange Shaded = exceedance is within or below background range

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA EQS_{ECO} [a] (background concentration)

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO} [a] (None reported)

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							**Location 1**				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_SED1**	**BFR_SED2**	**BFR_SED3**	**BFR_SED4**	
							BFR_SED1	**BFR_SED2**	**BFR_SED3**	**BFR_SED4**	**BFR_SED_DUP1**
Date Collected				**Minimum**	**Maximum**		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	0.038	<0.0050	<0.0050
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	0.038	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.080	<0.19	<0.0050	<0.0050
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	0.042	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	0.077	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	1.0	1.2	0.7	<0.0050	0.081
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	0.05	<0.0050	<0.0050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							**Location 1**				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_SED5**		**BFR_SED6**	**BFR_SED7**	**BFR_SED8**
							BFR_SED5	**BFR_SED_DUP2**	**BFR_SED6**	**BFR_SED7**	**BFR_SED8**
Date Collected				**Minimum**	**Maximum**		2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	0.18	<0.0050	<0.0050
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	0.18	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.0080	<0.0050	<0.15	<0.80	<0.0050
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	**0.12**	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	**0.15**	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	0.13	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.028	0.028	1.8	2.0	<0.0050
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	**0.11**	<0.0050	<0.0050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							**Location 1**				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_SED9**	**BFR_SED10**	**BFR_SED11**	**BFR_SED12**	**BFR_SED13**
							BFR_SED9	**BFR_SED10**	**BFR_SED11**	**BFR_SED12**	**BFR_SED13**
Date Collected				**Minimum**	**Maximum**		2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-02
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	0.082	0.053
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	0.082	0.053
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.030	<0.0050	<0.040	<0.0050	<0.19
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	**0.059**
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	0.063	0.094
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.58	<0.0050	0.041	<0.0050	<0.16
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	**0.061**

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1			Zone 2 (Background)	
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_SED14**	**BFR_SED15**	**BFR_SED16**	**BFR_SED17**	**BFR_SED18**
							BFR_SED14	**BFR_SED15**	**BFR_SED16**	**BFR_SED17**	**BFR_SED18**
Date Collected				**Minimum**	**Maximum**		2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.050	<1.2	<0.0050	<0.0050	<0.0050
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.35	1.3	0.17	<0.0050	0.022
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
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Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 2	Zone 3 (Background)			
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23
							BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23
Date Collected				**Minimum**	**Maximum**		2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.040	<0.0050	<0.0050	<0.050	<0.0050
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.084	<0.0050	<0.0050	0.17	0.11
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 2 (Background)		Zone 1		
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_SED24**	**BFR_SED25**	**BFR_L1_SED26**	**BFR_L1_SED27**	**BFR_L1_SED28**
							BFR_SED24	BFR_SED25	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28
Date Collected				**Minimum**	**Maximum**		2020-12-04	2020-12-04	2021-11-21	2021-11-21	2021-11-21
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.0050	<0.0050	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.0050	<0.0050	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	<0.010	<0.010	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.020	<0.88	0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	<0.0050	<0.0050	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.0050	<0.0050	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.0050	<0.0050	0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.0050	<0.0050	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.0050	1.4	<0.05	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.0050	<0.0050	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.0050	<0.0050	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED28**	**BFR_L1_SED29**	**BFR_L1_SED29**	**BFR_L1_SED30**	**BFR_L1_SED31**
							BFR_L1_SED_DUP1	**BFR_L1_SED29**	**BFR_L1_SED_DUP2**	**BFR_L1_SED30**	**BFR_L1_SED31**
Date Collected				**Minimum**	**Maximum**		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	0.005	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	0.08	<0.01	0.07	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	0.1	0.1	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	0.1	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.09	<0.05	0.83	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	**0.08**	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
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Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							**Location 1**				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED32**	**BFR_L1_SED33**	**BFR_L1_SED34**	**BFR_L1_SED35**	**BFR_L1_SED36**
							BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36
Date Collected				**Minimum**	**Maximum**		2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	0.02	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
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Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED39**	**BFR_L1_SED40**	**BFR_L1_SED41**	**BFR_L1_SED42**	**BFR_L1_SED44**
							BFR_L1_SED39	BFR_L1_SED40	BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44
Date Collected				**Minimum**	**Maximum**		2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-20
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
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Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1		Zone 2 (Background)		
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED45**	**BFR_L1_SED46**	**BFR_L1_SED47**	**BFR_L1_SED48**	**BFR_L1_SED49**
							BFR_L1_SED45	BFR_L1_SED46	BFR_L1_SED47	BFR_L1_SED48	BFR_L1_SED49
Date Collected				**Minimum**	**Maximum**		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	<0.05	<0.05	0.2	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
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Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 2	Zone 1			
Location							Location 1				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED50**	**BFR_L1_SED51**		**BFR_L1_SED52**	**BFR_L1_SED53**
							BFR_L1_SED50	BFR_L1_SED51	BFR_SED_DUP2	BFR_L1_SED52	BFR_L1_SED53
Date Collected				**Minimum**	**Maximum**		2021-11-20	2022-09-09	2022-09-09	2022-09-09	2022-09-09
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.02	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	0.05	0.06	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	0.16	2.06	2.3	3.66	4.52
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
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(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

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Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				
Location							**Location 1**				
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED54**	**BFR_L1_SED55**	**BFR_L1_SED56**	**BFR_L1_SED57**	**BFR_L1_SED58**
							BFR_L1_SED54	**BFR_L1_SED55**	**BFR_L1_SED56**	**BFR_L1_SED57**	**BFR_L1_SED58**
Date Collected				**Minimum**	**Maximum**		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	2.66	2.38	2.76	2.88	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
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Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Zone 1				Reference
Location							Location 1				Reference
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	BFR_L1_SED59		BFR_L1_SED60	BFR_L1_SED61	BFR_L1_SED62
							BFR_L1_SED59	BFR_SED_DUP1	BFR_L1_SED60	BFR_L1_SED61	BFR_L1_SED62
Date Collected				**Minimum**	**Maximum**		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-11
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	0.6	2.24	2.87	1.98
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
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Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

							Reference Locations				
Location							**Reference Locations**			**Location 2**	
Sample ID	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**Background Range[d]**		**Units**	**BFR_L1_SED63**		**BFR_L1_SED64**	**BFR_L2_SED1**	**BFR_L2_SED2**
							BFR_L1_SED63	**BFR_SED_DUP3**	**BFR_L1_SED64**	**BFR_L2_SED1**	**BFR_L2_SED2**
Date Collected				**Minimum**	**Maximum**		2022-09-11	2022-09-11	2022-09-11	2021-11-22	2021-11-21
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.02	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	<0.05	0.61	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 13: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	Background Range[d]		Units	Location 2					Location 2	
Sample ID							BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	
							BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED_DUP1
Date Collected				Minimum	Maximum		2021-11-21	2021-11-21	2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22
1-Methylnaphthalene	0.201	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	<0.00671	<0.00671	mg/kg	<0.00671	<0.00671	**0.016**	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	<0.004	<0.004	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	<0.010	<0.010	mg/kg	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	<0.0050	<0.0050	mg/kg	-	-	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	<0.006	<0.006	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	<0.01	<0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	1.98	<0.05	mg/kg	<0.05	0.6	8.35	6.44	<0.05	0.11	0.09
Phenanthrene	0.544	0.0419	0.515	<0.03	<0.03	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	<0.05	<0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background

Exceedance Identification:
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance of CCME ISQGs
Italicised and shaded = Exceedance of CCME PELs

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1						
								Location 1						
								BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4		BFR_SED5	
Sample ID								BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED_DUP1	BFR_SED5	BFR_SED_DUP2
Date Collected					Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	7300	8000	11000	5800	6000	2100	2400
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	<2.0	2.2	<2.0	2.5	2.2	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	34	33	29	23	24	9.7	11
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.42	0.52	0.60	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	10	9.3	5.4	4.8	4.4	3.1	2.9
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	1.5	1.7	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	8.4	9.6	9.1	19	16	<2.0	2.2
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	7500	8800	1900	2100	1800	6000	6400
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	35	35	34	***770***	***250***	17	21
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	5.0	4.1	<2.0	<2.0	<2.0	3.0	2.9
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	74	130	15	11	9.1	71	76
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.15	**0.18**	**0.26**	**0.25**	**0.23**	<0.10	<0.10
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	7.0	6.5	4.5	7.0	6.7	<2.0	2.1
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	9.3	7.9	2.0	2.6	2.0	4.9	6.3
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	1.9	2.7	5.6	4.5	4.4	<0.50	<0.50
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	9.5	11	22	12	12	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	1.3	1.2	1.0	3.2	3.1	<1.0	1.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	1.9	2.4	1.3	0.74	0.76	0.36	0.65
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	28	32	8.4	17	16	13	15
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	45	37	13	19	18	8.4	10

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1						
								Location 1						
Sample ID								BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12
								BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12
Date Collected					Minimum	Maximum		2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	14000	7700	17000	7800	2500	9400	7400
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	5.3	<2.0	<2.0	<2.0	<2.0	<2.0	3.1
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	50	15	170	5.4	8.3	61	19
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	**0.80**	<0.30	<0.30	<0.30	<0.30	<0.30	0.47
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	12	3.9	**45**	6.0	3.3	13	5.5
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	1.1	<1.0	9.9	<1.0	2.5	5.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	15	7.5	12	2.5	<2.0	<2.0	10
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	3800	1400	25000	320	8600	12000	3800
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	***140***	18	17	5.3	5.6	8.9	***100***
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	4.2	<2.0	20	<2.0	4.7	16	<2.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	52	22	290	2.0	160	260	7.8
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	**0.32**	0.13	<0.10	<0.10	<0.10	<0.10	**0.24**
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	9.9	3.3	19	<2.0	2.4	8.7	5.2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	8.2	2.7	60	<2.0	7.4	40	<2.0
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	4.9	2.1	<0.50	1.9	<0.50	<0.50	5.3
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	17	9.7	<5.0	<5.0	<5.0	<5.0	8.4
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	0.11	<0.10	0.37	<0.10	<0.10	0.24	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	5.9	1.5	1.2	1.3	<1.0	1.8	3.4
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	1.8	3.4	1.6	1.2	0.66	1.2	1.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	36	12	95	18	22	44	22
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	42	8.1	45	<5.0	10	34	13

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

								Zone 1				Zone 2 (Background)		
Location	**Atlantic RBCA EQS[a]**	**CCME ISQGs[b]**	**CCME PELs[c]**	**NSE Tier 1[d]**	**Background Range[e]**		**Units**	**Location 1**						
Sample ID								**BFR_SED13**	**BFR_SED14**	**BFR_SED15**	**BFR_SED16**	**BFR_SED17**	**BFR_SED18**	**BFR_SED19**
Date Collected					**Minimum**	**Maximum**		BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19
								2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	4900	7500	6700	4900	4600	14000	11000
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	2.1	<2.0	2.2	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	24	33	22	27	16	210	58
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.44	<0.30	0.37	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	4.5	8.4	6.2	4.3	4.7	**88**	13
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1.0	2.5	1.2	<1.0	2.6	6.8	3.2
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	8.7	2.3	5.4	10	<2.0	2.6	3.3
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	2400	7800	8400	2000	9900	13000	16000
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	**63**	6.5	4.8	**79**	7.2	8.6	15
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<2.0	8.2	<2.0	<2.0	8.5	7.8	7.7
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	10	170	100	18	120	180	170
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	**0.23**	<0.10	<0.10	0.16	<0.10	<0.10	<0.10
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	4.6	4.4	2.6	7.8	4.8	36	6.9
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	<2.0	19	2.8	2.9	17	25	14
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	5.1	0.52	1.6	3.0	<0.50	<0.50	0.99
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	27	<5.0	14	11	<5.0	8.9	6.4
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.13	<0.10	<0.10	0.11	0.17	0.11
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	1.7	1.1	<1.0	1.9	<1.0	1.3	1.1
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.78	0.55	1.3	0.69	0.23	0.25	1.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	10	28	24	16	19	50	48
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	19	20	11	13	15	21	26

Notes:
NGA = No Guideline Available
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< = concentration is below Reportable Detection Limit (RDL)
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(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 3 (Background)				Zone 2 (Background)		Zone 1
								Location 1						
Sample ID								BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25	BFR_SED26
								BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25	BFR_L1_SED26
Date Collected					Minimum	Maximum		2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-21
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	1100	8100	11000	6200	7000	7800	5990
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	6.6	38	32	40	74	15	15
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<50	<50	<50	<50	<50	<50	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	<0.30	0.45	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	<2.0	12	10	6.2	9.9	<2.0	8.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1.0	3.9	1.2	1.8	4.0	<1.0	2.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	<2.0	<2.0	4.7	3.6	<2.0	4.8	9.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	1200	15000	3400	6800	12000	460	29100
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	2.6	12	9.6	25	15	2.8	23.9
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<2.0	7.5	3.7	3.6	8.5	<2.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	42	240	57	95	200	3.0	62
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.10	<0.10	0.13	0.12	<0.10	0.12	0.11
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	<2.0	5.5	3.5	4.7	7.3	2.6	4.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	2.1	20	6.7	7.9	22	<2.0	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<0.50	<0.50	2.9	1.2	<0.50	2.1	3.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	<5.0	12	14	<5.0	10	8.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.16	<0.10	<0.10	0.16	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	<1.0	2.1	<1.0	1.4	2.1	<1.0	3.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.25	1.7	1.4	0.84	0.86	1.4	1.1
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	4.3	54	16	23	42	5.0	33
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	<5.0	25	9.1	18	24	5.3	32

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(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

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Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1						
								Location 1						
								BFR_SED27	BFR_SED28		BFR_SED29		BFR_SED30	BFR_SED31
Sample ID								BFR_L1_SED27	BFR_L1_SED28	BFR_L1_SED_DUP1	BFR_L1_SED29	BFR_L1_SED_DUP2	BFR_L1_SED30	BFR_L1_SED31
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	7310	2760	2570	7260	4090	16800	20100
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1.0	3.0	2.0	2.0	1.0	1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	4.0	3.0	3.0	**6.0**	5.0	***18***	5.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	19	25	22	17	13	7.0	19
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2.0	5.0	3.0	2.0	<2.0	3.0	2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.40	0.60	<0.30	0.60	0.50	<0.30	0.60
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	12	<2.0	3.0	7.0	5.0	15	18
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	2.0	<1.0	<1.0	<1.0	<1.0	2.0	3.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	14	21	12	10	7.0	13	11
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	8420	5950	5630	7180	4690	73600	17200
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	27.2	***126***	***114***	**62.5**	**68.6**	**64.3**	26.6
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	7.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	154	60	51	28	21	56	129
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.11	0.17	0.11	0.17	0.12	**0.21**	0.08
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	5.0	4.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	6.0	<2.0	<2.0	4.0	3.0	8.0	11
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	3.0	2.0	<1.0	6.0	3.0	7.0	6.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	11	28	21	17	12	<5.0	8.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	3.0	4.0	4.0	6.0	5.0	6.0	4.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	1.5	0.60	0.50	1.2	0.90	1.0	1.7
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	39	7.0	6.0	32	23	57	60
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	38	28	23	34	24	29	48

Notes:
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< = concentration is below Reportable Detection Limit (RDL)
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(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

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Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1						
								Location 1						
Sample ID								BFR_SED32	BFR_SED33	BFR_SED34	BFR_SED35	BFR_SED36	BFR_SED39	BFR_SED40
								BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36	BFR_L1_SED39	BFR_L1_SED40
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	6250	10300	6390	1760	7910	5910	9150
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	2.0	**6.0**	3.0	2.0	2.0	3.0	4.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	5.0	11	11	<5.0	17	25	25
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	0.40	<0.30	<0.30	0.50	0.50
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	5.0	9.0	5.0	8.0	12	3.0	11
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1.0	1.0	<1.0	<1.0	3.0	<1.0	2.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	<2.0	7.0	5.0	<2.0	2.0	4.0	6.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	2410	23400	1750	2120	5550	4540	11100
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	5.6	**63.2**	4.7	34.0	15.3	18.7	28.9
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5.0	<5.0	<5.0	<5.0	5.0	<5.0	6.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	46	46	6.0	50	117	12	88
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	0.15	0.11	<0.03	<0.03	0.06	0.16
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	<2.0	5.0	3.0	<2.0	4.0	2.0	5.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	1.0	5.0	7.0	<1.0	<1.0	2.0	3.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	<5.0	11	<5.0	<5.0	19	8.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	4.0	5.0	5.0	4.0	5.0	4.0	5.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.40	1.5	0.70	0.70	0.60	0.60	1.1
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	21	41	13	10	30	8.0	36
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	8.0	24	10	7.0	22	15	45

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Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1					Zone 2 (Background)	
								Location 1						
Sample ID								BFR_SED41	BFR_SED42	BFR_SED44	BFR_SED45	BFR_SED46	BFR_SED47	BFR_SED48
								BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44	BFR_L1_SED45	BFR_L1_SED46	BFR_L1_SED47	BFR_L1_SED48
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	4770	4610	2840	11100	4050	2300	6530
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	2.0	**6.0**	4.0	3.0	2.0	2.0	2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	9.0	20	14	29	8.0	<5.0	31
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	6.0	4.0	3.0	19	7.0	4.0	10
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	2.0	<1.0	<1.0	9.0	<1.0	<1.0	4.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	<2.0	5.0	3.0	7.0	<2.0	<2.0	<2.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	5810	20100	9950	33900	3190	2200	10200
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	7.8	**38.7**	31.5	6.5	19.9	9.0	4.3
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	6.0	<5.0	<5.0	18	<5.0	<5.0	11
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	84	46	30	402	50	55	199
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	**0.20**	0.12	<0.03	0.04	<0.03	<0.03
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	3.0	<2.0	<2.0	11	<2.0	2.0	5.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<1.0	1.0	2.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	20	17	<5.0	<5.0	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	3.0	5.0	5.0	5.0	4.0	3.0	4.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.60	0.70	0.40	0.50	0.40	0.50	0.70
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	19	16	9.0	82	16	9.0	30
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	14	23	16.0	50	7.0	7.0	25

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 2 (Background)	Zone 1				
								Location 1					
Sample ID								BFR_SED49	BFR_SED50	BFR-SED-51		BFR-SED-52	BFR-SED-53	BFR-SED-54
								BFR_L1_SED49	BFR_L1_SED50	BFR_L1_SED51	BFR_SED_DUP2	BFR_L1_SED52	BFR_L1_SED53	BFR_L1_SED54
Date Collected					Minimum	Maximum		2021-11-20	2021-11-20	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	2920	9100	5990	9210	6710	9830	3800
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1.0	<1.0	<1	1	<1	<1	<1
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	2.0	2.0	4	4	3	5	4
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	11	75	11	16	14	14	15
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2.0	<2.0	<2	2	<2	<2	<2
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	0.4	0.6	<0.3	0.3	<0.3
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	3.0	**54**	5	8	7	7	4
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	1.0	6.0	1	2	2	1	<1
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	<2.0	6.0	6	7	4	8	5
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	3720	11600	4050	6280	6160	5450	1520
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	4.0	8.5	19.0	22.5	8.8	30.8	22.5
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5.0	12	<5	<5	8	<5	<5
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	96	166	70	111	122	74	32
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	0.03	0.05	0.08	<0.03	0.08	0.07
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	<2.0	18	4	6	4	5	3
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<1.0	<1.0	2	3	<1	2	1
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	7.0	12	15	7	12	10
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	5.0	4.0	3	4	2	3	4
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.50	1.6	0.8	0.9	2.6	1.3	0.8
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	13	44	18	24	25	32	16
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	15	29	31	49	24	24	12

Notes:
NGA = No Guideline Available
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(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

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Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1							Zone 1
								Location 1							Location 1
Sample ID								BFR-SED-55	BFR-SED-56	BFR-SED-57	BFR-SED-58	BFR-SED-59		BFR-SED-60	BFR-SED-61
								BFR_L1_SED55	BFR_L1_SED56	BFR_L1_SED57	BFR_L1_SED58	BFR_L1_SED59	BFR_SED_DUP1	BFR_L1_SED60	BFR_L1_SED61
Date Collected					Minimum	Maximum		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	4790	8360	7840	8630	9160	14600	12700	18900
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1	<1	<1	1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	4	4	4	5	5	5	2	**6**
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	22	28	19	21	13	18	27	13
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2	<2	<2	2	<2	< 2	<2	<2
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.3	0.5	<0.3	0.5	<0.3	<0.3	0.4	<0.3
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	8	10	11	9	8	5	11	15
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1	2	3	2	<1	5	3	12
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	5	8	5	9	9	10	7	12
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	3560	5220	8320	3600	9630	5820	9660	41900
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	8.0	20.1	12.6	**43.1**	**37.6**	9.5	15.6	18.6
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5	5	9	<5	<5	<5	<5	5
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	47	74	154	43	40	80	166	583
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.04	0.07	0.04	0.16	0.09	**0.18**	0.03	0.04
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2	<2	<2	<2	<2	5	<2	2
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	3	5	5	6	6	10	6	5
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	2	2	1	4	3	1	2	<1
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	10	11	12	8	<5	21	11	<5
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	3	4	3	4	4	5	<2	3
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.9	1.5	2.0	1.0	0.9	2.1	3.5	3.5
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	25	30	36	26	29	5	46	68
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	17	28	27	13	13	45	47	31

Notes:
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(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

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Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

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Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Reference Locations				Zone 1			
								Reference Locations				Location 1			
								BFR-SED-62	BFR-SED-63		BFR-SED-64	BFR-SED-65-SA1	BFR-SED-65-SA2	BFR-SED-66-SA1	BFR-SED-66-SA2
Sample ID								BFR_L1_SED62	BFR_L1_SED63	BFR_SED_DUP3	BFR_L1_SED64	BFR-SED-65-SA1	BFR-SED-65-SA2	BFR-SED-66-SA1	BFR-SED-66-SA2
Date Collected					Minimum	Maximum		2022-09-11	2022-09-11	2022-09-11	2022-09-11	2022-09-06	2022-09-06	2022-09-06	2022-09-06
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	21400	6030	7480	11800	6670	3690	8930	11700
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	**6**	4	4	**7**	3	3	4	**7**
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	31	13	16	21	30	28	23	27
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2	<2	<2	<2	<2	<2	3	<2
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	**99**	20	24	**42**	3	2	3	4
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	17	4	5	8	<1	<1	<1	<1
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	8	4	4	7	5	2	3	3
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	41800	13600	17500	38200	1250	1350	1160	1320
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	17.0	13.7	15.7	31.0	6.0	1.2	3.2	4.3
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	26	8	10	13	<5	<5	<5	<5
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	434	180	221	302	9	10	6	7
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	<0.03	0.04	0.06	0.06	0.04	0.12	**0.20**
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	6	<2	2	5	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	42	9	10	17	3	<2	<2	2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<1	<1	<1	<1	2	<1	1	1
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	7	<5	<5	7	23	24	14	15
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	4	3	4	5	4	4	4	9
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	2.9	1.3	1.4	3.2	0.6	0.3	0.4	1.1
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	93	30	33	62	10	8	14	19
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	80	23	26	40	8	<5	5	5

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1							
								Location 1							
Sample ID								BFR-SED-66-SA3	BFR-SED-67-SA1	BFR-SED-67-SA2	BFR-SED-68-SA1	BFR-SED-68-SA2	BFR-SED-68-SA3	BFR-SED-69-SA1	BFR-SED-69-SA2
								BFR-SED-66-SA3	BFR-SED-67-SA1	BFR-SED-67-SA2	BFR-SED-68-SA1	BFR-SED-68-SA2	BFR-SED-68-SA3	BFR-SED-69-SA1	BFR-SED-69-SA2
Date Collected					Minimum	Maximum		2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	3440	7510	3700	6660	6720	4460	9770	6290
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1	<1	<1	2	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	4	4	4	3	3	3	3	4
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	6	33	53	22	33	23	16	31
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2	3	6	4	2	<2	2	3
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.3	0.4	0.3	0.4	<0.3	<0.3	**0.9**	<0.3
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	2	3	3	9	3	3	3	2
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1	<1	1	<1	<1	<1	<1	<1
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	<2	5	3	12	3	3	6	3
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	328	1390	3010	2850	1630	1690	924	1850
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	6.1	5.0	1.6	***134***	4.2	2.9	17.5	4.0
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5	<5	<5	<5	<5	<5	<5	<5
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	12	9	18	20	6	7	6	12
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.12	0.11	0.08	0.06	0.04	<0.03	0.04	<0.03
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	<2	3	<2	6	<2	<2	<2	<2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	1	2	2	2	2	1	2	1
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5	26	58	18	31	31	17	35
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	5	5	11	3	3	4	3	4
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.4	0.5	0.2	0.6	0.4	0.5	0.6	0.5
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	13	11	10	11	7	8	10	9
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	<5	8	<5	13	<5	<5	5	<5

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
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(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1							
								Location 1							
Sample ID								BFR-SED-70-SA1	BFR-SED-70-SA2	BFR-SED-70-SA3	BFR-SED-71-SA1	BFR-SED-71-SA2	BFR-SED-72-SA1	BFR-SED-72-SA2	BFR-SED-72-SA3
								BFR-SED-70-SA1	BFR-SED-70-SA2	BFR-SED-70-SA3	BFR-SED-71-SA1	BFR-SED-71-SA2	BFR-SED-72-SA1	BFR-SED-72-SA2	BFR-SED-72-SA3
Date Collected					Minimum	Maximum		2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	6880	5660	4440	9460	5570	5570	4980	7040
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	4	4	2	3	**7**	3	3	3
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	29	40	29	25	32	33	26	17
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2	<2	<2	2	<2	3	<2	<2
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.3	<0.3	<0.3	0.6	<0.3	0.3	<0.3	<0.3
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	3	2	2	2	4	4	3	3
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	6	4	3	5	3	5	3	3
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	1030	1090	1320	1040	1790	2230	1570	2340
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	16.5	4.4	1.3	8.2	3.4	6.8	1.8	2.8
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5	<5	<5	<5	<5	<5	<5	<5
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	6	8	9	9	16	12	7	10
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.04	<0.03	<0.03	0.05	<0.03	0.03	<0.03	0.04
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	3	<2	<2	<2	2	3	<2	<2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	3	1	1	2	2	2	1	2
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	20	30	27	22	31	26	23	29
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	3	6	3	3	10	4	4	4
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.6	0.5	0.4	0.4	0.4	0.4	0.8	1.1
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	12	12	7	8	11	6	6	9
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	10	6	<5	7	7	8	5	11

Notes:
NGA = No Guideline Available
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< = concentration is below Reportable Detection Limit (RDL)
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(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Zone 1		Location 2					
								Location 1							
Sample ID								BFR-SED-72-SA4	BFR-SED-72-DUP1	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7
								BFR-SED-72-SA4	BFR-SED-72-DUP1	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7
Date Collected					Minimum	Maximum		2022-09-06	2022-09-06	2021-11-22	2021-11-21	2021-11-21	2021-11-21	2021-11-22	2021-11-22
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	9400	4550	4330	7400	10300	6760	6970	3460
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	**6.0**	3	3.0	2.0	5.0	4.0	3.0	2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	15	22	13	43	24	15	38	20
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.6	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	8	3	11	**60**	28	13	5.0	3.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	2	<1	2.0	4.0	6.0	2.0	<1.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	7	3	<2.0	3.0	11	4.0	6.0	4.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	5840	1670	8570	9190	19500	8020	2410	4720
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	24.0	2.0	9.9	12.4	**45.4**	8.1	8.7	2.1
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	<5	<5	6.0	<5.0	10	7.0	<5.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	100	8	112	86	350	127	22	102
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.05	<0.03	<0.03	0.14	0.04	0.07	0.05	<0.03
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	6	<2	4.0	11	11	6.0	2.0	2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	3	<1	<1.0	<1.0	<1.0	2.0	2.0	3.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	15	24	<5.0	<5.0	9.0	10	29	16
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	4	3	4.0	5.0	5.0	4.0	5.0	4.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	1.0	0.6	0.50	0.10	2.4	1.5	1.0	0.50
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	25	7	24	45	56	31	10	6.0
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	45	<5	15	14	45	26	9.0	<5.0

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
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(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Table 14: Analytical Results - Metals in Sediment
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME ISQGs[b]	CCME PELs[c]	NSE Tier 1[d]	Background Range[e]		Units	Location 2		
Sample ID								BFR_L2_SED8	BFR_L2_SED9	
								BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED_DUP1
Date Collected					Minimum	Maximum		2021-11-21	2021-11-22	2021-11-22
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	21400	mg/kg	6020	8280	4770
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	<1.0	<2.0	mg/kg	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	7	mg/kg	**7.0**	2.0	2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	14	22	8.0
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	<2.0	<2.0	mg/kg	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	<2.0	<50	mg/kg	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	99	mg/kg	7.0	12	7.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	17	mg/kg	4.0	2.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	8	mg/kg	8.0	3.0	3.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	1200	41800	mg/kg	14400	5380	1300
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	31.0	mg/kg	5.1	4.4	3.7
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	26	mg/kg	13	6.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	18	434	mg/kg	282	112	31
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	0.08	<0.03
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	<2.0	6	mg/kg	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	42	mg/kg	7.0	4.0	3.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<1.0	1.0	2.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	<0.50	<0.50	mg/kg	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5	mg/kg	4.0	4.0	3.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	3.2	mg/kg	0.50	0.40	0.40
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	93	mg/kg	21	34	17
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	80	mg/kg	39	15	6.0

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of CCME ISQGs

Italicised and shaded = Exceedance of CCME PELs

Double underline and shaded = Exceedance of NSE Tier 1

Yellow Shaded = exceedance is within or below background range

Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Zone 1				
								Location 1				
								BFR_SW4		BFR_SW5		BFR_SW7
Sample ID								BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW7
Date Collected					Minimum	Maximum		2020-12-04	2020-12-01	2020-12-02	2020-12-02	2020-12-02
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	12	11	10	10	13
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	79[N,H]	91[N,H]	110[N,H]	110[N,H]	79[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	-	-	-	-	-
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	0.011	0.012	0.011	0.012	0.013
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	5.30	5.46	6.20	5.94	5.84
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	1.0	1.1	1.7	1.7	2.6
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	2.0	2.6	2.8	2.2	<2.0
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	0.57	0.61	4.3	3.7	0.26
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	-	-	-	-	-
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	-	-	-	-	-
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	-	-	-	-	-
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	47	45	40	39	50

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 15: Analytical Results - Inorganics in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Zone 1			
								Location 1			
Sample ID								BFR_SW8	BFR_SW10	BFR_SW13	BFR_SW16
Date Collected					Minimum	Maximum		2020-12-02	2020-12-04	2020-12-04	2020-12-04
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	9.3	12	12	11
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	85[N,H]	91[N,H]	100[N,H]	75[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	-	-	-	-
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	0.054	0.052	0.14	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	0.011	0.012	0.013	0.011
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	<0.050	<0.050	<0.050	<0.050
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	6.11	6.05	5.30	5.19
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	1.1	1.9	0.70	1.1
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	2.1	<2.0	<2.0	<2.0
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	0.57	1.3	2.7	1.1
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	8.5	-	-	9.0
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	-	-	-	-
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	-	-	-	-
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	37	45	49	48

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 15: Analytical Results - Inorganics in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Zone 2 (Background)		Zone 3 (Background)		Zone 2 (Background)
								Location 1				
Sample ID								BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
								BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
Date Collected					Minimum	Maximum		2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-04
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	14	14	14	12	12
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	87[N,H]	85[N,H]	92[N,H]	110[N,H]	80[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	-	-	-	-	-
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	0.012	0.011	0.012	0.013	0.011
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	0.070	<0.050	<0.050	<0.050	<0.050
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	5.23	5.08	5.34	5.27	5.48
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	2.9	2.1	2.1	1.8	1.5
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	4.6	3.1	3.1	3.4	3.4
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	0.55	0.64	0.44	1.0	0.68
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	-	-	-	-	-
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	-	-	-	-	-
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	-	-	-	-	-
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	63	61	53	50	45

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 15: Analytical Results - Inorganics in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Zone 1				
								Location 1			Location 2	
Sample ID								BFR_L1_SW29		BFR_L1_SW38	BFR_L2_SW4	BFR_L2_SW10
								BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW38	BFR_L2_SW4	BFR_L2_SW10
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-20	2021-11-21	2021-11-27
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	7.0	7.0	6.0	5.0	8.0
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	78.8[N,H]	136[N,H]	89.3[N,H]	21.8[N,H]	46.8[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	-	-	-	-	-
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	0.040	0.090	<0.030	<0.030	<0.050
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	6.46	5.40	5.39	5.36	4.85
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	10.6	1.5	1.1	16.1	1.4
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	<2.0	<2.0	<2.0	<2.0	6.0
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	1.0	0.90	1.8	1.40	1.4
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	10	10	11	12	7
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	-	-	-	-	-
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	-	-	-	-	-
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	41	44	42	32	80

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 15: Analytical Results - Inorganics in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Zone 1				
								Location 1				
Sample ID								BFR_L1_SW58	BFR_L1_SW59		BFR_L1_SW60	BFR_L1_SW61
								BFR_L1_SW58	BFR_L1_SW59	BFR_SW_DUP3	BFR_L1_SW60	BFR_L1_SW61
Date Collected					Minimum	Maximum		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	5.0	6.0	5.0	4.0	4.0
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	48.1[N,H]	51[N,H]	64.7[N,H]	148[N,H]	160[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	1.7	2.1	2.1	3.4	3.4
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	<0.03	0.41	<0.03	2.17	<0.03
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	5.1	4.40	5.3	5.1	5.2
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	<0.5	<0.5	<0.5	0.7	0.7
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	1.0	1.10	1.20	1.6	2.40
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	9.1	8.9	8.8	14.8	16
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	26.2	19.8	3.20	18.1	3.41
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	0.3	0.20	0.03	0.181	0.03
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	31	44	31	29	29

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 15: Analytical Results - Inorganics in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I EQS_{Eco}[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[i]		Units	Reference Locations			
								BFR_L1_SW62	BFR_L1_SW63		BFR_L1_SW64
Sample ID								BFR_L1_SW62	BFR_L1_SW63	BFR_SW_DUP1	BFR_L1_SW64
Date Collected					Minimum	Maximum		2022-09-11	2022-09-11	2022-09-11	2022-09-11
Total Alkalinity (Total as CaCO3)	NGA	NGA	NGA	NGA	<5.0	<5.0	mg/L	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl-)	120	120	250[g]	250[g]	3	14	mg/L	3.0	3.0	3.0	3.0
Colour	NGA	NGA	15[g]	15[g]	80	144	TCU	136[N,H]	138[N,H]	134[N,H]	144[N,H]
Hardness	NGA	NGA	NGA	NGA	4.1	4.4	mg/L	4.4	4.1	4.1	4.1
Nitrate + Nitrite (N)	NGA	NGA	10	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	NGA	3	<0.050	0.013	mg/L	<0.050	<0.050	<0.050	<0.050
Nitrogen (Ammonia Nitrogen)	153[e]	153[e]	NGA	NGA	<0.050	0.07	mg/L	<0.03	<0.03	<0.03	0.07
Orthophosphate (P)	NGA	NGA	NGA	NGA	<0.010	<0.010	mg/L	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	6.5 - 8.5	7.0 - 10.5	5.08	5.6	pH	5.6	5.6	5.60	5.6
Reactive Silica (SiO2)	NGA	NGA	NGA	NGA	0.5	2.9	mg/L	0.7	0.6	<0.5	0.5
Dissolved Sulphate (SO4)	128	NGA	500[g]	500[g]	<2.0	3.1	mg/L	<2.0	<2.0	<2.0	<2.0
Turbidity	NGA	<2 NTU above background levels	<1[f]	NGA	0.44	1.40	NTU	0.80	1.30	0.80	1.40
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	14	15	mg/L	14	15	13.9	14.6
Total Organic Carbon (C)	NGA	NGA	NGA	NGA	3.59	5.7	%	5.70	3.59	20.3	4.46
Fraction Organic Carbon in Soil	NGA	NGA	NGA	NGA	0.04	0.06	-	0.06	0.04	0.20	0.0446
Conductivity	NGA	NGA	NGA	NGA	26	63	uS/cm	26	26	26	26

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQSEco) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC
(e) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table
(f) To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less
(g) aesthetic objective, exceedances not related to a human health concern
(h) background location
(i) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Orange Shaded = Naturally occurring low levels of pH
Yellow Shaded = exceedance is within or below background range
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) = Exceedance of Health Canada Drinking Water Standards

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1						
									Location 1						
Sample ID									BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5	
									BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP 1	BFR_SW5	BFR_SW_DUP 2
Date Collected						Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L							
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L							
Reached Baseline at C32									NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance									NA	NA	NA	NA	NA	NA	NA

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1						
									Location 1						
Sample ID									BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12
Date Collected						Minimum	Maximum		2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L							
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L							
Reached Baseline at C32									NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance									NA	NA	NA	NA	NA	NA	NA

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1				Zone 2 (Background)		
									Location 1						
Sample ID									BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19
									BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19
Date Collected						Minimum	Maximum		2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L							
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L							
Reached Baseline at C32									NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance									NA	NA	NA	NA	NA	NA	NA

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 3 (Background)				Zone 2 (Background)		Zone 1
									Location 1						
Sample ID									BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_SW26
									BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26
Date Collected						Minimum	Maximum		2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-21
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L							
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L							
Reached Baseline at C32									NA	NA	NA	NA	NA	NA	Yes
Hydrocarbon Resemblance									NA	NA	NA	NA	NA	NA	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1					
									Location 1					
Sample ID									BFR_SW27	BFR_SW28		BFR_SW29		BFR_SW30
									BFR_L1_SW27	BFR_L1_SW28	BFR_L1_DUP1	BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW30
Date Collected						Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L						
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L						
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1					
									Location 1					
Sample ID									BFR_SW31	BFR_SW32	BFR_SW33	BFR_SW34	BFR_SW35	BFR_SW36
									BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36
Date Collected						Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L						
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L						
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1					
									Location 1					
Sample ID									BFR_SW37	BFR_SW38	BFR_SW39	BFR_SW40	BFR_SW41	BFR_SW42
									BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42
Date Collected						Minimum	Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L						
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L						
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 1				Zone 2 (Background)	
									Location 1					
Sample ID									BFR_SW43	BFR_SW44	BFR_SW45	BFR_SW46	BFR_SW47	BFR_SW48
									BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48
Date Collected						Minimum	Maximum		2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L						
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L						
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)
Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Zone 2 (Background)					
									Location 1		Location 2			
Sample ID									BFR_SW49	BFR_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4
									BFR_L1_SW49	BFR_L1_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4
Date Collected						Minimum	Maximum		2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-22	2021-11-21
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L						
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L						
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 16: Analytical Results - Petroleum Hydrocarbons (PHCs) in surface Water
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco}[a]	CCME WQG_{Eco}[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada Drinking Water Standards[d]	Background Range[f]		Units	Location 2						Location 2
Sample ID									BFR_L2_SW5	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
									BFR_L2_SW5	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_DUP1	BFR_L2_SW10
Date Collected						Minimum	Maximum		2021-11-21	2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22	2021-11-27
Benzene		2.1	0.37	NGA	0.005	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	0.002	NGA	0.024[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	0.09	NGA	0.0016[e]	<0.0010	<0.0010	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	NGA	NGA	0.02[e]	<0.0020	<0.0020	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	NGA	NGA	<0.050	<0.050	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	NGA	NGA	NGA	<0.090	<0.090	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	NGA	NGA			mg/L							
	Lube oil/No. 6 Oil	0.10***	NGA	NGA	NGA			mg/L							
Reached Baseline at C32									Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance									No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

Notes:
NA = not applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS_{Eco}) for Surface Water - Fresh Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.
(e) aesthetic objective, exceedances not related to a human health concern, there is a maximum allowable concentration with health basis for this parameter
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS_{ECO}[a] (None reported)

Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 1							
								Location 1							
Sample ID								BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6
								BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6
Date Collected					Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 1								
								Location 1								
Sample ID								BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15
								BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15
Date Collected					Minimum	Maximum		2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

								Zone 1	Zone 2 (Background)			Zone 3 (Background)			
Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Location 1							
Sample ID								BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23
								BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23
Date Collected					Minimum	Maximum		2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

								Zone 2 (Background)		Zone 1				
Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Location 1						
Sample ID								BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28		BFR_L1_SW29
								BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	BFR_L1_DUP1	BFR_L1_SW29
Date Collected					Minimum	Maximum		2020-12-04	2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.01	0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	<0.020	<0.020	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.20	<0.20	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 1						
								Location 1						
Sample ID								BFR_L1_SW29	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35
								BFR_L1_DUP2	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 1						
								Location 1						
Sample ID								BFR_L1_SW36	BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42
Date Collected					Minimum	Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

								Zone 1				Zone 2 (Background)		
Location	**Atlantic RBCA Ecological Tier I (EQS)[a]**	**CCME WQGs[b]**	**Guidelines for DW Quality in Newfoundland & Labrador[c]**	**Health Canada GCDWQ[d]**	**Background Range[e]**		**Units**	**Location 1**						
Sample ID								BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49
								BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49
Date Collected					**Minimum**	**Maximum**		2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 2	Zone 1					
								Location 1						
Sample ID								BFR_L1_SW50	BFR_L1_SW51		BFR_L1_SW52	BFR_L1_SW53	BFR_L1_SW54	BFR_L1_SW55
								BFR_L1_SW50	BFR_L1_SW51	BFR_L1_DUP2	BFR_L1_SW52	BFR_L1_SW53	BFR_L1_SW54	BFR_L1_SW55
Date Collected					Minimum	Maximum		2021-11-20	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
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(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Zone 1						
								Location 1						
Sample ID								BFR_L1_SW56	BFR_L1_SW57	BFR_L1_SW58	BFR_L1_SW59		BFR_L1_SW60	BFR_L1_SW61
								BFR_L1_SW56	BFR_L1_SW57	BFR_L1_SW58	BFR_L1_SW59	BFR_L1_DUP3	BFR_L1_SW60	BFR_L1_SW61
Date Collected					Minimum	Maximum		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Reference	Reference Location					
								Reference	Reference Locations			Location 2		
Sample ID								BFR_L1_SW62	BFR_L1_SW63		BFR_L1_SW64	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3
								BFR_L1_SW62	BFR_L1_SW63	BFR_L1_DUP1	BFR_L1_SW64	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3
Date Collected					Minimum	Maximum		2022-09-11	2022-09-11	2022-09-11	2022-09-09	2021-11-22	2021-11-21	2021-11-22
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Location 2			
Sample ID								BFR_L2_SW4	BFR_L2_SW5	BFR_L2_SW6	BFR_L2_SW7
Date Collected					Minimum	Maximum		2021-11-21	2021-11-21	2021-11-22	2021-11-22
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
"-" = no data available
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

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Yellow Shaded = exceedance is within or below background range

Table 17: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA Ecological Tier I (EQS)[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	Background Range[e]		Units	Location 2			
								BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
Sample ID								BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_DUP1	BFR_L2_SW10
Date Collected					Minimum	Maximum		2021-11-21	2021-11-22	2021-11-22	2021-11-27
1-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	NGA	NGA	<0.010	<0.010	ug/L	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	NGA	NGA	<0.010	<0.010	ug/L	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	NGA	0.04	<0.010	<0.010	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	NGA	NGA	<0.020	<0.020	ug/L	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	-	-	-	-
Chrysene	0.1	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	NGA	NGA	<0.20	<0.20	ug/L	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	NGA	NGA	<0.010	<0.010	ug/L	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	NGA	NGA	<0.050	<0.050	ug/L	<0.01	<0.01	<0.01	<0.01

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Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)
Bold and shaded = Exceedance of CCME WQGs (None reported)
Yellow Shaded = exceedance is within or below background range

Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1										
									Location 1										
Sample ID									BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
									BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
Date Collected						Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**250**[N,H]	**270**[N,H]	**300**[N,H]	**160**[N,H]	**170**[N,H]	**270**[N,H]	**250**[N,H]	**260**[N,H]	**180**[N,H]	**200**[N,H]	**100**
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	3.7	4.0	3.0	2.4	2.2	2.3	2.3	1.9	2.7	2.2	1.4
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	0.020	0.017	0.017	0.014	0.015	0.013	0.020	0.016	0.018	0.018	0.015
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	1400	1700	550	510	430	800	820	310	1100	740	400
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	0.57	0.56	<0.50	**2.2**	1.9	1.5	1.3	<0.50	<0.50	<0.50	<0.50
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	**310**[N,H]	**370**[N,H]	270	140	140	**330**[N,H]	300	110	200	160	83
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.61	0.52	0.80	**8.6**[N,H]	**8.3**[N,H]	**2.7**	**2.6**	0.60	<0.50	0.61	0.61
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	850	820	780	720	690	640	610	520	800	570	760
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	14	14	5.9	2.9	3.0	18	18	4.4	11	8.4	<2.0
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	400	420	180	120	110	220	230	150	190	240	150
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	7900	8500	5500	5200	4700	4900	4900	4000	5600	4700	5700
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	7.9	7.6	6.4	5.7	4.9	4.9	5.5	4.4	6.8	4.7	5.5
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	4.4	5.5	4.0	2.6	<2.0	5.0	5.2	2.6	2.4	3.5	<2.0
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	6.4	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
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(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
(k) Operation guidance and/or aesthetic objective not related to human health
(l) Operation guidance and/or aesthetic objective not related to human health, there is a maximum allowable concentration with health basis for this parameter
(m) Water chemistry parameters outside of valid range for CCME equation; therefore, the default WQG was applied

Exceedance Identification:
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Bold and shaded = Exceedance CCME WQS
Italicised and shaded =Exceedance of NSE Tier 1
(N) shaded = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) shaded = Exceedance of Health Canada Drinking Water Standards
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador - aesthetic objective only
(H) = Exceedance of Health Canada Drinking Water Standards - aesthetic objective only
Yellow Shaded = exceedance is within or below background range
Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1							Zone 2 (Background)		
									Location 1									
Sample ID									BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19
Date Collected						Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**210[N,H]**	**230[N,H]**	**170[N,H]**	**120[N,H]**	**200[N,H]**	**130[N,H]**	**170[N,H]**	**210[N,H]**	**390[N,H]**	**180[N,H]**
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	2.3	2.4	1.9	1.9	1.6	2.8	2.1	3.6	5.4	4.2
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	0.017	0.017	0.020	0.017	0.014	0.018	0.013	0.015	0.020	0.017
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	780	710	480	450	600	650	470	1000	950	680
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.99	1.6	<0.50	0.54	<0.50
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	260	260	150	140	110	210	140	230	**370[N,H]**	200
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.69	0.64	0.61	0.77	<0.50	<0.50	**3.4**	<0.50	0.70	0.57
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	720	710	760	760	570	630	770	880	870	910
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	10	9.2	3.6	2.3	5.0	7.3	2.8	18	11	5.1
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	180	230	170	150	190	210	110	190	320	150
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	5100	5400	5500	5500	4900	4800	5400	6200	6100	6000
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	6.1	6.0	5.6	5.9	4.8	5.3	5.7	7.8	7.3	6.9
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	2.5	3.7	2.1	3.1	2.5	<2.0	2.6	3.1	9.0	3.1
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	5.2	<5.0	<5.0	<5.0	6.9	<5.0	<5.0	6.1

Notes:
NGA = No Guideline Available
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< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
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(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
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Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 3 (Background)				Zone 2 (Background)		Zone 1			
									Location 1									
Sample ID									BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	
									BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	BFR_L1_DUP1
Date Collected						Minimum	Maximum		2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**210**[N,H]	**230**[N,H]	**110**[N,H]	**240**[N,H]	**190**[N,H]	**190**[N,H]	**335**[N,H]	**377**[N,H]	**262**[N,H]	**268**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	4.4	4.2	2.4	4.5	3.1	2.6	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<5.0	<5.0	<5.0	<5.0
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	0.021	0.020	0.019	0.025	0.018	0.018	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	890	940	370	810	780	480	-	-	-	-
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	1.0	1.0
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	200	220	73	240	170	140	**348**[N,H]	**437**[N,H]	**303**[N,H]	294
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.59	<0.50	<0.50	0.65	<0.50	0.57	0.80	0.70	**2.8**	**3.0**
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	860	940	750	830	760	700	-	-	-	-
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	10	11	<2.0	11	7.2	2.7	10	17	13	14
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	12	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	<100	<100	<100	<100	<100	<100	-	-	-	-
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	230	230	<100	290	220	160	-	-	-	-
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	5700	6200	5300	5300	5300	5300	-	-	-	-
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	7.1	7.5	5.4	6.7	6.2	5.8	5.0	6.0	<5.0	<5.0
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	4.2	4.0	<2.0	4.9	3.0	2.6	6.0	8.0	3.0	4.0
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
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(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
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(l) Operation guidance and/or aesthetic objective not related to human health, there is a maximum allowable concentration with health basis for this parameter
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Exceedance Identification:
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Italicised and shaded =Exceedance of NSE Tier 1
(N) shaded = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
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(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador - aesthetic objective only
(H) = Exceedance of Health Canada Drinking Water Standards - aesthetic objective only
Yellow Shaded = exceedance is within or below background range
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Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1								
									Location 1								
Sample ID									BFR_L1_SW29		BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36
									BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36
Date Collected						Minimum	Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**174**[N,H]	**175**[N,H]	**253**[N,H]	**245**[N,H]	**214**[N,H]	**232**[N,H]	**169**[N,H]	**231**[N,H]	**310**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	500	500	-	-	-	-	-	-	-
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	249	247	151	201	181	225	206	172	**348**[N,H]
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	**1.4**	**1.4**	0.60	0.60	0.70	0.60	0.60	0.70	0.70
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	600	600	-	-	-	-	-	-	-
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	4.0	4.0	6.0	6.0	4.0	7.0	<2.0	2.0	11
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	8.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	20	<20	-	-	-	-	-	-	-
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	200	200	-	-	-	-	-	-	-
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	4400	4500	-	-	-	-	-	-	-
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	2.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0	12
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:
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Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1								
									Location 1								
Sample ID									BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45
									BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45
Date Collected						Minimum	Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**235**[N,H]	**269**[N,H]	**280**[N,H]	**189**[N,H]	**337**[N,H]	**249**[N,H]	**188**[N,H]	**234**[N,H]	**268**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	-	300	-	-	-	-	-	-	-
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	**325**[N,H]	194	190	235	290	**316**[N,H]	**325**[N,H]	**342**[N,H]	294
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.60	0.70	0.70	<0.50	0.70	0.60	0.50	<0.50	**3.0**
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	-	400	-	-	-	-	-	-	-
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	12	3.0	3.0	3.0	8.0	7.0	7.0	6.0	14
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	-	20	-	-	-	-	-	-	-
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	-	200	-	-	-	-	-	-	-
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	-	4100	-	-	-	-	-	-	-
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	3.0	3.0	3.0	<2.0	5.0	4.0	3.0	3.0	4.0
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

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Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1	Zone 2				Zone 1			
									Location 1								
Sample ID									BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49	BFR_L1_SW50	BFR_L1_SW51		BFR_L1_SW52	BFR_L1_SW53
									BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49	BFR_L1_SW50	BFR_L1_SW51	BFR_L1_SW_DUP2	BFR_L1_SW52	BFR_L1_SW53
Date Collected						Minimum	Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**162**[N,H]	**366**[N,H]	**378**[N,H]	**436**[N,H]	**183**[N,H]	**490**[N,H]	**491**[N,H]	**321**[N,H]	**322**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5	<5	<5
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	6	6	5	5
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	-	-	-	-	-	-	2000	-	-
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	<1	<1
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	<1	<1
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	1	<1
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	177	**342**[N,H]	**369**[N,H]	**361**[N,H]	156	**1200**[N,H]	**704**[N,H]	**546**[N,H]	**635**[N,H]
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.70	0.90	0.90	0.80	0.60	**2.4**	**2.4**	**3.2**	1
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	-	-	-	-	-	-	600	-	-
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	2.0	6.0	7.0	8.0	4.0	30[N,H]	31[N,H]	24[N,H]	3
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	**0.037**	<0.026	**0.029**	**0.027**
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	-	-	-	-	-	-	0.03	-	-
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	-	-	-	-	-	-	200	-	-
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	<1	<1
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1	<0.1	<0.1
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	-	-	-	-	-	-	4300	-	-
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	<5.0	<5.0	5.0	5.0	<5.0	6	7	<5	<5
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	2.0	7.0	7.0	8.0	3.0	8	8	5	5
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2	<0.2	<0.2
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2	<2	<2
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5	<5	<5

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
(k) Operation guidance and/or aesthetic objective not related to human health
(l) Operation guidance and/or aesthetic objective not related to human health, there is a maximum allowable concentration with health basis for this parameter
(m) Water chemistry parameters outside of valid range for CCME equation; therefore, the default WQG was applied

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance CCME WQS
Italicised and shaded =Exceedance of NSE Tier 1
(N) shaded = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) shaded = Exceedance of Health Canada Drinking Water Standards
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador - aesthetic objective only
(H) = Exceedance of Health Canada Drinking Water Standards - aesthetic objective only
Yellow Shaded = exceedance is within or below background range
Orange shaded = exceedance above maximum background range but naturally occurring

Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Zone 1								
									Location 1								
Sample ID									BFR_L1_SW54	BFR_L1_SW55	BFR_L1_SW56	BFR_L1_SW57	BFR_L1_SW58	BFR_L1_SW59		BFR_L1_SW60	BFR_L1_SW61
									BFR_L1_SW54	BFR_L1_SW55	BFR_L1_SW56	BFR_L1_SW57	BFR_L1_SW58	BFR_L1_SW59	BFR_L1_SW_DUP3	BFR_L1_SW60	BFR_L1_SW61
Date Collected						Minimum	Maximum		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**520**[N,H]	**412**[N,H]	**461**[N,H]	**446**[N,H]	**229**[N,H]	**232**[N,H]	**245**[N,H]	**320**[N,H]	**313**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	7	6	6	6	<5	<5	<5	5	5
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	-	-	-	-	200	200	200	700	700
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1	<1	<1	<1	<1	<1	<1	2	2
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	**840**[N,H]	**603**[N,H]	**836**[N,H]	**903**[N,H]	131	132	131	**604**[N,H]	**623**[N,H]
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	**1.5**	**1.3**	1	1	<0.5	<0.5	<0.5	**4.1**	**4.1**
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	-	-	-	-	400	400	400	400	400
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	7	9	9	22[N,H]	4	4	4	34[N,H]	34[N,H]
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	**0.052**	**0.042**	**0.044**	**0.042**	**0.036**	<0.026	**0.043**	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	25	<2	<2	<2	<2	<2	<2	<2	<2
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	-	-	-	-	100	100	200	200	200
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	-	-	-	-	3600	3800	3900	3800	3700
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	5	5	<5	<5	5	<5	<5	<5	<5
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	9	6	7	7	<2	<2	<2	4	4
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5

Notes:
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(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
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Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Reference Locations				Location 2				
									Reference Locations								
Sample ID									BFR_L1_SW62	BFR_L1_SW63		BFR_L1_SW64	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4	BFR_L2_SW5
									BFR_L1_SW62	BFR_L1_SW63	BFR_L1_SW_DUP1	BFR_L1_SW64	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4	BFR_L2_SW5
Date Collected						Minimum	Maximum		2022-09-11	2022-09-11	2022-09-11	2022-09-11	2021-11-22	2021-11-21	2021-11-22	2021-11-21	2021-11-21
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**291[N,H]**	**283[N,H]**	**281[N,H]**	**291[N,H]**	**435[N,H]**	**295[N,H]**	**401[N,H]**	**355[N,H]**	**284[N,H]**
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5	<5	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	5	<5	<5	5	44	<5.0	46	25	6.0
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	1100	1000	1000	1000	-	-	-	2200	-
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1	<1	1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	**476[N,H]**	**376[N,H]**	**364[N,H]**	**403[N,H]**	**560[N,H]**	**562[N,H]**	227	**315[N,H]**	296
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	0.6	0.7	0.9	0.7	0.80	0.60	0.70	0.80	0.60
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	400	400	400	400	-	-	-	500	-
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	8	5	5	7	12	11	3.0	7.0	6.0
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	**0.027**	0.026	**0.031**	**0.031**	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	0.02	0.02	0.02	0.02	-	-	-	30	-
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	200	200	200	200	-	-	-	300	-
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	3400	3200	3300	3400	-	-	-	3900	-
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	<5	<5	<5	<5	8.0	<5.0	8.0	7.0	5.0
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	4	4	4	4	8.0	6.0	6.0	6.0	5.0
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	0.3	0.3	0.3	0.3	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	<5	<5	<5	<5	32	<5.0	39	16	<5.0

Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
(k) Operation guidance and/or aesthetic objective not related to human health
(l) Operation guidance and/or aesthetic objective not related to human health, there is a maximum allowable concentration with health basis for this parameter
(m) Water chemistry parameters outside of valid range for CCME equation; therefore, the default WQG was applied

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance CCME WQS
Italicised and shaded =Exceedance of NSE Tier 1
(N) shaded = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) shaded = Exceedance of Health Canada Drinking Water Standards
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador - aesthetic objective only
(H) = Exceedance of Health Canada Drinking Water Standards - aesthetic objective only
Yellow Shaded = exceedance is within or below background range
Orange shaded = exceedance above maximum background range but naturally occurring

Table 18: Analytical Results - Metals in Surface Water
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS[a]	CCME WQGs[b]	Guidelines for DW Quality in Newfoundland & Labrador[c]	Health Canada GCDWQ[d]	NSE Tier 1[e]	Background Range[f]		Units	Location 2					
									BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
Sample ID									BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_DUP 1	BFR_L2_SW10
Date Collected						Minimum	Maximum		2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22	2021-11-27
Total Aluminum (Al)	5	5[g]	2900	2900	NR	110	436	ug/L	**631**[N,H]	**264**[N,H]	**286**[N,H]	**631**[N,H]	**636**[N,H]	**210**[N,H]
Total Antimony (Sb)	9	NGA	6	6	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	10	10	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	2000	2000	NR	2.1	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NGA	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	5000	5000	NR	<5.0	<50	ug/L	80	37	<5.0	140	147	7.0
Total Cadmium (Cd)	0.09	0.04[h]	7	7	NR	0.013	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	NGA	NGA	200	1200	ug/L	-	-	-	-	-	1200
Total Chromium (Cr)	8.9	NGA	50	50	NR	<1	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NGA	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2[h]	2000	2000	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	2.0
Total Iron (Fe)	300	300	300[k]	300[k]	NR	73	562	ug/L	226	192	**302**[N,H]	128	139	**353**[N,H]
Total Lead (Pb)	1	1[h]	5	5	NR	<0.50	0.90	ug/L	**1.5**	0.60	0.60	0.80	0.80	<0.50
Total Magnesium (Mg)	NGA	NGA	NGA	NGA	NGA	400	940	ug/L	-	-	-	-	-	600
Total Manganese (Mn)	430	190[g,h]	120	120	NR	<2.0	18	ug/L	4.0	4.0	7.0	3.0	3.0	8.0
Total Mercury (Hg)	0.026	0.026	1	1	NR	<0.013	0.031	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25[h]	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20[i]	NGA	NGA	NGA	<0.02	<100	ug/L	-	-	-	-	-	<20
Total Potassium (K)	NGA	NGA	NGA	NGA	NGA	150	400	ug/L	-	-	-	-	-	400
Total Selenium (Se)	1	1	50	50	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	200,000[k]	200,000[k]	NGA	3200	6200	ug/L	-	-	-	-	-	5000
Total Strontium (Sr)	21,000	NGA	7000	7000	NR	<5	8.0	ug/L	11	7.0	<5.0	16	16	<5.0
Total Thallium (Tl)	0.8	0.8	NGA	NGA	NR	<0.1	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	NGA	NGA	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	NGA	NGA	<2.0	9.0	ug/L	11	5.0	4.0	11	12	3.0
Total Uranium (U)	15	15	20	20	NR	<0.10	0.3	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NGA	NGA	NR	<2	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	7[m]	5000[k]	5000[k]	NR	<5.0	32	ug/L	64	28	<5.0	119	115	<5.0

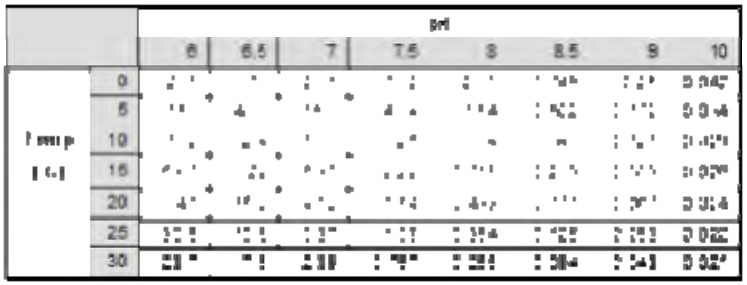
Notes:
NGA = No Guideline Available
NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
(c) Guidelines for Drinking Water Quality in Newfoundland & Labrador
(d) Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) (2022). Where available the maximum acceptable concentration (MAC) was used
(e) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.
(f) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.
(g) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table
(h) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL
(i) Value for mesotrophic freshwater used
(j) Water chemistry parameters outside of valid range for CCME equation
(k) Operation guidance and/or aesthetic objective not related to human health
(l) Operation guidance and/or aesthetic objective not related to human health, there is a maximum allowable concentration with health basis for this parameter
(m) Water chemistry parameters outside of valid range for CCME equation; therefore, the default WQG was applied

Exceedance Identification:
Underline and shaded = Exceedance of RBCA Ecological Tier 1
Bold and shaded = Exceedance CCME WQS
Italicised and shaded =Exceedance of NSE Tier 1
(N) shaded = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador
(H) shaded = Exceedance of Health Canada Drinking Water Standards
(N) = Exceedance of Guidelines for Drinking Water Quality in Newfoundland & Labrador - aesthetic objective only
(H) = Exceedance of Health Canada Drinking Water Standards - aesthetic objective only
Yellow Shaded = exceedance is within or below background range
Orange shaded = exceedance above maximum background range but naturally occurring

Table 19: Analytical Results - Inorganics in Groundwater
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	FIGQGs [b]	Units	Location 1				
				BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
Sample ID				BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
Date Collected				2021-12-19	2021-12-19	2021-12-19	2021-12-19	2022-09-12
Total Alkalinity (Total as CaCO3)	NGA	NGA	mg/L	<1.0	<1.0	<1.0	<1.0	<5.0
Dissolved Chloride (Cl-)	120	100	mg/L	8.2	8.9	9.5	6.8	5
Colour	NGA	NGA	TCU	<5.0	<5.0	23	<5.0	69.2
Nitrate + Nitrite (N)	NGA	NGA	mg/L	0.42	0.47	<0.050	0.33	<0.050
Nitrite (N)	0.06	0.06	mg/L	0.012	<0.010	<0.010	<0.010	<0.050
Nitrogen (Ammonia Nitrogen)	Table [c]	Table [c]	mg/L	<0.050	0.081	0.064	0.072	<0.030
Total Organic Carbon (C)	NGA	NGA	mg/L	5.8	5.2	5.1	1.4	821
Orthophosphate (P)	NGA	NGA	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5-9	6.5-9	pH	6.94	7.09	**6.31**	6.50	**5.50**
Reactive Silica (SiO2)	NGA	NGA	mg/L	7.2	7.7	6.5	7.0	6.3
Dissolved Sulphate (SO4)	128	100	mg/L	2.7	2.6	<2.0	2.6	<2.0
Turbidity	NGA	NGA	NTU	3.0	5.1	4.10	6.3	61.6
Conductivity	NGA	NGA	uS/cm	83.0	84.0	58.0	65.0	43.0

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021)
(b) Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines Generic Guidelines (FIGQGSs) for Agricultural Land Use (Lowest Guideline Coarse)
(c) Ammonia guideline is pH and temperature dependant: See Lookup Table



Exceedance Identification:
Underlined and shaded = Exceedance of FIGQGs (Naturally occurring)
Bolded and shaded = Exceedance of Atlantic RBCA EQS_{Eco} [a] (Naturally occurring)

Created by: PAC
Checked by: ADB

Table 20: Analytical Results - Petroleum Hydrocarbons (PHCs) in Groundwater
Burgeo Firing Range, NL

Location		Atlantic RBCA EQS_{Eco} [a]	FCSAP FIGQGs [b]	Units	Location 1				
					BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
Sample ID					BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
Date Collected					2021-12-19	2021-12-19	2021-12-19	2021-12-19	2022-09-12
Benzene		2.1	0.088	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Toluene		0.77	0.083	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Ethylbenzene		0.32	3.2	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Total Xylenes		0.33	3.9	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
C6 - C10 (less BTEX)		NGA	0.81	mg/L	<0.090	<0.090	<0.090	<0.090	<0.01
>C10-C16 Hydrocarbons		NGA	1.3	mg/L	<0.050	<0.050	<0.050	<0.050	<0.05
>C16-C21 Hydrocarbons		NGA	NGA	mg/L	0.067	<0.050	<0.050	<0.050	<0.05
>C21-<C32 Hydrocarbons		NGA	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.1
Modified TPH	Gasoline	1.5*	NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	NGA	mg/L					
	Lube oil/No. 6 Oil	0.10***	NGA	mg/L					
Reached Baseline at C32					NA	NA	NA	NA	NA
Hydrocarbon Resemblance					NA	NA	NA	NA	NA

Notes:
NA = Not Applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021)
(b) Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines Generic Guidelines (FIGQGSs) for Agricultural Land Use (Lowest Guideline Coarse)
*Guideline for gas range **Guideline for fuel range ***Guideline for lube range

Exceedance Identification:
Underline and shaded = Exceedance of Atlantic RBCA ESL (N
Bold and shaded = Exceedance of Atlantic RBCA Tier I RD

Table 21: Analytical Results - Polycyclic Aromatic Hydrocarbons
Burgeo Firing Range, NL

Location	Atlantic RBCA EQS_{Eco} [a]	Atlantic RBCA EQS_{HH} [b]	FIGQGs[c]	Units	Location 1			
					BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3
Sample ID					BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3
Date Collected					2021-12-19	2021-12-19	2021-12-19	2021-12-19
1-Methylnaphthalene	2	NGA	180	ug/L	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	2	NGA	180	ug/L	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	NGA	5.8	ug/L	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	360	46	ug/L	<0.010	<0.010	<0.010	<0.010
Acridine	NGA	NGA	0.05	ug/L	-	-	-	-
Anthracene	0.012	NGA	0.012	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	NGA	0.018	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	NGA	0.01	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	NGA	NGA	0.48	ug/L	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	NGA	0.17	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	NGA	0.48	ug/L	<0.010	<0.010	<0.010	<0.010
Chrysene	0.1	NGA	0.1	ug/L	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	0.26	ug/L	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	NGA	0.04	ug/L	<0.010	<0.010	<0.010	<0.010
Fluorene	3	NGA	3	ug/L	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	NGA	0.21	ug/L	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	7000	1.1	ug/L	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	NGA	0.4	ug/L	0.01	<0.010	<0.010	<0.010
Pyrene	0.025	NGA	0.025	ug/L	<0.010	<0.010	<0.010	<0.010
Quinoline	NGA	NGA	3.4	ug/L	-	-	-	-

Notes:
NGA = No Guideline Available
< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Tier 1 Environmental Quality Standards (EQS) for Groundwater, Agricultural Land-Use, Non-Potable Groundwater Condition

(c) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 1: agricultural land-use, Coarse grained soil

Exceedance Identification:

Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)
Italicised and shaded = Exceedance of FIGQGs (None reported)

Table 22: Analytical Results - Metals in Groundwater
Burgeo Firing Range, NL

Sample ID	Atlantic RBCA EQS[a]	FIGQGs[b]	Units	BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
				BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW4
Date Collected				2021-12-19	2021-12-19	2021-12-19	2021-12-19	2022-09-12
pH	6.5-9	6.5-9	pH	6.94	7.09	6.31	6.50	**5.50**
Total Aluminum (Al)	5	100[1]	ug/L	23	17	**200**	**140**	**348**
Total Antimony (Sb)	9	2000	ug/L	<1.0	<1.0	<1.0	<1.0	<2
Total Arsenic (As)	5	5	ug/L	<1.0	<1.0	<1.0	<1.0	<2
Total Barium (Ba)	1000	2900	ug/L	5.3	4.4	8.7	13.0	6
Total Beryllium (Be)	0.15	5.3	ug/L	<0.10	<0.10	<0.10	<0.10	<2
Total Bismuth (Bi)	NGA	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2
Total Boron (B)	1500	500	ug/L	<50	<50	<50	<50	<5
Total Cadmium (Cd)	0.09	0.09	ug/L	0.030	0.031	**0.790**	**0.100**	<0.09
Total Calcium (Ca)	NGA	NGA	ug/L	6300	6400	3000	3500	500
Total Chromium (Cr)	8.9	8.9	ug/L	<1.0	<1.0	<1.0	<1.0	2
Total Cobalt (Co)	1	50	ug/L	<0.40	<0.40	9.9	0.55	<1
Total Copper (Cu)	2	2	ug/L	2.0	1.0	**2.9**	1.3	**32**
Total Iron (Fe)	300	300	ug/L	73	<50	**650**	79	**881**
Total Lead (Pb)	1	1	ug/L	<0.50	<0.50	<0.50	<0.50	**2.7**
Total Magnesium (Mg)	NGA	NGA	ug/L	1200	1200	910	1500	100
Total Manganese (Mn)	430	200	ug/L	24	21	**420**	120	11
Total Mercury (Hg)	0.026	0.026	ug/L	<0.013 [2]	<0.013 [2]	<0.013 [2]	<0.013 [2]	<0.026
Total Molybdenum (Mo)	73	73	ug/L	5.2	<2.0	<2.0	<2.0	<2
Total Nickel (Ni)	25	NGA	ug/L	4.0	4.0	9.5	<2.0	3
Total Phosphorus (P)	NGA	NGA	ug/L	<100	<100	<100	<100	0.02
Total Potassium (K)	NGA	NGA	ug/L	1500	1500	1200	3400	<100
Total Selenium (Se)	1	1	ug/L	<0.50	<0.50	<0.50	<0.50	<1
Total Silver (Ag)	0.25	0.25	ug/L	<0.10	<0.10	<0.10	<0.10	0.2
Total Sodium (Na)	NGA	NGA	ug/L	7800	7200	5600	5600	500
Total Strontium (Sr)	21000	NGA	ug/L	22	22	16	18	<5
Total Thallium (Tl)	0.8	0.8	ug/L	<0.10	<0.10	<0.10	<0.10	<0.1
Total Tin (Sn)	NGA	NGA	ug/L	<2.0	<2.0	<2.0	<2.0	<2
Total Titanium (Ti)	NGA	100	ug/L	<2.0	<2.0	<2.0	4.8	9
Total Uranium (U)	15	10	ug/L	0.96	0.98	1.7	<0.10	<0.2
Total Vanadium (V)	120	100	ug/L	<2.0	<2.0	<2.0	<2.0	<2
Total Zinc (Zn)	7	10	ug/L	6.8	<5.0	**11**	5.1	9

Notes:

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021).

(b) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 1: Agricultural Land, Coarse grained soil. Where Tier 1 values were based on marine waters, the next lowest tier 2 guideline value was applied.

(1) Aluminum Guideline = 5 µg/L if pH < 6.5; = 100 µg/L if pH ≥ 6.5

(2) Mercury analyzed past recommended hold time.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of FIGQGs

Sample ID	Atlantic RBCA EQS[a]	FIGQGs[b]	Units	BFR_L1_GW4
				BFR_L1_GW4
Date Collected				2022-09-12
1,1,1,2-Tetrachloroethane	20	3.3	ug/L	<0.5
1,1,1-Trichloroethane	10	640	ug/L	<1
1,1,2,2-Tetrachloroethane	70	3.2	ug/L	<1
1,1,2-Trichloroethane	800	4.7	ug/L	<1
1,1-Dichloroethane	200	320	ug/L	<1
1,1-Dichloroethylene	400	NGA	ug/L	<0.6
1,2-Dibromoethane	NGA	NGA	ug/L	<0.5
1,2-Dichlorobenzene	0.7	0.7	ug/L	<0.7
1,2-Dichloroethane	100	5	ug/L	<2
1,2-Dichloropropane	0.7	16	ug/L	<0.7
1,3-Dichlorobenzene	150	42	ug/L	<1
1,4-Dichlorobenzene	26	26	ug/L	<1
2-Hexanone	NGA	NGA	ug/L	<10.0
Acetone	NGA	13,000	ug/L	<10
Benzene	2100	88	ug/L	<1
Bromodichloromethane	200	8500	ug/L	<1
Bromoform	60	380	ug/L	<1
Bromomethane	0.9	5.6	ug/L	<0.89
Carbon Tetrachloride	13.3	0.56	ug/L	<0.56
Chlorobenzene	1.3	1.3	ug/L	<1
Chloroethane	1100	NGA	ug/L	<5
Chloroform	1.8	1.8	ug/L	<1
Chloromethane	700	NGA	ug/L	<1
cis-1,2-Dichloroethylene	200	NGA	ug/L	<2
cis-1,3-Dichloropropene	NGA	NGA	ug/L	<0.5
Dibromochloromethane	40	100	ug/L	<1
Ethylbenzene	320	3200	ug/L	<2
m,p-Xylene	NGA	NGA	ug/L	<4
Methylene Chloride (Dichloromethane)	98.1	50	ug/L	<2
o-Xylene	NGA	NGA	ug/L	<1
Styrene	72	72	ug/L	<1
Tetrachloroethylene	1100	110	ug/L	<2
Toluene	770	83	ug/L	<2
trans-1,2-Dichloroethylene	200	NGA	ug/L	<2
trans-1,3-Dichloropropene	NGA	NGA	ug/L	<0.5
Trichloroethylene	21	20	ug/L	<1
Trichlorofluoromethane (FREON 11)	NGA	NGA	ug/L	<5
Vinyl Chloride	600	1.1	ug/L	<0.6

Notes:

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental

(b) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 1: agricultural land, Coarse grained soil.

(1) Aluminum Guideline = 5 µg/L if pH < 6.5; = 100 µg/L if pH ≥ 6.5

(2) Mercury analyzed past recommended hold time.

Exceedance Identification:

Underline and shaded = Exceedance of RBCA Ecological Tier 1

Bold and shaded = Exceedance of FIGQGs

Table 24: Analytical Results - Grain Size Analysis (Sieve Pipette)
Burgeo Firing Range, NL

Location	Units	Location 1							
Sample ID		BFR_SED_65	BFR_SED_66	BFR_SED_67	BFR_SED_68	BFR_SED_69	BFR_SED_70	BFR_SED_71	BFR_SED_72
Date Collected		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11
Particle Size Distribution (<12.5mm, -4 PHI)	%	100	100	100	100	100	100	100	100
Particle Size Distribution (<9.5mm, -3 PHI)	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Particle Size Distribution (<4.75mm, -2 PHI	%	100	100	100	100	100	100	100	100
Particle Size Distribution (<2mm, -1 PHI)	%	77.9	79.7	85.3	84.5	84.4	85	88.3	88.6
Particle Size Distribution (<1mm, 0 PHI)	%	75.7	73.4	80.2	76.5	80.3	80.8	81.2	79.3
Particle Size Distribution (<1/2mm, 1 PHI)	%	73.3	66.9	75	69.2	74.7	74.6	75.9	71.2
Particle Size Distribution (<1/4mm, 2 PHI)	%	70.4	61.1	68.4	63	69.2	69.4	68.6	64.6
Particle Size Distribution (<1/8mm, 3 PHI)	%	65.1	52.2	61.1	57.9	61	64.9	64.1	58.5
Particle Size Distribution (<1/16mm, 4 PHI)	%	64.5	48.7	56.5	55.8	59.5	61.2	63	53.6
Particle Size Distribution (<1/32mm, 5 PHI)	%	55	47.6	55.2	55.5	58.4	59.7	62.6	53.5
Particle Size Distribution (<1/64mm, 6 PHI)	%	54	42.5	54.9	55.3	54.9	58.5	62.4	52.3
Particle Size Distribution (<1/128mm, 7 PHI)	%	51.1	38.5	51.3	51.6	52.5	53.3	58.7	49
Particle Size Distribution (<1/256mm, 8 PHI)	%	49	36.2	48.7	48.9	50.5	55.9	57.6	46.7
Particle Size Distribution (<1/512mm, 9 PHI)	%	47	33.70	44.70	45.3	46.7	51.8	53.8	43.8
Particle Size Distribution (Gravel)	%	22.1	20.3	14.7	15.5	15.6	15	11.8	11.4
Particle Size Distribution (Sand)	%	13.5	31	28.7	29.2	24.9	23.8	25.8	35
Particle Size Distribution (Silt)	%	15.5	12.50	7.90	6.4	9.00	5.30	4.90	6.90
Particle Size Distribution (Clay)	%	49	36.2	48.7	48.9	50.5	55.9	57.6	46.7
Particles >75um	%	35.4	50.4	42.3	44.1	40.10	37.80	37.10	45.10
Classification	Coarse/Fine	FINE	COARSE	FINE	FINE	FINE	FINE	FINE	FINE

Table 25: Analytical Results - Metals in Surficial Soil TCLP Leachate
Burgeo Firing Range, NL

Location	R.R.O. 1990, REGULATION 347	Units	Location 1			
			BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2	BFR_SED_TCLP_SA1	BFR_SED_TCLP_SA2
Sample ID	GENERAL SCHEDULE 4 LEACHATE QUALITY CRITERIA (ug/L)		BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2	BFR_SED_TCLP_SA1	BFR_SED_TCLP_SA2
Sample Depth (mbgs)			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Sample Type			Composite	Composite	Composite	Composite
Date Collected			2022-09-08	2022-09-08	2022-09-06	2022-09-06
Aluminum Leachate	-	mg/L	3.52	3.09	-	-
Antimony Leachate	-	mg/L	2.14	0.78	-	-
Arsenic Leachate	2.5	mg/L	0.05	<0.02	<0.01	<0.01
Barium Leachate	100	mg/L	0.20	0.62	0.05	0.04
Beryllium Leachate	-	mg/L	<0.05	<0.05	-	-
Bismuth Leachate	500	mg/L	<0.02	<0.02	-	-
Boron Leachate	500	mg/L	<0.05	0.06	0.13	0.12
Cadmium Leachate	-	mg/L	<0.003	<0.003	<0.01	<0.01
Chromium Leachate	5	mg/L	<0.02	<0.02	<0.01	<0.01
Cobalt Leachate	-	mg/L	<0.01	<0.01	-	-
Copper Leachate	-	mg/L	1.20	6.68	-	-
Iron Leachate	-	mg/L	0.3	<0.2	-	-
Lead Leachate	5	mg/L	**283**	**57.7**	0.02	0.01
Lithium Leachate	-	mg/L	<0.02	<0.02	-	-
Mercury Leachate	-	ug/L	<0.5	<0.5	<0.01	<0.01
Manganese Leachate	-	mg/L	0.18	0.26	-	-
Molybdenum Leachate	-	mg/L	<0.02	<0.02	-	-
Nickel Leachate	-	mg/L	<0.02	<0.02	-	-
Selenium Leachate	-	mg/L	<0.02	<0.02	0.02	<0.010
Silver Leachate	1	mg/L	<0.005	<0.005	<0.010	<0.010
Strontium Leachate	5	mg/L	0.02	0.03	-	-
Thallium Leachate	-	mg/L	<0.001	<0.001	-	-
Tin Leachate	-	mg/L	<0.02	<0.02	-	-
Uranium Leachate	-	mg/L	0.002	0.002	<0.050	<0.050
Vanadium Leachate	10	mg/L	<0.02	<0.02	-	-
Zinc Leachate	-	mg/L	0.16	3.48	-	-

Notes:
NA = Not Applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
Exceedance Identification:
Bold and shaded = Leachate Quality Criteria

Table 26: Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surficial Soil Lechate
Burgeo Firing Range, NL

Location	R.R.O. 1990, REGULATION 347	Units	Location 1			
			BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2	BFR_SED_TCLP_SA1	BFR_SED_TCLP_SA2
Sample ID	GENERAL SCHEDULE 4 LEACHATE QUALITY CRITERIA (ug/L)		BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2	BFR_SED_TCLP_SA1	BFR_SED_TCLP_SA2
Sample Depth (mbgs)			0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Sample Type			Composite	Composite	Composite	Composite
Date Collected			2022-09-08	2022-09-08	2022-09-06	2022-09-06
1-Methylnaphthalene	-	ug/L	<0.08	<0.08	<0.08	<0.08
2-Methylnaphthalene	-	ug/L	0.03	<0.03	<0.03	<0.03
Acenaphthene	-	ug/L	0.03	0.03	<0.01	<0.01
Acenaphthylene	-	ug/L	<0.02	<0.02	<0.02	<0.02
Anthracene	-	ug/L	<0.03	<0.03	<0.03	<0.03
Acridine	-	ug/L	<0.10	<0.10	<0.10	<0.10
Benzo(e)pyrene	-	ug/L	<0.06	<0.06	<0.06	<0.06
Benzo(a)anthracene	-	ug/L	<0.06	<0.06	<0.06	<0.06
Benzo(a)pyrene	1	ug/L	<0.06	<0.06	<0.06	<0.06
Benzo(b)fluoranthene	-	ug/L	<0.05	0.07	<0.05	<0.05
Benzo(j+k)fluoranthene	-	µg/L	<0.05	0.14	<0.05	<0.05
Benzo(ghi)perylene	-	ug/L	<0.03	<0.03	<0.03	<0.03
Chrysene	-	ug/L	<0.04	<0.04	<0.04	<0.04
Dibenzo(a,h)anthracene	-	ug/L	<0.03	<0.03	<0.03	<0.03
Fluoranthene	-	ug/L	0.68	1.26	0.18	0.41
Fluorene	-	ug/L	0.06	0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	-	ug/L	<0.08	<0.08	<0.08	<0.08
Naphthalene	-	ug/L	<0.02	<0.02	<0.02	<0.02
Perylene	-	ug/L	<0.06	<0.06	<0.06	<0.06
Phenanthrene	-	ug/L	0.88	0.71	<0.04	0.52
Pyrene	-	ug/L	0.49	0.94	<0.03	<0.03
Naphthalene-d8	-	%	81	75	93	83
Terphenyl-d14	-	%	63	66	84	76
Pyrene-d10	-	%	80	79	120	110

Notes:
NA = Not Applicable
NGA = No Guideline Available
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)

Exceedance Identification:
Bold and shaded = Leachate Quality Criteria

Table 27: Analytical Results - Nitroaromatics, Nitroamines and Nitrate Esters in Soil
Burgeo Firing Range, NL

Location	SCMTSE (mg/kg)	BC (mg/kg)	Units	Location 1	
				BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2
Sample ID				BFR_SS_TCLP_SA1	BFR_SS_TCLP_SA2
Sample Depth (mbgs)				0 - 0.15	0 - 0.15
Sample Type				Composite	Composite
Date Collected				2022-09-08	2022-09-08
Octahydro1,3,5,7tetranitro1,3,5,7tetrazocine (HMX)	89	31000	mg/kg	<0.05	<0.05
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	7.7	160	mg/kg	<0.05	<0.05
1,3,5-Trinitrobenzene (1,3,5-TNB)	NGA	18000	mg/kg	<0.05	<0.05
1,3-Dinitrobenzene (1,3-DNB)	NGA	NGA	mg/kg	<0.05	<0.05
Nitrobenzene (NB)	NGA	100	mg/kg	<0.05	<0.05
3,5-Dinitroaniline	NGA	NGA	mg/kg	<0.05	<0.05
Nitroglycerin (NG)	54	1200	mg/kg	0.07	1.68
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NGA	6200	mg/kg	<0.05	<0.05
2,4,6-Trinitrotoluene (2,4,6-TNT)	9.6	570	mg/kg	<0.05	<0.05
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	NGA	120	mg/kg	<0.05	<0.05
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	NGA	120	mg/kg	<0.05	<0.05
2,4-Dinitrotoluene (2,4-DNT)	6.7	NGR	mg/kg	<0.05	<0.05
2,6-Dinitrotoluene (2,6-DNT)	10.6	NGR	mg/kg	<0.05	<0.05
2-Nitrotoluene (2-NT)	NGA	22	mg/kg	<0.05	<0.05
4-Nitrotoluene (4-NT)	NGA	1000	mg/kg	<0.05	<0.05
3-Nitrotoluene (3-NT)	NGA	300	mg/kg	<0.05	<0.05
Pentaerythritol tetranitrate (PETN)	NGA	NGA	mg/kg	<0.05	<0.05
3,4-Dinitrotoluene (3,4-DNT)	NGA	NGA	%	91	89

Notes:
NA = Not Applicable
NGA = No Guideline Available
NGR = No Guideline is Required as an applicable guideline is available from a more appropriate jurisdiction
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)

SCMTSE = Soils Concentrations for Ensuring Military Training Sustainability, National Research Council, for active Ranges and Training Areas, protective of ecological and human health, Updated 2011). These guidelines as shown for reference only.

BC = British Columbia Environmental Management Act, Contaminated Sites Regulation 375/96 (July 19, 2016) - Schedule 10 for a Commercial/Industrial Site. The B.C human health criteria are based on a 10-5 risk level for carcinogens and a hazard index of 0.2 for noncarcinogens.

Exceedance Identification:

Bold and shaded = Exceedance of BC
Underlined and shaded = Exceedance of SCMTSE

Table 28a: Relative Percent Differences (RPDs) - Petroleum Hydrocarbons (PHCs) in Soil
Burgeo Firing Range, NL

Sample ID	Units	BFR_SS1			BFR_SS7			BFR_L1_SS6			BFR_L1_SS13			BFR_L1_SS28			BFR_L2_SS10		
		BFR_SS1_SA1	BFR_SS_DUP1	RPD (%)	BFR_SS7_SA1 (revised)	BFR_SS_DUP2 (revised)	RPD (%)	BFR_L1_SS6A	BFR_L1_SS-DUP1	RPD (%)	BFR_L1_SS13A_SA1	BFR_L1_SS_DUP2	RPD (%)	BFR_L1_SS28_SA1	BFR_L1_SS_DUP3	RPD (%)	BRF_L2_SS10_SA1	BFR_L2_SS_DUP2	RPD (%)
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2020-12-01	2020-12-01		2020-12-01	2020-12-01		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25	
Benzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Toluene	mg/kg	<0.050	<0.050	-	<0.10	<0.10	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-
Ethylbenzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Total Xylenes	mg/kg	<0.050	<0.050	-	<0.10	<0.10	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	-	<5.0	<5.0	-	<3	<3	-	<3	<3	-	<3	<3	-	<3	<3	-
>C10-C16 Hydrocarbons	mg/kg	<10	<10	-	<10	<1	-	<15	<15	-	<15	<15	-	<15	<15	-	<15	19	NA
>C16-C21 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	<15	<15	-	19	<15	NA	15	42	NA
>C21-<C32 Hydrocarbons	mg/kg	<15	<15	-	37	270	-	312	192	47.62	586	610	4.01	418	180	**79.60**	359	675	**61.12**
Modified TPH	mg/kg	<15	<15	-	37	270	-	312	192	47.62	586	610	4.01	437	180	**83.31**	374	736	**65.23**

Notes:
NA = not applicable
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28b: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Burgeo Firing Range, NL

Sample ID	Units	BFR_SS1			BFR_SS7			BFR_L1_SS6			BFR_L1_SS13			BFR_L1_SS28			BFR_L2_SS10		
		BFR_SS1_SA1	BFR_SS_DUP1	RPD (%)	BFR_SS7_SA1	BFR_SS_DUP2	RPD (%)	BFR_L1_SS6A	BFR_L1_SS-DUP1	RPD (%)	BFR_L1_SS13A_SA1	BFR_L1_SS_DUP2	RPD (%)	BFR_L1_SS28_SA1	DUP3	RPD (%)	BRF_L2_SS10_SA1	BFR_L2_SS_DUP2	RPD (%)
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2020-12-01	2020-12-01		2020-12-01	2020-12-01		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25	
1-Methylnaphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
2-Methylnaphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-
Acenaphthylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-
Anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Benzo(a)anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(a)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Benzo(b/j)fluoranthene	mg/kg	<0.020	<0.020	-	<0.020	<0.020	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(j)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-
Fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Fluorene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	0.02	0.02	NA	0.03	0.03	NA	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	0.11	0.18	NA
Phenanthrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Index of Additive Cancer Risk (IACR)		0.15	0.15	-	0.15	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)

Table 28c: Relative Percent Differences (RPDs) - Metals in Soil
Burgeo Firing Range, NL

Sample ID	Units	BFR_SS1			BFR_SS7			BFR_L1_SS2			BFR_L1_SS3			BFR_L1_SS4		
		BFR_SS1_SA1	BFR_SS_DUP1	RPD (%)	BFR_SS7_SA1	BFR_SS_DUP2	RPD (%)	BFR_L1_SS2_D_SA1	BFR_L1_SS_DUP6	RPD (%)	BFR_L1_SS3_C_SA1	BFR_L1_SS_DUP5	RPD (%)	BFR_L1_SS4_SA2	BFR_L1_SS_DUP4	RPD (%)
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2020-12-01	2020-12-01		2020-12-01	2020-12-01		2021-11-27	2021-11-27		2021-11-27	2021-11-27		2021-11-27	2021-11-27	
Acid Extractable Aluminum (Al)	mg/kg	5500	5700	3.57	1600	1200	28.57	10900	9880	9.82	4670	4840	3.58	4890	7910	47.19
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	-	9.3	5.9	-	0.9	<0.8	NA	2	2.3	NA	<0.8	<0.8	-
Acid Extractable Arsenic (As)	mg/kg	2.5	3.2	24.56	2.8	2.1	-	6	7	15.38	3	3	NA	2	2	NA
Acid Extractable Barium (Ba)	mg/kg	21	21	0	220	63	**110.95**	84.1	58	36.73	18	16.3	9.91	13.1	13.5	3.01
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	0.5	0.6	NA	<0.4	<0.4	-	<0.4	<0.4	-
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<50	<50	-	<50	<50	-	<5	<5	-	<5	<5	-	<5	<5	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	-	0.85	0.64	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Chromium (Cr)	mg/kg	10	10	0	<2.0	<2.0	-	28	25	11.32	8	7	NA	9	8	NA
Acid Extractable Cobalt (Co)	mg/kg	2.8	3.1	10.17	2.6	1.3	-	9.4	7.9	17.34	2.3	2	NA	0.9	1	NA
Acid Extractable Copper (Cu)	mg/kg	4.5	4.9	8.51	42	31	30.14	16.7	14.4	14.79	8.6	9.2	6.74	5	4.3	NA
Acid Extractable Iron (Fe)	mg/kg	8700	9500	8.79	2000	1200	50.00	20800	18000	14.43	6870	6010	13.35	3450	3620	4.81
Acid Extractable Lead (Pb)	mg/kg	3.8	4.1	7.59	640	420	41.51	82	25	**106.54**	41	51	21.74	32	33	3.08
Acid Extractable Lithium (Li)	mg/kg	8.6	9.3	7.82	<2.0	<2.0	-	22.8	19	18.18	6.4	6	6.45	2.3	2.2	NA
Acid Extractable Manganese (Mn)	mg/kg	130	130	0	22	14	44.44	560	435	25.13	127	104	19.91	46.3	49.3	6.28
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	-	0.49	0.32	-	0.05	<0.03	NA	<0.03	<0.03	-	0.2	0.17	16.22
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Nickel (Ni)	mg/kg	6.6	7.3	-	5.5	3.8	-	14	14	0	4	4	NA	3	3	NA
Acid Extractable Rubidium (Rb)	mg/kg	8.0	8.9	10.65	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	-	1.7	1.4	-	<0.8	<0.8	-	<0.8	<0.8	-	4.7	3.8	21.18
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	-	<0.50	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	-	76	110	36.56	10	8	NA	<5	<5	-	<5	<5	-
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	-	0.15	0.11	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	-	2.2	<1.0	-	1	1	NA	<1	<1	-	3	1	NA
Acid Extractable Uranium (U)	mg/kg	0.68	0.52	-	0.17	0.10	-	1.32	1.14	NA	1.36	1.12	NA	1.29	1.15	NA
Acid Extractable Vanadium (V)	mg/kg	18	20	10.53	8.1	3.9	-	62	48.1	25.25	15.5	13.8	11.60	14.1	14.2	0.71
Acid Extractable Zinc (Zn)	mg/kg	14	14	0	270	90	**100.00**	62	53	15.65	12	11	NA	9	9	NA

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
RPD over 50% limit

Table 28c: Relative Percent Differences (RPDs) - Metals in Soil
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_SS6			BFR_L1_SS13			BFR_L1_SS28			BFR_L2_SS10		
		BFR_L1_SS6_A_SA	BFR_L1_SS-DUP1	RPD (%)	BFR_L1_SS13_A_SA1	BFR_L1_SS_DUP2	RPD (%)	BFR_L1_SS28_SA1	BFR_L1_SS_DUP3	RPD (%)	BFR_L2_SS10_SA1	BFR_L2_SS_DUP2	RPD (%)
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25	
Acid Extractable Aluminum (Al)	mg/kg	888	1580	**56.08**	1190	1390	15.50	3210	1200	**91.16**	6570	6990	6.19
Acid Extractable Antimony (Sb)	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-	2	<1	NA
Acid Extractable Arsenic (As)	mg/kg	2	3	NA	2	2	NA	3	2	NA	2	3	NA
Acid Extractable Barium (Ba)	mg/kg	6	11	NA	<5	6	NA	13	5	NA	11	13	NA
Acid Extractable Beryllium (Be)	mg/kg	<2	<2	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Bismuth (Bi)	mg/kg	-	-	-	-	-	-	-	-	-	-		-
Acid Extractable Boron (B)	mg/kg	<2	<2	-	12	<2	NA	5	<2	NA	<2	<2	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	-
Acid Extractable Chromium (Cr)	mg/kg	<2	3	NA	<2	<2	-	10	<2	NA	4	3	NA
Acid Extractable Cobalt (Co)	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Acid Extractable Copper (Cu)	mg/kg	<2	<2	-	<2	<2	-	10	2	NA	14	6	NA
Acid Extractable Iron (Fe)	mg/kg	399	721	**57.50**	450	573	24.05	634	274	**79.30**	594	489	19.39
Acid Extractable Lead (Pb)	mg/kg	4.7	6	24.30	4.6	6.4	32.73	8.2	9.4	13.64	28.9	7.9	**114.13**
Acid Extractable Lithium (Li)	mg/kg	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-
Acid Extractable Manganese (Mn)	mg/kg	11	15	30.77	12	9	28.57	3	5	NA	5	4	NA
Acid Extractable Mercury (Hg)	mg/kg	0.04	0.07	NA	0.07	0.08	NA	0.06	<0.03	NA	0.04	<0.03	NA
Acid Extractable Molybdenum (Mo)	mg/kg	<2	<2	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Nickel (Ni)	mg/kg	<2	<2	-	<2	<2	-	4	<2	NA	<2	<2	-
Acid Extractable Rubidium (Rb)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	<1	<1	-	1	2	NA	3	<1	NA	2	2	NA
Acid Extractable Silver (Ag)	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	<5	8	NA	<5	<5	-	9	<5	NA	9	9	NA
Acid Extractable Thallium (Tl)	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Acid Extractable Tin (Sn)	mg/kg	3	3	NA	3	3	NA	3	3	NA	3	3	NA
Acid Extractable Uranium (U)	mg/kg	0.2	0.2	NA	0.4	0.4	NA	0.7	0.1	NA	0.7	0.8	13.33
Acid Extractable Vanadium (V)	mg/kg	6	9	NA	4	4	NA	7	3	NA	9	9	NA
Acid Extractable Zinc (Zn)	mg/kg	<5	5	NA	16	<5	NA	10	7	NA	6	7	NA

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
RPD over 50% limit

Table 28c: Relative Percent Differences (RPDs) - Metals in Soil
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_SS38			BFR_L1_SS44			BFR_L1_SS55		
		BFR_L1_SS38_SA1	BFR_L1_SS38_DUP1	RPD (%)	BFR_L1_SS44_SA1	BFR_L1_SS44_DUP1	RPD (%)	BFR_L1_SS55_SA1	BFR_L1_SS55_DUP1	RPD (%)
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2022-09-05	2022-09-05		2022-09-05	2022-09-05		2022-09-05	2022-09-05	
Acid Extractable Aluminum (Al)	mg/kg	2060	16900	**156.54**	8360	8750	4.56	11700	13100	11.29
Acid Extractable Antimony (Sb)	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-
Acid Extractable Arsenic (As)	mg/kg	3	4	28.57	3	3	0.00	3	3	0.00
Acid Extractable Barium (Ba)	mg/kg	16	25	43.90	7	5	33.33	9	8	11.76
Acid Extractable Beryllium (Be)	mg/kg	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Bismuth (Bi)	mg/kg	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	-
Acid Extractable Chromium (Cr)	mg/kg	5	23	**128.57**	9	7	25.00	10	14	33.33
Acid Extractable Cobalt (Co)	mg/kg	<1	6	#VALUE!	1	<1	NA	<1	<1	-
Acid Extractable Copper (Cu)	mg/kg	5	10	66.67	<2	<2	-	6	6	0.00
Acid Extractable Iron (Fe)	mg/kg	1220	15000	**169.91**	4510	2210	**68.45**	2870	2640	8.35
Acid Extractable Lead (Pb)	mg/kg	25.7	5.5	**129.49**	7.6	6.9	9.66	9.2	6.8	30.00
Acid Extractable Lithium (Li)	mg/kg	<5	26	NA	5	<5	NA	<5	<5	-
Acid Extractable Manganese (Mn)	mg/kg	147	335	78.01	76	53	35.66	46	42	9.09
Acid Extractable Mercury (Hg)	mg/kg	0.04	<0.03	NA	<0.03	<0.03	-	0.06	0.05	NA
Acid Extractable Molybdenum (Mo)	mg/kg	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Nickel (Ni)	mg/kg	<2	13	NA	3	2	NA	2	<2	NA
Acid Extractable Rubidium (Rb)	mg/kg	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	<1	1	NA	<1	<1	-	4	4	0.00
Acid Extractable Silver (Ag)	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	17	<5	NA	<5	<5	-	<5	<5	-
Acid Extractable Thallium (Tl)	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Acid Extractable Tin (Sn)	mg/kg	6	6	0.00	6	6	0.00	4	3	28.57
Acid Extractable Uranium (U)	mg/kg	0.1	0.9	**160.00**	0.6	0.7	15.38	1.5	1.5	0.00
Acid Extractable Vanadium (V)	mg/kg	5	54	**166.10**	22	17	25.64	15	17	12.50
Acid Extractable Zinc (Zn)	mg/kg	10	40	**120.00**	9	6	NA	8	7	13.33

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
mbgs = metres below ground surface
< = concentration is below Reportable Detection Limit (RDL)
RPD over 50% limit

Table 28d: Relative Percent Differences (RPDs) - Petroleum Hydrocarbons (PHCs) in Sediment
Burgeo Firing Range, NL

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29			BFR_L2_SED9		
		BFR_SED4 (revised)	BFR_SED_DUP1 (revised)	RPD (%)	BFR_SED5 (revised)	BFR_SED_DUP2 (revised)	RPD (%)	BFR_L1_SED28	BFR_L1_SED_DUP1	RPD (%)	BFR_L1_SED29	BFR_L1_SED_DUP2	RPD (%)	BFR_L2_SED9	BFR_L2_SED_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-21	2021-11-21	
Benzene	mg/kg	<0.050	<0.050	-	<0.025	<0.025	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Toluene	mg/kg	<0.10	<0.10	-	<0.050	<0.050	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-
Ethylbenzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Total Xylenes	mg/kg	<0.10	<0.10	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
C6 - C10 (less BTEX)	mg/kg	<5.0	<5.0	-	7.9	<2.5	-	<3	<3	-	<3	<3	-	<3	<3	-
>C10-C16 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	<15	<15	-	<15	<15	-
>C16-C21 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	41	54	NA	<15	<15	-
>C21-<C32 Hydrocarbons	mg/kg	390	290	29.41	26	23	12.24	160	254	45.41	468	614	26.99	266	321	18.74
Modified TPH	mg/kg	390	290	29.41	34	23	38.60	160	254	45.41	509	668	27.02	266	321	18.74

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

Table 28e: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29		
		BFR_SED4	BFR_SED_DUP1	RPD (%)	BFR_SED5	BFR_SED_DUP2	RPD (%)	BFR_L1_SED28	BFR_L1_SED_DUP1	RPD (%)	BFR_L1_SED29	BFR_L1_SED_DUP2	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21	
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	<0.05	<0.05	-
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-
Acenaphthylene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.004	<0.004	-	<0.004	<0.004	-
Anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.03	<0.03	-	<0.03	<0.03	-
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	<0.05	<0.05	-
Benzo(b/j)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	-	<0.0080	<0.0050	-	<0.01	<0.01	-	0.08	<0.01	NA
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.006	<0.006	-	<0.006	<0.006	-
Fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	0.1	0.1	NA
Fluorene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	mg/kg	<0.0050	0.081	**176.74**	0.028	0.028	0	<0.05	0.09	NA	<0.05	0.83	**177.27**
Phenanthrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.03	<0.03	-	<0.03	<0.03	-
Pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	0.08	<0.05	NA

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28e: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment
Burgeo Firing Range, NL

Sample ID	Units	BFR_L2_SED9			BFR_L1_SED51			BFR_L1_SED59			BFR_L1_SED63		
		BFR_L2_SED9	BFR_L2_SED_DUP1	RPD (%)	BFR_L1_SED51	BFR_SED_DUP2	RPD (%)	BFR_L1_SED59	BFR_SED_DUP1	RPD (%)	BFR_L1_SED59	BFR_SED_DUP3	RPD (%)
Date Collected		2021-11-22	2021-11-22		2022-09-08	2022-09-08		2022-09-08	2022-09-08		2022-09-11	2022-09-11	
1-Methylnaphthalene	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
2-Methylnaphthalene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	mg/kg	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-
Acenaphthylene	mg/kg	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-
Anthracene	mg/kg	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Benzo(a)anthracene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(a)pyrene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b)fluoranthene	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Benzo(b/j)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	<0.01	<0.01	-	<0.01	<0.02	-	<0.01	<0.01	-	<0.01	<0.02	-
Benzo(j)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	mg/kg	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-
Fluoranthene	mg/kg	<0.05	<0.05	-	0.05	0.06	18.181818	<0.05	<0.05	-	<0.05	<0.05	-
Fluorene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	mg/kg	0.11	0.09	20.00	2.06	2.3	11.009174	0.11	0.09	20	<0.05	<0.05	-
Phenanthrene	mg/kg	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Pyrene	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28f: Relative Percent Differences (RPDs) - Metals in Sediment
Burgeo Firing Range, NL

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29			BFR_L2_SED9	
		BFR_SED4	BFR_SED_DUP1	RPD (%)	BFR_SED5	BFR_SED_DUP2	RPD (%)	BFR_L1_SED28	BFR_L1_SED_DUP1	RPD (%)	BFR_L1_SED29	BFR_L1_SED_DUP2	RPD (%)	BFR_L2_SED9	BFR_L2_SED_DUP1
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22
Acid Extractable Aluminum (Al)	mg/kg	5800	6000	3.39	2100	2400	13.33	2760	2570	7.13	7260	4090	**55.86**	6020	4770
Acid Extractable Antimony (Sb)	mg/kg	2.7	<2.0	-	<2.0	<2.0	-	3	2	NA	2	1	NA	<1	<1
Acid Extractable Arsenic (As)	mg/kg	2.5	2.2	-	<2.0	<2.0	-	3	3	NA	6	5	18.18	7	2
Acid Extractable Barium (Ba)	mg/kg	23	24	-	9.7	11	-	25	22	NA	17	13	NA	14	8
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<50	<50	-	<50	<50	-	5	3	NA	2	<2	NA	<2	<2
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	-	<0.30	<0.30	-	0.6	<0.3	NA	0.6	0.5	NA	<0.3	<0.3
Acid Extractable Chromium (Cr)	mg/kg	4.8	4.4	-	3.1	2.9	-	<2	3	NA	7	5	NA	7	7
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	-	<1.0	<1.0	-	<1	<1	-	<1	<1	-	4	<1
Acid Extractable Copper (Cu)	mg/kg	19	16	17.14	<2.0	2.2	-	21	12	**54.55**	10	7	NA	8	3
Acid Extractable Iron (Fe)	mg/kg	2100	1800	15.38	6000	6400	6.45	5950	5630	5.53	7180	4690	41.95	14400	1300
Acid Extractable Lead (Pb)	mg/kg	770	250	**101.96**	17	21	21.05	126	114	10.00	62.5	68.6	9.31	5.1	3.7
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	-	3.0	2.9	-	<5	<5	-	<5	<5	-	13	<5
Acid Extractable Manganese (Mn)	mg/kg	11	9.1	-	71	76	6.80	60	51	16.22	28	21	28.57	282	31
Acid Extractable Mercury (Hg)	mg/kg	0.25	0.23	-	<0.10	<0.10	-	0.17	0.11	NA	0.17	0.12	NA	<0.03	<0.03
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2
Acid Extractable Nickel (Ni)	mg/kg	7.0	6.7	-	<2.0	2.1	-	<2	<2	-	4	3	NA	7	3
Acid Extractable Rubidium (Rb)	mg/kg	2.6	2.0	-	4.9	6.3	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	4.5	4.4	2.25	<0.50	<0.50	-	2	<1	NA	6	3	NA	<1	2
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	-	<0.50	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5
Acid Extractable Strontium (Sr)	mg/kg	12	12	0	<5.0	<5.0	-	28	21	NA	17	12	NA	<5	<5
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
Acid Extractable Tin (Sn)	mg/kg	3.2	3.1	3.17	<1.0	1.0	-	4	4	NA	6	5	NA	4	3
Acid Extractable Uranium (U)	mg/kg	0.74	0.76	2.67	0.36	0.65	-	0.6	0.5	18.18	1.2	0.9	28.57	0.5	0.4
Acid Extractable Vanadium (V)	mg/kg	17	16	6.06	13	15	14.29	7	6	NA	32	23	32.73	21	17
Acid Extractable Zinc (Zn)	mg/kg	19	18	-	8.4	10	-	28	23	19.61	34	24	34.48	39	6

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28f: Relative Percent Differences (RPDs) - Metals in Sediment
Burgeo Firing Range, NL

Sample ID	Units		BFR_L1_SED51			BFR_L1_SED59			BFR_L1_SED63		
		RPD (%)	BFR_L1_SED51	BFR_SED_DUP2	RPD (%)	BFR_L1_SED59	BFR_SED_DUP1	RPD (%)	BFR_L1_SED59	BFR_SED_DUP3	RPD (%)
Date Collected			2022-09-08	2022-09-08		2022-09-08	2022-09-08		2022-09-11	2022-09-11	
Acid Extractable Aluminum (Al)	mg/kg	23.17	5990	9210	42.37	9160	14600	45.79	6030	7480	21.47
Acid Extractable Antimony (Sb)	mg/kg	-	<1	1	NA	<1	<1	-	<1	<1	-
Acid Extractable Arsenic (As)	mg/kg	NA	4	4	NA	5	5	NA	4	4	NA
Acid Extractable Barium (Ba)	mg/kg	NA	11	16	NA	13	18	NA	13	16	NA
Acid Extractable Beryllium (Be)	mg/kg	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Bismuth (Bi)	mg/kg	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	-	<2	2	NA	<2	< 2	-	<2	<2	-
Acid Extractable Cadmium (Cd)	mg/kg	-	0.4	0.6	NA	<0.3	<0.3	-	<0.3	<0.3	-
Acid Extractable Chromium (Cr)	mg/kg	NA	5	8	NA	8	5	NA	20	24	18.18
Acid Extractable Cobalt (Co)	mg/kg	NA	1	2	NA	<1	5	NA	4	5	NA
Acid Extractable Copper (Cu)	mg/kg	NA	6	7	NA	9	10	NA	4	4	NA
Acid Extractable Iron (Fe)	mg/kg	**166.88**	4050	6280	43.18	9630	5820	49.32	13600	17500	25.08
Acid Extractable Lead (Pb)	mg/kg	31.82	19.0	22.5	16.87	37.6	9.5	**119.32**	13.7	15.7	13.61
Acid Extractable Lithium (Li)	mg/kg	NA	<5	<5	NA	<5	<5	NA	8	10	NA
Acid Extractable Manganese (Mn)	mg/kg	**160.38**	70	111	45.30	40	80	**66.67**	180	221	20.45
Acid Extractable Mercury (Hg)	mg/kg	-	0.05	0.08	NA	0.09	0.18	NA	<0.03	0.04	NA
Acid Extractable Molybdenum (Mo)	mg/kg	-	<2	<2	-	<2	5	NA	<2	2	NA
Acid Extractable Nickel (Ni)	mg/kg	NA	4	6	NA	6	10	NA	9	10	NA
Acid Extractable Rubidium (Rb)	mg/kg	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	NA	2	3	NA	3	1	NA	<1	<1	NA
Acid Extractable Silver (Ag)	mg/kg	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	-	12	15	NA	<5	21	NA	<5	<5	-
Acid Extractable Thallium (Tl)	mg/kg	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Acid Extractable Tin (Sn)	mg/kg	NA	3	4	NA	4	5	NA	3	4	NA
Acid Extractable Uranium (U)	mg/kg	NA	0.8	0.9	11.76	0.9	2.1	**80.00**	1.3	1.4	7.41
Acid Extractable Vanadium (V)	mg/kg	21.05	18	24	28.57	29	5	**141.18**	30	33	9.52
Acid Extractable Zinc (Zn)	mg/kg	NA	31	49	45.00	13	45	**110.34**	23	26	NA

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28g: Relative Percent Differences (RPDs) - Inorganics in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW29			BFR_L1_SED59		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)	BFR_L1_SED59	BFR_SW_DUP3	RPD (%)
Date Collected		2020-12-04	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2022-09-08	2022-09-08	
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	<5.0	-	<5.0	<5.0	-	<5	<5	-	<5.0	<5.0	-
Dissolved Chloride (Cl-)	mg/L	12	11	8.70	10	10	0	7	7	0	6	5	18.2
Colour	TCU	79	91	-	110	110	0	78.8	136	**53.26**	51	64.7	23.68
Nitrate + Nitrite (N)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.050	<0.050	-
Nitrite (N)	mg/L	0.011	0.012	8.70	0.011	0.012	8.70	<0.05	<0.05	-	<0.050	<0.050	-
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	0.04	0.09	NA	0.41	<0.03	**172.73**
Total Organic Carbon (C)	mg/L	-	-	-	-	-	-	10	10	0	8.9	8.8	1
Orthophosphate (P)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.010	<0.010	-
pH	pH	5.3	5.46	2.97	6.2	5.94	4.28	6.46	5.4	-	4.4	5.3	-
Reactive Silica (SiO2)	mg/L	1	1.1	9.52	1.7	1.7	0	10.6	1.5	**150.41**	<0.5	<0.5	**-**
Dissolved Sulphate (SO4)	mg/L	2	2.6	NA	2.8	2.2	-	<2	<2	-	<2.0	<2.0	-
Turbidity	NTU	0.57	0.61	6.78	4.3	3.7	15.00	1	0.9	NA	1.1	1.2	NA
Conductivity	uS/cm	47	45	4.35	40	39	2.53	41	44	7.06	44	31	34.67

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28g: Relative Percent Differences (RPDs) - Inorganics in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_SW4			BFR_L1_SED63		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_L1_SED59	BFR_SW_DUP1	RPD (%)
Date Collected		2020-12-04	2020-12-01		2022-09-11	2022-09-11	
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	<5.0	-	<5.0	<5.0	-
Dissolved Chloride (Cl-)	mg/L	12	11	8.70	3.0	3.0	NA
Colour	TCU	79	91	-	138	134	2.94
Nitrate + Nitrite (N)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-
Nitrite (N)	mg/L	0.011	0.012	8.70	<0.050	<0.050	-
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	-	<0.03	<0.03	-
Total Organic Carbon (C)	mg/L	-	-	-	15	13.9	8
Orthophosphate (P)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-
pH	pH	5.3	5.46	2.97	5.6	5.6	-
Reactive Silica (SiO2)	mg/L	1	1.1	9.52	0.6	<0.5	NA
Dissolved Sulphate (SO4)	mg/L	2	2.6	NA	<2.0	<2.0	-
Turbidity	NTU	0.57	0.61	6.78	1.3	0.8	NA
Conductivity	uS/cm	47	45	4.35	26	26	0.00

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28h: Relative Percent Differences (RPDs) - Petroleum Hydrocarbons (PHCs) in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29			BFR_L2_SW9		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)	BFR_L2_SW9	BFR_L2_SW_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22	
Benzene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Toluene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Ethylbenzene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Total Xylenes	mg/L	<0.0020	<0.0020	-	<0.0020	<0.0020	-	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	-
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Modified TPH	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

Created By: MA
Checked By: SZ

Table 28i: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21	
1-Methylnaphthalene	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-
2-Methylnaphthalene	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Acridine	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-
Anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.012	<0.012	-	<0.012	<0.012	-
Benzo(a)anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.018	<0.018	-	<0.018	<0.018	-
Benzo(a)pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	-	<0.020	<0.020	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-
Chrysene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Fluorene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	ug/L	<0.20	<0.20	-	<0.20	<0.20	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Phenanthrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-
Quinoline	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

Table 28i: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_L2_SW9			BFR_L1_SW51			BFR_L1_SW59			BFR_L1_SW63		
		BFR_L2_SW9	BFR_L2_SW_DUP1	RPD (%)	BFR_L1_SW51	BFR_SW_DUP2	RPD (%)	BFR_L1_SW59	BFR_SW_DUP3	RPD (%)	BFR_L1_SW59	BFR_SW_DUP1	RPD (%)
Date Collected		2021-11-22	2021-11-22		2022-09-09	2022-09-09		2022-09-09	2022-09-09		2022-09-11	2022-09-11	
1-Methylnaphthalene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
2-Methylnaphthalene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthylene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acridine	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Anthracene	ug/L	<0.012	<0.012	-	<0.012	<0.012	-	<0.012	<0.012	-	<0.012	<0.012	-
Benzo(a)anthracene	ug/L	<0.018	<0.018	-	<0.018	<0.018	-	<0.018	<0.018	-	<0.018	<0.018	-
Benzo(a)pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b)fluoranthene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b/j)fluoranthene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(j)fluoranthene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Fluoranthene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	0.02	NA
Fluorene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Phenanthrene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Pyrene	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Quinoline	ug/L	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

Table 28j: Relative Percent Differences (RPDs) - Metals in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21	
Total Aluminum (Al)	ug/L	160	170	6.06	270	250	7.69	262	268	2.26	174	177	1.71
Total Antimony (Sb)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Arsenic (As)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Barium (Ba)	ug/L	2.4	2.2	-	2.3	2.3	-	<5	<5	-	<5	<5	-
Total Beryllium (Be)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Bismuth (Bi)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Boron (B)	ug/L	<50	<50	-	<50	<50	-	<5	<5	-	<5	<5	-
Total Cadmium (Cd)	ug/L	0.014	0.015	-	0.013	0.020	-	<0.09	<0.09	-	<0.09	<0.09	-
Total Calcium (Ca)	ug/L	510	430	-	800	820	2.47	-	-	-	500	500	NA
Total Chromium (Cr)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<1	<1	-	<1	<1	-
Total Cobalt (Co)	ug/L	<0.40	<0.40	-	<0.40	<0.40	-	<1	<1	-	<1	<1	-
Total Copper (Cu)	ug/L	2.2	1.9	-	1.5	1.3	-	1	1	NA	<1	<1	-
Total Iron (Fe)	ug/L	140	140	-	330	300	9.52	303	294	3.02	249	247	NA
Total Lead (Pb)	ug/L	8.6	8.3	3.55	2.7	2.6	3.77	2.8	3	6.90	1.4	1.4	NA
Total Magnesium (Mg)	ug/L	720	690	4.26	640	610	4.80	-	-	-	600	600	0
Total Manganese (Mn)	ug/L	2.9	3.0	-	18	18	0	13	14	7.41	4	4	NA
Total Mercury (Hg)	ug/L	<0.013	<0.013	-	<0.013	<0.013	-	<0.026	<0.026	-	<0.026	<0.026	-
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Nickel (Ni)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	12	<2	NA	<2	8	NA
Total Phosphorus (P)	ug/L	<100	<100	-	<100	<100	-	-	-	-	20	<20	NA
Total Potassium (K)	ug/L	120	110	-	220	230	-	-	-	-	200	200	NA
Total Selenium (Se)	ug/L	<0.50	<0.50	-	<0.50	<0.50	-	<1	<1	-	<1	<1	-
Total Silver (Ag)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-
Total Sodium (Na)	ug/L	5200	4700	10.10	4900	4900	0	-	-	-	4400	4500	2.25
Total Strontium (Sr)	ug/L	5.7	4.9	-	4.9	5.5	-	<5	<5	-	<5	<5	-
Total Thallium (Tl)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-
Total Tin (Sn)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Titanium (Ti)	ug/L	2.6	<2.0	-	5.0	5.2	-	3	4	NA	2	2	NA
Total Uranium (U)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.2	<0.2	-	<0.2	<0.2	-
Total Vanadium (V)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Zinc (Zn)	ug/L	6.4	5.9	-	<5.0	<5.0	-	<5	<5	-	<5	<5	-

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

Table 28j: Relative Percent Differences (RPDs) - Metals in Surface Water
Burgeo Firing Range, NL

Sample ID	Units	BFR_L2_SW9							BFR_L1_SW51			BF
		BFR_L2_SW9	BFR_L2_SW_DUP 1	Hide - RDL	Hide - 5x RDL	Hide - Avg	Hide - Avg > 5x RDL?	RPD (%)	BFR_L1_SW51	BFR_L1_SW_DUP 2	RPD (%)	BFR_L1_SW59
Date Collected		2021-11-22	2021-11-22						2022-09-09	2022-09-09		2022-09-09
Total Aluminum (Al)	ug/L	631	636	5	25	633.5	yes	0.79	490	491	0.20	232
Total Antimony (Sb)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Arsenic (As)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Barium (Ba)	ug/L	<5	<5	5	25	NA	NA	-	<5	<5	-	<5
Total Beryllium (Be)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Bismuth (Bi)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Boron (B)	ug/L	140	147	5	25	143.5	yes	4.88	6	6	NA	<5
Total Cadmium (Cd)	ug/L	<0.09	<0.09	0.09	0.45	NA	NA	-	<0.09	<0.09	-	<0.09
Total Calcium (Ca)	ug/L	-	-	-	#VALUE!	NA	NA	-	-	2000	NA	200
Total Chromium (Cr)	ug/L	<1	<1	1	5	NA	NA	-	<1	<1	-	<1
Total Cobalt (Co)	ug/L	<1	<1	1	5	NA	NA	-	<1	<1	-	<1
Total Copper (Cu)	ug/L	<1	<1	1	5	NA	NA	-	<1	<1	-	<1
Total Iron (Fe)	ug/L	128	139	50	250	133.5	no	NA	1200	704	**52.10**	132
Total Lead (Pb)	ug/L	0.8	0.8	0.5	2.5	0.8	no	NA	2.4	2.4	NA	<0.5
Total Magnesium (Mg)	ug/L	-	-		0	NA	NA	-	-	600	NA	400
Total Manganese (Mn)	ug/L	3	3	2	10	3	no	NA	30	31	3.28	4
Total Mercury (Hg)	ug/L	<0.026	<0.026	0.026	0.13	NA	NA	-	0.037	<0.026	NA	<0.026
Total Molybdenum (Mo)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Nickel (Ni)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Phosphorus (P)	ug/L	-	-	-	#VALUE!	NA	NA	-	-	0.03	NA	<0.02
Total Potassium (K)	ug/L	-	-	-	#VALUE!	NA	NA	-	-	200	NA	100
Total Selenium (Se)	ug/L	<1	<1	1	5	NA	NA	-	<1	<1	-	<1
Total Silver (Ag)	ug/L	<0.1	<0.1	0.1	0.5	NA	NA	-	<0.1	<0.1	-	<0.1
Total Sodium (Na)	ug/L	-	-	-	#VALUE!	NA	NA	-	-	4300	NA	3800
Total Strontium (Sr)	ug/L	16	16	5	25	16	no	NA	6	7	NA	<5
Total Thallium (Tl)	ug/L	<0.1	<0.1	0.1	0.5	NA	NA	-	<0.1	<0.1	-	<0.1
Total Tin (Sn)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Titanium (Ti)	ug/L	11	12	2	10	11.5	yes	8.70	8	8	NA	<2
Total Uranium (U)	ug/L	<0.2	<0.2	0.2	1	NA	NA	-	<0.2	<0.2	-	<0.2
Total Vanadium (V)	ug/L	<2	<2	2	10	NA	NA	-	<2	<2	-	<2
Total Zinc (Zn)	ug/L	119	115	5	25	117	yes	3.42	<5	<5	-	<5

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

Sample ID	Units	R_L1_SW59		BFR_L1_SW63		
		BFR_L1_SW_DUP 3	RPD (%)	BFR_L1_SW63	BFR_L1_SW_DUP 1	RPD (%)
Date Collected		2022-09-09		2022-09-11	2022-09-11	
Total Aluminum (Al)	ug/L	245	5.45	283	281	0.71
Total Antimony (Sb)	ug/L	<2	-	<2	<2	-
Total Arsenic (As)	ug/L	<2	-	<2	<2	-
Total Barium (Ba)	ug/L	<5	-	<5	<5	-
Total Beryllium (Be)	ug/L	<2	-	<2	<2	-
Total Bismuth (Bi)	ug/L	<2	-	<2	<2	-
Total Boron (B)	ug/L	<5	-	<5	<5	-
Total Cadmium (Cd)	ug/L	<0.09	-	<0.09	<0.09	-
Total Calcium (Ca)	ug/L	200	NA	1000	1000	0.00
Total Chromium (Cr)	ug/L	<1	-	<1	<1	-
Total Cobalt (Co)	ug/L	<1	-	<1	<1	-
Total Copper (Cu)	ug/L	<1	-	<1	1	NA
Total Iron (Fe)	ug/L	131	NA	376	364	3.24
Total Lead (Pb)	ug/L	<0.5	-	0.7	0.9	NA
Total Magnesium (Mg)	ug/L	400	0.00	400	400	0.00
Total Manganese (Mn)	ug/L	4	NA	5	5	NA
Total Mercury (Hg)	ug/L	0.043	NA	0.026	0.031	NA
Total Molybdenum (Mo)	ug/L	<2	-	<2	<2	-
Total Nickel (Ni)	ug/L	<2	-	<2	<2	-
Total Phosphorus (P)	ug/L	<0.02	-	0.02	0.02	NA
Total Potassium (K)	ug/L	200	NA	200	200	NA
Total Selenium (Se)	ug/L	<1	-	<1	<1	-
Total Silver (Ag)	ug/L	<0.1	-	<0.1	<0.1	-
Total Sodium (Na)	ug/L	3900	2.60	3200	3300	3.08
Total Strontium (Sr)	ug/L	<5	-	<5	<5	-
Total Thallium (Tl)	ug/L	<0.1	-	<0.1	<0.1	-
Total Tin (Sn)	ug/L	<2	-	<2	<2	-
Total Titanium (Ti)	ug/L	<2	-	4	4	NA
Total Uranium (U)	ug/L	<0.2	-	0.3	0.3	NA
Total Vanadium (V)	ug/L	<2	-	<2	<2	-
Total Zinc (Zn)	ug/L	<5	-	<5	<5	-

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

Table 28k: Relative Percent Differences (RPDs) - Inorganics in Groundwater
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
Total Alkalinity (Total as CaCO3)	mg/L	<1.0	<1.0	-
Dissolved Chloride (Cl-)	mg/L	8.2	8.9	8.19
Colour	TCU	<5.0	<5.0	-
Nitrate + Nitrite (N)	mg/L	0.42	0.47	11.24
Nitrite (N)	mg/L	0.012	<0.010	NA
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.081	NA
Total Organic Carbon (C)	mg/L	5.8	5.2	10.91
Orthophosphate (P)	mg/L	<0.010	<0.010	-
pH	pH	6.94	7.09	-
Reactive Silica (SiO2)	mg/L	7.2	7.7	6.71
Dissolved Sulphate (SO4)	mg/L	2.7	2.6	NA
Turbidity	NTU	3.0	5.1	**51.85**
Conductivity	uS/cm	83.0	84.0	1.20

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

RPD over 50% limit

Table 28l: Relative Percent Differences (RPDs) - Petroleum Hydrocarbons (PHCs) in Groundwater
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_GW1		
		BFR_L1_GW1	BFR_L1_DUP2	RPD (%)
Date Collected		2021-12-19	2021-12-19	
Benzene	mg/L	<0.0010	<0.0010	-
Toluene	mg/L	<0.0010	<0.0010	-
Ethylbenzene	mg/L	<0.0010	<0.0010	-
Total Xylenes	mg/L	<0.0020	<0.0020	-
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	-
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	-
>C16-C21 Hydrocarbons	mg/L	0.067	<0.050	-
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	-

Notes:
" - " = RPD not calculated due to parameters being equal or
< = concentration is below Reportable Detection Limit (RDL)

Table 28m: Relative Percent Differences (RPDs) - Polycyclic Aromatic Hydrocarbons in Groundwater
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
1-Methylnaphthalene	ug/L	<0.050	<0.050	-
2-Methylnaphthalene	ug/L	<0.050	<0.050	-
Acenaphthene	ug/L	<0.010	<0.010	-
Acenaphthylene	ug/L	<0.010	<0.010	-
Anthracene	ug/L	<0.010	<0.010	-
Benzo(a)anthracene	ug/L	<0.010	<0.010	-
Benzo(a)pyrene	ug/L	<0.010	<0.010	-
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	-
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	-
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	-
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	-
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	-
Chrysene	ug/L	<0.010	<0.010	-
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	-
Fluoranthene	ug/L	<0.010	<0.010	-
Fluorene	ug/L	<0.010	<0.010	-
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	-
Naphthalene	ug/L	<0.20	<0.20	-
Perylene	ug/L	<0.010	<0.010	-
Phenanthrene	ug/L	0.01	<0.010	-
Pyrene	ug/L	<0.010	<0.010	-

Notes:
" - " = RPD not calculated due to parameters being equal or less than 5 times RDL
< = concentration is below Reportable Detection Limit (RDL)

Table 28n: Relative Percent Differences (RPDs) - Metals in Groundwater
Burgeo Firing Range, NL

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
Total Aluminum (Al)	ug/L	*23*	*17*	NA
Total Antimony (Sb)	ug/L	<1.0	<1.0	-
Total Arsenic (As)	ug/L	<1.0	<1.0	-
Total Barium (Ba)	ug/L	5.3	4.4	NA
Total Beryllium (Be)	ug/L	<0.10	<0.10	-
Total Bismuth (Bi)	ug/L	<2.0	<2.0	-
Total Boron (B)	ug/L	<50	<50	-
Total Cadmium (Cd)	ug/L	0.030	0.031	NA
Total Calcium (Ca)	ug/L	6300	6400	1.57
Total Chromium (Cr)	ug/L	<1.0	<1.0	-
Total Cobalt (Co)	ug/L	<0.40	<0.40	-
Total Copper (Cu)	ug/L	2.00	*1.0*	NA
Total Iron (Fe)	ug/L	*73*	<50	NA
Total Lead (Pb)	ug/L	<0.50	<0.50	-
Total Magnesium (Mg)	ug/L	1200	1200	0
Total Manganese (Mn)	ug/L	24	21.0	13.33
Total Mercury (Hg)	ug/L	<0.013	<0.013	-
Total Molybdenum (Mo)	ug/L	5.2	<2.0	NA
Total Nickel (Ni)	ug/L	4	4	NA
Total Phosphorus (P)	ug/L	<100	<100	-
Total Potassium (K)	ug/L	1500	1500	0
Total Selenium (Se)	ug/L	<0.50	<0.50	-
Total Silver (Ag)	ug/L	<0.10	<0.10	-
Total Sodium (Na)	ug/L	7800	7200	8.00
Total Strontium (Sr)	ug/L	22.0	22.0	0
Total Thallium (Tl)	ug/L	<0.10	<0.10	-
Total Tin (Sn)	ug/L	<2.0	<2.0	-
Total Titanium (Ti)	ug/L	<2.0	<2.0	-
Total Uranium (U)	ug/L	0.96	0.98	2.06
Total Vanadium (V)	ug/L	<2.0	<2.0	-
Total Zinc (Zn)	ug/L	6.8	<5.0	NA

Notes:

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

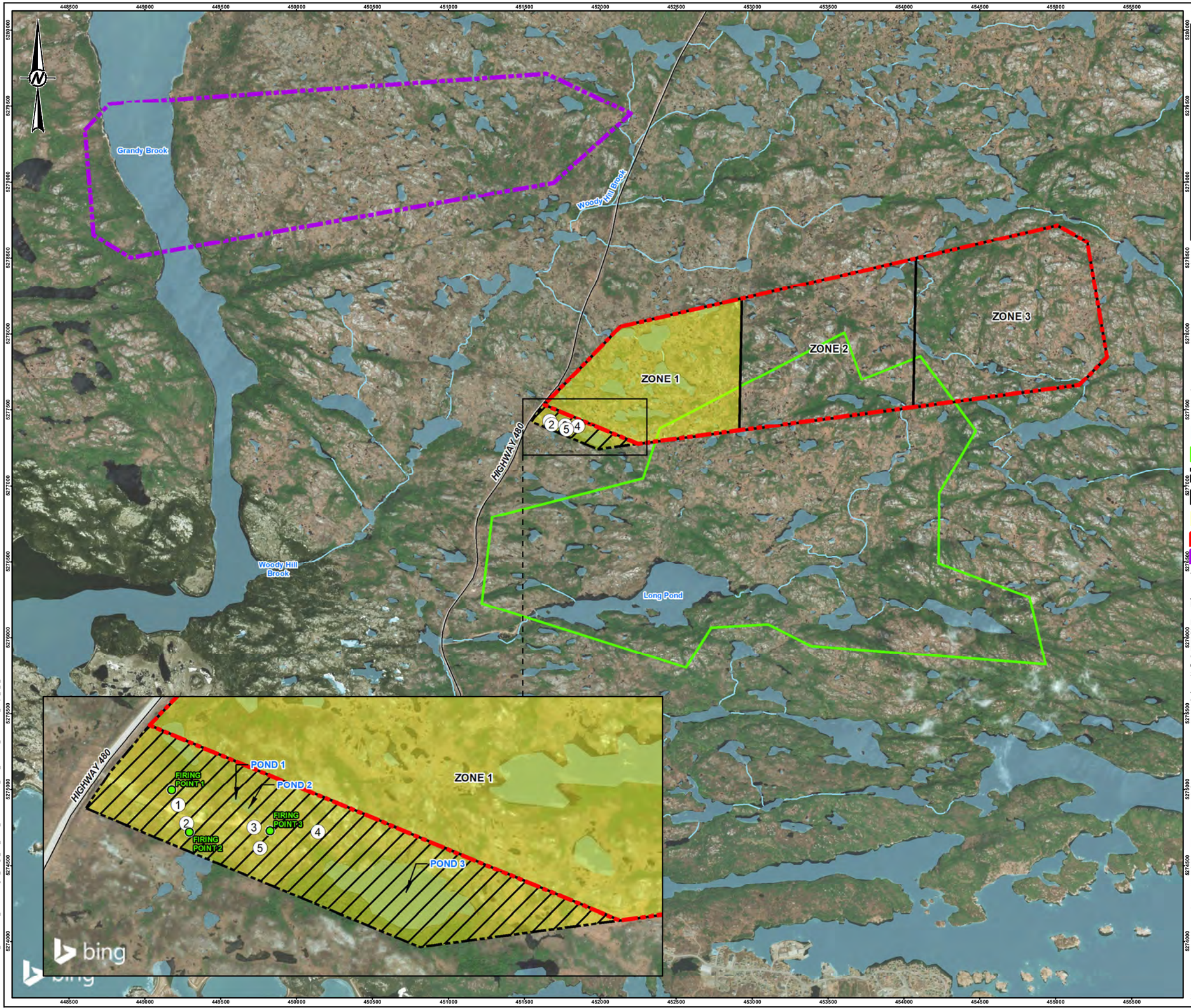
< = concentration is below Reportable Detection Limit (RDL)

Table 29: Monitoring Well Construction Details and Groundwater Levels
Burgeo Firing Range, NL

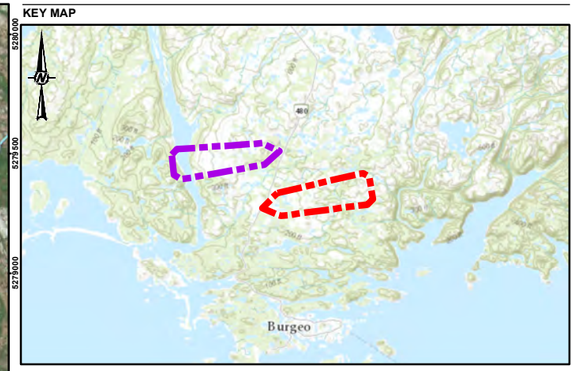
Monitoring Well ID	Ground Surface Elevation (masl)	Top of Pipe Elevation (masl)	Depth to Bedrock (mbgs)	Bedrock Elevation	Monitoring Well Depth (mbTOP)	Monitoring Well Depth Elevation (masl)	Screen Interval (mbgs)	Screen Interval Elevation (masl)	Depth to Groundwater (mbTOP)	Groundwater Elevation (masl)	Date of well Completion
GW1	84.81	85.72	1.68	83.13	8.45	77.270	4.58 - 8.45	77.27 - 78.79	6.73	78.99	16-Dec-21
GW2	82.00	82.79	1.75	80.25	5.18	77.610	0.99 - 5.18	77.61 - 79.13	2.30	80.49	17-Dec-21
GW3	80.10	80.93	1.00	79.10	5.34	75.590	2.11 - 5.34	75.59 - 77.11	3.23	77.70	17-Dec-21
GW4	-	-	-	-	2.49	-	0 - 2.49	-	1.77	-	12-Sep-22

Notes:
mbgs-metres below ground surface
masl: metres above sea level
mbTOP: metres below top of (well) pipe

Figures



KEY MAP



SCALE 1:200,000

LEGEND

1. APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
2. APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
3. APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
4. APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
5. APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

- ROADWAY
- WATERCOURSE
- WATERBODY
- PROTECTED PUBLIC WATER SUPPLY
- ADDITIONAL PROPOSED LEASED LANDS/FIRING AREA
- ZONE BOUNDARY
- RISK ASSESSMENT AREA
- LOCATION 1
- LOCATION 2

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. KEY MAP: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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0 275 550 1,100

1:25,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
SITE PLAN

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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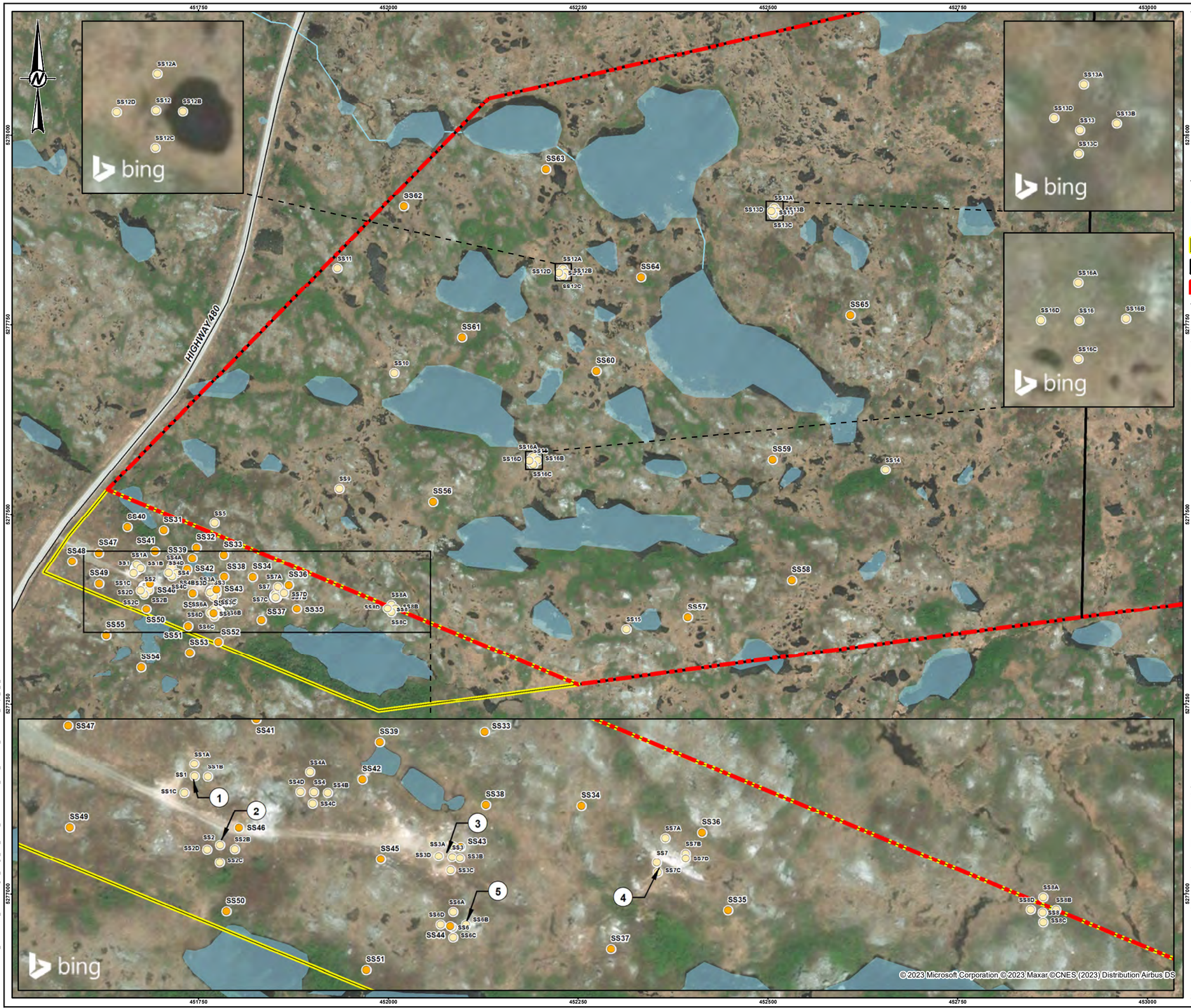

LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2022)
- APPROXIMATE SOIL SAMPLE LOCATION (2020/21)
- (1) APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- (2) APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- (3) APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- (4) APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- (5) APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. SAMPLE ID PREFIX "BFR_" OR "BFR_L1_" TRUNCATED ON FIGURE FOR READABILITY

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
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0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 1 - SOIL SAMPLE LOCATIONS

CONSULTANT
wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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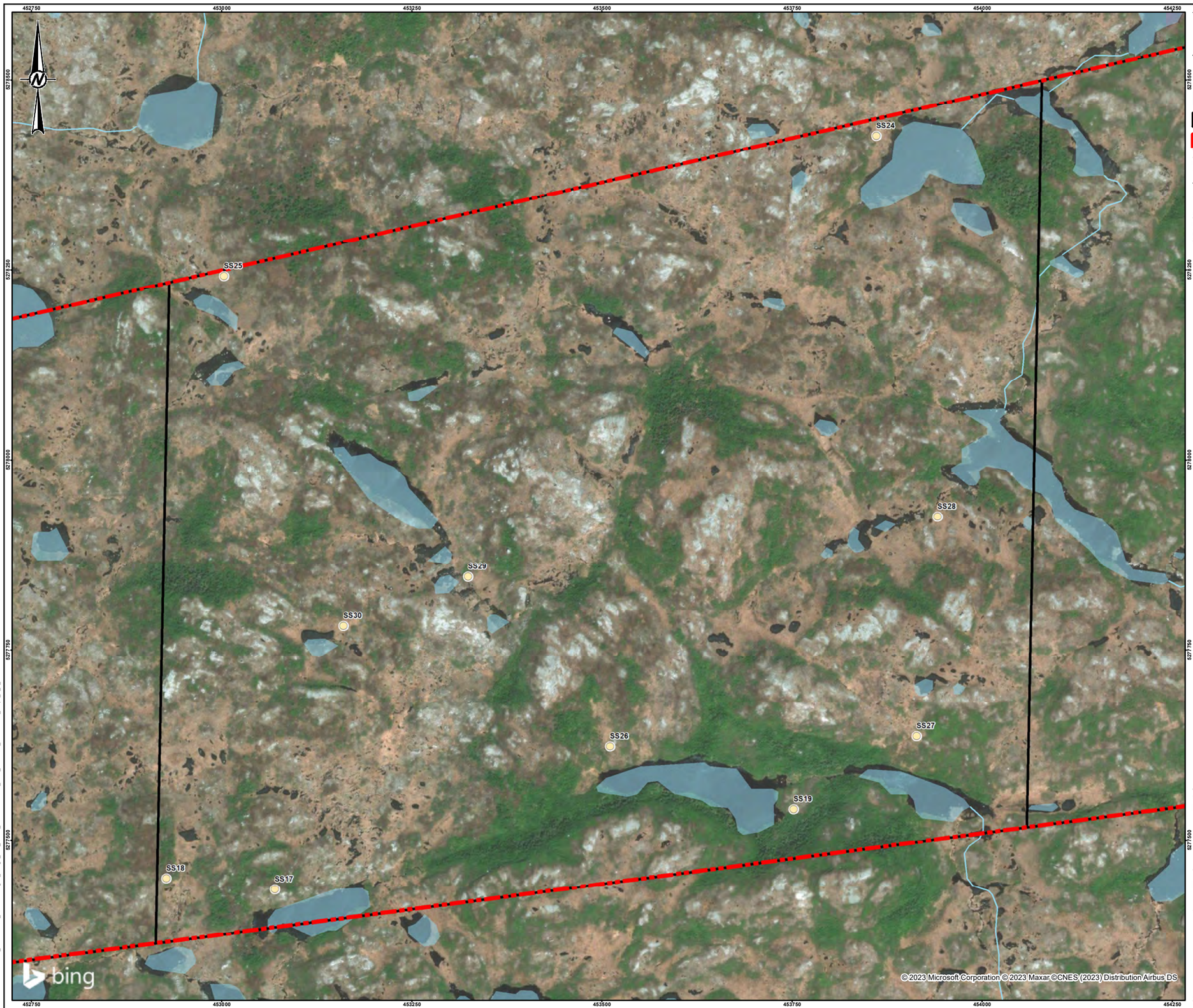

LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2020/21)
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
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0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 2 - SOIL SAMPLE LOCATIONS

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	3

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0 25mm

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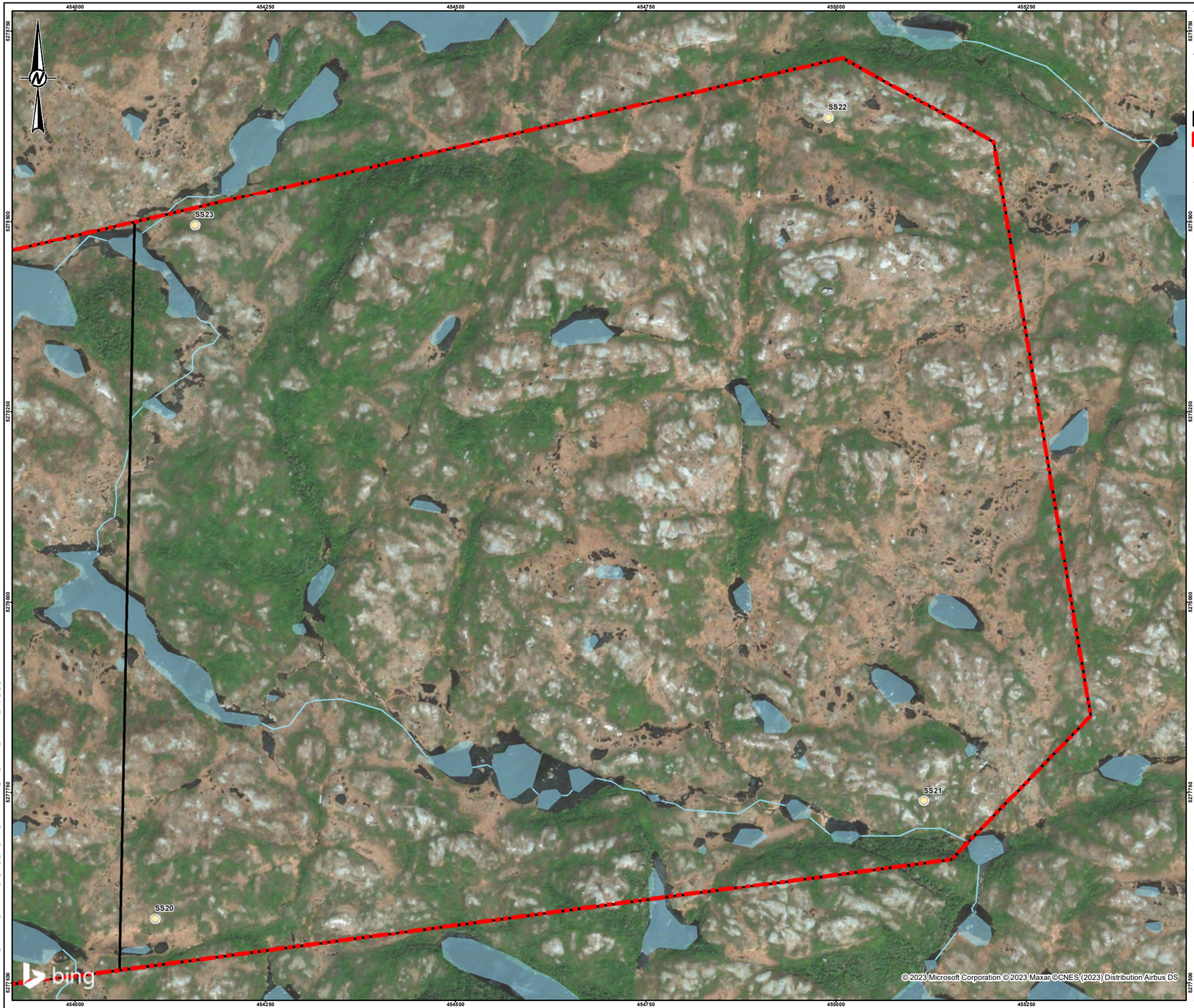

LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2020)
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
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0 50 100 200

1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 3 - SOIL SAMPLE LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	**4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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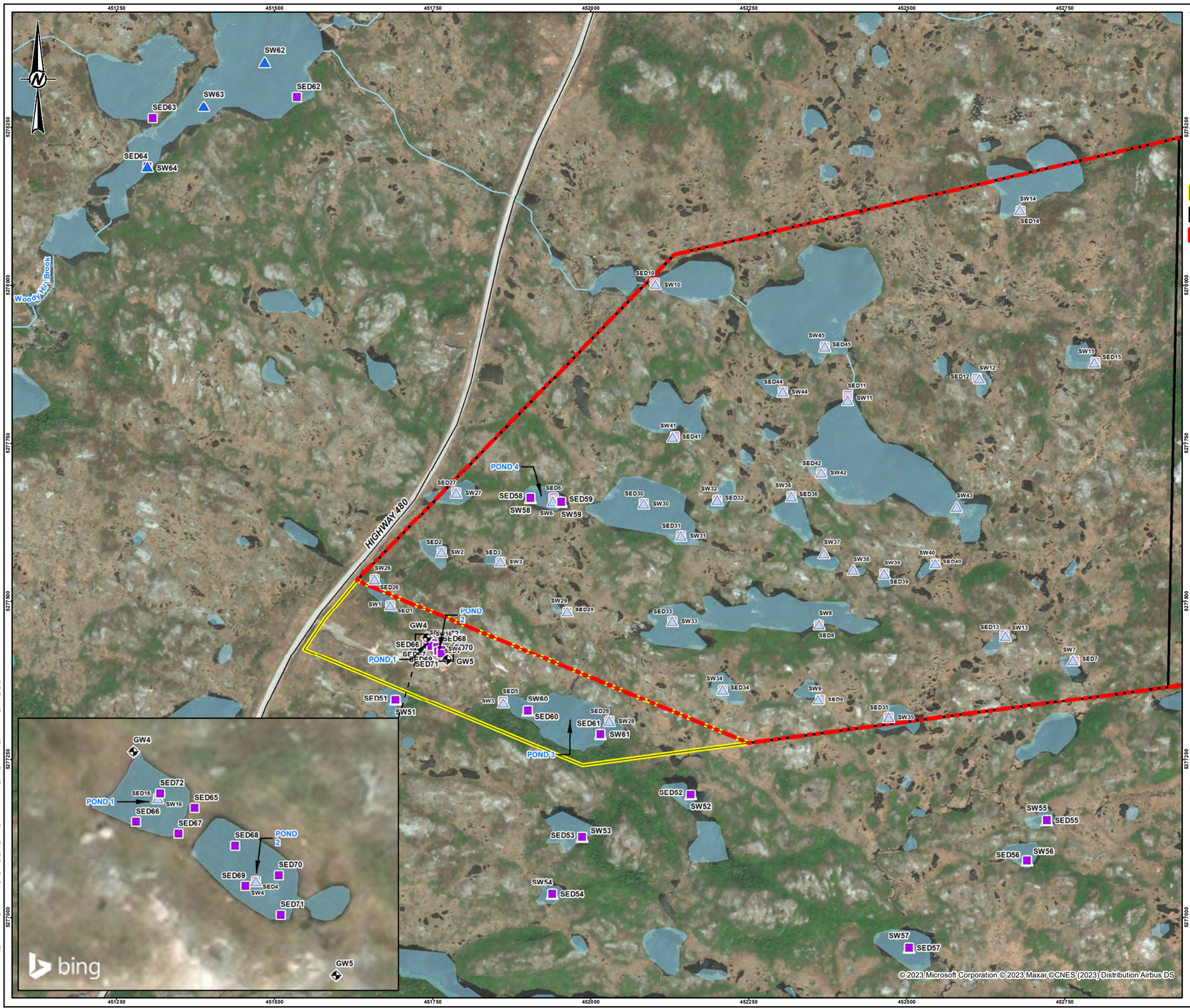

LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2022)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2022)
- APPROXIMATE GROUNDWATER SAMPLE LOCATION (2022)
- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020/21)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020/21)
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
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0 100 200 400

1:6,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 1 - SURFACE WATER, SEDIMENT, AND GROUNDWATER SAMPLE LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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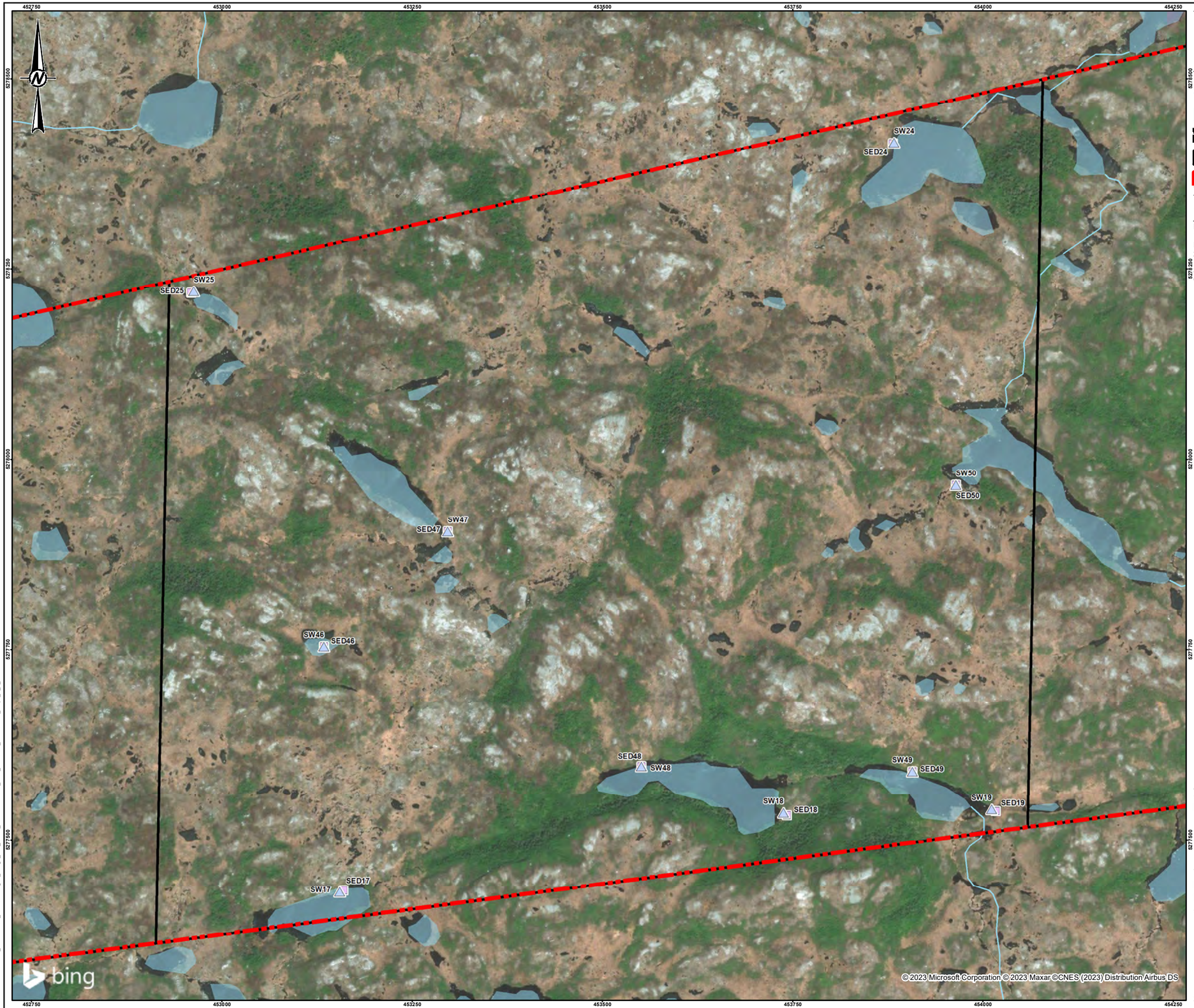

LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020/21)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020/21)
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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0 50 100 200

1:5,000 METRES

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE, NL

TITLE

LOCATION 1 - ZONE 2 - SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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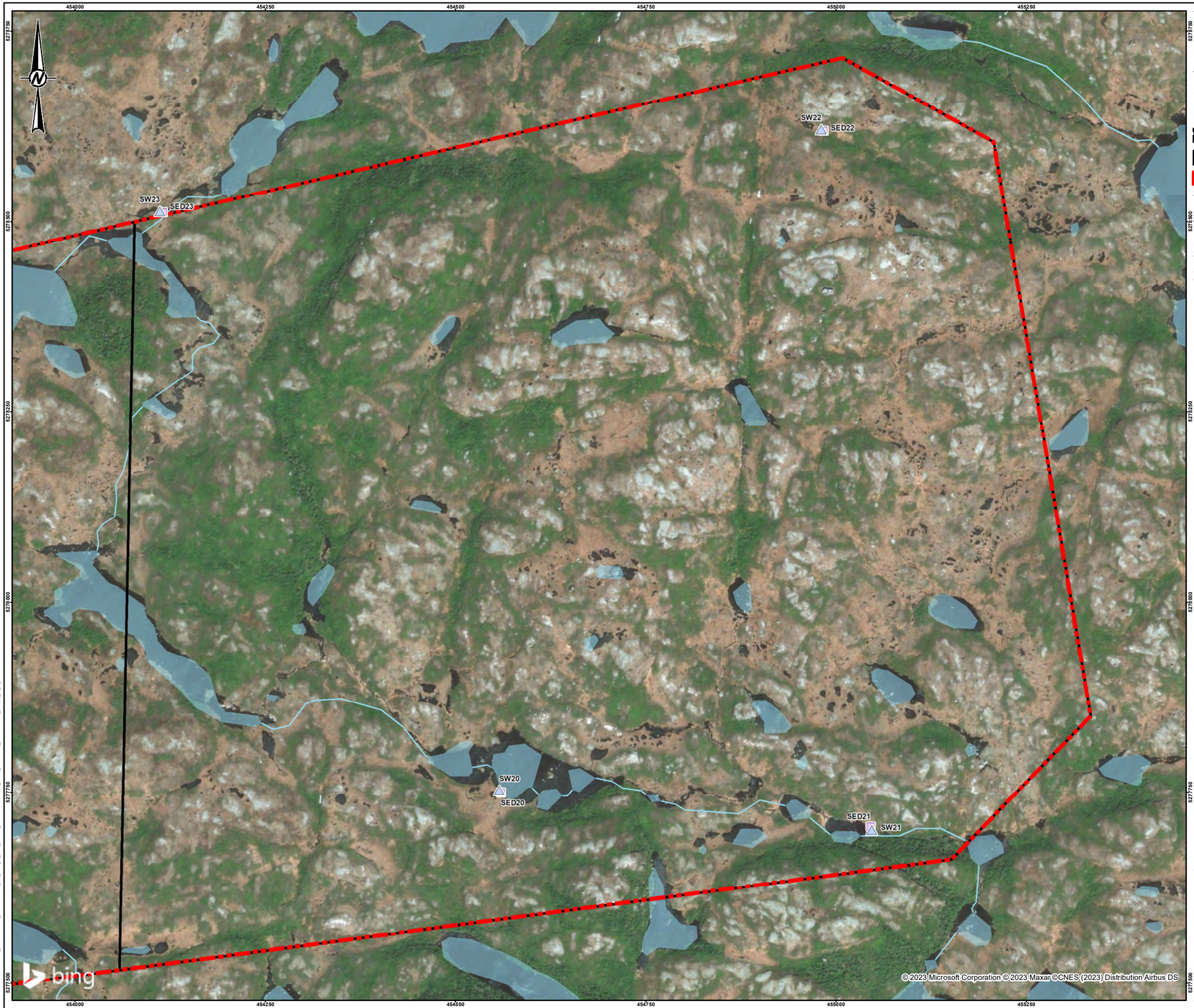

LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020)
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 3 - SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2021)
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:3,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - SOIL SAMPLE LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE **8**

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LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2021)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2021)
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:3,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - SURFACE WATER, SEDIMENT, AND GROUNDWATER SAMPLE LOCATIONS

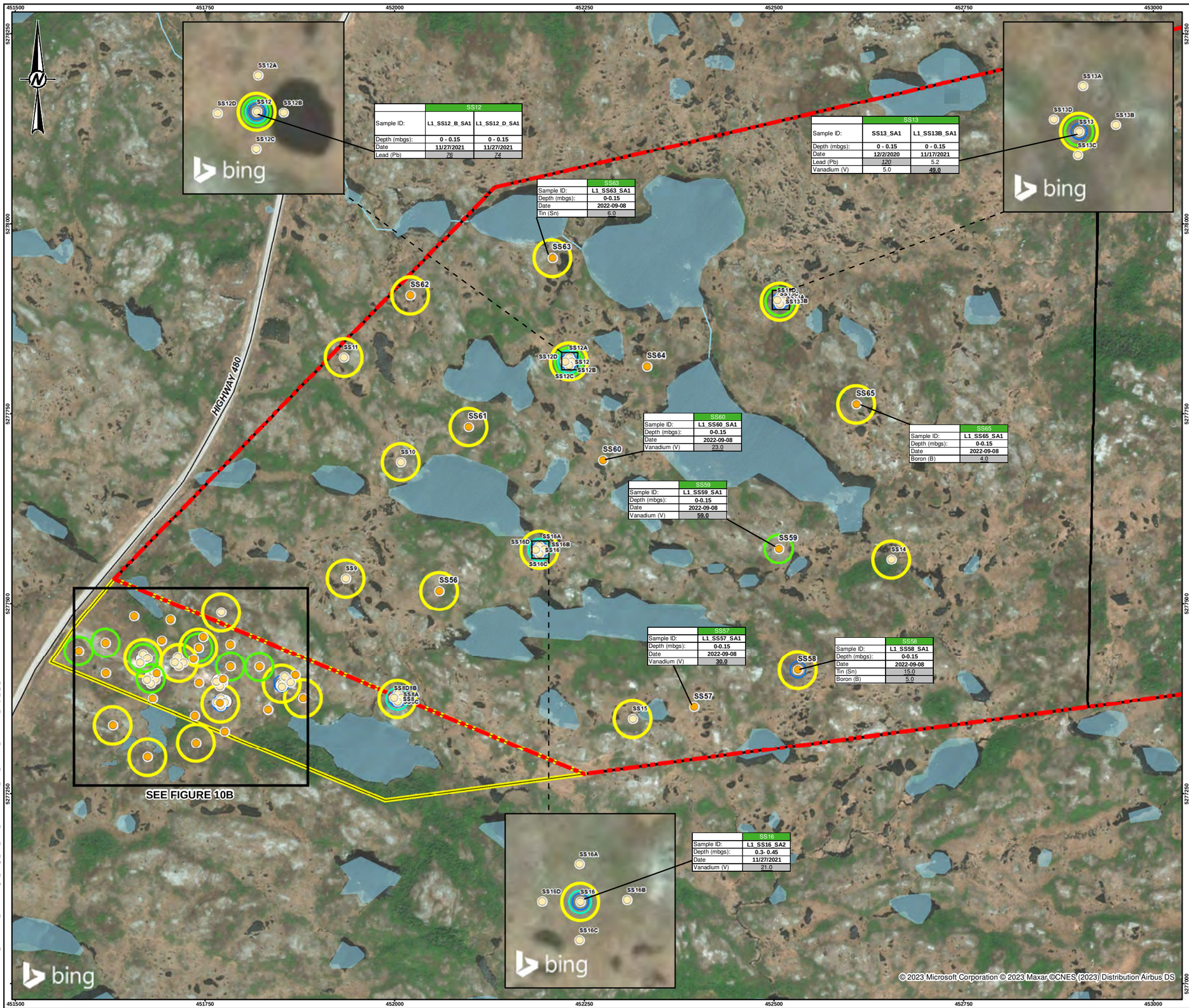
CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	9

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PROJ\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_20221225\22532464-0002-HS-0009.mxd



	SS12	
Sample ID:	L1_SS12_B_SA1	L1_SS12_D_SA1
Depth (mbgs):	0 - 0.15	0 - 0.15
Date	11/27/2021	11/27/2021
Lead (Pb)	76	74

	SS13	
Sample ID:	SS13_SA1	L1_SS13B_SA1
Depth (mbgs):	0 - 0.15	0 - 0.15
Date	12/2/2020	11/17/2021
Lead (Pb)	120	5.2
Vanadium (V)	5.0	49.0

	SS63
Sample ID:	L1_SS63_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Tin (Sn)	6.0

	SS60
Sample ID:	L1_SS60_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Vanadium (V)	23.0

	SS65
Sample ID:	L1_SS65_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Boron (B)	4.0

	SS59
Sample ID:	L1_SS59_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Vanadium (V)	59.0

	SS57
Sample ID:	L1_SS57_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Vanadium (V)	30.0

	SS58
Sample ID:	L1_SS58_SA1
Depth (mbgs):	0-0.15
Date	2022-09-08
Tin (Sn)	15.0
Boron (B)	5.0

	SS16
Sample ID:	L1_SS16_SA2
Depth (mbgs):	0.3- 0.45
Date	11/27/2021
Vanadium (V)	21.0

LEGEND

1. APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
2. APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
3. APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
4. APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
5. APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

APPROXIMATE SOIL SAMPLE LOCATION (2022)

APPROXIMATE SOIL SAMPLE LOCATION (2020/21)

NATURALLY OCCURRING EXCEEDANCE OF BORON

NATURALLY OCCURRING EXCEEDANCE OF CADMIUM

NATURALLY OCCURRING EXCEEDANCE OF IRON

NATURALLY OCCURRING EXCEEDANCE OF SELENIUM

ROADWAY

WATERCOURSE

WATERBODY

PROPOSED ADDITIONAL LEASE AREA

ZONE BOUNDARY

SITE

Site Criteria	Atlantic RBCA EQS_{Eco}	Atlantic RBCA EQS_{HH}	CCME SQG	NSE EQS Tier 1
Aluminum (Al)	NGA	15400	NGA	15400
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR
Boron (B)	NGA	NGA	NGA	NR

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
4. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:5,000 METRES

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE, NL

TITLE

LOCATION 1 - ZONE 1 - OUTLYING AREA - METALS EXCEEDANCES IN SOIL

CONSULTANT

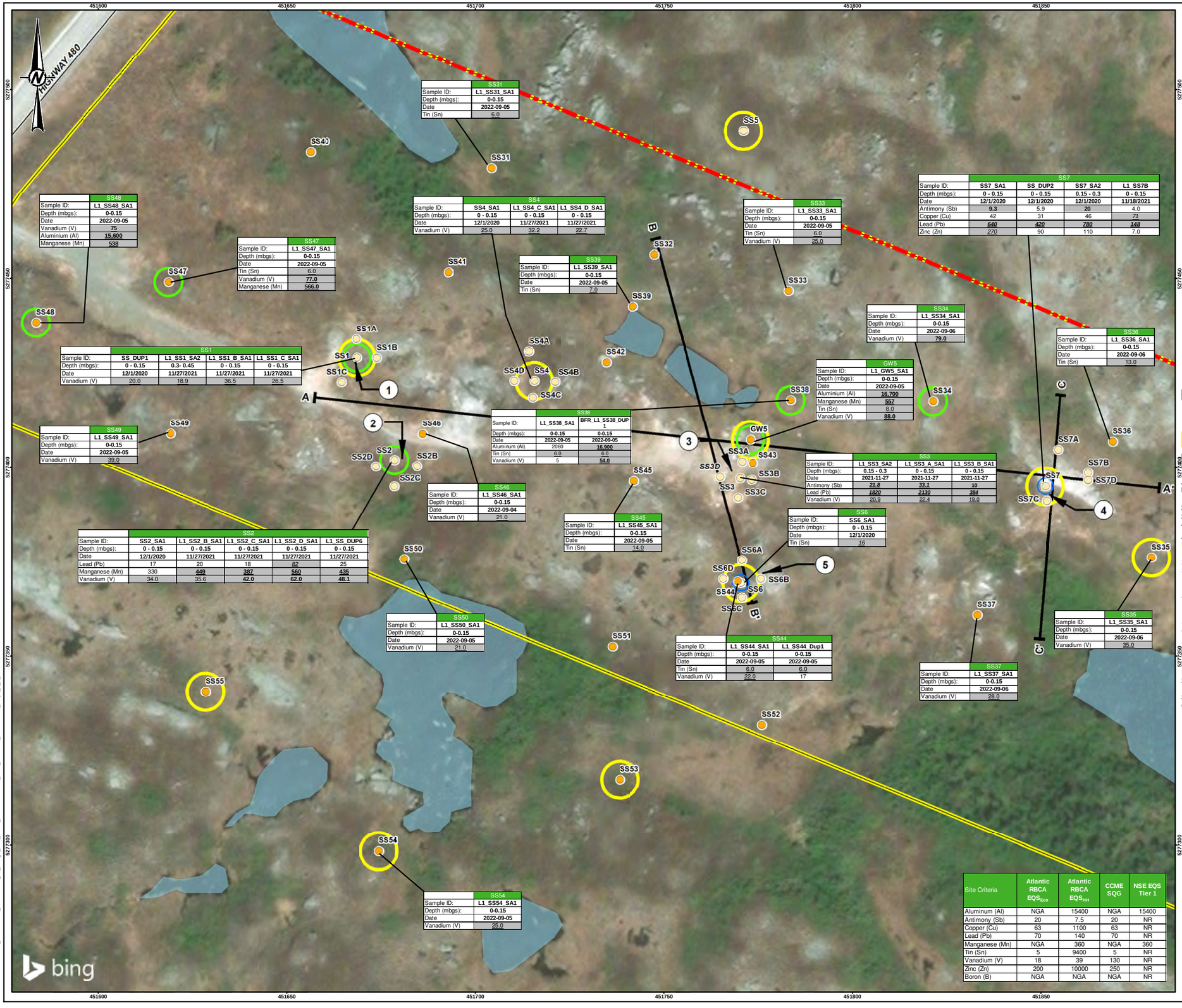
wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE **10A**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_20222532464-0002-HS-0010A.mxd



	SS31
Sample ID:	L1_SS31_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0

	SS48
Sample ID:	L1_SS48_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	75
Aluminium (Al)	15,600
Manganese (Mn)	538

	SS4		
Sample ID:	SS4_SA1	L1_SS4_C_SA1	L1_SS4_D_SA1
Depth (mbgs):	0 - 0.15	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021
Vanadium (V)	25.0	32.2	22.7

	SS33
Sample ID:	L1_SS33_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	25.0

	SS7			
Sample ID:	SS7_SA1	SS_DUP2	SS7_SA2	L1_SS7B
Depth (mbgs):	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15
Date	12/1/2020	12/1/2020	12/1/2020	11/18/2021
Antimony (Sb)	9.3	5.9	20	4.0
Copper (Cu)	42	31	46	71
Lead (Pb)	640	420	780	148
Zinc (Zn)	270	90	110	7.0

	SS47
Sample ID:	L1_SS47_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	77.0
Manganese (Mn)	566.0

	SS39
Sample ID:	L1_SS39_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	7.0

	SS34
Sample ID:	L1_SS34_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	79.0

	SS36
Sample ID:	L1_SS36_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Tin (Sn)	13.0

	SS1			
Sample ID:	SS_DUP1	L1_SS1_SA2	L1_SS1_B_SA1	L1_SS1_C_SA1
Depth (mbgs):	0 - 0.15	0.3- 0.45	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021	11/27/2021
Vanadium (V)	20.0	18.9	36.5	26.5

	GW5
Sample ID:	L1_GW5_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Aluminium (Al)	16,700
Manganese (Mn)	557
Tin (Sn)	8.0
Vanadium (V)	88.0

	SS38	
Sample ID:	L1_SS38_SA1	BFR_L1_SS38_DUP 1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Aluminum (Al)	2060	16,900
Tin (Sn)	6.0	6.0
Vanadium (V)	5	54.0

	SS3		
Sample ID:	L1_SS3_SA2	L1_SS3_A_SA1	L1_SS3_B_SA1
Depth (mbgs):	0.15 - 0.3	0 - 0.15	0 - 0.15
Date	2021-11-27	2021-11-27	2021-11-27
Antimony (Sb)	21.8	33.1	10
Lead (Pb)	1820	2130	384
Vanadium (V)	20.9	22.4	19.0

	SS49
Sample ID:	L1_SS49_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	39.0

	SS46
Sample ID:	L1_SS46_SA1
Depth (mbgs):	0-0.15
Date	2022-09-04
Vanadium (V)	21.0

	SS45
Sample ID:	L1_SS45_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	14.0

	SS6
Sample ID:	SS6_SA1
Depth (mbgs):	0 - 0.15
Date	12/1/2020
Tin (Sn)	16

	SS2				
Sample ID:	SS2_SA1	L1_SS2_B_SA1	L1_SS2_C_SA1	L1_SS2_D_SA1	L1_SS_DUP6
Depth (mbgs):	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021	11/27/2021	11/27/2021
Lead (Pb)	17	20	18	82	25
Manganese (Mn)	330	449	387	560	435
Vanadium (V)	34.0	35.6	42.0	62.0	48.1

	SS50
Sample ID:	L1_SS50_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	21.0

	SS44	
Sample ID:	L1_SS44_SA1	L1_SS44_Dup1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Tin (Sn)	6.0	6.0
Vanadium (V)	22.0	17

	SS37
Sample ID:	L1_SS37_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	28.0

	SS35
Sample ID:	L1_SS35_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	35.0

	SS54
Sample ID:	L1_SS54_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	25.0

Site Criteria	Atlantic RBCA EQS_{Eco}	Atlantic RBCA EQS_{HH}	CCME SQG	NSE EQS Tier 1
Aluminum (Al)	NGA	15400	NGA	15400
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR
Boron (B)	NGA	NGA	NGA	NR

LEGEND

1. APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
2. APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
3. APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
4. APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
5. APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

SITE

APPROXIMATE SOIL SAMPLE LOCATION (2022)

APPROXIMATE SOIL SAMPLE LOCATION (2020/21)

NATURALLY OCCURRING EXCEEDANCE OF BORON

NATURALLY OCCURRING EXCEEDANCE OF CADMIUM

NATURALLY OCCURRING EXCEEDANCE OF IRON

NATURALLY OCCURRING EXCEEDANCE OF SELENIUM

ROADWAY

WATERCOURSE

CROSS-SECTION LOCATION

WATERBODY

PROPOSED ADDITIONAL LEASE AREA

ZONE BOUNDARY

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
4. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 10 20 40

1:1,000 METRES

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE, NL

TITLE

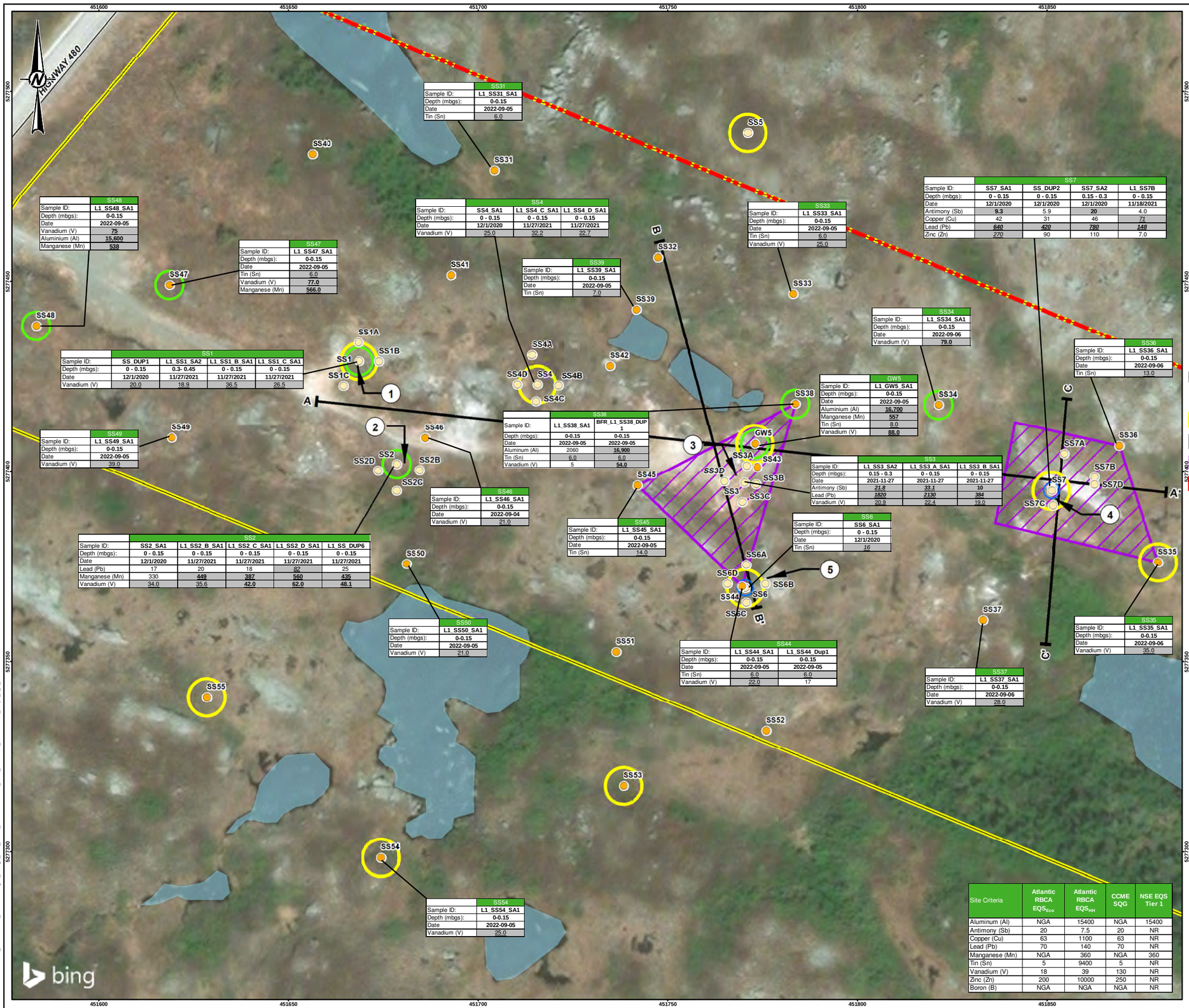
LOCATION 1 - ZONE 1 - FIRING AREA - METALS EXCEEDANCES IN SOIL

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE **10B**



	SS31
Sample ID:	L1_SS31_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0

	SS48
Sample ID:	L1_SS48_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	75
Aluminium (Al)	15,600
Manganese (Mn)	538

	SS4		
Sample ID:	SS4_SA1	L1_SS4_C_SA1	L1_SS4_D_SA1
Depth (mbgs):	0 - 0.15	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021
Vanadium (V)	25.0	32.2	22.7

	SS47
Sample ID:	L1_SS47_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	77.0
Manganese (Mn)	566.0

	SS39
Sample ID:	L1_SS39_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	7.0

	SS33
Sample ID:	L1_SS33_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	25.0

	SS7			
Sample ID:	SS7_SA1	SS_DUP2	SS7_SA2	L1_SS7B
Depth (mbgs):	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15
Date	12/1/2020	12/1/2020	12/1/2020	11/18/2021
Antimony (Sb)	9.3	5.9	20	4.0
Copper (Cu)	42	31	46	71
Lead (Pb)	640	420	780	148
Zinc (Zn)	270	90	110	7.0

	SS34
Sample ID:	L1_SS34_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	79.0

	SS36
Sample ID:	L1_SS36_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Tin (Sn)	13.0

	SS1			
Sample ID:	SS_DUP1	L1_SS1_SA2	L1_SS1_B_SA1	L1_SS1_C_SA1
Depth (mbgs):	0 - 0.15	0.3- 0.45	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021	11/27/2021
Vanadium (V)	20.0	18.9	36.5	26.5

	GW5
Sample ID:	L1_GW5_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Aluminium (Al)	16,700
Manganese (Mn)	557
Tin (Sn)	8.0
Vanadium (V)	88.0

	SS38	
Sample ID:	L1_SS38_SA1	BFR_L1_SS38_DUP 1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Aluminium (Al)	2060	16,900
Tin (Sn)	6.0	6.0
Vanadium (V)	5	54.0

	SS49
Sample ID:	L1_SS49_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	39.0

	SS3		
Sample ID:	L1_SS3_SA2	L1_SS3_A_SA1	L1_SS3_B_SA1
Depth (mbgs):	0.15 - 0.3	0 - 0.15	0 - 0.15
Date	2021-11-27	2021-11-27	2021-11-27
Antimony (Sb)	21.8	33.1	10
Lead (Pb)	1820	2130	384
Vanadium (V)	20.9	22.4	19.0

	SS46
Sample ID:	L1_SS46_SA1
Depth (mbgs):	0-0.15
Date	2022-09-04
Vanadium (V)	21.0

	SS45
Sample ID:	L1_SS45_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	14.0

	SS6
Sample ID:	SS6_SA1
Depth (mbgs):	0 - 0.15
Date	12/1/2020
Tin (Sn)	16

	SS2				
Sample ID:	SS2_SA1	L1_SS2_B_SA1	L1_SS2_C_SA1	L1_SS2_D_SA1	L1_SS_DUP6
Depth (mbgs):	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	12/1/2020	11/27/2021	11/27/2021	11/27/2021	11/27/2021
Lead (Pb)	17	20	18	82	25
Manganese (Mn)	330	449	387	560	435
Vanadium (V)	34.0	35.6	42.0	62.0	48.1

	SS44	
Sample ID:	L1_SS44_SA1	L1_SS44_Dup1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Tin (Sn)	6.0	6.0
Vanadium (V)	22.0	17

	SS35
Sample ID:	L1_SS35_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	35.0

	SS37
Sample ID:	L1_SS37_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	28.0

	SS50
Sample ID:	L1_SS50_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	21.0

	SS54
Sample ID:	L1_SS54_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Vanadium (V)	25.0

Site Criteria	Atlantic RBCA EQS_{Eco}	Atlantic RBCA EQS_{HH}	CCME SQG	NSE EQS Tier 1
Aluminum (Al)	NGA	15400	NGA	15400
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR
Boron (B)	NGA	NGA	NGA	NR

LEGEND

1. APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
2. APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
3. APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
4. APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
5. APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

- APPROXIMATE SOIL SAMPLE LOCATION (2020/21)
- NATURALLY OCCURRING EXCEEDANCE OF BORON
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- CROSS-SECTION LOCATION
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- PROPOSED DELINEATION AREA
- SITE

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
4. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 10 20 40

1:1,000 METRES

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE, NL

TITLE

LOCATION 1 - ZONE 1 - FIRING AREA - DELINEATION OF CONTAMINATED SOIL

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	10C

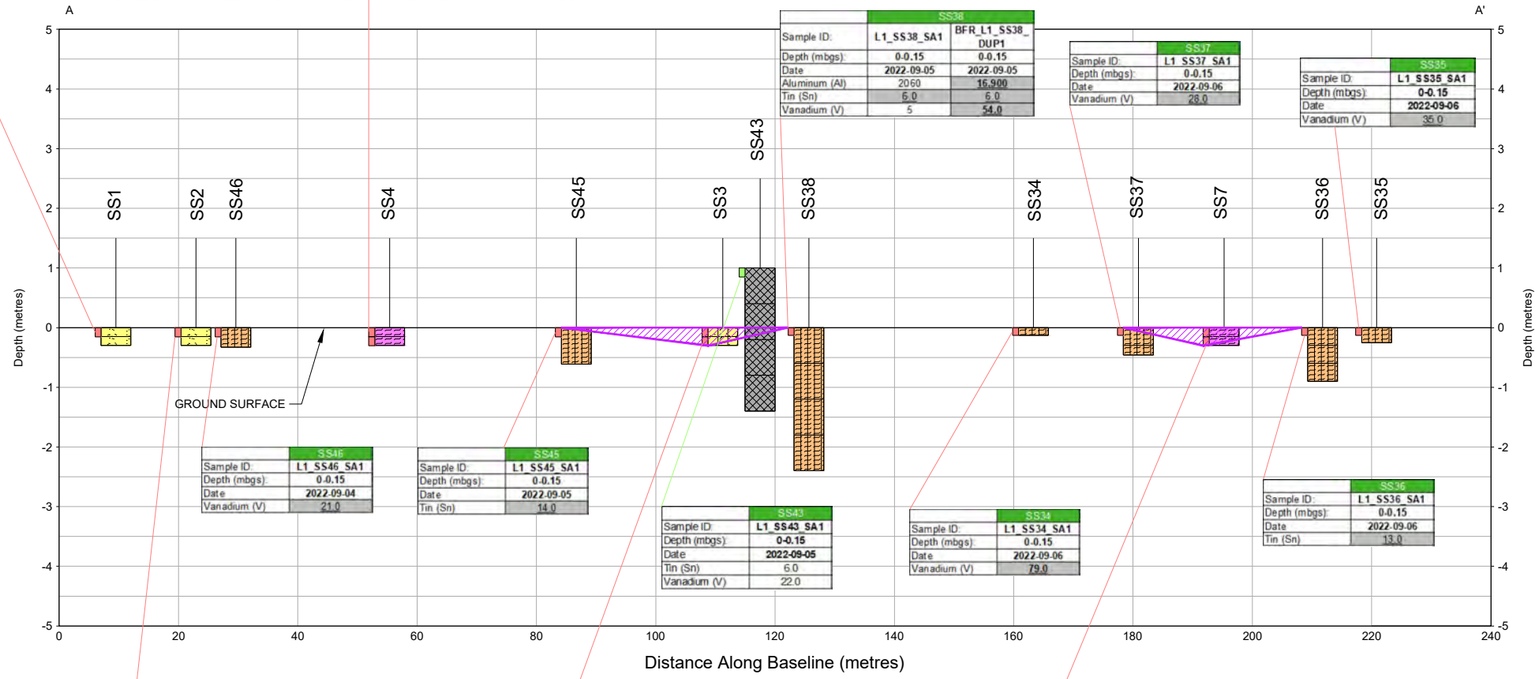
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_2022\22532464-0002-HS-0010C.mxd

Site Criteria	Atlantic RBCA EQS	CCME ISQGs	CCME PELs
Acenaphthene	0.0889	0.00671	0.0889
Chrysene	0.846	0.0571	0.862
Fluoranthene	1.494	0.111	2.355
Pyrene	1.298	0.053	0.875
Arsenic (As)	17	5.9	17
Cadmium (Cd)	3.5	0.60	3.5
Iron (Fe)	43766	NGA	NGA
Lead (Pb)	91.3	35	91.3
Mercury (Hg)	0.486	0.17	0.486

	SS1					
Sample ID:	L1_SS1_SA1	SS_DUP1	L1_SS1_SA2	L1_SS1_A_SA1	L1_SS1_B_SA1	L1_SS1_C_SA1
Depth (mbgs):	0 - 0.15	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Vanadium (V)	18.0	20.0	18.9	17.8	36.5	26.5

	SS4					
Sample ID:	SS4_SA1	L1_SS4_SA2	L1_SS4_A_SA1	L1_SS4_B_SA1	L1_SS4_C_SA1	L1_SS4_D_SA1
Depth (mbgs):	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2021-11-27	2021-11-27	2020-12-01	2021-11-27	2021-11-27
Vanadium (V)	25.0	14.1	18.9	4.0	32.2	22.7



	SS38	
Sample ID:	L1_SS38_SA1	BFR_L1_SS38_DUP1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Aluminum (Al)	2060	16,900
Tin (Sn)	6.0	6.0
Vanadium (V)	5	54.0

	SS37
Sample ID:	L1_SS37_SA1
Depth (mbgs):	0-0.15
Date:	2022-09-06
Vanadium (V)	28.0

	SS35
Sample ID:	L1_SS35_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	35.0

	SS46
Sample ID:	L1_SS46_SA1
Depth (mbgs):	0-0.15
Date	2022-09-04
Vanadium (V)	21.0

	SS45
Sample ID:	L1_SS45_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	14.0

	SS43
Sample ID:	L1_SS43_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	22.0

	SS34
Sample ID:	L1_SS34_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	79.0

	SS36
Sample ID:	L1_SS36_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Tin (Sn)	13.0

	SS2				
Sample ID:	SS2_SA1	L1_SS2_B_SA1	L1_SS2_C_SA1	L1_SS2_D_SA1	L1_SS_DUP6
Depth (mbgs):	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Lead (Pb)	17	20	18	82	25
Manganese (Mn)	330	449	387	560	435
Vanadium (V)	34.0	35.6	42.0	62.0	48.1

	SS3					
Sample ID:	L1_SS3_SA1	L1_SS3_SA2	L1_SS3_A_SA1	L1_SS3_B_SA1	L1_SS3_C_SA1	L1_SS3_D_SA1
Depth (mbgs):	0.0- 0.15	0.15- 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Antimony (Sb)	2.8	21.8	33.1	10	2.0	<0.8
Lead (Pb)	13	1820	2130	384	41	15
Vanadium (V)	17.0	20.9	22.4	19.0	15.5	16.8

	SS7					
Sample ID:	BFR_SS7_SA1	BFR_SS7_SA2	L1_SS7_A_SA1	L1_SS7_B_SA1	L1_SS7_C_SA1	L1_SS7_D_SA1
Depth (mbgs):	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Antimony (Sb)	9.3	20	<1.0	4.0	3.0	<1.0
Copper (Cu)	42	46	<2.0	71	11	5.0
Lead (Pb)	640	780	8.1	148	56	22
Zinc (Zn)	270	110	6.0	7.0	41	55

LEGEND

BOREHOLE/MONITORING IDENTIFIER — SS1

GROUNDWATER LEVEL

STRATIGRAPHY

WELL SCREEN

SAND

SILTY SAND

ORGANIC SILT

TOPSOIL

FILL

SAMPLE MEETING APPLICABLE MECP STANDARD

SAMPLE EXCEEDING APPLICABLE MECP STANDARD

EXTENT OF SOIL IMPACTS

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICIZED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FOR DETAILED STRATIGRAPHY SEE RECORD OF BOREHOLE LOGS
3. FOR CROSS-SECTION LOCATION SEE FIGURE 10B
4. ALL SOIL, SEDIMENT, AND SURFACE WATER LOCATIONS ARE APPROXIMATE, MONITORING WELLS HAVE BEEN SURVEYED
5. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
6. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
7. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE
8. ALL CONCENTRATIONS IN mg/kg

0 2.5 5
1:100 VERTICAL METRES

0 25 50
1:1,000 HORIZONTAL METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
CROSS SECTION A-A'

CONSULTANT

YYYY-MM-DD	2023-02-17
DESIGNED	
PREPARED	DM/SA
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	10D

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

25 mm

Path: \\goldfer.gdiscomplexdata\office\Ontario\SIM\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_2022\ | File Name: 22532464-0002HS-010D.dwg | Last Edited By: gld_jmckenzie Date: 2023-02-17 Time:10:44:38 AM | Printed By: gld_jmckenzie Date: 2023-03-27 Time:10:08:46 PM

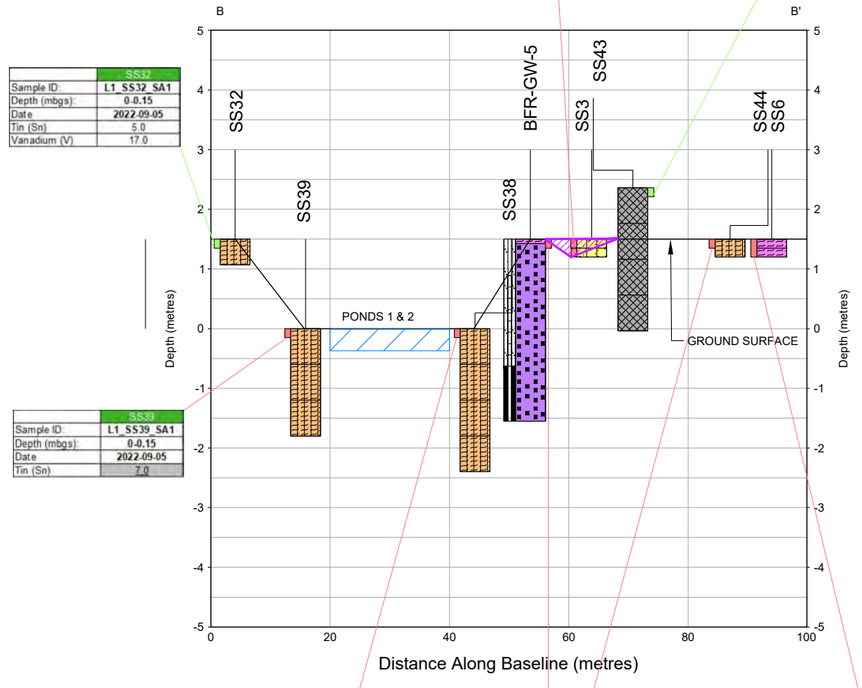
Site Criteria	Atlantic RBCA EQS_{Eco}	Atlantic RBCA EQS_{HH}	CCME SQG	NSE EQS Tier 1
Aluminum (Al)	NGA	15400	NGA	15400
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR
Boron (B)	NGA	NGA	NGA	NR

	SS3					
Sample ID:	L1_SS3_SA1	L1_SS3_SA2	L1_SS3_A_SA1	L1_SS3_B_SA1	L1_SS3_C_SA1	L1_SS3_D_SA1
Depth (mbgs):	0.0- 0.15	0.15- 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2021-11-27	2021-11-27	2021-11-27	2021-11-27	2021-11-27
Antimony (Sb)	2.8	***21.8***	***33.1***	**10**	2.0	<0.8
Lead (Pb)	13	***1820***	***2130***	***384***	41	15
Vanadium (V)	17.0	20.9	22.4	19.0	15.5	16.8

	SS43
Sample ID:	L1_SS43_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	6.0
Vanadium (V)	22.0

	SS37
Sample ID:	L1_SS37_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Vanadium (V)	28.0

	SS32
Sample ID:	L1_SS32_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	5.0
Vanadium (V)	17.0

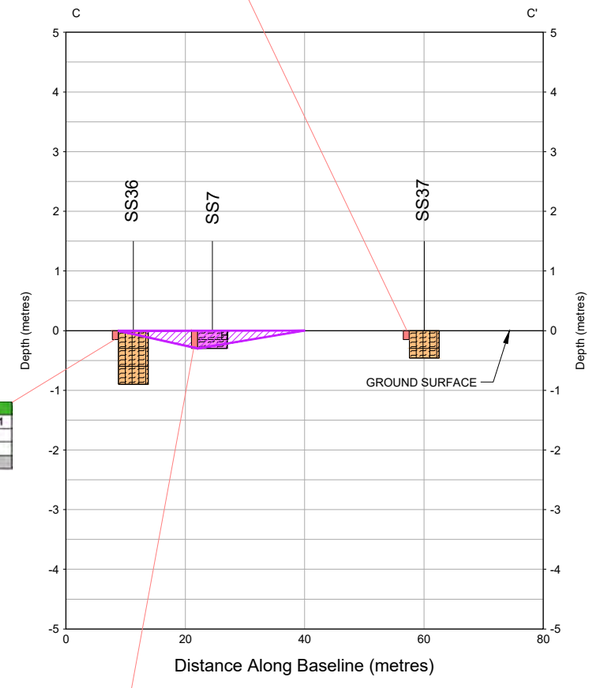


	SS39
Sample ID:	L1_SS39_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Tin (Sn)	7.0

	SS38	
Sample ID:	L1_SS38_SA1	BFR_L1_SS38_DUP1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Aluminum (Al)	2060	**16,900**
Tin (Sn)	5.0	5.0
Vanadium (V)	5	**54.0**

	GW5
Sample ID	L1_GW5_SA1
Depth (mbgs):	0-0.15
Date	2022-09-05
Aluminium (Al)	**16,700**
Manganese (Mn)	**557**
Tin (Sn)	6.0
Vanadium (V)	**88.0**

	SS44	
Sample ID:	L1_SS44_SA1	L1_SS44_Dup1
Depth (mbgs):	0-0.15	0-0.15
Date	2022-09-05	2022-09-05
Tin (Sn)	5.0	6.0
Vanadium (V)	22.0	17

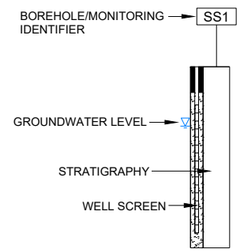


	SS36
Sample ID:	L1_SS36_SA1
Depth (mbgs):	0-0.15
Date	2022-09-06
Tin (Sn)	13.0

	SS7					
Sample ID:	BFR_SS7_SA1	BFR_SS7_SA2	L1_SS7_A_SA1	L1_SS7_B_SA1	L1_SS7_C_SA1	L1_SS7_D_SA1
Depth (mbgs):	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Antimony (Sb)	**9.3**	***20***	<1.0	4.0	3.0	<1.0
Copper (Cu)	42	46	<2.0	***71***	11	5.0
Lead (Pb)	***640***	***780***	8.1	***148***	56	22
Zinc (Zn)	***270***	110	6.0	7.0	41	55

	SS6					
Sample ID:	BFR_SS6_SA1	BFR_SS6_SA2	L1_SS6_A_SA1	L1_SS6_B_SA1	L1_SS6_C_SA1	L1_SS6_D_SA1
Depth (mbgs):	0 - 0.15	0.15 - 0.3	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Tin (Sn)	***16***	<1.0	3.0	<2.0	4.0	3.0

LEGEND



- DIORITE
- SAND
- SILTY SAND
- ORGANIC SILT
- TOPSOIL
- FILL
- SAMPLE MEETING APPLICABLE MECP STANDARD
- SAMPLE EXCEEDING APPLICABLE MECP STANDARD
- EXTENT OF SOIL IMPACTS

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICIZED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FOR DETAILED STRATIGRAPHY SEE RECORD OF BOREHOLE LOGS
3. FOR CROSS-SECTION LOCATION SEE FIGURE 10B
4. ALL SOIL, SEDIMENT, AND SURFACE WATER LOCATIONS ARE APPROXIMATE, MONITORING WELLS HAVE BEEN SURVEYED
5. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
6. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
7. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE
8. ALL CONCENTRATIONS IN mg/kg

0 2.5 5
1:100 VERTICAL METRES

0 25 50
1:1,000 HORIZONTAL METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
CROSS SECTION B-B' AND C-C'

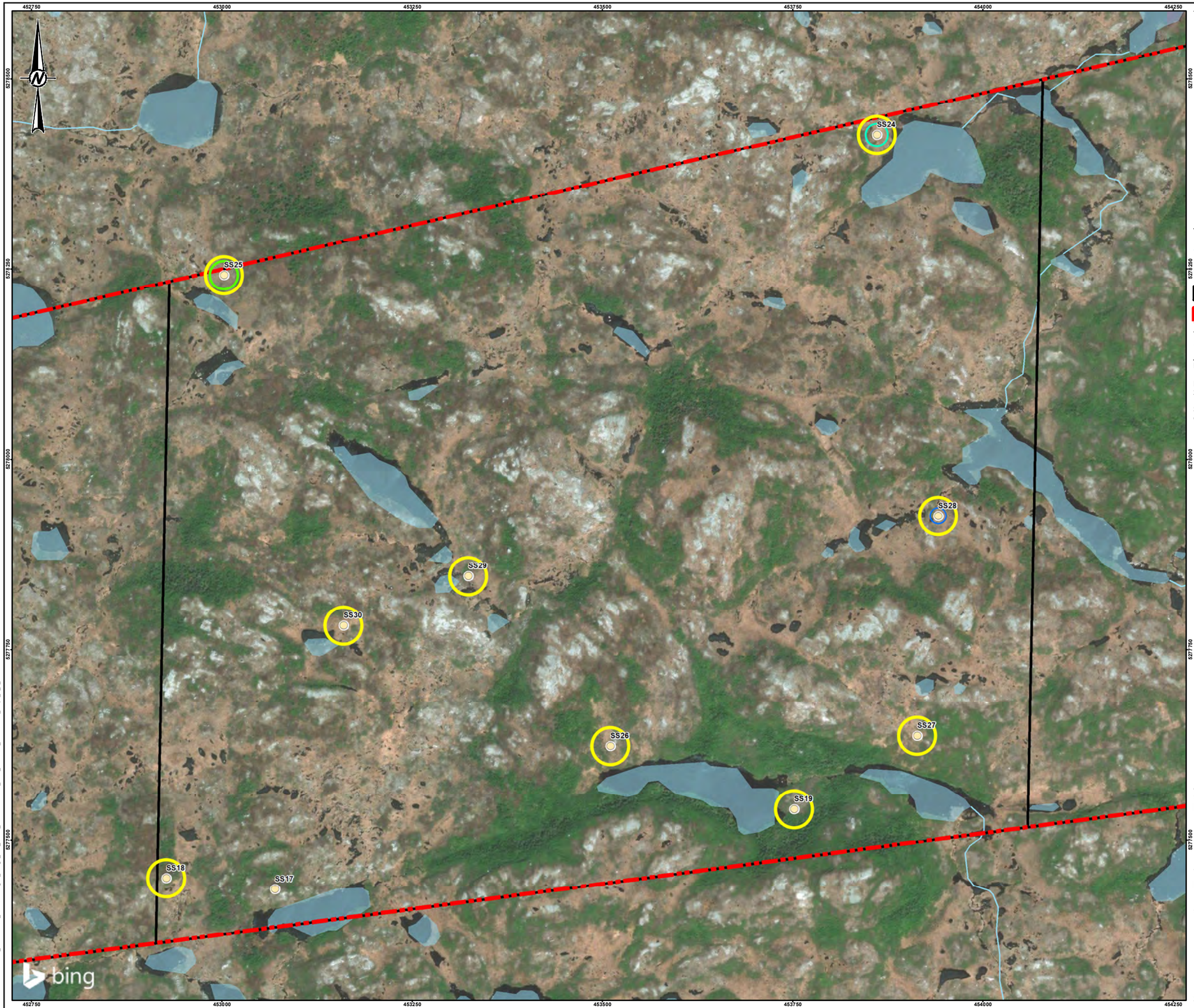
CONSULTANT
wsp

YYYY-MM-DD	2023-02-17
DESIGNED	
PREPARED	DM/SA
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	10E

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

0 25 mm



LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2020/21)
- NATURALLY OCCURRING EXCEEDANCE OF BORON
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 2 - METALS EXCCEEDANCES IN SOIL

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	11

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
0 25mm

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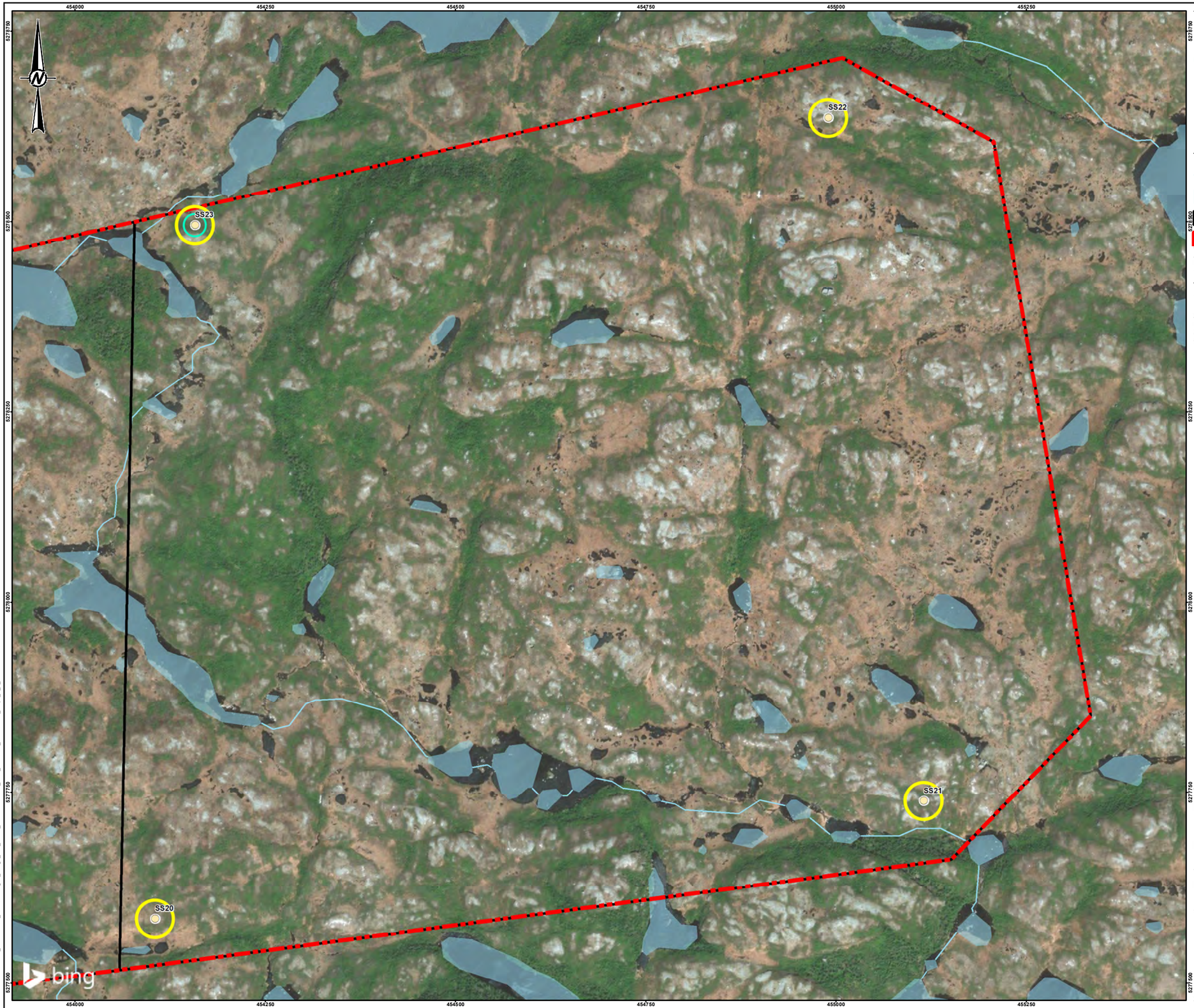


LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2020)
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 3 - METALS EXCEEDANCES IN SOIL

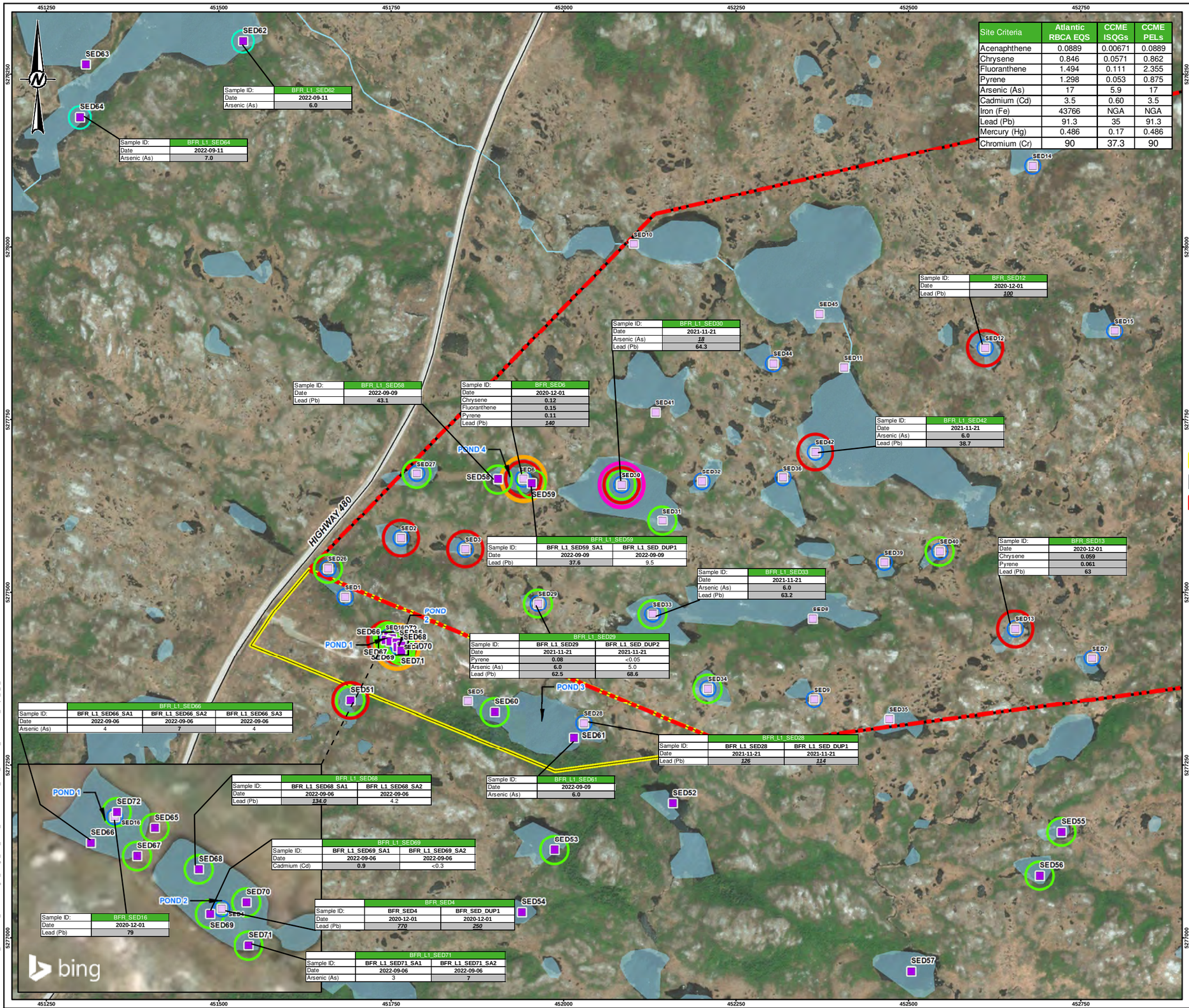
CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	**12**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: S:\Clients\DeBence_Construction_Canada\Burgeo_Range_Site_NL\99-PROJ\22532464_DCC_Enviro\40_PRO\0002_Steps_5_7_20222253246 4-0002-HS-0012.mxd



LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2022)
- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020/21)
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- NATURALLY OCCURRING EXCEEDANCE OF MERCURY
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF CCME ISQGs
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME PELs

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SEDIMENT
4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) INTERIM SEDIMENT QUALITY GUIDELINES (ISQGS) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER. PRESENTED FOR INFORMATIONAL PURPOSES ONLY.
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) PROBABLE EFFECT LEVELS (PELS) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER
6. ASSUMED TEMPERATURE AND AVERAGE pH USED FOR GUIDELINES WITH LOOKUP TABLE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 100 200 400
1:5,500 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 1 - EXCEEDANCES IN SEDIMENT

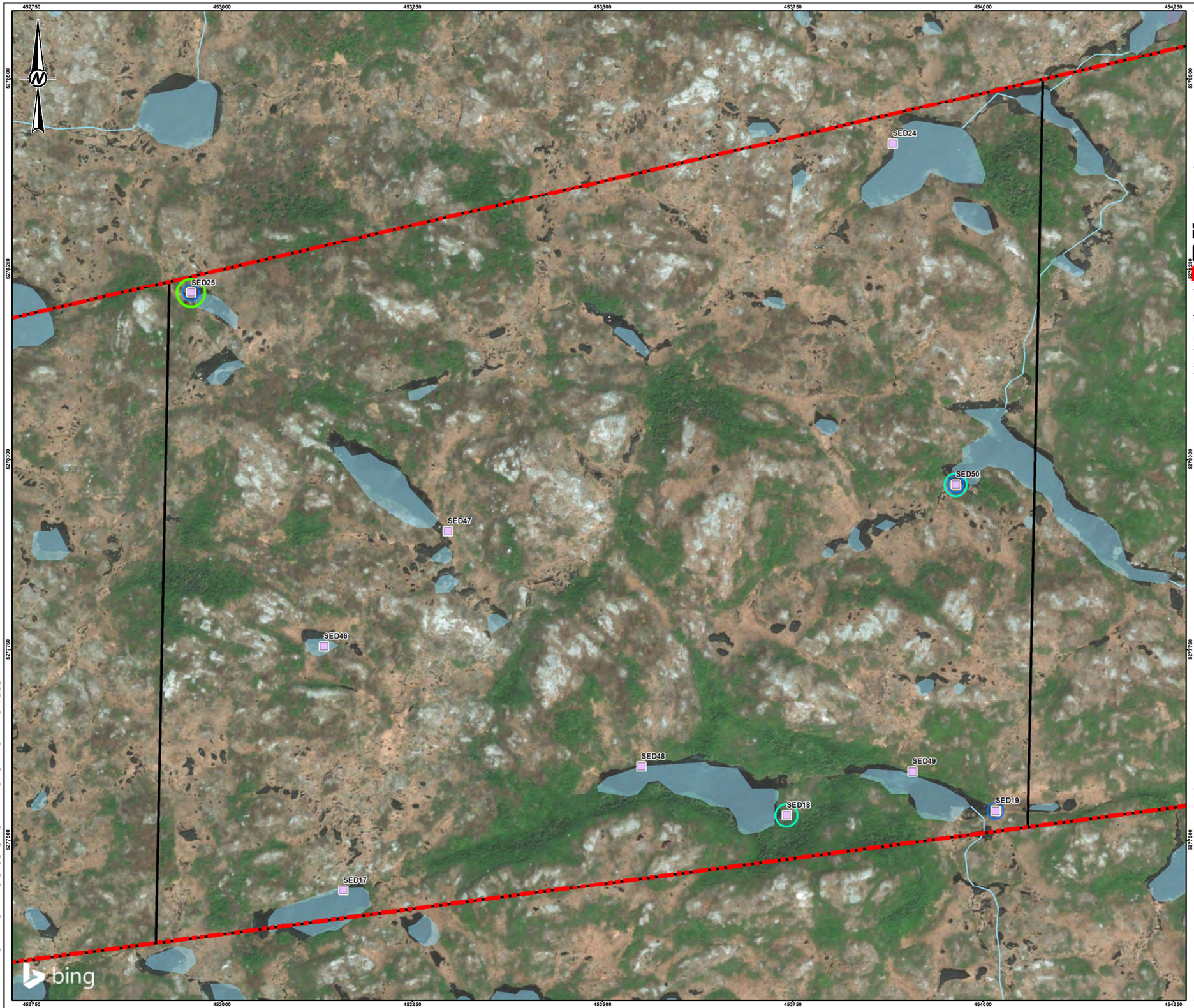
CONSULTANT
wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE 13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PROJ\22532464_DCC_Enviro\40_PROD\0002_Sites_5_7_2022\22532464-0002-HS-0013.mxd



LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020/21)
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 2 - EXCEEDANCES IN SEDIMENT

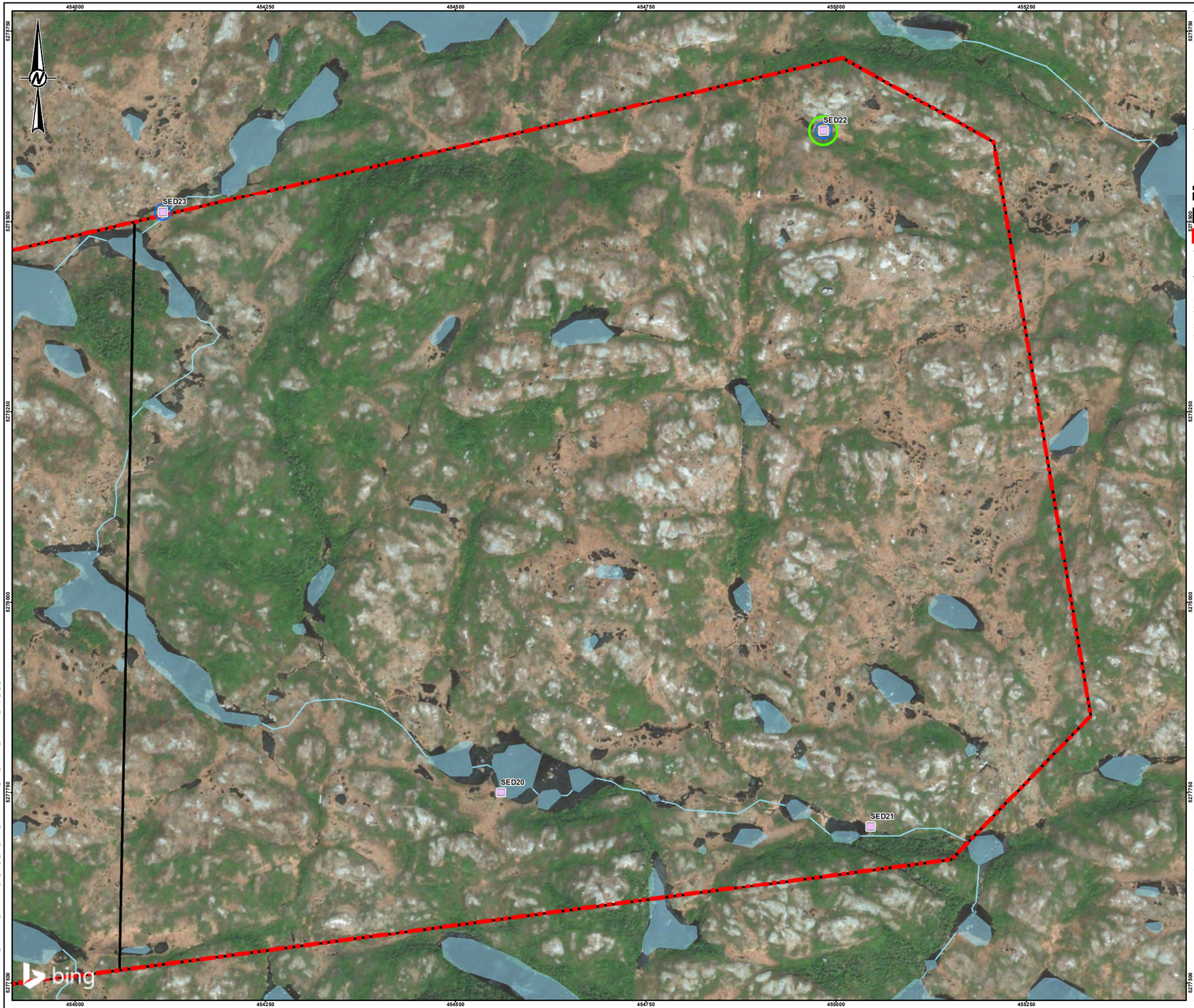
CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	14

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PROJ\22532464_DCC_Enviro\40_PROD\002_Steps_5_7_20222253246 4-0002-HIS-0014.mxd



LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2020)
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 3 - EXCEEDANCES IN SEDIMENT

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	15

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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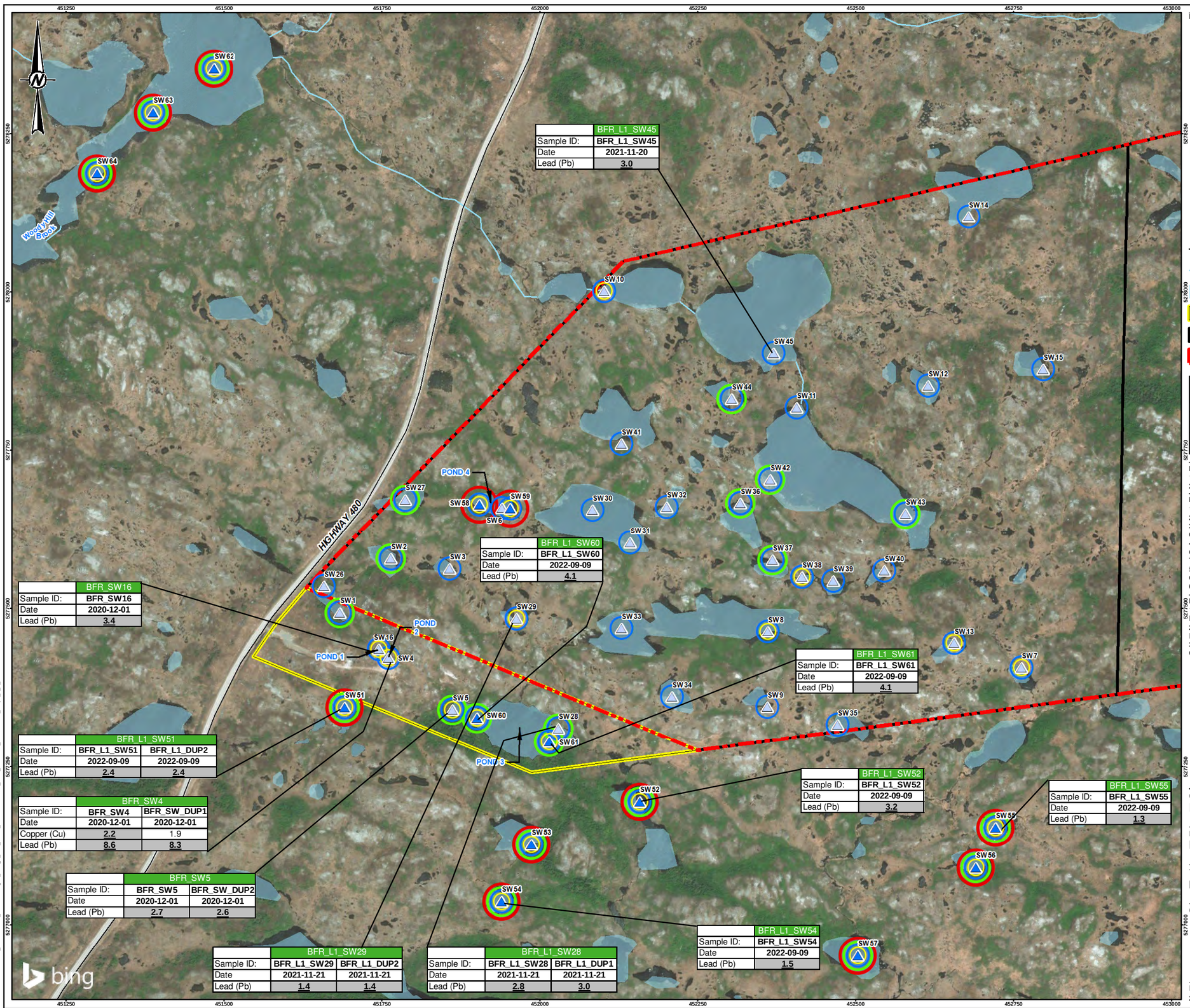
451250 451500 451750 452000 452250 452500 452750 453000

5278250 5278000 5277750 5277500 5277250 5277000



	BFR_L1_SW45
Sample ID:	**BFR_L1_SW45**
Date	**2021-11-20**
Lead (Pb)	**3.0**

	BFR_L1_SW60
Sample ID:	**BFR_L1_SW60**
Date	**2022-09-09**
Lead (Pb)	**4.1**

	BFR_SW16
Sample ID:	**BFR_SW16**
Date	**2020-12-01**
Lead (Pb)	**3.4**

	BFR_L1_SW61
Sample ID:	**BFR_L1_SW61**
Date	**2022-09-09**
Lead (Pb)	**4.1**

	BFR_L1_SW51	BFR_L1_DUP2
Sample ID:	**BFR_L1_SW51**	**BFR_L1_DUP2**
Date	**2022-09-09**	**2022-09-09**
Lead (Pb)	**2.4**	**2.4**

	BFR_SW4	
Sample ID:	**BFR_SW4**	**BFR_SW_DUP1**
Date	**2020-12-01**	**2020-12-01**
Copper (Cu)	**2.2**	1.9
Lead (Pb)	**8.6**	**8.3**

	BFR_L1_SW52
Sample ID:	**BFR_L1_SW52**
Date	**2022-09-09**
Lead (Pb)	**3.2**

	BFR_L1_SW55
Sample ID:	**BFR_L1_SW55**
Date	**2022-09-09**
Lead (Pb)	**1.3**

	BFR_SW5	
Sample ID:	**BFR_SW5**	**BFR_SW_DUP2**
Date	**2020-12-01**	**2020-12-01**
Lead (Pb)	**2.7**	**2.6**

	BFR_L1_SW54
Sample ID:	**BFR_L1_SW54**
Date	**2022-09-09**
Lead (Pb)	**1.5**

	BFR_L1_SW29	BFR_L1_DUP2
Sample ID:	**BFR_L1_SW29**	**BFR_L1_DUP2**
Date	**2021-11-21**	**2021-11-21**
Lead (Pb)	**1.4**	**1.4**

	BFR_L1_SW28	BFR_L1_DUP1
Sample ID:	**BFR_L1_SW28**	**BFR_L1_DUP1**
Date	**2021-11-21**	**2021-11-21**
Lead (Pb)	**2.8**	**3.0**

bing

LEGEND

- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2022)
- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020/21)
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF MERCURY
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Site Criteria	Atlantic RBCA EQS	CCME WQGs
Copper (Cu)	2	2
Lead (Pb)	1	1
Iron (Fe)	300	300
Mercury (Hg)	0.026	0.026
Aluminum (Al)	5	5

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE CCME WQS

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN µg/L
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SURFACE WATER (FRESH WATER)
4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) WATER QUALITY GUIDELINES (WQGS) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM
5. AVERAGE pH AND WATER HARDNESS VALUES USED FOR CALCULATING VARIABLE GUIDELINES
6. NGA = NO GUIDELINE AVAILABLE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 60 120 240

1:6,000 METRES

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE, NL

TITLE

LOCATION 1 - ZONE 1 - EXCEEDANCES IN SURFACE WATER

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	**16**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 0 25mm

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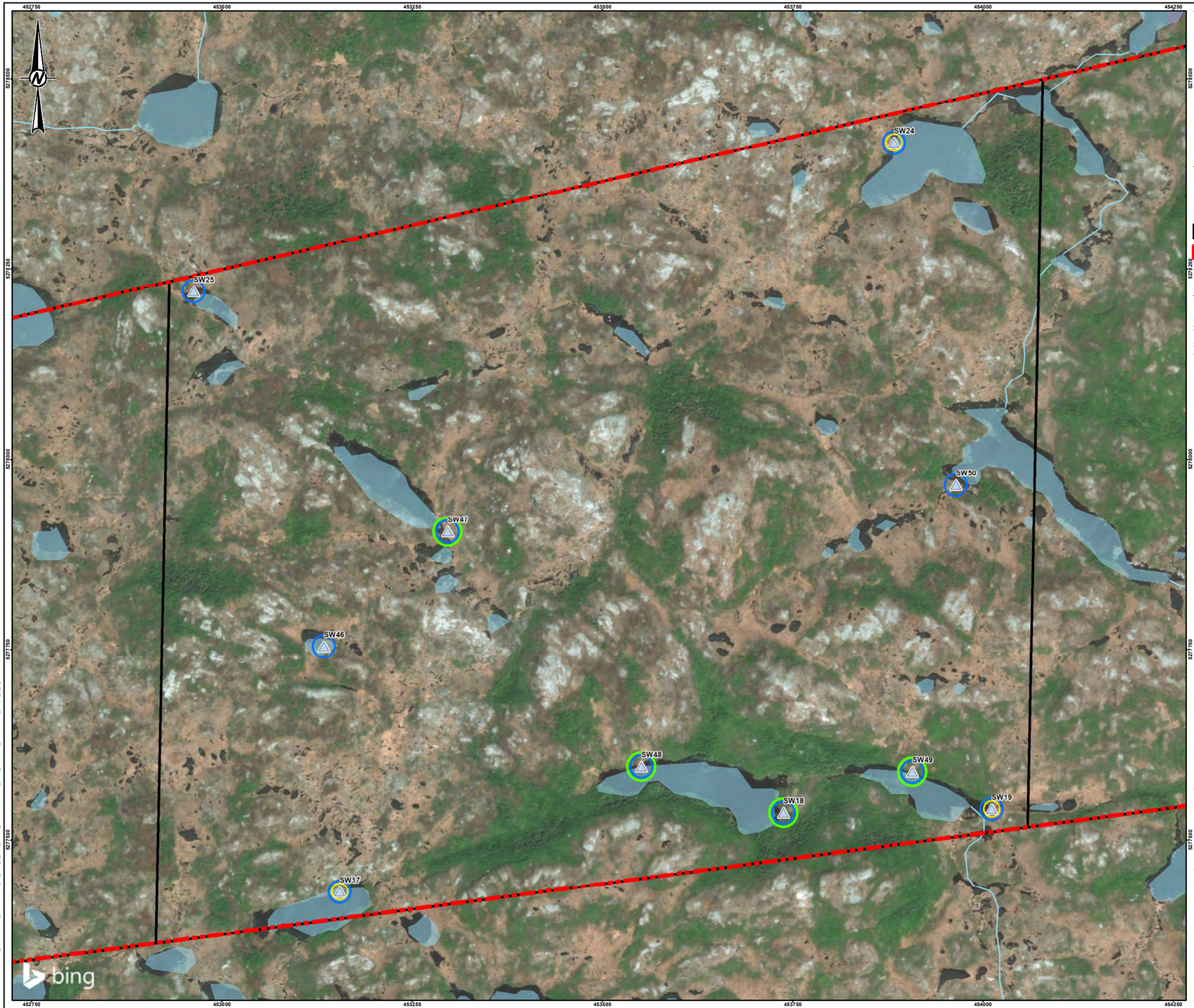

LEGEND

- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020/21)
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 2 - EXCEEDANCES IN SURFACE WATER

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	17

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

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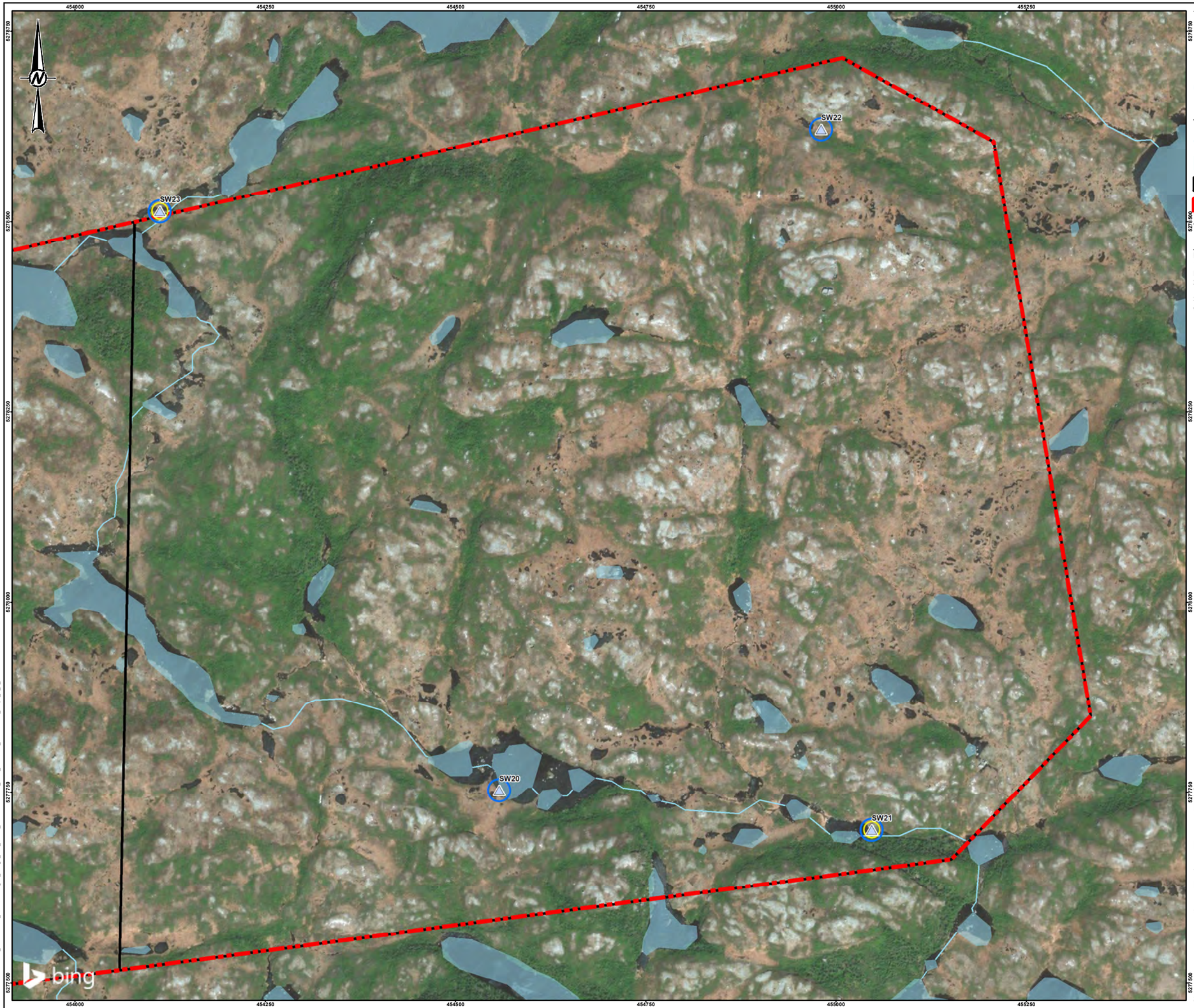


LEGEND

- APPROXIMATE SURFACE WATER SAMPLE LOCATION (2020)
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 3 - EXCEEDANCES IN SURFACE WATER

CONSULTANT

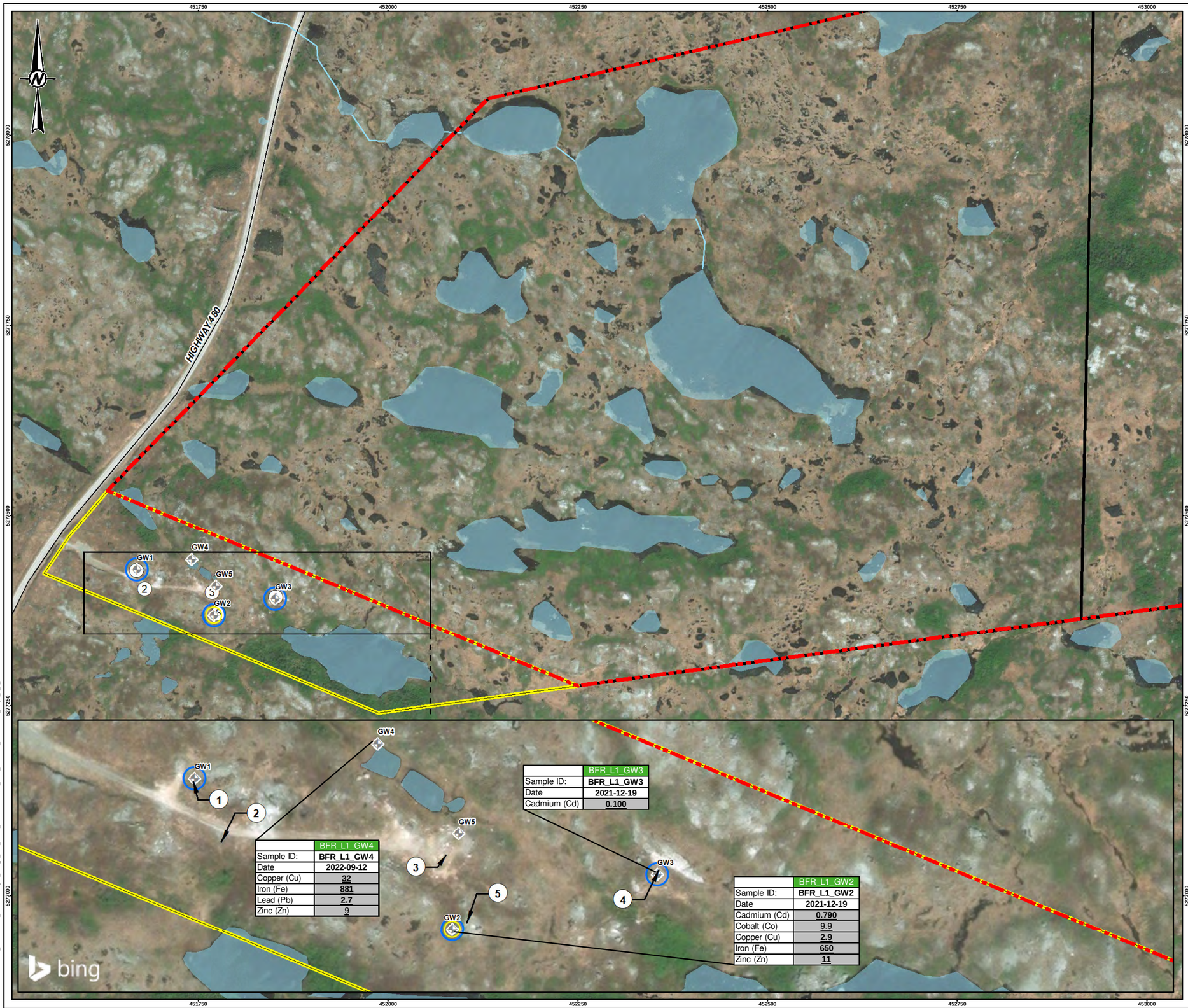
wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	18

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99-PROJ\22532464_DCC_Enviro\40_PRO\0002_Steps_5_7_20222253246 4-0002-HS-0018.mxd



LEGEND

- APPROXIMATE GROUNDWATER SAMPLE LOCATION (2021)
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- EXCEEDANCE OF ALUMINUM SITE CRITERIA
- (1) APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- (2) APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- (3) APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- (4) APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- (5) APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Site Criteria	Atlantic RBCA EQS	FIGQGs
Total Cadmium (Cd)	0.09	0.09
Total Cobalt (Co)	1	NGA
Total Copper (Cu)	2	2
Total Iron (Fe)	300	300
Total Zinc (Zn)	7	10
Total Lead (Pb)	1	1

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. UNDERLINED AND SHADED = EXCEEDANCE OF FIGQGs

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN µg/L
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR GROUNDWATER, DISCHARGE TO FRESH WATER, <10 m FROM SURFACE WATER BODY (2021).
4. FEDERAL INTERIM GROUNDWATER QUALITY GUIDELINES FOR FEDERAL CONTAMINATED SITES, JUNE 2016 V4 – TABLE 3: RESIDENTIAL/PARKLAND LAND, COARSE GRAINED SOIL.
5. NGA = NO GUIDELINE AVAILABLE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

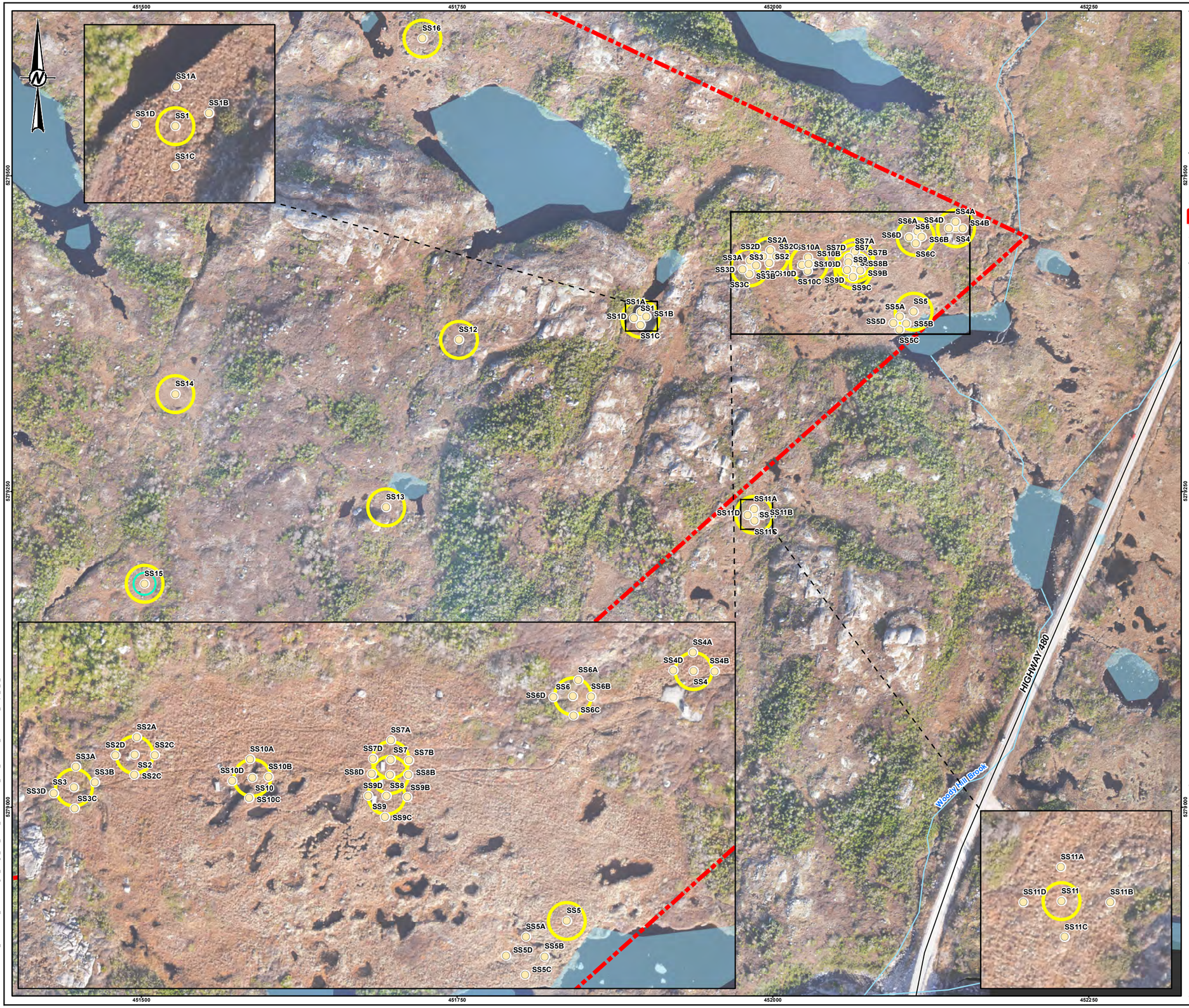
PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - ZONE 1 - EXCEEDANCES IN GROUNDWATER

CONSULTANT
wsp

YYYY-MM-DD	2023-03-28
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	19



LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2021)
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200

1:3,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - METALS EXCEEDANCES IN SOIL

CONSULTANT

wsp

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	**20**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

0

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LEGEND

- APPROXIMATE SEDIMENT SAMPLE LOCATION (2021)
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

Site Criteria	Atlantic RBCA EQS	CCME ISQGs	CCME PELs
Acenaphthene	0.0889	0.00671	0.0889
Chrysene	0.846	0.0571	0.862
Fluoranthene	1.494	0.111	2.355
Pyrene	1.298	0.053	0.875
Arsenic (As)	17	5.9	17
Cadmium (Cd)	3.5	0.60	3.5
Iron (Fe)	43766	NGA	NGA
Lead (Pb)	91.3	35	91.3
Mercury (Hg)	0.486	0.17	0.486
Chromium (Cr)	90	37.3	90

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF CCME ISQGS
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME PELS

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SEDIMENT
4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) INTERIM SEDIMENT QUALITY GUIDELINES (ISQGS) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER. PRESENTED FOR INFORMATIONAL PURPOSES ONLY.
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) PROBABLE EFFECT LEVELS (PELS) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER
6. ASSUMED TEMPERATURE AND AVERAGE pH USED FOR GUIDELINES WITH LOOKUP TABLE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:3,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - EXCEEDANCES IN SEDIMENT

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE **21**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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LEGEND

- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF ZINC
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

Site Criteria	Atlantic RBCA EQS	CCME WQGs
Copper (Cu)	2	2
Lead (Pb)	1	1
Iron (Fe)	300	300
Mercury (Hg)	0.026	0.026
Aluminum (Al)	5	5

EXCEEDANCE IDENTIFICATION

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE CCME WQS

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN µg/L
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SURFACE WATER (FRESH WATER)
4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) WATER QUALITY GUIDELINES (WQGS) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM
5. AVERAGE pH AND WATER HARDNESS VALUES USED FOR CALCULATING VARIABLE GUIDELINES
6. NGA = NO GUIDELINE AVAILABLE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:3,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - EXCEEDANCES IN SURFACE WATER

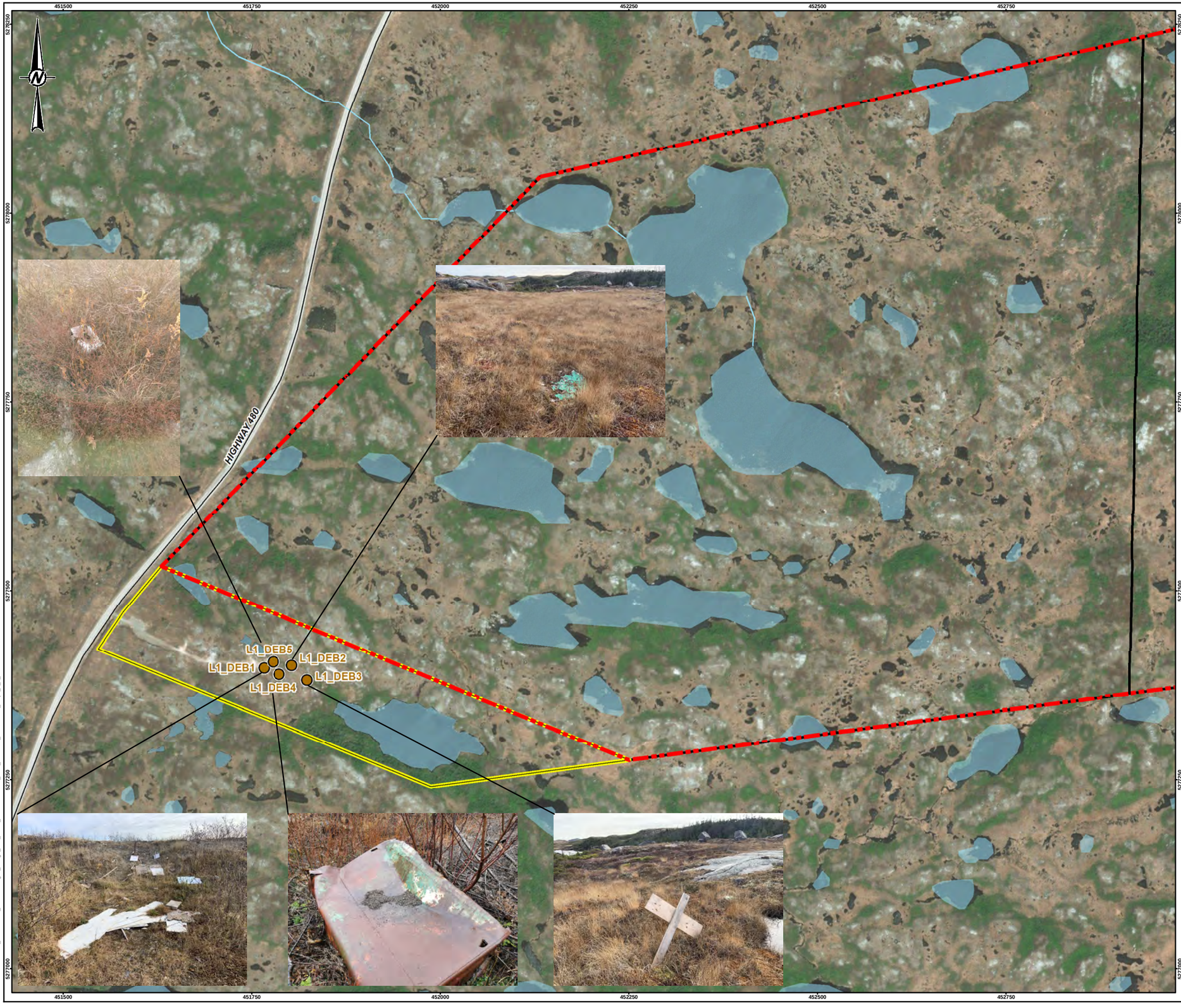
CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	22

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_2022\22532464-0002-HS-0022.mxd



LEGEND

- APPROXIMATE DEBRIS LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m^3
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m^3
L1_DEB_3	Wooden stakes and cardboard target.	~1m^3
L1_DEB_4	Rusted tank used as target. Includes spent ammunition, spent rifle cartridges and spent ammunition.	~1m^3
L1_DEB_5	Rusted Kitchen sink used as target. Includes spent ammunition.	<1m^3

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 1 - DEBRIS LOCATIONS

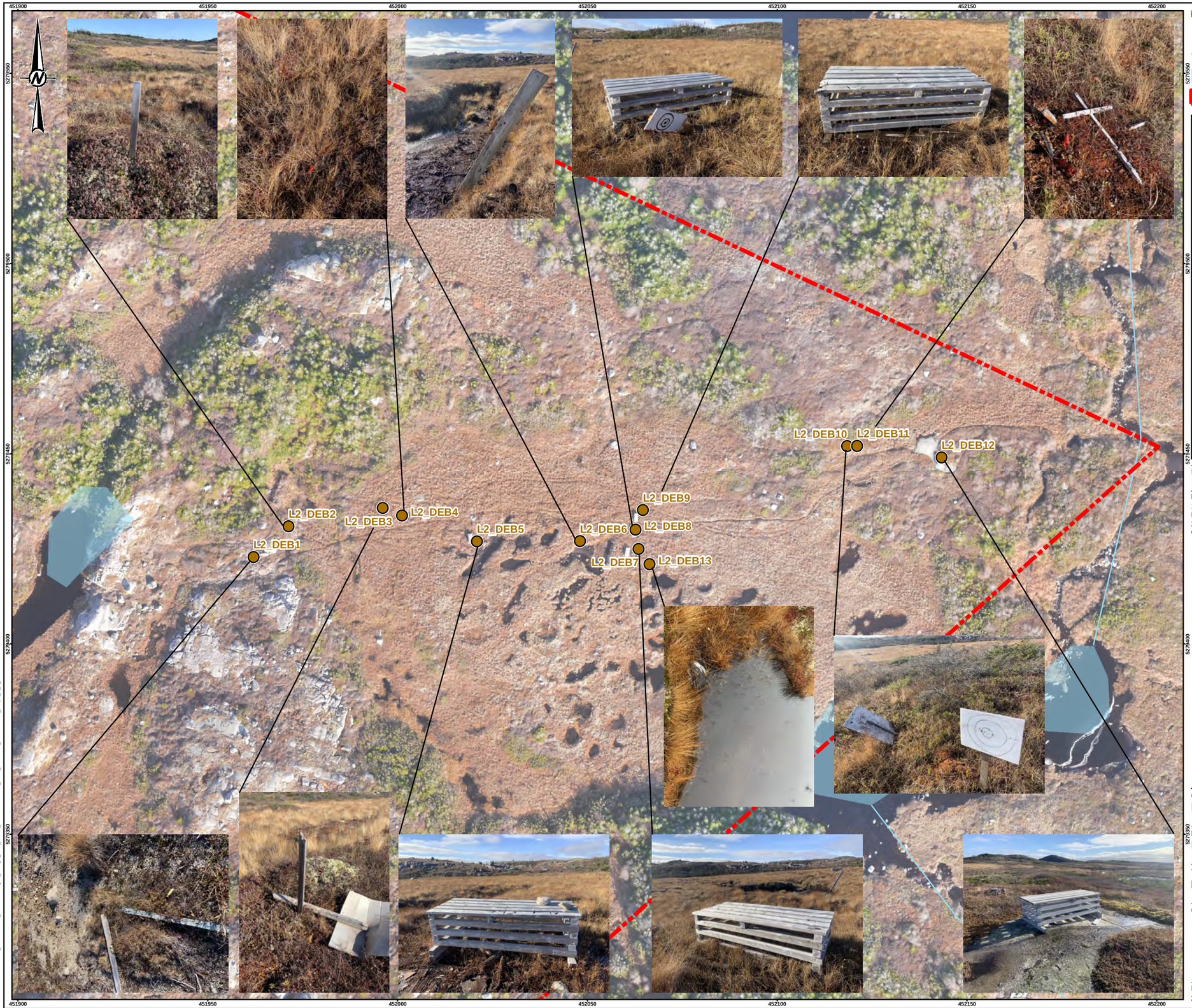
CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0002	0	23

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PROD\0002_Steps_5_7_2022\22532464-0002-HS-0023.mxd



LEGEND

- APPROXIMATE DEBRIS LOCATION
- WATERCOURSE
- WATERBODY
- SITE

Debris ID	Description	Approximate Quantity
L2_DEB_1	Wooden stake target and spent ammunition.	<1m^3
L2_DEB_2	Wooden stakes and spent shotgun shells.	<1m^3
L2_DEB_3	Wooden stakes and cardboard target.	<1m^3
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m^3
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_6	Wooden plank target	<1m^3
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m^3
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m^3
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m^3
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_13	Wooden stake and spent shot gun shells	~1m^3

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 10 20 40
1:1,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE, NL

TITLE
LOCATION 2 - DEBRIS LOCATIONS

CONSULTANT

YYYY-MM-DD	2023-03-27
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO. 22532464 | CONTROL 0002 | REV. 0 | FIGURE **24**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PRO\22532464_DCC_Enviro\40_PRO\0002_Steps_5_7_20222253246 4-0002-HS-0024.mxd

APPENDIX A

Photographs

Photo 1: BFR_L1_SS31 location, 3 samples, stop at 1m, no bedrock

Photo 2: BFR_L1_SS32 location, 1 sample and bedrock

Photo 3: BFR_L1_SS33 location, 1 sample and bedrock

Photo 4: BFR_L1_SS34 location, 1 sample and bedrock

Photo 5: BFR_L1_SS35 location, 1 samples and bedrock

Photo 6: BFR_L1_SS36 location, 3 samples

Photo 7: BFR_L1_SS37 location, 2 sample and bedrock

Photo 8: BFR_L1_SS37 location, 2 sample and bedrock, facing high activity pond

Photo 9: BFR_L1_SS38 location, 3 sample no bedrock, run 3 (1.21mbgs – 1.83mbgs)

Photo 10: BFR_L1_SS38 location, 3 sample no bedrock, run 1 (0 – 0.61mbgs)

Photo 11: BFR_L1_SS39 location, 3 sample, no bedrock

Photo 12: BFR_L1_SS39 location, 3 sample, no bedrock

Photo 13: BFR_L1_SS40 location, 1 sample and bedrock

Photo 14: BFR_L1_SS40 location, 1 sample and bedrock

Photo 15: BFR_L1_SS41 location, 1 sample and bedrock

Photo 16: BFR_L1_SS42 location, 2 sample and bedrock

Photo 17: BFR_L1_SS43 location, 4 sample and bedrock

Photo 18: BFR_L1_SS44 location, 1 sample and bedrock

Photo 19: BFR_L1_SS45 location, 1 sample and bedrock

Photo 20: BFR_L1_SS46 location, 1 sample and bedrock

Photo 21: BFR_L1_SS47 location, 1 sample and bedrock, surrounding

Photo 22: BFR_L1_SS47 location, 1 sample and bedrock

Photo 23: BFR_L1_SS48 location, 1 sample and bedrock

Photo 24: BFR_L1_SS49 location, 1 sample and bedrock

Photo 25: BFR_L1_SS50 location, 1 sample and bedrock

Photo 26: BFR_L1_SS50 location, 1 sample and bedrock, surroundings

Photo 27: BFR_L1_SS51 location, 1 sample and bedrock

Photo 28: BFR_L1_SS52 location, 2 sample and bedrock

Photo 29: BFR_L1_SS53 location, 3 sample

Photo 30: BFR_L1_SS54 location, 1 sample and bedrock

Photo 31: BFR_L1_SS54 location, 1 sample and bedrock

Photo 32: BFR_L1_SS56 location, 2 samples, no bedrock

Photo 33: BFR_L1_SS57 location, 2 samples and bedrock

Photo 34: BFR_L1_SS58 location, 2 samples and bedrock

Photo 35: BFR_L1_SS59 location, 1 samples and bedrock

Photo 36: BFR_L1_SS60 location, 2 samples no bedrock

Photo 37: BFR_L1_SS61 location, 2 samples no bedrock

Photo 38: BFR_L1_SS62 location, 2 samples and bedrock

Photo 39: BFR_L1_SS63 location, 2 samples and bedrock

Photo 40: BFR_L1_SS64 location, 2 samples no bedrock

Photo 41: BFR_L1_SS65 location, 2 samples and bedrock

Photo 42: BFR_L1_SED51 location, 1 sample

Photo 43: BFR_L1_SED52 location, 1 sample

Photo 44: BFR_L1_SED52 location, 1 sample

Photo 45: BFR_L1_SED53 location, 1 sample

Photo 46: BFR_L1_SED54 location, 1 sample

Photo 47: BFR_L1_SED55 location, 1 sample

Photo 48: BFR_L1_SED56 location, 1 sample

Photo 49: BFR_L1_SED57 location, 1 sample

Photo 50: BFR_L1_SED57 location, 1 sample

Photo 50: BFR_L1_SED61 location, 1 sample

Photo 51: BFR_L1_SED63 location surroundings

Photo 52: Typical Landscape Dominated by Barrens

Photo 53: Typical Shrub Thicket

Photo 54: Patch of Relatively Large Trees on North Facing Slope

Photo 55: Typical Creek with Fen Plant Community

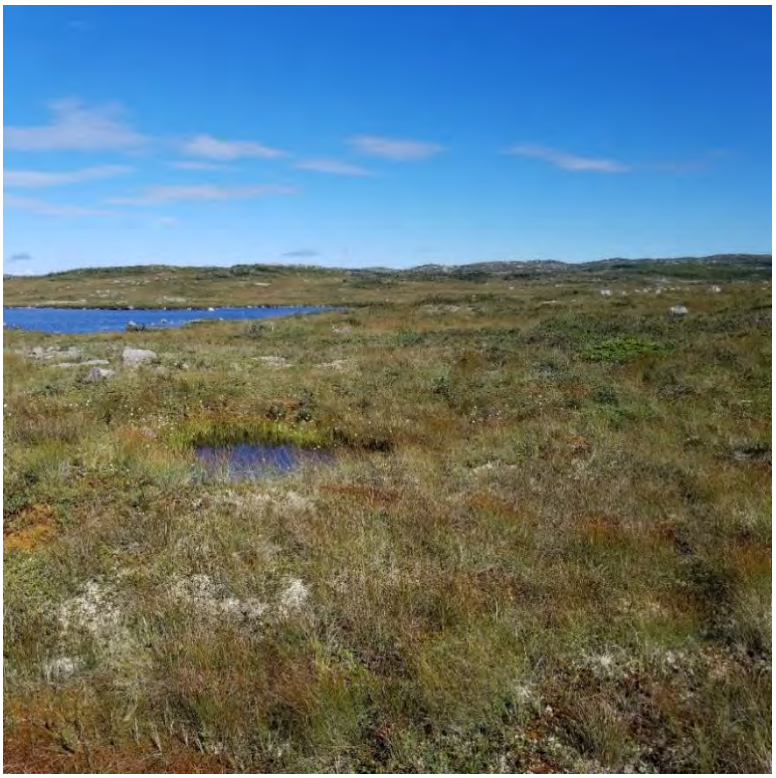


Photo 56: Typical Bog Community

Photo 57: Garbage Pile, a Sign of Anthropogenic Use (Feature 1 on Figure 1, Firing Point 1)

Photo 58: Disturbed Area with Cultural Meadow Vegetation (Feature 3 on Figure 1, Backstop)

Photo 59: Pond 3 (Location of SW5, SW28, SW60, SW61)

Photo 60: Pond 3 Shallow Bay

Photo 61: Pond 4 (Location of SW6, SW58, and SW59)

Photo 62: Reference Waterbody

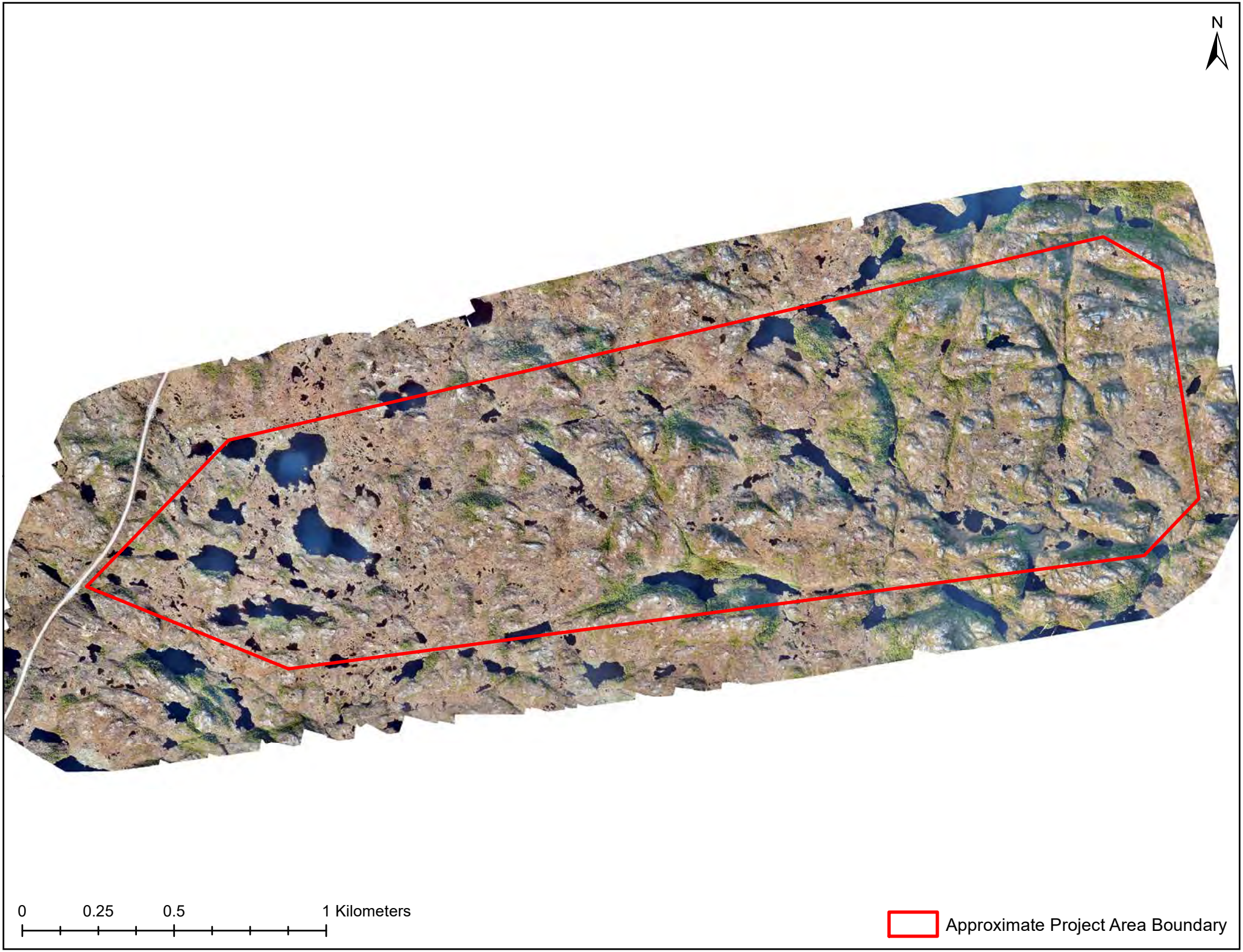
Photo 63: Permanent Stream Flowing into Reference Waterbody

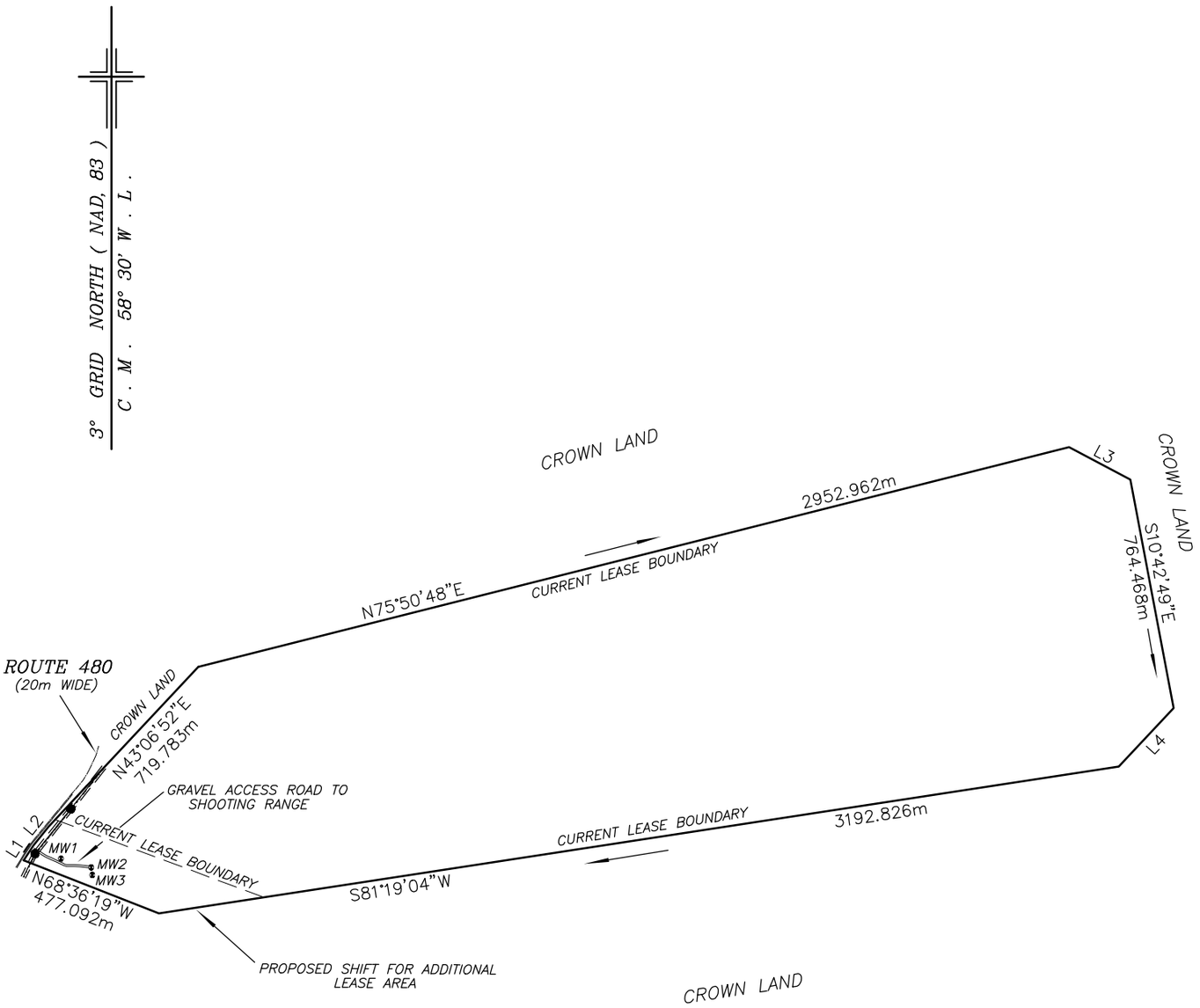
Photo 64: Aquatic Leach Species

Photo 65: Green Frog

APPENDIX B

Survey Plans


N
0
0.25
0.5
1 Kilometers
Approximate Project Area Boundary



MW1	TOP=85.72	GROUND=84.81
MW2	TOP=82.79	GROUND=82.00
MW3	TOP=80.93	GROUND=80.10

LEGEND

CONTROL MONUMENT .....
CAPPED IRON PIN .....
FOUND IRON PIN .....
PK NAIL ..... PK
MONITORING WELL..... MW
BOUNDARY LINE .....
POLE OR LIGHT STANDARD .....
HYDRANT.....
FENCE POST ..... FP
FENCE LINES .....
GUY WIRE .....
POWER–TELEPHONE LINES .....
EASEMENTS .....
CENTERLINE .....

NUM	BEARING	DISTANCE
L1	N32°56'11"E	58.806m
L2	N39°01'19"E	79.097m
L3	S62°03'15"E	227.749m
L4	S43°03'53"W	263.456m

REFERENCE MONUMENTS : 89G6154 N 5,276,532.059 E 368,548.649
(COMBINED SCALE FACTOR : 0.999942)
89G6155 N 5,275,849.512 E 369,991.205

ALL DISTANCES SHOWN ARE HORIZONTAL
DISTANCES MEASURED IN METERS .

YATES AND WOODS LTD.
NEWFOUNDLAND LAND SURVEYORS
53 CARIBOU ROAD CORNER BROOK, NL.
A2H 4W8 TEL. 639–9177 E–mail: yatesandwoods@bellaliant.com

SURVEY PLAN SHOWING MONITOR WELLS FOR DEPARTMENT OF NATIONAL DEFENCE SHOOTING RANGE ROUTE 480, BURGEO, NL.

Clint O. Rumbolt
NEWFOUNDLAND LAND SURVEYOR
PROVINCE OF NEWFOUNDLAND

SCALE: 1 : 20000 | DWG. NO. 20456–1 | DRAWN BY M.D.L | DATE: MARCH 29, 2022

N

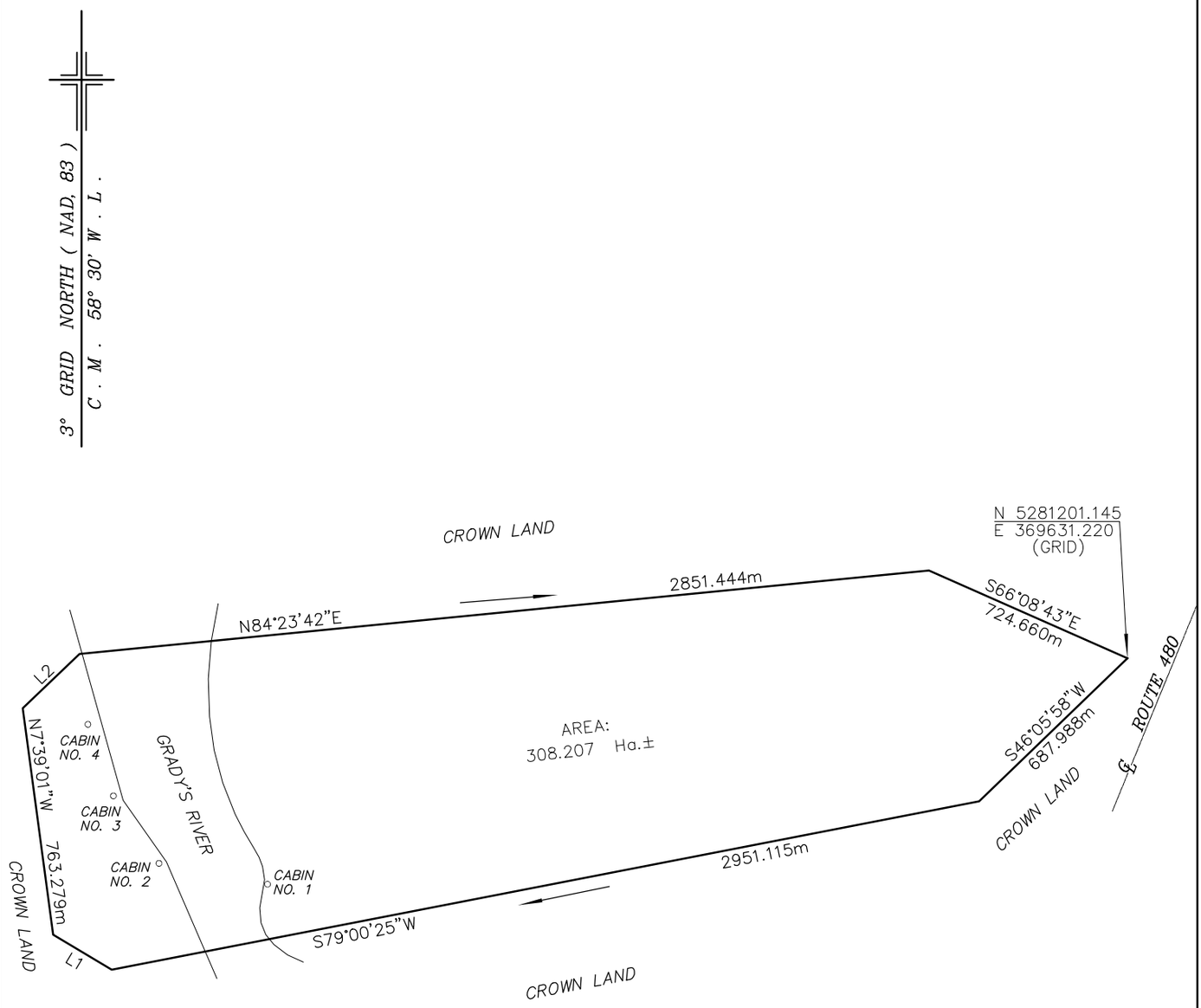
0 0.25 0.5 1 km

GOLDER

sem

BURGEO FIRING RANGE
LOCATION 2

UAV IMAGERY ACQUIRED 18/11/2021



APPROXIMATE CABIN LOCATIONS		
CABIN NO. 1	MORGAN STRICKLAND	TITLE NO. 75661
CABIN NO. 2	CALVIN INGRAM	TITLE NO. 77947
CABIN NO. 3	WARD STRICKLAND	TITLE NO. 88621
CABIN NO. 4	ALLISTER BARTER	TITLE NO. 74906

LEGEND

- CONTROL MONUMENT .....
- CAPPED IRON PIN .....
- FOUND IRON PIN .....
- PK NAIL ..... PK
- BOUNDARY LINE .....
- POLE OR LIGHT STANDARD .....
- HYDRANT.....
- FENCE POST ..... FP
- FENCE LINES .....
- GUY WIRE .....
- POWER–TELEPHONE LINES .....
- EASEMENTS .....
- CENTERLINE .....

NUM	BEARING	DISTANCE
L1	N59°08'13"W	228.058m
L2	N46°19'52"E	261.976m

REFERENCE MONUMENTS : 89G6154 N 5,276,532.059 E 368,548.649
(COMBINED SCALE FACTOR : 0.999942)
89G6155 N 5,275,849.512 E 369,991.205

ALL DISTANCES SHOWN ARE HORIZONTAL
DISTANCES MEASURED IN METERS .

YATES AND WOODS LTD.
NEWFOUNDLAND LAND SURVEYORS
53 CARIBOU ROAD CORNER BROOK, NL.
A2H 4W8 TEL. 639–9177 E–mail: yatewood@nf.aibn.com

SURVEY PLAN OF LAND FOR DEPARTMENT OF NATIONAL DEFENCE SHOOTING RANGE ROUTE 480, BURGEO, NL.

Clint O. Rumbolt
NEWFOUNDLAND
LAND
SURVEYOR
PROVINCE OF NEWFOUNDLAND

SCALE: 1 : 20000 | DWG. NO. 21474 | DRAWN BY M.D.L | DATE: MARCH 29, 2022

APPENDIX C

Borehole Logs

PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-65

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT, trace sand, fine; black (GLACIAL TILL); cohesive, wet, very soft		0.00	1 2 3	PMSS	-				
		End of Borehole		0.61							
1											

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

GTA-BHS 001 S:\CLIENTS\DEFENCE_CONSTRUCTION_CANADA\BURGEO_RANGE_SITE_NL\02_DATA\GINT\22532464.GPJ GAL-MIS.GDT 2/24/23 RS

PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-66

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT, trace gravel; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
					2						
					3						
		End of Borehole		0.61							
1											

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

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PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-67

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT, trace sand, fine; black, contains organics (GLACIAL TILL); cohesive, wet, very soft		0.00	1	PMSS	-				
		End of Borehole Refusal on Bedrock		0.15							
1											

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

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PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-68

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1 2 3	PMSS	-				
1		End of Borehole		0.61							

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

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PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-69

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT; black, contains organics, organic odour (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
					2						
		End of Borehole		0.61							
1											

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

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PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-70

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT; black, contains organics, organic odour (GLACIAL TILL); cohesive, wet, soft		0.00	1 2 3	PMSS	-				
		End of Borehole		0.61							
1											

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DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-71

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, wet, very soft		0.00	1	PMSS	-				
					2						
		End of Borehole		0.61							
1											

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

GTA-BHS 001 S:\CLIENTS\DEFENCE_CONSTRUCTION_CANADA\BURGEO_RANGE_SITE_NL\02_DATA\GINT\22532464.GPJ GAL-MIS.GDT 2/24/23 RS

PROJECT: 22532464

LOCATION: See Site Plan

RECORD OF BOREHOLE: BFR SED-72

BORING DATE: September 6, 2022

DRILL RIG: Hand Pressure Split Spoon

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Manual Pressure Split Spoon	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1 2 3	PMSS	-				
1		End of Borehole		0.61							

DEPTH SCALE

1 : 5

LOGGED: PC

CHECKED: JTD

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PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-65

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT, trace sand, fine; black (GLACIAL TILL); cohesive, wet, very soft		0.00	1	PMSS	-				
2		End of Borehole		2.04							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-66

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT, trace gravel; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
1											
2		End of Borehole		2.04							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-67

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT, trace sand, fine; black, contains organics (GLACIAL TILL); cohesive, wet, very soft		0.00	1	PMSS	-				
1											
2		End of Borehole Refusal on Bedrock		2.04							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-68

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
1											
2		End of Borehole		1.99							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-69

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT; black, contains organics, organic odour (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
1											
2											
		End of Borehole		2.37							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-70

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT; black, contains organics, organic odour (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
1											
2		End of Borehole		2.07							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-71

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, wet, very soft		0.00	1	PMSS	-				
1											
2		End of Borehole		2.23							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR SED-72

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hand Pushed Split Spoon	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	PMSS	-				
1											
2		End of Borehole		1.96							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-31

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; black brown, contains organics, organic odour (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
					2	Shovel	-				
					3	Shovel	-				
1		End of Borehole		0.91							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-32

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.43							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-33

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; brownish black, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.41							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-34

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, fine; black (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
				0.13							
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-35

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.25							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-36

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
					2	Shovel	-				
					3	Shovel	-				
1		End of Borehole		0.91							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-37

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
	Shovel	(PT) SILTY PEAT, fine; black to brown, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
					2	Shovel	-				
		End of Borehole Refusal on Bedrock		0.46							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-38

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	(PT) SILTY PEAT, some sand, fine; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	SS	-				
1					2	SS	-				
2					3	SS	-				
		(CL) SILTY CLAY, trace sand, fine; grey (GLACIAL TILL); cohesive, wet		2.20	4	SS	-				
		End of Borehole Refusal		2.44							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-39

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	(PT) SILTY PEAT, fine; brown, contains organics (GLACIAL TILL); cohesive, wet, soft to firm		0.00	1	Shovel	-				
1					2	SS	-				
					3	SS	-				
2		End of Borehole		1.83							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-40

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, trace sand; black		0.00	1	Shovel	-				
		(GLACIAL TILL); cohesive, moist, soft		0.20							
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-41

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, trace sand and gravel, fine; brown, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
				0.20							
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-42

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	(PT) fibrous PEAT; green, healthy; moist		0.00	1	SS	-				
1	Jack Hammer	(PT) SILTY PEAT, some gravel, sub-rounded; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.61	2	SS	-				
		End of Borehole Refusal on Bedrock		1.12							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-43

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	FILL - (SP) gravelly SAND, poorly graded, sub-rounded; beige to grey; non-cohesive, loose		0.00	1	SS	-				
1					2	SS	-				
2					3	SS	-				
					4	SS	-				
		End of Borehole Refusal		2.44							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-44

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, trace sand, fine; black (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.30							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-45

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	(PT) sandy SILTY PEAT; black (GLACIAL TILL); wet, soft		0.00	1	SS	-				
		End of Borehole Refusal		0.61							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-46

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 4, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Hammer	(PT) SILTY PEAT, trace sand, fine; brownish black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	SS	-				
	Split Spoon	End of Borehole Refusal on Bedrock		0.33							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-47

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
	Shovel	(ML) SILT, some gravel, fine; grey (GLACIAL TILL); non-cohesive, dry, loose		0.04	1	Shovel	-				
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-48

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
	Shovel	(PT) SILTY PEAT, trace sand, fine; brown, contains organics (GLACIAL TILL); non-cohesive, dry, very loose		0.05	1	Shovel	-				
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-49

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; black (GLACIAL TILL); non-cohesive, dry, loose		0.04	1	Shovel	-				
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-50

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 6, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
	Shovel	(PT) SILTY PEAT, trace gravel, fine; brownish black, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.48							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-51

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT; brownish black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.30							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-52

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) sandy SILTY PEAT, trace clay; black, contains organics, ants (GLACIAL TILL); cohesive, moist, firm		0.00	1	Shovel	-				
					2	Shovel	-				
		End of Borehole Refusal on Bedrock		0.58							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-53

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
	Shovel	(PT) SILTY PEAT, trace sand and clay; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.00	1	Shovel	-				
	Shovel	(SM) SILTY SAND, some gravel, coarse; black; cohesive, wet, stiff		0.61	2	Shovel	-				
1		End of Borehole Refusal		0.91							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-54

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, fine; black, contains organics (GLACIAL TILL); cohesive, moist, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.28							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-55

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) SILTY PEAT, some sand, fine; black (GLACIAL TILL); cohesive, moist to wet, soft		0.00	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.33							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-56

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; brown, healthy, no dirt; wet		0.00							
	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.31	1	Shovel	-				
					2	Shovel	-				
		End of Borehole		0.56							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-57

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; red brown, healthy, no dirt; cohesive, wet		0.00							
		(PT) SILTY PEAT, trace gravel; black, contains organics (GLACIAL TILL); cohesive, wet, very soft		0.15	1	Shovel	-				
		End of Borehole		0.41	2	Shovel	-				
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-58

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; green, healthy; wet		0.00							
	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.30	1	Shovel	-				
					2	Shovel	-				
				0.48							
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-59

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; green white, healthy, no dirt; cohesive, dry		0.00							
		(PT) SILTY PEAT, trace sand; black (GLACIAL TILL); cohesive, wet, soft		0.15	1	Shovel	-				
		End of Borehole Refusal on Bedrock		0.25							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-60

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; brown red, no dirt; wet		0.00							
	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.25	1	Shovel	-				
				0.51	2	Shovel	-				
		End of Borehole Refusal on Bedrock									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-61

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; red brown, healthy; wet		0.00							
		(PT) SILTY PEAT; black, contains organcis (GLACIAL TILL); cohesive, wet, soft		0.25	1	Shovel					
					2	Shovel					
		End of Borehole		0.51							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-62

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; green, healthy, no dirt; wet		0.00							
	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.30	1	Shovel	-				
	Shovel				2	Shovel	-				
		End of Borehole		0.61							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-63

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Shovel	(PT) fibrous PEAT; red green brown, healthy, no dirt		0.00							
		(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.15	1	Shovel	-				
					2	Shovel	-				
		End of Borehole		0.36							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-64

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		0.00									
0	Shovel	(PT) fibrous PEAT; orange green, healthy; wet		0.10	1	Shovel	-						
		(PT) SILTY PEAT; brownish black, contains organics (GLACIAL TILL); cohesive, wet, soft			2	Shovel	-						
				0.36									
		End of Borehole											
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-SS-65

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 8, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		0.00							
0	Shovel	(PT) fibrous PEAT; red, healthy, no dirt; wet		0.10	1	Shovel	-				
	Shovel	(PT) SILTY PEAT; black, contains organics (GLACIAL TILL); cohesive, wet, soft		0.30	2	Shovel	-				
		End of Borehole									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 12-21-22 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-GW-4

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 5, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	Jack Hammer	(PT) SILTY PEAT, fine; brown, contains organics (GLACIAL TILL); cohesive, wet, soft to firm		0.00	1	Shovel	-				Screen
1					2	SS	-				
					3	SS	-				
2		End of Borehole		1.83							
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 2/16/23 RS

PROJECT: 22532464

RECORD OF BOREHOLE: BFR-GW-5

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: September 4, 2022

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE						SHEAR STRENGTH Cu, kPa — nat V. + Q - ● rem V. ⊕ U - ○ (20 40 60 80)	WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80)		
0	CME-55 Track Mounted	(OH) ORGANIC SILT, trace coarse sand; brown (TILL), cohesive, moist, soft			1	SS	-				Riser
		Refusal on Bedrock									
1		Grano Diorite			2	RC	-				Screen
2					3	RC	-				Bentonite
3		End of Borehole		3.05							
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

LOGGED: PC

CHECKED: JTD

MIS-BHS 001 22532464.GPJ GAL-MIS.GDT 2/16/23 RS

APPENDIX D

Laboratory Certificates of Analysis

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600
ATTENTION TO: James Doyle
PROJECT: 22532464
AGAT WORK ORDER: 22X945935
SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
DATE REPORTED: Oct 05, 2022
PAGES (INCLUDING COVER): 13
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
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- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-10-05

Parameter	Unit	G / S	RDL	BFR_SS_31_SA 1 Soil 2022-09-05 4310474	BFR_SS_32_SA 1 Soil 2022-09-05 4310503	BFR_SS_33_SA 1 Soil 2022-09-05 4310504	BFR_SS_34_SA 1 Soil 2022-09-06 4310505	BFR_SS_35_SA 1 Soil 2022-09-06 4310506	BFR_SS_36_SA 1 Soil 2022-09-06 4310507	BFR_SS_37_SA 1 Soil 2022-09-06 4310509	BFR_SS_38_SA 1 Soil 2022-09-05 4310511
Aluminum	mg/kg		10	2630	7580	6980	10400	8910	4890	14400	2060
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	4	4	4	4	4	7	3	3
Barium	mg/kg		5	11	7	6	26	27	15	9	16
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	<0.3	<0.3
Chromium	mg/kg		2	3	8	6	16	13	3	10	5
Cobalt	mg/kg		1	<1	1	<1	5	2	<1	2	<1
Copper	mg/kg		2	<2	3	<2	6	14	3	2	5
Iron	mg/kg		50	641	3320	5250	19200	7680	678	10000	1220
Lead	mg/kg		0.5	2.2	5.4	6.3	25.4	41.3	4.5	10.2	25.7
Lithium	mg/kg		5	<5	8	<5	9	<5	<5	8	<5
Manganese	mg/kg		2	12	98	36	222	102	6	99	147
Mercury	mg/kg		0.03	0.04	<0.03	0.04	0.06	0.08	0.06	0.04	0.04
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	2	<2	8	4	<2	3	<2
Selenium	mg/kg		1	<1	<1	<1	<1	2	<1	<1	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	8	<5	<5	<5	<5	7	<5	17
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	6	5	6	5	5	13	4	6
Uranium	mg/kg		0.1	0.4	0.8	0.5	0.7	1.0	1.5	0.4	0.1
Vanadium	mg/kg		2	8	17	25	79	35	12	28	5
Zinc	mg/kg		5	<5	13	7	28	16	8	13	10

Certified By:

AGAT Laboratories

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-10-05

Parameter	Unit	G / S	RDL	BFR_SS_39_SA	BFR_SS_40_SA	BFR_SS_41_SA	BFR_SS_42_SA	BFR_SS_43_SA	BFR_SS_44_SA	BFR_SS_45_SA	BFR_SS_46_SA
SAMPLE DESCRIPTION:				1	1	1	1	1	1	1	1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-05	2022-09-06	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-05	2022-09-04
				4310515	4310518	4310519	4310520	4310522	4310525	4310526	4310527
Aluminum	mg/kg		10	4190	3380	952	5580	4820	8360	3500	8500
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	4	3	3	3	4	3	4	4
Barium	mg/kg		5	8	19	8	6	10	7	24	8
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3
Chromium	mg/kg		2	2	3	<2	4	5	9	16	8
Cobalt	mg/kg		1	<1	1	<1	<1	2	1	1	2
Copper	mg/kg		2	<2	3	<2	<2	7	<2	10	5
Iron	mg/kg		50	603	4530	658	1730	4100	4510	8390	5120
Lead	mg/kg		0.5	1.7	8.9	4.5	9.8	10.3	7.6	40.0	3.7
Lithium	mg/kg		5	<5	<5	<5	<5	7	5	<5	10
Manganese	mg/kg		2	3	59	8	75	89	76	156	99
Mercury	mg/kg		0.03	0.05	0.05	0.04	<0.03	<0.03	<0.03	0.07	<0.03
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	3	<2
Nickel	mg/kg		2	<2	2	<2	<2	3	3	3	4
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	5	7	10	<5	<5	<5	16	<5
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	7	5	4	5	4	6	14	5
Uranium	mg/kg		0.1	0.6	0.2	0.1	0.6	0.7	0.6	0.3	0.6
Vanadium	mg/kg		2	8	15	9	16	12	22	10	21
Zinc	mg/kg		5	<5	13	11	5	9	9	49	13

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-10-05

Parameter	Unit	G / S	RDL	BFR_SS_47_SA 1 Soil 2022-09-05 4310528	BFR_SS_48_SA 1 Soil 2022-09-05 4310529	BFR_SS_49_SA 1 Soil 2022-09-05 4310530	BFR_SS_50_SA 1 Soil 2022-09-05 4310531	BFR_SS_51_SA 1 Soil 2022-09-05 4310532	BFR_SS_52_SA 1 Soil 2022-09-05 4310533	BFR_SS_53_SA 1 Soil 2022-09-05 4310535	BFR_SS_54_SA 1 Soil 2022-09-05 4310538
Aluminum	mg/kg		10	14600	15600	8980	4780	4260	764	6670	7810
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	3	4	3	2	2	3	3	3
Barium	mg/kg		5	63	35	19	<5	6	19	12	20
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	<2	2	<2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3
Chromium	mg/kg		2	21	20	11	8	4	<2	2	9
Cobalt	mg/kg		1	10	10	3	<1	<1	<1	<1	1
Copper	mg/kg		2	9	26	3	<2	<2	4	<2	3
Iron	mg/kg		50	25100	17800	10300	1090	1730	440	148	5180
Lead	mg/kg		0.5	4.4	3.5	6.4	10.5	6.1	6.6	1.8	13.4
Lithium	mg/kg		5	33	34	11	<5	<5	<5	<5	<5
Manganese	mg/kg		2	566	538	158	23	31	13	<2	101
Mercury	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	0.03	0.09
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	13	13	5	<2	<2	<2	<2	3
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	2	2
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	<5	<5	<5	<5	53	6	<5
Thallium	mg/kg		0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	6	5	5	5	4	4	4	4
Uranium	mg/kg		0.1	0.7	1.0	0.9	0.5	0.4	<0.1	0.2	0.8
Vanadium	mg/kg		2	77	75	39	21	15	6	5	25
Zinc	mg/kg		5	58	56	18	<5	<5	27	<5	14

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-10-05

Parameter	Unit	G / S	RDL	BFR_SS_55_SA	BFR_SS_55_DU	BFR_SS_56_SA	BFR_SS_57_SA	BFR_SS_58_SA	BFR_SS_59_SA	BFR_SS_60_SA	BFR_SS_61_SA
SAMPLE DESCRIPTION:				1	P1	1	1	1	1	1	1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-05	2022-09-05	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08	2022-09-08
				4310539	4310540	4310541	4310543	4310544	4310546	4310547	4310549
Aluminum	mg/kg		10	11700	13100	1640	6910	7840	9400	6960	11600
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	3	3	2	2	3	3	2	3
Barium	mg/kg		5	9	8	19	37	29	22	6	6
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	5	<2	<2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3
Chromium	mg/kg		2	10	14	2	12	<2	8	10	6
Cobalt	mg/kg		1	<1	<1	<1	3	<1	3	2	<1
Copper	mg/kg		2	6	6	<2	<2	3	2	<2	6
Iron	mg/kg		50	2870	2640	252	7300	1840	12700	5850	343
Lead	mg/kg		0.5	9.2	6.8	1.4	7.2	8.3	11.3	5.9	6.5
Lithium	mg/kg		5	<5	<5	<5	7	<5	9	7	<5
Manganese	mg/kg		2	46	42	<2	146	9	172	71	2
Mercury	mg/kg		0.03	0.06	0.05	0.09	<0.03	0.10	0.03	<0.03	0.07
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	2	<2	<2	4	<2	4	4	<2
Selenium	mg/kg		1	4	4	1	<1	2	<1	<1	4
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	<5	11	<5	18	<5	<5	<5
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	4	3	5	4	15	5	4	4
Uranium	mg/kg		0.1	1.5	1.5	0.5	0.4	0.5	0.7	0.4	2.2
Vanadium	mg/kg		2	15	17	4	30	5	59	23	13
Zinc	mg/kg		5	8	7	<5	17	11	22	12	<5

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-10-05

Parameter	Unit	G / S	RDL	BFR_SS_63_SA 1 Soil 2022-09-08 4310551	BFR_SS_64_SA 1 Soil 2022-09-08 4310553	BFR_SS_65_SA 1 Soil 2022-09-08 4310555	BFR_SS_38_DU P1 Soil 2022-09-08 4310557	BFR_SS_DUP2 Soil 2022-09-08 4310559	BFR_SS_62_SA 1 Soil 2022-09-08 4310563	BFR_L1_GW_4 Soil 2022-09-05 4310565	BFR_SS_44_DU P1 Soil 2022-09-05 4311838
Aluminum	mg/kg		10	6850	5340	8000	16900	4880	3300	16700	8750
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	1	<1
Arsenic	mg/kg		1	3	2	4	4	2	3	5	3
Barium	mg/kg		5	9	6	32	25	7	13	139	5
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	4	<2	<2	2	<2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	0.6	<0.3	<0.3	<0.3	0.6	<0.3
Chromium	mg/kg		2	3	14	3	23	4	4	24	7
Cobalt	mg/kg		1	<1	<1	<1	6	<1	<1	10	<1
Copper	mg/kg		2	3	3	10	10	<2	4	10	<2
Iron	mg/kg		50	486	290	2640	15000	243	633	27600	2210
Lead	mg/kg		0.5	6.3	7.5	39.7	5.5	2.7	3.5	48.5	6.9
Lithium	mg/kg		5	<5	<5	<5	26	<5	<5	25	<5
Manganese	mg/kg		2	3	4	40	335	<2	4	557	53
Mercury	mg/kg		0.03	0.06	<0.03	0.10	<0.03	0.03	0.07	0.08	<0.03
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	<2	2	13	<2	2	16	2
Selenium	mg/kg		1	3	<1	2	1	1	4	1	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	<5	16	<5	<5	15	8	<5
Thallium	mg/kg		0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.4	<0.1
Tin	mg/kg		2	6	4	5	6	3	4	8	6
Uranium	mg/kg		0.1	1.8	0.6	0.9	0.9	0.4	0.6	0.6	0.7
Vanadium	mg/kg		2	8	16	8	54	6	6	88	17
Zinc	mg/kg		5	<5	<5	17	40	<5	11	63	6

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4310474-4311838 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Oct 05, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Available Metals in Soil (Incl. Hg)															
Aluminum	4293685		7850	9210	15.9%	< 10	103%	80%	120%	102%	80%	120%	NA	70%	130%
Antimony	4293685		<1	<1	NA	< 1	80%	80%	120%	NA	80%	120%	112%	70%	130%
Arsenic	4293685		4	5	NA	< 1	98%	80%	120%	101%	80%	120%	110%	70%	130%
Barium	4293685		36	46	24.2%	< 5	103%	80%	120%	101%	80%	120%	NA	70%	130%
Beryllium	4293685		<2	<2	NA	< 2	100%	80%	120%	104%	80%	120%	129%	70%	130%
Boron	4293685		<2	<2	NA	< 2	100%	80%	120%	105%	80%	120%	121%	70%	130%
Cadmium	4293685		<0.3	<0.3	NA	< 0.3	95%	80%	120%	99%	80%	120%	106%	70%	130%
Chromium	4293685		5	7	NA	< 2	92%	80%	120%	94%	80%	120%	NA	70%	130%
Cobalt	4293685		5	6	16.9%	< 1	94%	80%	120%	94%	80%	120%	124%	70%	130%
Copper	4293685		12	14	13.7%	< 2	99%	80%	120%	100%	80%	120%	113%	70%	130%
Iron	4293685		12100	13200	8.7%	< 50	95%	80%	120%	98%	80%	120%	NA	70%	130%
Lead	4293685		4.3	5.5	24.8%	< 0.5	105%	80%	120%	103%	80%	120%	118%	70%	130%
Lithium	4293685		13	13	NA	< 5	102%	70%	130%	105%	70%	130%	NA	70%	130%
Manganese	4293685		775	969	22.3%	< 2	95%	80%	120%	96%	80%	120%	NA	70%	130%
Mercury	4293685		<0.03	<0.03	NA	< 0.03	106%	80%	120%	109%	80%	120%	NA	70%	130%
Molybdenum	4293685		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	111%	70%	130%
Nickel	4293685		6	7	NA	< 2	95%	80%	120%	98%	80%	120%	117%	70%	130%
Selenium	4293685		<1	<1	NA	< 1	95%	80%	120%	101%	80%	120%	98%	70%	130%
Silver	4293685		<0.5	<0.5	NA	< 0.5	101%	80%	120%	101%	80%	120%	112%	70%	130%
Strontium	4293685		<5	6	NA	< 5	90%	80%	120%	90%	80%	120%	129%	70%	130%
Thallium	4293685		<0.1	<0.1	NA	< 0.1	106%	80%	120%	103%	80%	120%	NA	70%	130%
Tin	4293685		3	3	NA	< 2	93%	80%	120%	95%	80%	120%	123%	70%	130%
Uranium	4293685		0.2	0.2	NA	< 0.1	102%	80%	120%	99%	80%	120%	96%	70%	130%
Vanadium	4293685		12	14	19.5%	< 2	91%	80%	120%	95%	80%	120%	NA	70%	130%
Zinc	4293685		83	99	17.6%	< 5	96%	80%	120%	97%	80%	120%	NA	70%	130%
Available Metals in Soil (Incl. Hg)															
Aluminum	4310553	4310553	5340	5140	3.8%	< 10	108%	80%	120%	109%	80%	120%	NA	70%	130%
Antimony	4310553	4310553	<1	<1	NA	< 1	80%	80%	120%	NA	80%	120%	94%	70%	130%
Arsenic	4310553	4310553	2	2	NA	< 1	99%	80%	120%	96%	80%	120%	92%	70%	130%
Barium	4310553	4310553	6	7	NA	< 5	103%	80%	120%	106%	80%	120%	113%	70%	130%
Beryllium	4310553	4310553	<2	<2	NA	< 2	105%	80%	120%	101%	80%	120%	112%	70%	130%
Boron	4310553	4310553	<2	<2	NA	< 2	103%	80%	120%	100%	80%	120%	109%	70%	130%
Cadmium	4310553	4310553	<0.3	<0.3	NA	< 0.3	93%	80%	120%	93%	80%	120%	94%	70%	130%
Chromium	4310553	4310553	14	13	7.5%	< 2	92%	80%	120%	92%	80%	120%	NA	70%	130%
Cobalt	4310553	4310553	<1	<1	NA	< 1	94%	80%	120%	93%	80%	120%	101%	70%	130%
Copper	4310553	4310553	3	2	NA	< 2	99%	80%	120%	98%	80%	120%	109%	70%	130%
Iron	4310553	4310553	290	252	13.8%	< 50	95%	80%	120%	95%	80%	120%	NA	70%	130%
Lead	4310553	4310553	7.5	8.0	6.5%	< 0.5	103%	80%	120%	104%	80%	120%	106%	70%	130%
Lithium	4310553	4310553	<5	<5	NA	< 5	106%	70%	130%	103%	70%	130%	121%	70%	130%

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Oct 05, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Manganese	4310553	4310553	4	6	NA	< 2	96%	80%	120%	93%	80%	120%	123%	70%	130%
Mercury	4310553	4310553	<0.03	<0.03	NA	< 0.03	106%	80%	120%	106%	80%	120%	NA	70%	130%
Molybdenum	4310553	4310553	<2	<2	NA	< 2	91%	80%	120%	91%	80%	120%	80%	70%	130%
Nickel	4310553	4310553	<2	<2	NA	< 2	96%	80%	120%	94%	80%	120%	97%	70%	130%
Selenium	4310553	4310553	<1	<1	NA	< 1	99%	80%	120%	90%	80%	120%	130%	70%	130%
Silver	4310553	4310553	<0.5	<0.5	NA	< 0.5	101%	80%	120%	97%	80%	120%	100%	70%	130%
Strontium	4310553	4310553	<5	<5	NA	< 5	91%	80%	120%	88%	80%	120%	110%	70%	130%
Thallium	4310553	4310553	<0.1	<0.1	NA	< 0.1	104%	80%	120%	104%	80%	120%	74%	70%	130%
Tin	4310553	4310553	4	5	NA	< 2	93%	80%	120%	91%	80%	120%	107%	70%	130%
Uranium	4310553	4310553	0.6	0.6	2.5%	< 0.1	97%	80%	120%	97%	80%	120%	96%	70%	130%
Vanadium	4310553	4310553	16	15	6.7%	< 2	91%	80%	120%	90%	80%	120%	NA	70%	130%
Zinc	4310553	4310553	<5	<5	NA	< 5	97%	80%	120%	95%	80%	120%	99%	70%	130%

Certified By:

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CANADA B3B 1M2
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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945935

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS

AGAT Laboratories

Unit 122 • 11 Morris Drive
Dartmouth, NS
B3B 1M2
webearth.agatlabs.com • www.agatlabs.com
P: 902.468.8718 • F: 902.468.8924

Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 11.2, 11.4, 11.9
Hold Time:
AGAT Job Number: 22X945935
Notes:

Report Information
Company: Golder
Contact: James Doyle
Address: 1931 Robertson Road
Phone: 613-298-0765 Fax:
Client Project #: 22532464
AGAT Quotation: 649648
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: James Doyle
Email: james_doyle@golder.com
2. Name: Philippe Chevrette
Email: Philippe.chevrette@wsp.com

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:
22SEP16 10:25AM

Invoice To Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☑ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
BFR_SS_31_SA1	Sep 5, 2022	S	1				☑	☑																				N
BFR_SS_31_SA2	Sep 5, 2022	S	1	HOLD			☑	☑																				N
BFR_SS_31_SA3	Sep 5, 2022	S	1	HOLD			☑	☑																				N
BFR_SS_32_SA1	Sep 5, 2022	S	1				☑	☑																				N
BFR_SS_33_SA1	Sep 5, 2022	S	1				☑	☑																				N
BFR_SS_34_SA1	Sep 6, 2022	S	1				☑	☑																				N
BFR_SS_35_SA1	Sep 6, 2022	S	1				☑	☑																				N
BFR_SS_36_SA1	Sep 6, 2022	S	1				☑	☑																				N
BFR_SS_36_SA2	Sep 6, 2022	S	1	HOLD			☑	☑																				N
BFR_SS_37_SA1	Sep 6, 2022	S	1				☑	☑																				N
BFR_SS_37_SA2	Sep 6, 2022	S	1	HOLD			☑	☑																				N
BFR_SS_38_SA1	Sep 5, 2022	S	1				☑	☑																				N

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Philippe Chevrette	13/09/22 - 12:00		
Samples Relinquished By (Sign):	**Date/Time**	**Samples Received By (Sign):**	**Date/Time**
	13/09/22 - 12:00		

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Yellow Copy - AGAT
White Copy - AGAT

N°:

Document ID: DM-133-3552.004
Date revised: Apr 19, 2021

AGAT Laboratories

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Chain of Custody Record

P: 902.468.8718 • F: 902.468.8924

Report to:

Company: ______ Same as COC#: 22X945935

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
1	BFR_SS_38_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N
2	BFR_SS_38_SA3	Sep 5, 2022	S	HOLD	1					☑	☑																				N
3	BFR_SS_39_SA1	Sep 5, 2022	S		1					☑	☑																				N
4	BFR_SS_39_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N
5	BFR_SS_39_SA3	Sep 5, 2022	S	HOLD	1					☑	☑																				N
6	BFR_SS_40_SA1	Sep 6, 2022	S		1					☑	☑																				N
7	BFR_SS_41_SA1	Sep 5, 2022	S		1					☑	☑																				N
8	BFR_SS_42_SA1	Sep 5, 2022	S		1					☑	☑																				N
9	BFR_SS_42_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N
10	BFR_SS_43_SA1	Sep 5, 2022	S		1					☑	☑																				N
11	BFR_SS_43_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N
12	BFR_SS_43_SA3	Sep 5, 2022	S	HOLD	1					☑	☑																				N
13	BFR_SS_43_SA4	Sep 5, 2022	S	HOLD	1					☑	☑																				N
14	BFR_SS_44_SA1	Sep 5, 2022	S		1					☑	☑																				N
15	BFR_SS_45_SA1	Sep 5, 2022	S		1					☑	☑																				N
16	BFR_SS_46_SA1	Sep 4, 2022	S		1					☑	☑																				N
17	BFR_SS_47_SA1	Sep 5, 2022	S		1					☑	☑																				N
18	BFR_SS_48_SA1	Sep 5, 2022	S		1					☑	☑																				N
19	BFR_SS_49_SA1	Sep 5, 2022	S		1					☑	☑																				N
20	BFR_SS_50_SA1	Sep 5, 2022	S		1					☑	☑																				N
21	BFR_SS_51_SA1	Sep 5, 2022	S		1					☑	☑																				N
22	BFR_SS_52_SA1	Sep 5, 2022	S		1					☑	☑																				N
23	BFR_SS_52_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N
24	BFR_SS_53_SA1	Sep 5, 2022	S		1					☑	☑																				N
25	BFR_SS_53_SA2	Sep 5, 2022	S	HOLD	1					☑	☑																				N

22 SEP 1 10:25 AM

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time		
Philippe Chevrette [signature]	13/09/22 12:00	[signature]		Pink Copy - Client	Page 2 of 4
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	Yellow Copy - AGAT	
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	White Copy- AGAT	Nº:

AGAT Laboratories
Unit 122 • 11 Morris Drive
Dartmouth, NS B3B 1M2
webearth.agatlabs.com
P: 902.468.8718 • F: 902.468.8924

Chain of Custody Record

Report to:

Company:

Same as COC#: 22X945935

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS			Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
					VIALS / JARS	BAGS	BOTTLES																								
1	BFR_SS_53_SA3	Sep 5, 2022	S	HOLD	1					☑	☑																				N
2	BFR_SS_54_SA1	Sep 5, 2022	S		1					☑	☑																				N
3	BFR_SS_55_SA1	Sep 5, 2022	S		1					☑	☑																				N
4	BFR_SS_55_DUP1	Sep 5, 2022	S		1					☑	☑																				N
5	BFR_SS_56_SA1	Sep 8, 2022	S		1					☑	☑																				N
6	BFR_SS_56_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
7	BFR_SS_57_SA1	Sep 8, 2022	S		1					☑	☑																				N
8	BFR_SS_58_SA1	Sep 8, 2022	S		1					☑	☑																				N
9	BFR_SS_58_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
10	BFR_SS_59_SA1	Sep 8, 2022	S		1					☑	☑																				N
11	BFR_SS_60_SA1	Sep 8, 2022	S		1					☑	☑																				N
12	BFR_SS_60_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
13	BFR_SS_61_SA1	Sep 8, 2022	S		1					☑	☑																				N
14	BFR_SS_62_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
15	BFR_SS_63_SA1	Sep 8, 2022	S		1					☑	☑																				N
16	BFR_SS_63_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
17	BFR_SS_64_SA1	Sep 8, 2022	S		1					☑	☑																				N
18	BFR_SS_64_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
19	BFR_SS_65_SA1	Sep 8, 2022	S		1					☑	☑																				N
20	BFR_SS_65_SA2	Sep 8, 2022	S	HOLD	1					☑	☑																				N
21	BFR_SS_44_DUP1	Sep 5, 2022	S		1					☑	☑																				N
22	BFR_SS_38_DUP1	Sep 6, 2022	S		1					☑	☑																				N
23	BFR_SS_DUP1	Sep 8, 2022	S	HOLD	1					☑	☑																				N
24	BFR_SS_DUP2	Sep 8, 2022	S		1					☑	☑																				N
25	BFR_SS_DUP3	Sep 8, 2022	S	HOLD	1					☑	☑																				N

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Philippe Chevrette	13/09/22 - 1220		
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time

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Page 3 of 4

N°:

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Unit 122 • 11 Morris Drive
Dartmouth, NS B3B 1M2
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Chain of Custody Record

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Report to:

Company:

Same as COC#: 22X945935

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS		
					VIALS / JARS	BAGS	BOTTLES
1	BFR_SS_36_SA3	Sep 6, 2022	S	HOLD	1		
2	BFR_SS_57_SA2	Sep 8, 2022	S	HOLD	1		
3	BFR_SS_62_SA1	Sep 8, 2022	S		1		
4	BFR_SS_61_SA2	Sep 8, 2022	S	HOLD	1		
5	BFR_L1_GW_4	Sep 5, 2022	S		1		
6							
7							
8							
9							
10							
11							
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22							
23							
24							
25							

Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
		☑	☑																				
		☑	☑																				
		☑	☑																				
		☑	☑																				
		☑	☑																				

Samples Relinquished By (Print Name and Sign): Phillippa Chevrette	Date/Time: 13/09/22 -12:0	Samples Received By (Print Name and Sign):	Date/Time	Pink Copy - Client Yellow Copy - AGAT White Copy- AGAT
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	

Page 4 of 4

N°:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600
ATTENTION TO: James Doyle
PROJECT: 22532464
AGAT WORK ORDER: 22X945948
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
DATE REPORTED: Feb 24, 2023
PAGES (INCLUDING COVER): 29
VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 2:Version 2 of this report was issued to correct the previously reported sample IDs. New report issued February 24, 2023. Version 2 replaces Version 1.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-GW-4
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-12
Parameter	Unit	G / S	RDL	4310647
Benzene	mg/L		0.001	<0.001
Toluene	mg/L		0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1
Sediment				YES
Resemblance Comment				NR
Return to Baseline at C32				Y
Surrogate	Unit	Acceptable Limits		
Isobutylbenzene - EPH	%	70-130		79
Isobutylbenzene - VPH	%	70-130		108
n-Dotriacontane - EPH	%	70-130		78

Certified By:

AGAT Laboratories

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CANADA B3B 1M2
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4310647 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION:				BFR-L1-SW-51	BFR-L1-SW-52	BFR-L1-SW-53	BFR-L1-SW-54	BFR-L1-SW-55	BFR-L1-SW-56	BFR-L1-SW-57	BFR-L1-SW-60
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310571	4310632	4310633	4310634	4310635	4310636	4310637	4310639
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment				NO	NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		78	73	80	76	84	99	80	78
Terphenyl-d14	%	50-140		81	79	79	84	85	101	79	79
Pyrene-d10	%	50-140		87	86	86	92	93	111	86	86

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION:				BFR-L1-SW-61	BFR-L1-SW-62	BFR-L1-SW-63	BFR-L1-SW-64	BFR-L1-SW-DUP1	BFR-L1-SW-DUP2	BFR-L1-SW-DUP3	BFR-L1-SW-58
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09	2022-09-09	2022-09-11	2022-09-09
Parameter	Unit	G / S	RDL	4310640	4310641	4310642	4310643	4310644	4310645	4310646	4310690
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment				NO	NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		78	75	79	82	73	76	111	77
Terphenyl-d14	%	50-140		78	78	79	80	74	77	112	77
Pyrene-d10	%	50-140		84	84	84	88	82	82	121	84

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-SW-59
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-09
Parameter	Unit	G / S	RDL	4310783
1-Methylnaphthalene	ug/L		0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01
Acridine	ug/L		0.01	<0.01
Anthracene	ug/L		0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01
Chrysene	ug/L		0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01
Fluorene	ug/L		0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01
Naphthalene	ug/L		0.01	<0.01
Perylene	ug/L		0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01
Pyrene	ug/L		0.01	<0.01
Quinoline	ug/L		0.01	<0.01
Sediment				NO
Surrogate	Unit	Acceptable Limits		
Naphthalene-d8	%	50-140		78
Terphenyl-d14	%	50-140		77
Pyrene-d10	%	50-140		82

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AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4310571-4310783 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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CANADA B3B 1M2
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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-GW-4
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-12
Parameter	Unit	G / S	RDL	4310647
Chloromethane	ug/L		1	<1
Vinyl Chloride	ug/L		0.6	<0.6
Bromomethane	ug/L		0.89	<0.89
Chloroethane	ug/L		5	<5
Trichlorofluoromethane (FREON 11)	ug/L		5	<5
Acetone	ug/L		10	<10
1,1-Dichloroethylene	ug/L		0.6	<0.6
Methylene Chloride (Dichloromethane)	ug/L		2	<2
trans-1,2-Dichloroethylene	ug/L		2	<2
1,1-Dichloroethane	ug/L		1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2
Chloroform	ug/L		1	<1
1,2-Dichloroethane	ug/L		2	<2
1,1,1-Trichloroethane	ug/L		1	<1
Carbon Tetrachloride	ug/L		0.56	<0.56
Benzene	ug/L		1	<1
1,2-Dichloropropane	ug/L		0.7	<0.7
Trichloroethylene	ug/L		1	<1
Bromodichloromethane	ug/L		1	<1
cis-1,3-Dichloropropene	ug/L		0.5	<0.5
trans-1,3-Dichloropropene	ug/L		0.5	<0.5
1,1,2-Trichloroethane	ug/L		1	<1
Toluene	ug/L		2	<2
2-Hexanone	ug/L		10.0	<10.0
Dibromochloromethane	ug/L		1	<1
1,2-Dibromoethane	ug/L		0.5	<0.5
Tetrachloroethylene	ug/L		2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5
Chlorobenzene	ug/L		1	<1

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PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-GW-4
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-12
Parameter	Unit	G / S	RDL	4310647
Ethylbenzene	ug/L		2	<2
m,p-Xylene	ug/L		4	<4
Bromoform	ug/L		1	<1
Styrene	ug/L		1	<1
1,1,2,2-Tetrachloroethane	ug/L		1	<1
o-Xylene	ug/L		1	<1
1,3-Dichlorobenzene	ug/L		1	<1
1,4-Dichlorobenzene	ug/L		1	<1
1,2-Dichlorobenzene	ug/L		0.7	<0.7
Surrogate	Unit	Acceptable Limits		
Toluene-d8	%	60-140		93
4-Bromofluorobenzene	%	60-140		102

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

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CANADA B3B 1M2
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AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Total)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-SW-51	BFR-L1-SW-52	BFR-L1-SW-53	BFR-L1-SW-54	BFR-L1-SW-55	BFR-L1-SW-56	BFR-L1-SW-57	BFR-L1-SW-60
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310571	4310632	4310633	4310634	4310635	4310636	4310637	4310639
Total Mercury	ug/L		0.026	0.037	0.029	0.027	0.052	0.042	0.044	0.042	<0.026

		SAMPLE DESCRIPTION:		BFR-L1-SW-61	BFR-L1-SW-62	BFR-L1-SW-63	BFR-L1-SW-64	BFR-L1-SW-DUP1	BFR-L1-SW-DUP2	BFR-L1-SW-DUP3	BFR-L1-GW-4
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09	2022-09-09	2022-09-11	2022-09-12
Parameter	Unit	G / S	RDL	4310640	4310641	4310642	4310643	4310644	4310645	4310646	4310647
Total Mercury	ug/L		0.026	<0.026	0.027	0.026	0.031	0.031	<0.026	0.043	<0.026

		SAMPLE DESCRIPTION:		BFR-L1-SW-58	BFR-L1-SW-59
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310690	4310783
Total Mercury	ug/L		0.026	0.036	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION:				BFR-L1-SW-60	BFR-L1-SW-61	BFR-L1-SW-62	BFR-L1-SW-63	BFR-L1-SW-64	BFR-L1-SW-DUP1	BFR-L1-SW-DUP2	BFR-L1-SW-DUP3
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09	2022-09-09	2022-09-11
Parameter	Unit	G / S	RDL	4310639	4310640	4310641	4310642	4310643	4310644	4310645	4310646
pH				5.1	5.2	5.6	5.6	5.6	5.6	5.8	5.3
Reactive Silica as SiO2	mg/L		0.5	0.7	0.7	0.7	0.6	0.5	<0.5	1.1	<0.5
Chloride	mg/L		1	4	4	3	3	3	3	4	5
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Alkalinity	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
True Color	TCU		5.00	148	160	136	138	144	134	292	64.7
Turbidity	NTU		0.5	1.6	2.4	0.8	1.3	1.4	0.8	1.5	1.2
Electrical Conductivity	umho/cm		1	29	29	26	26	26	26	36	31
Nitrate + Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	2.17	<0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	14.8	16	14	15	14.6	13.9	25.1	8.8
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	3.8	3.7	3.4	3.2	3.4	3.3	4.3	3.9
Total Potassium	mg/L		0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Calcium	mg/L		0.1	0.7	0.7	1.1	1.0	1.0	1.0	2.0	0.2
Total Magnesium	mg/L		0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.4
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	13	10	9	8	9	9	12	10
Hardness	mg/L			3.4	3.4	4.4	4.1	4.1	4.1	7.5	2.1
Langelier Index (@20C)	NA			-5.87	-5.76	-5.16	-5.20	-5.20	-5.20	-4.71	-6.21
Langelier Index (@ 4C)	NA			-6.19	-6.08	-5.48	-5.52	-5.52	-5.52	-5.03	-6.53
Saturation pH (@ 20C)	NA			11.0	11.0	10.8	10.8	10.8	10.8	10.5	11.5
Saturation pH (@ 4C)	NA			11.3	11.3	11.1	11.1	11.1	11.1	10.8	11.8
Anion Sum	me/L			0.11	0.11	0.08	0.08	0.08	0.08	0.11	0.14

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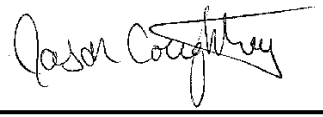

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION:				BFR-L1-SW-60	BFR-L1-SW-61	BFR-L1-SW-62	BFR-L1-SW-63	BFR-L1-SW-64	BFR-L1-SW-DUP1	BFR-L1-SW-DUP2	BFR-L1-SW-DUP3
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09	2022-09-09	2022-09-11
Parameter	Unit	G / S	RDL	4310639	4310640	4310641	4310642	4310643	4310644	4310645	4310646
Cation sum	me/L			0.46	0.30	0.29	0.27	0.29	0.28	0.42	0.25
% Difference/ Ion Balance	%			60.6	45.1	55.2	52.9	54.9	53.4	57.9	28.7
Total Aluminum	ug/L		5	320	313	291	283	291	281	491	245
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	5	5	5	<5	5	<5	6	<5
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	2	2	<1	<1	<1	1	<1	<1
Total Iron	ug/L		50	604	623	476	376	403	364	704	131
Total Lead	ug/L		0.5	4.1	4.1	0.6	0.7	0.7	0.9	2.4	<0.5
Total Manganese	ug/L		2	34	34	8	5	7	5	31	4
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L		0.02	<0.02	<0.02	0.02	0.02	0.02	0.02	0.03	<0.02
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5	<5	<5	<5	<5	7	<5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	4	4	4	4	4	4	8	<2
Total Uranium	ug/L		0.2	<0.2	<0.2	0.3	0.3	0.3	0.3	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	<5	<5	<5

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CANADA B3B 1M2
TEL (902)468-8718
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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

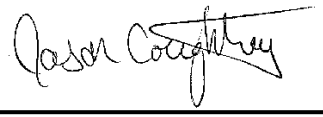
Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-GW-4	BFR-L1-SW-58	BFR-L1-SW-59
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2022-09-12	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310647	4310690	4310783
pH				5.5	5.1	4.4
Reactive Silica as SiO2	mg/L		0.5	6.3	<0.5	<0.5
Chloride	mg/L		1	5	5	6
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	<2	<2
Alkalinity	mg/L		5	<5	<5	<5
True Color	TCU		5.00	69.2	48.1	51.0
Turbidity	NTU		0.5	61.6	1.0	1.1
Electrical Conductivity	umho/cm		1	43	31	44
Nitrate + Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	0.41
Total Organic Carbon	mg/L		0.5	821	9.1	8.9
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	0.5	3.6	3.8
Total Potassium	mg/L		0.1	<0.1	0.1	0.1
Total Calcium	mg/L		0.1	0.5	0.2	0.2
Total Magnesium	mg/L		0.1	0.1	0.4	0.4
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5	<5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5
Calculated TDS	mg/L		1	7	10	11
Hardness	mg/L			1.7	2.1	2.1
Langelier Index (@20C)	NA			-5.60	-6.40	-7.11
Langelier Index (@ 4C)	NA			-5.92	-6.72	-7.43
Saturation pH (@ 20C)	NA			11.1	11.5	11.5
Saturation pH (@ 4C)	NA			11.4	11.8	11.8
Anion Sum	me/L			0.14	0.14	0.17
Cation sum	me/L			0.13	0.24	0.31

Certified By:



AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

		SAMPLE DESCRIPTION:		BFR-L1-GW-4	BFR-L1-SW-58	BFR-L1-SW-59
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2022-09-12	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310647	4310690	4310783
% Difference/ Ion Balance	%			4.1	26.0	29.4
Total Aluminum	ug/L		5	348	229	232
Total Antimony	ug/L		2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2
Total Barium	ug/L		5	6	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	<5
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	2	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1
Total Copper	ug/L		1	32	<1	<1
Total Iron	ug/L		50	881	131	132
Total Lead	ug/L		0.5	2.7	<0.5	<0.5
Total Manganese	ug/L		2	11	4	4
Total Molybdenum	ug/L		2	<2	<2	<2
Total Nickel	ug/L		2	3	<2	<2
Total Phosphorous	mg/L		0.02	0.02	<0.02	<0.02
Total Selenium	ug/L		1	<1	<1	<1
Total Silver	ug/L		0.1	0.2	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5	<5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2
Total Titanium	ug/L		2	9	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2
Total Zinc	ug/L		5	9	<5	<5

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-16

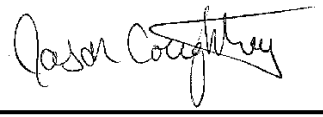
DATE REPORTED: 2023-02-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4310639-4310783 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Total Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-02-24

SAMPLE DESCRIPTION:				BFR-L1-SW-51	BFR-L1-SW-52	BFR-L1-SW-53	BFR-L1-SW-54	BFR-L1-SW-55	BFR-L1-SW-56	BFR-L1-SW-57
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4310571	4310632	4310633	4310634	4310635	4310636	4310637
Total Aluminum	ug/L		5	490	321	322	520	412	461	446
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	6	5	5	7	6	6	6
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	1	<1	<1	<1	<1	<1
Total Iron	ug/L		50	1200	546	635	840	603	836	903
Total Lead	ug/L		0.5	2.4	3.2	1.0	1.5	1.3	1.0	1.0
Total Manganese	ug/L		2	30	24	3	7	9	9	22
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	25	<2	<2	<2
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	6	<5	<5	5	5	<5	5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	8	5	5	9	6	7	7
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 22X945948
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Feb 24, 2023

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Polycyclic Aromatic Hydrocarbons in Water - (PAH)															
1-Methylnaphthalene	1	4310571	< 0.01	< 0.01	NA	< 0.01	119%	50%	140%	93%	50%	140%	96%	50%	140%
2-Methylnaphthalene	1	4310571	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	77%	50%	140%	78%	50%	140%
Acenaphthene	1	4310571	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	101%	50%	140%	101%	50%	140%
Acenaphthylene	1	4310571	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	95%	50%	140%	94%	50%	140%
Acridine	1	4310571	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	99%	50%	140%	104%	50%	140%
Anthracene	1	4310571	< 0.012	< 0.012	NA	< 0.012	93%	50%	140%	101%	50%	140%	101%	50%	140%
Benzo(a)anthracene	1	4310571	< 0.018	< 0.018	NA	< 0.018	100%	50%	140%	99%	50%	140%	94%	50%	140%
Benzo(a)pyrene	1	4310571	< 0.010	< 0.010	NA	< 0.010	89%	50%	140%	95%	50%	140%	90%	50%	140%
Benzo(b)fluoranthene	1	4310571	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	68%	50%	140%	82%	50%	140%
Benzo(j+k)fluoranthene	1	4310571	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	116%	50%	140%	108%	50%	140%
Benzo(e)pyrene	1	4310571	< 0.01	< 0.01	NA	< 0.01	95%	50%	140%	104%	50%	140%	103%	50%	140%
Benzo(ghi)perylene	1	4310571	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	113%	50%	140%	112%	50%	140%
Chrysene	1	4310571	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	122%	50%	140%	124%	50%	140%
Dibenzo(a,h)anthracene	1	4310571	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	107%	50%	140%	102%	50%	140%
Fluoranthene	1	4310571	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	110%	50%	140%	108%	50%	140%
Fluorene	1	4310571	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	101%	50%	140%	102%	50%	140%
Indeno(1,2,3-cd)pyrene	1	4310571	< 0.01	< 0.01	NA	< 0.01	126%	50%	140%	126%	50%	140%	115%	50%	140%
Naphthalene	1	4310571	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	77%	50%	140%	81%	50%	140%
Perylene	1	4310571	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	113%	50%	140%	117%	50%	140%
Phenanthrene	1	4310571	< 0.01	< 0.01	NA	< 0.01	119%	50%	140%	116%	50%	140%	117%	50%	140%
Pyrene	1	4310571	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	115%	50%	140%	114%	50%	140%
Quinoline	1	4310571	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	123%	50%	140%	135%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)															
Benzene	1	4318187	< 0.001	< 0.001	NA	< 0.001	96%	70%	130%	109%	70%	130%			
Toluene	1	4318187	< 0.001	< 0.001	NA	< 0.001	105%	70%	130%	117%	70%	130%			
Ethylbenzene	1	4318187	< 0.001	< 0.001	NA	< 0.001	129%	70%	130%	122%	70%	130%			
Xylene (Total)	1	4318187	< 0.002	< 0.002	NA	< 0.002	111%	70%	130%	97%	70%	130%			
C6-C10 (less BTEX)	1	4318187	< 0.01	< 0.01	NA	< 0.01	109%	70%	130%	113%	70%	130%	88%	70%	130%
>C10-C16 Hydrocarbons	1	4310165	< 0.05	< 0.05	NA	< 0.05	100%	70%	130%	101%	70%	130%	71%	70%	130%
>C16-C21 Hydrocarbons	1	4310165	< 0.05	< 0.05	NA	< 0.05	94%	70%	130%	101%	70%	130%	71%	70%	130%
>C21-C32 Hydrocarbons	1	4310165	< 0.1	< 0.1	NA	< 0.1	93%	70%	130%	101%	70%	130%	71%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Water															
Chloromethane	1	4303688	< 1	< 1	NA	< 1	54%	50%	140%	55%	60%	130%	54%	50%	140%

AGAT Laboratories
11 Morris Drive, Unit 122
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CANADA B3B 1M2
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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 22X945948
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Feb 24, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Vinyl Chloride	1	4303688	< 0.6	< 0.6	NA	< 0.6	61%	50%	140%	62%	60%	130%	55%	50%	140%
Bromomethane	1	4303688	< 0.89	< 0.89	NA	< 0.89	74%	50%	140%	75%	60%	130%	73%	50%	140%
Chloroethane	1	4303688	< 5	< 5	NA	< 5	90%	50%	140%	100%	60%	130%	72%	50%	140%
Trichlorofluoromethane (FREON 11)	1	4303688	< 5	< 5	NA	< 5	68%	50%	140%	66%	60%	130%	72%	50%	140%
Acetone	1	4303688	< 10	< 10	NA	< 10	76%	50%	140%	91%	50%	140%	74%	50%	140%
1,1-Dichloroethylene	1	4303688	< 0.6	< 0.6	NA	< 0.6	72%	50%	140%	72%	60%	130%	70%	50%	140%
Methylene Chloride (Dichloromethane)	1	4303688	< 2	< 2	NA	< 2	80%	50%	140%	81%	60%	130%	81%	50%	140%
trans-1,2-Dichloroethylene	1	4303688	< 2	< 2	NA	< 2	78%	50%	140%	77%	60%	130%	73%	50%	140%
1,1-Dichloroethane	1	4303688	< 1	< 1	NA	< 1	81%	50%	140%	80%	60%	130%	79%	50%	140%
cis-1,2-Dichloroethylene	1	4303688	< 2	< 2	NA	< 2	85%	50%	140%	84%	60%	130%	83%	50%	140%
Chloroform	1	4303688	< 1	< 1	NA	< 1	93%	50%	140%	93%	60%	130%	84%	50%	140%
1,2-Dichloroethane	1	4303688	< 2	< 2	NA	< 2	83%	50%	140%	88%	60%	130%	86%	50%	140%
1,1,1-Trichloroethane	1	4303688	< 1	< 1	NA	< 1	80%	50%	140%	81%	60%	130%	78%	50%	140%
Carbon Tetrachloride	1	4303688	< 0.56	< 0.56	NA	< 0.56	79%	50%	140%	79%	60%	130%	78%	50%	140%
Benzene	1	4303688	< 1	< 1	NA	< 1	82%	70%	130%	82%	60%	140%	79%	60%	140%
1,2-Dichloropropane	1	4303688	< 0.7	< 0.7	NA	< 0.7	81%	50%	140%	81%	60%	130%	81%	50%	140%
Trichloroethylene	1	4303688	< 1	< 1	NA	< 1	81%	50%	140%	81%	60%	130%	77%	50%	140%
Bromodichloromethane	1	4303688	< 1	< 1	NA	< 1	83%	50%	140%	83%	60%	130%	87%	50%	140%
cis-1,3-Dichloropropene	1	4303688	< 0.5	< 0.5	NA	< 0.5	85%	50%	140%	85%	60%	130%	82%	50%	140%
trans-1,3-Dichloropropene	1	4303688	< 0.5	< 0.5	NA	< 0.5	78%	50%	140%	78%	60%	130%	76%	50%	140%
1,1,2-Trichloroethane	1	4303688	< 1	< 1	NA	< 1	80%	50%	140%	80%	60%	130%	83%	50%	140%
Toluene	1	4303688	< 2	< 2	NA	< 2	74%	70%	130%	77%	60%	140%	74%	60%	140%
2-Hexanone	1	4303688	< 10.0	< 10.0	NA	< 10.0	86%	50%	140%	71%	50%	140%	83%	50%	140%
Dibromochloromethane	1	4303688	< 1	< 1	NA	< 1	79%	50%	140%	79%	60%	130%	84%	50%	140%
1,2-Dibromoethane	1	4303688	< 0.5	< 0.5	NA	< 0.5	80%	50%	140%	80%	60%	130%	80%	50%	140%
Tetrachloroethylene	1	4303688	< 2	< 2	NA	< 2	76%	50%	140%	75%	60%	130%	71%	50%	140%
1,1,1,2-Tetrachloroethane	1	4303688	< 0.5	< 0.5	NA	< 0.5	78%	50%	140%	77%	60%	130%	77%	50%	140%
Chlorobenzene	1	4303688	< 1	< 1	NA	< 1	77%	50%	140%	76%	60%	130%	80%	50%	140%
Ethylbenzene	1	4303688	< 2	< 2	NA	< 2	75%	70%	130%	75%	60%	140%	75%	60%	140%
m,p-Xylene	1	4303688	< 4	< 4	NA	< 4	79%	70%	130%	78%	60%	140%	43%	60%	140%
Bromoform	1	4303688	< 1	< 1	NA	< 1	77%	50%	140%	76%	60%	130%	77%	50%	140%
Styrene	1	4303688	< 1	< 1	NA	< 1	73%	50%	140%	76%	60%	130%	3%	50%	140%
1,1,2,2-Tetrachloroethane	1	4303688	< 1	< 1	NA	< 1	84%	50%	140%	84%	60%	130%	86%	50%	140%
o-Xylene	1	4303688	< 1	< 1	NA	< 1	80%	70%	130%	80%	60%	140%	74%	60%	140%
1,3-Dichlorobenzene	1	4303688	< 1	< 1	NA	< 1	76%	50%	140%	80%	60%	130%	85%	50%	140%
1,4-Dichlorobenzene	1	4303688	< 1	< 1	NA	< 1	78%	50%	140%	84%	60%	130%	83%	50%	140%
1,2-Dichlorobenzene	1	4303688	< 0.7	< 0.7	NA	< 0.7	85%	50%	140%	84%	60%	130%	79%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Feb 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Matrix spike and blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

Certified By:

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FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 22X945948
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Feb 24, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Metals															
Total Aluminum	4310783	4310783	232	252	8.3%	< 5	96%	80%	120%	102%	80%	120%	NA	70%	130%
Total Antimony	4310783	4310783	<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	NA	70%	130%
Total Arsenic	4310783	4310783	<2	<2	NA	< 2	95%	80%	120%	98%	80%	120%	91%	70%	130%
Total Barium	4310783	4310783	<5	<5	NA	< 5	96%	80%	120%	100%	80%	120%	90%	70%	130%
Total Beryllium	4310783	4310783	<2	<2	NA	< 2	99%	80%	120%	100%	80%	120%	96%	70%	130%
Total Bismuth	4310783	4310783	<2	<2	NA	< 2	91%	80%	120%	102%	80%	120%	103%	70%	130%
Total Boron	4310783	4310783	<5	<5	NA	< 5	95%	80%	120%	101%	80%	120%	102%	70%	130%
Total Cadmium	4310783	4310783	<0.09	<0.09	NA	< 0.09	94%	80%	120%	97%	80%	120%	91%	70%	130%
Total Chromium	4310783	4310783	<1	<1	NA	< 1	89%	80%	120%	95%	80%	120%	99%	70%	130%
Total Cobalt	4310783	4310783	<1	<1	NA	< 1	90%	80%	120%	94%	80%	120%	97%	70%	130%
Total Copper	4310783	4310783	<1	<1	NA	< 1	95%	80%	120%	98%	80%	120%	101%	70%	130%
Total Iron	4310783	4310783	132	136	NA	< 50	90%	80%	120%	96%	80%	120%	101%	70%	130%
Total Lead	4310783	4310783	<0.5	<0.5	NA	< 0.5	99%	80%	120%	103%	80%	120%	93%	70%	130%
Total Manganese	4310783	4310783	4	4	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Molybdenum	4310783	4310783	<2	<2	NA	< 2	83%	80%	120%	87%	80%	120%	95%	70%	130%
Total Nickel	4310783	4310783	<2	<2	NA	< 2	91%	80%	120%	98%	80%	120%	102%	70%	130%
Total Selenium	4310783	4310783	<1	<1	NA	< 1	96%	80%	120%	95%	80%	120%	86%	70%	130%
Total Silver	4310783	4310783	<2	<2	NA	< 0.1	93%	80%	120%	96%	80%	120%	97%	70%	130%
Total Strontium	4310783	4310783	<5	<5	NA	< 5	87%	80%	120%	90%	80%	120%	95%	70%	130%
Total Thallium	4310783	4310783	<0.1	<0.1	NA	< 0.1	100%	80%	120%	104%	80%	120%	93%	70%	130%
Total Tin	4310783	4310783	<2	<2	NA	< 2	89%	80%	120%	92%	80%	120%	99%	70%	130%
Total Titanium	4310783	4310783	<2	<2	NA	< 2	95%	80%	120%	100%	80%	120%	108%	70%	130%
Total Uranium	4310783	4310783	<0.2	<0.2	NA	< 0.2	98%	80%	120%	101%	80%	120%	90%	70%	130%
Total Vanadium	4310783	4310783	<2	<2	NA	< 2	86%	80%	120%	90%	80%	120%	93%	70%	130%
Total Zinc	4310783	4310783	<5	<5	NA	< 5	92%	80%	120%	96%	80%	120%	88%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Mercury Analysis in Water (Total)

Total Mercury	4310571	4310571	0.037	0.041	NA	< 0.026	85%	80%	120%	NA	80%	120%	125%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Reactive Silica as SiO2	4309913		5.9	5.2	14.2%	< 0.5	94%	80%	120%	97%	80%	120%	100%	80%	120%
Chloride	4305557		<1	<1	NA	< 1	81%	80%	120%	NA	80%	120%	85%	70%	130%
Fluoride	4305557		<0.12	<0.12	NA	< 0.12	98%	80%	120%	NA	80%	120%	96%	70%	130%
Sulphate	4305557		<2	<2	NA	< 2	98%	80%	120%	NA	80%	120%	94%	70%	130%
True Color	4309913		<5.00	<5.00	NA	< 5	94%	80%	120%	98%	80%	120%	NA		
Turbidity	4307020		<0.5	0.7	NA	< 0.5	96%	80%	120%	NA			NA		
Nitrate as N	4305557		<0.05	<0.05	NA	< 0.05	95%	80%	120%	NA	80%	120%	91%	70%	130%
Nitrite as N	4305557		<0.05	<0.05	NA	< 0.05	89%	80%	120%	NA	80%	120%	92%	70%	130%

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 22X945948
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 24, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Ammonia as N	4312335		<0.03	<0.03	NA	< 0.03	104%	80%	120%	85%	80%	120%	105%	70%	130%
Total Organic Carbon	4322283		<0.50	1.3	NA	< 0.5	100%	80%	120%	NA	80%	120%	104%	80%	120%
Ortho-Phosphate as P	4309913		<0.01	<0.01	NA	< 0.01	107%	80%	120%	95%	80%	120%	102%	80%	120%
Total Sodium	4310783	4310783	3.8	4.0	6.5%	< 0.1	99%	80%	120%	101%	80%	120%	NA	70%	130%
Total Potassium	4310783	4310783	0.1	0.2	NA	< 0.1	98%	80%	120%	103%	80%	120%	107%	70%	130%
Total Calcium	4310783	4310783	0.2	0.2	NA	< 0.1	97%	80%	120%	96%	80%	120%	100%	70%	130%
Total Magnesium	4310783	4310783	0.4	0.4	NA	< 0.1	99%	80%	120%	100%	80%	120%	110%	70%	130%
Total Aluminum	4310783	4310783	232	252	8.3%	< 5	96%	80%	120%	102%	80%	120%	NA	70%	130%
Total Arsenic	4310783	4310783	<2	<2	NA	< 2	95%	80%	120%	98%	80%	120%	91%	70%	130%
Total Barium	4310783	4310783	<5	<5	NA	< 5	96%	80%	120%	100%	80%	120%	90%	70%	130%
Total Beryllium	4310783	4310783	<2	<2	NA	< 2	99%	80%	120%	100%	80%	120%	96%	70%	130%
Total Bismuth	4310783	4310783	<2	<2	NA	< 2	91%	80%	120%	102%	80%	120%	103%	70%	130%
Total Boron	4310783	4310783	<5	<5	NA	< 5	95%	80%	120%	101%	80%	120%	102%	70%	130%
Total Cadmium	4310783	4310783	<0.09	<0.09	NA	< 0.09	94%	80%	120%	97%	80%	120%	91%	70%	130%
Total Chromium	4310783	4310783	<1	<1	NA	< 1	89%	80%	120%	95%	80%	120%	99%	70%	130%
Total Cobalt	4310783	4310783	<1	<1	NA	< 1	90%	80%	120%	94%	80%	120%	97%	70%	130%
Total Copper	4310783	4310783	<1	<1	NA	< 1	95%	80%	120%	98%	80%	120%	101%	70%	130%
Total Iron	4310783	4310783	132	136	NA	< 50	90%	80%	120%	96%	80%	120%	101%	70%	130%
Total Lead	4310783	4310783	<0.5	<0.5	NA	< 0.5	99%	80%	120%	103%	80%	120%	93%	70%	130%
Total Manganese	4310783	4310783	4	4	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Molybdenum	4310783	4310783	<2	<2	NA	< 2	83%	80%	120%	87%	80%	120%	95%	70%	130%
Total Nickel	4310783	4310783	<2	<2	NA	< 2	91%	80%	120%	98%	80%	120%	102%	70%	130%
Total Phosphorous	4310783	4310783	<0.02	<0.02	NA	< 0.02	95%	80%	120%	102%	80%	120%	100%	70%	130%
Total Selenium	4310783	4310783	<1	<1	NA	< 1	96%	80%	120%	95%	80%	120%	86%	70%	130%
Total Silver	4310783	4310783	<2	<2	NA	< 0.1	93%	80%	120%	96%	80%	120%	97%	70%	130%
Total Strontium	4310783	4310783	<5	<5	NA	< 5	87%	80%	120%	90%	80%	120%	95%	70%	130%
Total Thallium	4310783	4310783	<0.1	<0.1	NA	< 0.1	100%	80%	120%	104%	80%	120%	93%	70%	130%
Total Tin	4310783	4310783	<2	<2	NA	< 2	89%	80%	120%	92%	80%	120%	99%	70%	130%
Total Titanium	4310783	4310783	<2	<2	NA	< 2	95%	80%	120%	100%	80%	120%	108%	70%	130%
Total Uranium	4310783	4310783	<0.2	<0.2	NA	< 0.2	98%	80%	120%	101%	80%	120%	90%	70%	130%
Total Vanadium	4310783	4310783	<2	<2	NA	< 2	86%	80%	120%	90%	80%	120%	93%	70%	130%
Total Zinc	4310783	4310783	<5	<5	NA	< 5	92%	80%	120%	96%	80%	120%	88%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

pH	1	6.8	6.8	0.0%	<	100%	80%	120%							
Chloride	4312959	8	9	4.4%	< 1	81%	80%	120%	NA	80%	120%	90%	70%	130%	
Fluoride	4312959	<0.12	<0.12	NA	< 0.12	99%	80%	120%	NA	80%	120%	96%	70%	130%	
Sulphate	4312959	49	51	4.8%	< 2	101%	80%	120%	NA	80%	120%	NA	70%	130%	
Alkalinity	1	45	44	2.2%	< 5	81%	80%	120%							

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	1		155	156	0.6%	< 1	103%	90%	110%						
Nitrate as N	4312959		1.16	1.21	4.3%	< 0.05	99%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	4312959		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	91%	70%	130%
Bicarb. Alkalinity (as CaCO3)	1		45	44	2.2%	< 5		80%	120%						
Carb. Alkalinity (as CaCO3)	1		<10	<10	NA	< 10		80%	120%						
Hydroxide	1		<5	<5	NA	< 5		80%	120%						

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

ATTENTION TO: James Doyle

RPT Date: Feb 24, 2023

PARAMETER	Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Volatile Organic Compounds in Water										
Chloromethane	4303688	54%	50%	140%	55%	60%	130%	54%	50%	140%
m,p-Xylene	4303688	79%	70%	130%	78%	60%	140%	43%	60%	140%
Styrene	4303688	73%	50%	140%	76%	60%	130%	3%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Matrix spike and blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

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Method Summary

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PROJECT: 22532464

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA 3510C/8270E	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Acenaphthene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Acenaphthylene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Acridine	ORG-120-5119	EPA 3510C/8270E	GC/MS
Anthracene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Chrysene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Fluoranthene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Fluorene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Naphthalene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Perylene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Phenanthrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Pyrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Quinoline	ORG-120-5119	EPA 3510C/8270E	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3510C/8270E	GC/MS

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5119	EPA 3510C/8270E	GC/MS
Pyrene-d10	ORG-120-5119	EPA 3510C/8270E	GC/MS
Chloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Vinyl Chloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromomethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Acetone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,1-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Benzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloropropane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromodichloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
2-Hexanone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Dibromochloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dibromoethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Tetrachloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Ethylbenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
m,p-Xylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromoform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Styrene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
o-Xylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,3-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene-d8	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X945948

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 12.9, 12.6, 12.6
Hold Time:
AGAT Job Number: 22x945948 22SEP16 10:19AM
Notes:

Report Information
Company: Golder
Contact: James Doyle
Address: 1931 Robertson Road
Phone: 613-298-0765 Fax:
Client Project #: 22532464
AGAT Quotation: 649648
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: James Doyle
Email: james_doyle@golder.com
2. Name:
Email:

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☑ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: General Chem	Other:	Hazardous (Y/N)
BFR-L1-SW-51	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-52	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-53	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-54	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-55	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-56	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-57	Sep 9, 2022	SW	7				☑	☑													☑							
BFR-L1-SW-58	Sep 9, 2022	SW	7			☑	☑	☑		☑											☑					☑		
BFR-L1-SW-59	Sep 9, 2022	SW	7				☑	☑		☑											☑					☑		
BFR-L1-SW-60	Sep 9, 2022	SW	7				☑	☑		☑											☑					☑		
BFR-L1-SW-61	Sep 9, 2022	SW	7				☑	☑		☑											☑					☑		
BFR-L1-SW-62	Sep 11, 2022	SW	7				☑	☑		☑											☑					☑		

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Philippe Chevrette	13/09/22-2:00pm		
Samples Relinquished By (Sign):	**Date/Time**	**Samples Received By (Sign):**	**Date/Time**

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White Copy- AGAT

N°:

Document ID: BIN-LIG-1502.004
Date revised: Apr 19, 2021

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Chain of Custody Record

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Report to:

Company:

Same as COC#: 22x 945948

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS		
					VIALS / JARS	BAGS	BOTTLES
1	BFR-L1-SW-63	Sep 11, 2022	SW		2		5
2	BFR-L1-SW-64	Sep 11, 2022	SW		2		5
3	BFR-L1-SW-DUP1	Sep 9, 2022	SW		2		5
4	BFR-L1-SW-DUP2	Sep 9, 2022	SW		2		5
5	BFR-L1-SW-DUP3	Sep 11, 2022	SW		2		5
6	BFR-L1-GW-4	Sep 12, 2022	GW		5		5
7							
8	split between						
9	Cooler 4 and 3						
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ VSS	☐ TDS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: General Chem	Other:	Hazardous (Y/N)
	☑	☑	☑		☑												☑					☑		
	☑	☑	☑		☑												☑					☑		
	☑	☑	☑		☑												☑					☑		
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	☑	☑	☑								☑			☑			☑					☑		

Samples Relinquished By (Print Name and Sign): Philippe Chevrette — Philippe Chevrette — Date/Time: 13/09/22-2:00

Samples Received By (Print Name and Sign): — Date/Time:

Samples Relinquished By (Print Name and Sign): — Date/Time:

Samples Received By (Print Name and Sign): — Date/Time:

Samples Relinquished By (Print Name and Sign): — Date/Time:

Samples Received By (Print Name and Sign): — Date/Time:

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Page 2 of 2

N°:

Document ID: BA-033-IM2.004

Date issued: Apr 19, 2021

SEP 16 19:19

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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CLIENT NAME: WSP CANADA INC.
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600
ATTENTION TO: James Doyle
PROJECT: 22532464
AGAT WORK ORDER: 22X946026
SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
DATE REPORTED: Jan 25, 2023
PAGES (INCLUDING COVER): 31
VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 3:Version 3 supersedes version 2. Workorder 22X946026, version 2, issued December 13, 2022. Updated sample dates January 25, 2023. AC

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FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-51	BFR-SED-52	BFR-SED-53	BFR-SED-54	BFR-SED-55	BFR-SED-56	BFR-SED-57	BFR-SED-58
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4311587	4311649	4311650	4311651	4311652	4311653	4311654	4311655
Aluminum	mg/kg		10	5990	6710	9830	3800	4790	8360	7840	8630
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	1
Arsenic	mg/kg		1	4	3	5	4	4	4	4	5
Barium	mg/kg		5	11	14	14	15	22	28	19	21
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	2
Cadmium	mg/kg		0.3	0.4	<0.3	0.3	<0.3	<0.3	0.5	<0.3	0.5
Chromium	mg/kg		2	5	7	7	4	8	10	11	9
Cobalt	mg/kg		1	1	2	1	<1	<1	2	3	2
Copper	mg/kg		2	6	4	8	5	5	8	5	9
Iron	mg/kg		50	4050	6160	5450	1520	3560	5220	8320	3600
Lead	mg/kg		0.5	19.0	8.8	30.8	22.5	8.0	20.1	12.6	43.1
Lithium	mg/kg		5	<5	8	<5	<5	<5	5	9	<5
Manganese	mg/kg		2	70	122	74	32	47	74	154	43
Mercury	mg/kg		0.03	0.05	<0.03	0.08	0.07	0.04	0.07	0.04	0.16
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	4	4	5	3	3	5	5	6
Selenium	mg/kg		1	2	<1	2	1	2	2	1	4
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	12	7	12	10	10	11	12	8
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
Tin	mg/kg		2	3	2	3	4	3	4	3	4
Uranium	mg/kg		0.1	0.8	2.6	1.3	0.8	0.9	1.5	2.0	1.0
Vanadium	mg/kg		2	18	25	32	16	25	30	36	26
Zinc	mg/kg		5	31	24	24	12	17	28	27	13

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-59	BFR-SED-60	BFR-SED-61	BFR-SED-62	BFR-SED-63	BFR-SED-64	BFR-SED-65-SA1	BFR-SED-65-SA2
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-06	2022-09-06
Parameter	Unit	G / S	RDL	4311658	4311659	4311660	4311661	4311662	4311663	4311665	4311668
Aluminum	mg/kg		10	9160	12700	18900	21400	6030	11800	6670	3690
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	5	2	6	6	4	7	3	3
Barium	mg/kg		5	13	27	13	31	13	21	30	28
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium	mg/kg		0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	0.4	<0.3
Chromium	mg/kg		2	8	11	15	99	20	42	3	2
Cobalt	mg/kg		1	<1	3	12	17	4	8	<1	<1
Copper	mg/kg		2	9	7	12	8	4	7	5	2
Iron	mg/kg		50	9630	9660	41900	41800	13600	38200	1250	1350
Lead	mg/kg		0.5	37.6	15.6	18.6	17.0	13.7	31.0	6.0	1.2
Lithium	mg/kg		5	<5	<5	5	26	8	13	<5	<5
Manganese	mg/kg		2	40	166	583	434	180	302	9	10
Mercury	mg/kg		0.03	0.09	0.03	0.04	<0.03	<0.03	0.06	0.06	0.04
Molybdenum	mg/kg		2	<2	<2	2	6	<2	5	<2	<2
Nickel	mg/kg		2	6	6	5	42	9	17	3	<2
Selenium	mg/kg		1	3	2	<1	<1	<1	<1	2	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	11	<5	7	<5	7	23	24
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	4	<2	3	4	3	5	4	4
Uranium	mg/kg		0.1	0.9	3.5	3.5	2.9	1.3	3.2	0.6	0.3
Vanadium	mg/kg		2	29	46	68	93	30	62	10	8
Zinc	mg/kg		5	13	47	31	80	23	40	8	<5

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
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FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-66-SA1	BFR-SED-66-SA2	BFR-SED-66-SA3	BFR-SED-67-SA1	BFR-SED-67-SA2	BFR-SED-68-SA1	BFR-SED-68-SA2	BFR-SED-68-SA3
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06
Parameter	Unit	G / S	RDL	4311669	4311670	4311671	4311672	4311673	4311674	4311675	4311676
Aluminum	mg/kg		10	8930	11700	3440	7510	3700	6660	6720	4460
Antimony	mg/kg		1	<1	<1	<1	<1	<1	2	<1	<1
Arsenic	mg/kg		1	4	7	4	4	4	3	3	3
Barium	mg/kg		5	23	27	6	33	53	22	33	23
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	3	<2	<2	3	6	4	2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	0.4	0.3	0.4	<0.3	<0.3
Chromium	mg/kg		2	3	4	2	3	3	9	3	3
Cobalt	mg/kg		1	<1	<1	<1	<1	1	<1	<1	<1
Copper	mg/kg		2	3	3	<2	5	3	12	3	3
Iron	mg/kg		50	1160	1320	328	1390	3010	2850	1630	1690
Lead	mg/kg		0.5	3.2	4.3	6.1	5.0	1.6	134	4.2	2.9
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/kg		2	6	7	12	9	18	20	6	7
Mercury	mg/kg		0.03	0.12	0.20	0.12	0.11	0.08	0.06	0.04	<0.03
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	2	<2	3	<2	6	<2	<2
Selenium	mg/kg		1	1	1	1	2	2	2	2	1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	14	15	<5	26	58	18	31	31
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	4	9	5	5	11	3	3	4
Uranium	mg/kg		0.1	0.4	1.1	0.4	0.5	0.2	0.6	0.4	0.5
Vanadium	mg/kg		2	14	19	13	11	10	11	7	8
Zinc	mg/kg		5	5	5	<5	8	<5	13	<5	<5

Certified By:

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-69-SA1	BFR-SED-69-SA2	BFR-SED-70-SA1	BFR-SED-70-SA2	BFR-SED-70-SA3	BFR-SED-71-SA1	BFR-SED-71-SA2	BFR-SED-72-SA1
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-06
Parameter	Unit	G / S	RDL	4311677	4311678	4311679	4311680	4311681	4311682	4311683	4311684
Aluminum	mg/kg		10	9770	6290	6880	5660	4440	9460	5570	5570
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	3	4	4	4	2	3	7	3
Barium	mg/kg		5	16	31	29	40	29	25	32	33
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	2	3	<2	<2	<2	2	<2	3
Cadmium	mg/kg		0.3	0.9	<0.3	0.3	<0.3	<0.3	0.6	<0.3	0.3
Chromium	mg/kg		2	3	2	3	2	2	2	4	4
Cobalt	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	mg/kg		2	6	3	6	4	3	5	3	5
Iron	mg/kg		50	924	1850	1030	1090	1320	1040	1790	2230
Lead	mg/kg		0.5	17.5	4.0	16.5	4.4	1.3	8.2	3.4	6.8
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/kg		2	6	12	6	8	9	9	16	12
Mercury	mg/kg		0.03	0.04	<0.03	0.04	<0.03	<0.03	0.05	<0.03	0.03
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	<2	3	<2	<2	<2	2	3
Selenium	mg/kg		1	2	1	3	1	1	2	2	2
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	17	35	20	30	27	22	31	26
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Tin	mg/kg		2	3	4	3	6	3	3	10	4
Uranium	mg/kg		0.1	0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.4
Vanadium	mg/kg		2	10	9	12	12	7	8	11	6
Zinc	mg/kg		5	5	<5	10	6	<5	7	7	8

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil (Incl. Hg)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-72-SA2	BFR-SED-72-SA3	BFR-SED-72-SA4	BFR-SED-72-DUP1	BFR-SED-DUP1	BFR-L1-SED-DUP2	BFR-L1-SED-DUP3
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-06	2022-09-06	2022-09-06	2022-09-06	2022-09-09	2022-09-09	2022-09-11
Parameter	Unit	G / S	RDL	4311685	4311686	4311687	4311688	4311997	4311998	4311999
Aluminum	mg/kg		10	4980	7040	9400	4550	14600	9210	7480
Antimony	mg/kg		1	<1	<1	<1	<1	<1	1	<1
Arsenic	mg/kg		1	3	3	6	3	5	4	4
Barium	mg/kg		5	26	17	15	22	18	16	16
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	<2	<2	<2	<2	< 2	2	<2
Cadmium	mg/kg		0.3	<0.3	<0.3	0.6	<0.3	<0.3	0.6	<0.3
Chromium	mg/kg		2	3	3	8	3	5	8	24
Cobalt	mg/kg		1	<1	<1	2	<1	5	2	5
Copper	mg/kg		2	3	3	7	3	10	7	4
Iron	mg/kg		50	1570	2340	5840	1670	5820	6280	17500
Lead	mg/kg		0.5	1.8	2.8	24.0	2.0	9.5	22.5	15.7
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	10
Manganese	mg/kg		2	7	10	100	8	80	111	221
Mercury	mg/kg		0.03	<0.03	0.04	0.05	<0.03	0.18	0.08	0.04
Molybdenum	mg/kg		2	<2	<2	<2	<2	5	<2	2
Nickel	mg/kg		2	<2	<2	6	<2	10	6	10
Selenium	mg/kg		1	1	2	3	<1	1	3	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	23	29	15	24	21	15	<5
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	4	4	4	3	5	4	4
Uranium	mg/kg		0.1	0.8	1.1	1.0	0.6	2.1	0.9	1.4
Vanadium	mg/kg		2	6	9	25	7	5	24	33
Zinc	mg/kg		5	5	11	45	<5	45	49	26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311587-4311999 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by *)

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AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Grain Size Analysis (Sieve & Pipette)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-65	BFR-SED-66	BFR-SED-67	BFR-SED-68	BFR-SED-69	BFR-SED-70	BFR-SED-71	BFR-SED-72
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:											
Parameter	Unit	G / S	RDL	4320846	4320852	4320853	4320854	4320855	4320856	4320857	4320858
Particle Size Distribution (<12.5mm, -4 PHI)	%		0.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Particle Size Distribution (<9.5mm, -3 PHI)	%		0.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Particle Size Distribution (<4.75mm, -2 PHI	%		0.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Particle Size Distribution (<2mm, -1 PHI)	%		0.1	77.9	79.7	85.3	84.5	84.4	85.0	88.3	88.6
Particle Size Distribution (<1mm, 0 PHI)	%		0.1	75.7	73.4	80.2	76.5	80.3	80.8	81.2	79.3
Particle Size Distribution (<1/2mm, 1 PHI)	%		0.1	73.3	66.9	75.0	69.2	74.7	74.6	75.9	71.2
Particle Size Distribution (<1/4mm, 2 PHI)	%		0.1	70.4	61.1	68.4	63.0	69.2	69.4	68.6	64.6
Particle Size Distribution (<1/8mm, 3 PHI)	%		0.1	65.1	52.2	61.1	57.9	61.0	64.9	64.1	58.5
Particle Size Distribution (<1/16mm, 4 PHI)	%		0.1	64.5	48.7	56.5	55.8	59.5	61.2	63.0	53.6
Particle Size Distribution (<1/32mm, 5 PHI)	%		0.1	55.0	47.6	55.2	55.5	58.4	59.7	62.6	53.5
Particle Size Distribution (<1/64mm, 6 PHI)	%		0.1	54.0	42.5	54.9	55.3	54.9	58.5	62.4	52.3
Particle Size Distribution (<1/128mm, 7 PHI)	%		0.1	51.1	38.5	51.3	51.6	52.5	53.3	58.7	49.0
Particle Size Distribution (<1/256mm, 8 PHI)	%		0.1	49.0	36.2	48.7	48.9	50.5	55.9	57.6	46.7
Particle Size Distribution (<1/512mm, 9 PHI)	%		0.1	47.0	33.7	44.7	45.3	46.7	51.8	53.8	43.8
Particle Size Distribution (Gravel)	%		1	22.1	20.3	14.7	15.5	15.6	15.0	11.8	11.4
Particle Size Distribution (Sand)	%		1	13.5	31.0	28.7	29.2	24.9	23.8	25.8	35.0
Particle Size Distribution (Silt)	%		1	15.5	12.5	7.9	6.4	9.0	5.3	4.9	6.9
Particle Size Distribution (Clay)	%		1	49.0	36.2	48.7	48.9	50.5	55.9	57.6	46.7
Particles >75um	%		1	35.4	50.4	42.3	44.1	40.1	37.8	37.1	45.1
Classification	Coarse/Fine			FINE	COARSE	FINE	FINE	FINE	FINE	FINE	FINE

Certified By:

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Grain Size Analysis (Sieve & Pipette)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

O. Reg. 558 Metals

DATE RECEIVED: 2022-09-16

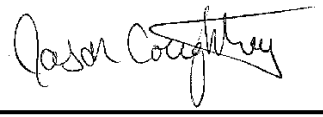
DATE REPORTED: 2023-01-25

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR-SED-TCLP-SA1	BFR-SED-TCLP-SA2
				SAMPLE TYPE: Sediment	Sediment
				DATE SAMPLED: 2022-09-06	2022-09-06
				4311841	4311914
Arsenic Leachate	mg/L	2.5	0.010	<0.010	<0.010
Barium Leachate	mg/L	100	0.010	0.051	0.043
Boron Leachate	mg/L	500	0.050	0.127	0.118
Cadmium Leachate	mg/L	0.5	0.010	<0.010	<0.010
Chromium Leachate	mg/L	5	0.050	<0.050	<0.050
Lead Leachate	mg/L	5	0.010	0.021	0.014
Mercury Leachate	mg/L	0.1	0.01	<0.01	<0.01
Selenium Leachate	mg/L	1	0.010	0.016	<0.010
Silver Leachate	mg/L	5	0.010	<0.010	<0.010
Uranium Leachate	mg/L	10	0.050	<0.050	<0.050

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

		SAMPLE DESCRIPTION:		BFR-SED-58	BFR-SED-59	BFR-SED-60	BFR-SED-61	BFR-SED-62	BFR-SED-63	BFR-SED-64	BFR-SED-DUP1
		SAMPLE TYPE:		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
		DATE SAMPLED:		2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09
Parameter	Unit	G / S	RDL	4311655	4311658	4311659	4311660	4311661	4311662	4311663	4311997
Total Organic Carbon	%		0.10	26.2	19.8	18.1	3.41	5.70	3.59	4.46	28.8
Fraction Organic Carbon in Soil			0.0015	0.262	0.198	0.181	0.0341	0.0570	0.0359	0.0446	0.288

		SAMPLE DESCRIPTION:		BFR-L1-SED-DUP2	BFR-L1-SED-DUP3
		SAMPLE TYPE:		Sediment	Sediment
		DATE SAMPLED:		2022-09-09	2022-09-11
Parameter	Unit	G / S	RDL	4311998	4311999
Total Organic Carbon	%		0.10	20.3	3.20
Fraction Organic Carbon in Soil			0.0015	0.203	0.0320

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Moisture

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR-SED-51 / SAMPLE TYPE: Sediment / DATE SAMPLED: 2022-09-09 / 4311587	BFR-SED-52 / Sediment / 2022-09-09 / 4311649	BFR-SED-53 / Sediment / 2022-09-09 / 4311650	BFR-SED-54 / Sediment / 2022-09-09 / 4311651	BFR-SED-55 / Sediment / 2022-09-09 / 4311652	BFR-SED-56 / Sediment / 2022-09-09 / 4311653	BFR-SED-57 / Sediment / 2022-09-09 / 4311654	BFR-SED-58 / Sediment / 2022-09-09 / 4311655
% Moisture	%		1	85	76	93	94	84	87	85	95

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR-SED-59 / SAMPLE TYPE: Sediment / DATE SAMPLED: 2022-09-09 / 4311658	BFR-SED-60 / Sediment / 2022-09-09 / 4311659	BFR-SED-61 / Sediment / 2022-09-09 / 4311660	BFR-SED-62 / Sediment / 2022-09-11 / 4311661	BFR-SED-63 / Sediment / 2022-09-11 / 4311662	BFR-SED-64 / Sediment / 2022-09-11 / 4311663	BFR-SED-DUP1 / Sediment / 2022-09-09 / 4311997	BFR-L1-SED-DUP2 / Sediment / 2022-09-09 / 4311998
% Moisture	%		1	94	89	88	76	67	79	91	84

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR-L1-SED-DUP3 / SAMPLE TYPE: Sediment / DATE SAMPLED: 2022-09-11 / 4311999
% Moisture	%		1	56

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PAHs (TCLP Extraction)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:					BFR-SED-TCLP-SA1	BFR-SED-TCLP-SA2
SAMPLE TYPE:					Sediment	Sediment
DATE SAMPLED:					2022-09-06	2022-09-06
Parameter	Unit	G / S	RDL		4311841	4311914
TCLP PAHs-EXTR					Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311841-4311914 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons - TCLP Leachate

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

				BFR-SED-TCLP-	BFR-SED-TCLP-
SAMPLE DESCRIPTION:				SA1	SA2
SAMPLE TYPE:				Sediment	Sediment
DATE SAMPLED:				2022-09-06	2022-09-06
Parameter	Unit	G / S	RDL	4311841	4311914
1-Methylnaphthalene	ug/L		0.08	<0.08	<0.08
2-Methylnaphthalene	ug/L		0.03	<0.03	<0.03
Acenaphthene	ug/L		0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.02	<0.02	<0.02
Anthracene	ug/L		0.03	<0.03	<0.03
Acridine	ug/L		0.10	<0.10	<0.10
Benzo(e)pyrene	ug/L		0.06	<0.06	<0.06
Benzo(a)anthracene	ug/L		0.06	<0.06	<0.06
Benzo(a)pyrene	ug/L		0.06	<0.06	<0.06
Benzo(b)fluoranthene	ug/L		0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	µg/L		0.05	<0.05	<0.05
Benzo(ghi)perylene	ug/L		0.03	<0.03	<0.03
Chrysene	ug/L		0.04	<0.04	<0.04
Dibenzo(a,h)anthracene	ug/L		0.03	<0.03	<0.03
Fluoranthene	ug/L		0.03	0.18	0.41
Fluorene	ug/L		0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	ug/L		0.08	<0.08	<0.08
Naphthalene	ug/L		0.02	<0.02	<0.02
Perylene	ug/L		0.06	<0.06	<0.06
Phenanthrene	ug/L		0.04	<0.04	0.52
Pyrene	ug/L		0.03	<0.03	<0.03
Surrogate	Unit	Acceptable Limits			
Naphthalene-d8	%	50-140		93	83
Terphenyl-d14	%	50-140		84	76
Pyrene-d10	%	50-140		120	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311841-4311914 Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-51	BFR-SED-52	BFR-SED-53	BFR-SED-54	BFR-SED-55	BFR-SED-56	BFR-SED-57	BFR-SED-58
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4311587	4311649	4311650	4311651	4311652	4311653	4311654	4311655
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	2.06	3.66	4.52	2.66	2.38	2.76	2.88	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	74	75	78	75	71	71	65
Terphenyl-d14	%	50-140		76	83	88	91	87	86	84	76
Pyrene-d10 (%)	%	50-140		74	81	87	87	81	81	80	74

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
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FAX (902)468-8924
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Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

SAMPLE DESCRIPTION:				BFR-SED-59	BFR-SED-60	BFR-SED-61	BFR-SED-62	BFR-SED-63	BFR-SED-64	BFR-SED-DUP1	BFR-L1-SED-DUP2
SAMPLE TYPE:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
DATE SAMPLED:				2022-09-09	2022-09-09	2022-09-09	2022-09-11	2022-09-11	2022-09-11	2022-09-09	2022-09-09
Parameter	Unit	G / S	RDL	4311658	4311659	4311660	4311661	4311662	4311663	4311997	4311998
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	2.24	2.87	1.98	<0.05	0.61	0.60	2.30
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	65	70	67	72	78	74	77
Terphenyl-d14	%	50-140		82	75	81	79	84	91	87	93
Pyrene-d10 (%)	%	50-140		80	73	79	76	82	84	83	87

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

				BFR-L1-SED-DUP3
SAMPLE DESCRIPTION:				
SAMPLE TYPE:				Sediment
DATE SAMPLED:				2022-09-11
Parameter	Unit	G / S	RDL	4311999
1-Methylnaphthalene	mg/kg		0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004
Acridine	mg/kg		0.05	<0.05
Anthracene	mg/kg		0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01
Chrysene	mg/kg		0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05
Fluorene	mg/kg		0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01
Perylene	mg/kg		0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03
Pyrene	mg/kg		0.05	<0.05
Quinoline	mg/kg		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Naphthalene-d8	%	50-140		72
Terphenyl-d14	%	50-140		90
Pyrene-d10 (%)	%	50-140		87

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AGAT WORK ORDER: 22X946026

PROJECT: 22532464

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2023-01-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311587-4311999 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X946026
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Soil Analysis

RPT Date: Jan 25, 2023

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Available Metals in Soil (Incl. Hg)															
Aluminum	4319383		3430	3610	4.9%	< 10	105%	80%	120%	107%	80%	120%	NA	70%	130%
Antimony	4319383		<1	<1	NA	< 1	90%	80%	120%	NA	80%	120%	NA	70%	130%
Arsenic	4319383		8	9	8.7%	< 1	102%	80%	120%	102%	80%	120%	NA	70%	130%
Barium	4319383		10	13	NA	< 5	100%	80%	120%	94%	80%	120%	91%	70%	130%
Beryllium	4319383		<2	<2	NA	< 2	102%	80%	120%	103%	80%	120%	88%	70%	130%
Boron	4319383		20	22	10.1%	< 2	100%	80%	120%	102%	80%	120%	108%	70%	130%
Cadmium	4319383		<0.3	<0.3	NA	< 0.3	100%	80%	120%	97%	80%	120%	86%	70%	130%
Chromium	4319383		3	10	NA	< 2	100%	80%	120%	99%	80%	120%	101%	70%	130%
Cobalt	4319383		2	2	NA	< 1	98%	80%	120%	96%	80%	120%	88%	70%	130%
Copper	4319383		4	4	NA	< 2	100%	80%	120%	101%	80%	120%	83%	70%	130%
Iron	4319383		7820	7820	0.1%	< 50	103%	80%	120%	101%	80%	120%	NA	70%	130%
Lead	4319383		10.5	8.1	26.4%	< 0.5	97%	80%	120%	93%	80%	120%	NA	70%	130%
Lithium	4319383		12	12	NA	< 5	101%	70%	130%	105%	70%	130%	90%	70%	130%
Manganese	4319383		162	155	4.0%	< 2	99%	80%	120%	96%	80%	120%	NA	70%	130%
Mercury	4319383		0.09	<0.03	NA	< 0.03	106%	80%	120%	106%	80%	120%	NA	70%	130%
Molybdenum	4319383		<2	<2	NA	< 2	99%	80%	120%	96%	80%	120%	100%	70%	130%
Nickel	4319383		10	10	NA	< 2	100%	80%	120%	103%	80%	120%	113%	70%	130%
Selenium	4319383		<1	<1	NA	< 1	102%	80%	120%	86%	80%	120%	101%	70%	130%
Silver	4319383		<0.5	<0.5	NA	< 0.5	101%	80%	120%	84%	80%	120%	79%	70%	130%
Strontium	4319383		1130	1230	8.6%	< 5	104%	80%	120%	104%	80%	120%	NA	70%	130%
Thallium	4319383		0.2	<0.1	NA	< 0.1	97%	80%	120%	90%	80%	120%	NA	70%	130%
Tin	4319383		5	6	NA	< 2	97%	80%	120%	96%	80%	120%	87%	70%	130%
Uranium	4319383		0.6	0.7	16.7%	< 0.1	103%	80%	120%	95%	80%	120%	90%	70%	130%
Vanadium	4319383		11	12	5.9%	< 2	109%	80%	120%	107%	80%	120%	NA	70%	130%
Zinc	4319383		20	25	NA	< 5	100%	80%	120%	100%	80%	120%	77%	70%	130%
Available Metals in Soil (Incl. Hg)															
Aluminum	4311687	4311687	9400	9460	0.6%	< 10	105%	80%	120%	103%	80%	120%	NA	70%	130%
Antimony	4311687	4311687	<1	<1	NA	< 1	80%	80%	120%	NA	80%	120%	124%	70%	130%
Arsenic	4311687	4311687	6	6	12.7%	< 1	105%	80%	120%	102%	80%	120%	121%	70%	130%
Barium	4311687	4311687	15	17	NA	< 5	81%	80%	120%	83%	80%	120%	95%	70%	130%
Beryllium	4311687	4311687	<2	<2	NA	< 2	103%	80%	120%	99%	80%	120%	115%	70%	130%
Boron	4311687	4311687	<2	<2	NA	< 2	101%	80%	120%	99%	80%	120%	109%	70%	130%
Cadmium	4311687	4311687	0.6	0.6	NA	< 0.3	103%	80%	120%	98%	80%	120%	103%	70%	130%
Chromium	4311687	4311687	8	9	NA	< 2	101%	80%	120%	97%	80%	120%	NA	70%	130%
Cobalt	4311687	4311687	2	2	NA	< 1	100%	80%	120%	96%	80%	120%	114%	70%	130%
Copper	4311687	4311687	7	8	NA	< 2	104%	80%	120%	100%	80%	120%	123%	70%	130%
Iron	4311687	4311687	5840	6050	3.6%	< 50	111%	80%	120%	104%	80%	120%	NA	70%	130%
Lead	4311687	4311687	24.0	27.4	13.4%	< 0.5	84%	80%	120%	90%	80%	120%	NA	70%	130%
Lithium	4311687	4311687	<5	<5	NA	< 5	105%	70%	130%	103%	70%	130%	128%	70%	130%

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11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jan 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Manganese	4311687	4311687	100	103	2.8%	< 2	115%	80%	120%	110%	80%	120%	NA	70%	130%
Mercury	4311687	4311687	0.05	0.06	NA	0.06	93%	80%	120%	95%	80%	120%	NA	70%	130%
Molybdenum	4311687	4311687	<2	<2	NA	< 2	97%	80%	120%	93%	80%	120%	106%	70%	130%
Nickel	4311687	4311687	6	7	NA	< 2	102%	80%	120%	101%	80%	120%	118%	70%	130%
Selenium	4311687	4311687	3	3	NA	< 1	104%	80%	120%	106%	80%	120%	NA	70%	130%
Silver	4311687	4311687	<0.5	<0.5	NA	< 0.5	105%	80%	120%	90%	80%	120%	109%	70%	130%
Strontium	4311687	4311687	15	16	NA	< 5	108%	80%	120%	101%	80%	120%	121%	70%	130%
Thallium	4311687	4311687	<0.1	<0.1	NA	< 0.1	84%	80%	120%	87%	80%	120%	NA	70%	130%
Tin	4311687	4311687	4	5	NA	< 2	97%	80%	120%	96%	80%	120%	114%	70%	130%
Uranium	4311687	4311687	1.0	1.1	10.3%	< 0.1	98%	80%	120%	101%	80%	120%	94%	70%	130%
Vanadium	4311687	4311687	25	27	9.8%	< 2	105%	80%	120%	98%	80%	120%	NA	70%	130%
Zinc	4311687	4311687	45	46	2.0%	< 5	102%	80%	120%	100%	80%	120%	112%	70%	130%
Grain Size Analysis (Sieve & Pipette)															
Particle Size Distribution (<12.5mm, -4 PHI)	1	4320846	100.0	100.0	0.0%	< 0.1	100%	70%	130%						
Particle Size Distribution (<9.5mm, -3 PHI)	1	4320846	100.0	100.0	0.0%	< 0.1	100%	70%	130%						
Particle Size Distribution (<4.75mm, -2 PHI	1	4320846	100.0	100.0	0.0%	< 0.1	101%	70%	130%						
Particle Size Distribution (<2mm, -1 PHI)	1	4320846	77.9	84.0	7.5%	< 0.1	101%	70%	130%						
Particle Size Distribution (<1mm, 0 PHI)	1	4320846	75.7	81.9	7.9%	< 0.1	101%	70%	130%						
Particle Size Distribution (<1/2mm, 1 PHI)	1	4320846	73.3	78.2	6.5%	< 0.1	101%	70%	130%						
Particle Size Distribution (<1/4mm, 2 PHI)	1	4320846	70.4	75.3	6.7%	< 0.1	101%	70%	130%						
Particle Size Distribution (<1/8mm, 3 PHI)	1	4320846	65.1	69.2	6.1%	< 0.1	100%	70%	130%						
Particle Size Distribution (<1/16mm, 4 PHI)	1	4320846	64.5	66.9	3.7%	< 0.1	103%	70%	130%						
Particle Size Distribution (<1/32mm, 5 PHI)	1	4320846	55.0	70.0	24.0%	< 0.1	103%	70%	130%						
Particle Size Distribution (<1/64mm, 6 PHI)	1	4320846	54.0	63.0	15.4%	< 0.1	110%	70%	130%						
Particle Size Distribution (<1/128mm, 7 PHI)	1	4320846	51.1	62.5	20.1%	< 0.1	102%	70%	130%						
Particle Size Distribution (<1/256mm, 8 PHI)	1	4320846	49.0	61.6	22.8%	< 0.1	102%	70%	130%						
Particle Size Distribution (<1/512mm, 9 PHI)	1	4320846	47.0	60.4	25.0%	< 0.1	100%	70%	130%						
Particle Size Distribution (Sand)	1	4320846	13.5	17.1	23.5%	< 1	89%	70%	130%						
Particle Size Distribution (Silt)	1	4320846	15.5	5.3	98.1%	< 1	107%	70%	130%						
Particle Size Distribution (Clay)	1	4320846	49.0	61.6	22.8%	< 1	100%	70%	130%						

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

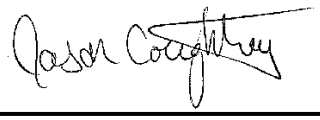
Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X946026
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jan 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)															
Total Organic Carbon	4259631	4259631	0.68	0.59	14.2%	< 0.10	95%	80%	120%				95%	80%	120%
Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated. Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.															
Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)															
Total Organic Carbon	4285320		5.0	4.5	10.5%	< 0.10	101%	80%	120%	NA			107%	80%	120%
Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated. Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.															
Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)															
Total Organic Carbon	8042	4259631	0.68	0.59	14.2%	< 0.10	95%	80%	120%				95%	80%	120%
Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated. Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.															
O. Reg. 558 Metals															
Arsenic Leachate	4377212		<0.010	<0.010	NA	< 0.010	99%	70%	130%	105%	80%	120%	112%	70%	130%
Barium Leachate	4377212		0.197	0.199	1.0%	< 0.010	99%	70%	130%	107%	80%	120%	100%	70%	130%
Boron Leachate	4377212		<0.050	<0.050	NA	< 0.050	99%	70%	130%	101%	80%	120%	92%	70%	130%
Cadmium Leachate	4377212		<0.010	<0.010	NA	< 0.010	100%	70%	130%	99%	80%	120%	107%	70%	130%
Chromium Leachate	4377212		<0.050	<0.050	NA	< 0.050	105%	70%	130%	113%	80%	120%	119%	70%	130%
Lead Leachate	4377212		<0.010	<0.010	NA	< 0.010	99%	70%	130%	109%	80%	120%	97%	70%	130%
Mercury Leachate	4377212		<0.01	<0.01	NA	< 0.01	102%	70%	130%	102%	80%	120%	98%	70%	130%
Selenium Leachate	4377212		<0.010	<0.010	NA	< 0.010	99%	70%	130%	96%	80%	120%	94%	70%	130%
Silver Leachate	4377212		<0.010	<0.010	NA	< 0.010	101%	70%	130%	108%	80%	120%	104%	70%	130%
Uranium Leachate	4377212		<0.050	<0.050	NA	< 0.050	94%	70%	130%	110%	80%	120%	107%	70%	130%
Comments: NA signifies Not Applicable. Duplicate NA: results are under 5X the RDL and will not be calculated.															

Certified By:



AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X946026
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 25, 2023

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Polycyclic Aromatic Hydrocarbons in Soil															
1-Methylnaphthalene	1	4311587	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	84%	50%	140%	86%	50%	140%
2-Methylnaphthalene	1	4311587	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	71%	50%	140%	75%	50%	140%
Acenaphthene	1	4311587	< 0.00671	< 0.00671	NA	< 0.00671	115%	50%	140%	82%	50%	140%	83%	50%	140%
Acenaphthylene	1	4311587	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	69%	50%	140%	80%	50%	140%
Acridine	1	4311587	< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	79%	50%	140%	71%	50%	140%
Anthracene	1	4311587	< 0.03	< 0.03	NA	< 0.03	77%	50%	140%	67%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	4311587	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	66%	50%	140%	81%	50%	140%
Benzo(a)pyrene	1	4311587	< 0.01	< 0.01	NA	< 0.01	73%	50%	140%	61%	50%	140%	68%	50%	140%
Benzo(b)fluoranthene	1	4311587	< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	68%	50%	140%	76%	50%	140%
Benzo(j+k)fluoranthene	1	4311587	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	100%	50%	140%	99%	50%	140%
Benzo(e)pyrene	1	4311587	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	73%	50%	140%	68%	50%	140%
Benzo(ghi)perylene	1	4311587	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	73%	50%	140%	71%	50%	140%
Chrysene	1	4311587	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	85%	50%	140%	77%	50%	140%
Dibenzo(a,h)anthracene	1	4311587	< 0.006	< 0.006	NA	< 0.006	74%	50%	140%	66%	50%	140%	74%	50%	140%
Fluoranthene	1	4311587	0.05	0.06	NA	< 0.05	105%	50%	140%	76%	50%	140%	82%	50%	140%
Fluorene	1	4311587	< 0.01	< 0.01	NA	< 0.01	105%	50%	140%	76%	50%	140%	82%	50%	140%
Indeno(1,2,3)pyrene	1	4311587	< 0.01	< 0.01	NA	< 0.01	86%	50%	140%	79%	50%	140%	88%	50%	140%
Naphthalene	1	4311587	< 0.01	< 0.01	NA	< 0.01	100%	50%	140%	69%	50%	140%	70%	50%	140%
Perylene	1	4311587	2.06	2.32	11.9%	< 0.05	101%	50%	140%	92%	50%	140%	NA	50%	140%
Phenanthrene	1	4311587	< 0.03	< 0.03	NA	< 0.03	122%	50%	140%	83%	50%	140%	82%	50%	140%
Pyrene	1	4311587	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	79%	50%	140%	78%	50%	140%
Quinoline	1	4311587	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	108%	50%	140%	105%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Polycyclic Aromatic Hydrocarbons - TCLP Leachate															
1-Methylnaphthalene	1	BS DUP	11.1	12.4	11.1%	< 0.08	113%	50%	140%	125%	50%	140%	139%	50%	140%
2-Methylnaphthalene	1	BS DUP	9.91	11.0	10.4%	< 0.03	103%	50%	140%	111%	50%	140%	123%	50%	140%
Acenaphthene	1	BS DUP	11.1	11.8	6.1%	< 0.01	111%	50%	140%	124%	50%	140%	132%	50%	140%
Acenaphthylene	1	BS DUP	11.1	11.8	6.1%	< 0.02	108%	50%	140%	125%	50%	140%	132%	50%	140%
Anthracene	1	BS DUP	9.29	9.93	6.7%	< 0.03	79%	50%	140%	104%	50%	140%	112%	50%	140%
Acridine	1	BS DUP	6.21	6.20	0.2%	< 0.10	91%	50%	140%	70%	50%	140%	70%	50%	140%
Benzo(e)pyrene	1	BS DUP	11.5	11.9	3.4%	< 0.06	105%	50%	140%	129%	50%	140%	134%	50%	140%
Benzo(a)anthracene	1	BS DUP	10.5	10.9	3.7%	< 0.06	113%	50%	140%	118%	50%	140%	123%	50%	140%
Benzo(a)pyrene	1	BS DUP	8.74	9.43	7.6%	< 0.06	82%	50%	140%	98%	50%	140%	106%	50%	140%
Benzo(b)fluoranthene	1	BS DUP	12.2	9.09	29.2%	< 0.05	110%	50%	140%	137%	50%	140%	102%	50%	140%
Benzo(j+k)fluoranthene	1	BS DUP	21.1	20.3	3.9%	< 0.05	103%	50%	140%	119%	50%	140%	114%	50%	140%
Benzo(ghi)perylene	1	BS DUP	9.55	8.92	6.8%	< 0.03	97%	50%	140%	107%	50%	140%	100%	50%	140%
Chrysene	1	BS DUP	11.4	12.3	7.6%	< 0.04	101%	50%	140%	128%	50%	140%	138%	50%	140%
Dibenzo(a,h)anthracene	1	BS DUP	8.70	6.88	23.4%	< 0.03	94%	50%	140%	98%	50%	140%	77%	50%	140%

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X946026
PROJECT: 22532464
ATTENTION TO: James Doyle
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jan 25, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Fluoranthene	1	BS DUP	12.3	12.4	0.8%	< 0.03	123%	50%	140%	139%	50%	140%	140%	50%	140%
Fluorene	1	BS DUP	10.3	10.8	4.7%	< 0.05	105%	50%	140%	116%	50%	140%	121%	50%	140%
Indeno(1,2,3-cd)pyrene	1	BS DUP	11.0	11.1	0.9%	< 0.08	102%	50%	140%	123%	50%	140%	125%	50%	140%
Naphthalene	1	BS DUP	9.79	10.8	9.8%	< 0.02	98%	50%	140%	110%	50%	140%	121%	50%	140%
Perylene	1	BS DUP	11.2	11.7	4.4%	< 0.06	111%	50%	140%	126%	50%	140%	131%	50%	140%
Phenanthrene	1	BS DUP	12.0	12.0	0.0%	< 0.04	128%	50%	140%	135%	50%	140%	135%	50%	140%
Pyrene	1	BS DUP	13.0	14.5	10.9%	< 0.03	125%	50%	140%	146%	50%	140%	162%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Blank Spike and Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	4311997	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	86%	50%	140%	98%	50%	140%
2-Methylnaphthalene	1	4311997	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	73%	50%	140%	86%	50%	140%
Acenaphthene	1	4311997	< 0.00671	< 0.00671	NA	< 0.00671	116%	50%	140%	85%	50%	140%	95%	50%	140%
Acenaphthylene	1	4311997	< 0.004	< 0.004	NA	< 0.004	108%	50%	140%	77%	50%	140%	92%	50%	140%
Acridine	1	4311997	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	66%	50%	140%	64%	50%	140%
Anthracene	1	4311997	< 0.03	< 0.03	NA	< 0.03	87%	50%	140%	73%	50%	140%	88%	50%	140%
Benzo(a)anthracene	1	4311997	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	75%	50%	140%	92%	50%	140%
Benzo(a)pyrene	1	4311997	< 0.01	< 0.01	NA	< 0.01	84%	50%	140%	69%	50%	140%	79%	50%	140%
Benzo(b)fluoranthene	1	4311997	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	61%	50%	140%	66%	50%	140%
Benzo(j+k)fluoranthene	1	4311997	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	103%	50%	140%	99%	50%	140%
Benzo(e)pyrene	1	4311997	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	77%	50%	140%	81%	50%	140%
Benzo(ghi)perylene	1	4311997	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	78%	50%	140%	80%	50%	140%
Chrysene	1	4311997	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	83%	50%	140%	89%	50%	140%
Dibenzo(a,h)anthracene	1	4311997	< 0.006	< 0.006	NA	< 0.006	96%	50%	140%	78%	50%	140%	85%	50%	140%
Fluoranthene	1	4311997	0.01	<0.01	NA	< 0.05	112%	50%	140%	83%	50%	140%	93%	50%	140%
Fluorene	1	4311997	< 0.01	< 0.01	NA	< 0.01	110%	50%	140%	80%	50%	140%	93%	50%	140%
Indeno(1,2,3)pyrene	1	4311997	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	98%	50%	140%	97%	50%	140%
Naphthalene	1	4311997	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	68%	50%	140%	79%	50%	140%
Perylene	1	4311997	0.60	0.99	49.1%	< 0.05	100%	50%	140%	81%	50%	140%	109%	50%	140%
Phenanthrene	1	4311997	< 0.03	< 0.03	NA	< 0.03	121%	50%	140%	84%	50%	140%	94%	50%	140%
Pyrene	1	4311997	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	85%	50%	140%	92%	50%	140%
Quinoline	1	4311997	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	107%	50%	140%	99%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jan 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

QC Exceedance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

RPT Date: Jan 25, 2023

PARAMETER	Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons - TCLP Leachate										
Pyrene	BS DUP	125%	50%	140%	146%	50%	140%	162%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Blank Spike and Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

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11 Morris Drive, Unit 122
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CANADA B3B 1M2
TEL (902)468-8718
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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Particle Size Distribution (<12.5mm, -4 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<9.5mm, -3 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<4.75mm, -2 PHI	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<2mm, -1 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1mm, 0 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Particle Size Distribution (<1/2mm, 1 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/4mm, 2 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/8mm, 3 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/16mm, 4 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/32mm, 5 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/64mm, 6 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/128mm, 7 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/256mm, 8 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/512mm, 9 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Gravel)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Sand)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Silt)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Clay)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particles >75um	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Classification	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Arsenic Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Barium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Cadmium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Lead Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Mercury Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Selenium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Silver Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Uranium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Total Organic Carbon	SOIL 0480; SOIL 0110; SOIL 0120	Organic Carbon, SSSA, 1996 & Skjemstad 2008	SPECTROPHOTOMETER

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
TCLP PAHs-EXTR	LAB 4025	EPA SW-846 1311	PH METER
1-Methylnaphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
2-Methylnaphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acenaphthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acenaphthylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acridine	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(e)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(a)anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(a)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(b)fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(ghi)perylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Chrysene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Fluorene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Naphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Perylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Phenanthrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3510C/8270E	GC/MS
Terphenyl-d14	ORG-120-5119	EPA 3510C/8270E	GC/MS
Pyrene-d10	ORG-120-5119	EPA 3510C/8270E	GC/MS
1-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acridine	ORG-120-5119	EPA 3570/8270E	GC/MS
Anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS

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CANADA B3B 1M2
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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X946026

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Benzo(a)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Chrysene	ORG-120-5119	EPA 3570/8270E	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluorene	ORG-120-5119	EPA 3570/8270E	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Phenanthrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Quinoline	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3570/8270E	GC/MS
Terphenyl-d14	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA 3570/8270E	GC/MS

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B3B 1M2
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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 6.2 / 13.2 / 13.4
Hold Time:
AGAT Job Number: 22X946026
Notes:

Report Information

Company: Golder
Contact: James Doyle
Address: 1931 Robertson Road
Phone: 613-298-0765 Fax:
Client Project #: 22532464
AGAT Quotation: 649648
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: James Doyle
   Email: james_doyle@golder.com
2. Name:
   Email:

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

'22 SEP 16 10:22AM

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☑ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Invoice To

Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
BFR-SED-51	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-52	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-53	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-54	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-55	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-56	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-57	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-58	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-59	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-60	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-61	Sep 8, 2022	SED	2	Do moisture content aswell
BFR-SED-62	Sep 11, 2022	SED	2	Do moisture content aswell

Sample Identification	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: Total organic carbon (TOC)	Other: Grain Size	Hazardous (Y/N)
BFR-SED-51			☑	☑													☑							
BFR-SED-52			☑	☑													☑							
BFR-SED-53			☑	☑													☑							
BFR-SED-54			☑	☑													☑							
BFR-SED-55			☑	☑													☑							
BFR-SED-56			☑	☑													☑							
BFR-SED-57			☑	☑													☑							
BFR-SED-58			☑	☑													☑							
BFR-SED-59			☑	☑													☑					☑	☑	
BFR-SED-60			☑	☑													☑					☑	☑	
BFR-SED-61			☑	☑													☑					☑	☑	
BFR-SED-62			☑	☑													☑					☑	☑	

Samples Relinquished By (Print Name): Philippe Chevrette Date/Time: 2022/09/13-2:00
Samples Relinquished By (Sign): [signature] Date/Time:
Samples Received By (Print Name): Date/Time:
Samples Received By (Sign): [signature] Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 3
Nº:

Document ID: DIV-13-1502.004

Date revised: Apr 19, 2021

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Chain of Custody Record

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Report to:

Company: Same as COC#:

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES
1	BFR-SED-63	Sep 11, 2022	SED		2		
2	BFR-SED-64	Sep 11, 2022	SED		2		
3	BFR-SED-65-SA1	Sep 6, 2022	SED		1		
4	BFR-SED-65-SA2	Sep 6, 2022	SED	HOLD	1		
5	BFR-SED-66-SA1	Sep 6, 2022	SED		1		
6	BFR-SED-66-SA2	Sep 6, 2022	SED	HOLD	1		
7	BFR-SED-66-SA3	Sep 6, 2022	SED	HOLD	1		
8	BFR-SED-67-SA1	Sep 6, 2022	SED		1		
9	BFR-SED-67-SA2	Sep 6, 2022	SED	HOLD	1		
10	BFR-SED-68-SA1	Sep 6, 2022	SED		1		
11	BFR-SED-68-SA2	Sep 6, 2022	SED	HOLD	1		
12	BFR-SED-68-SA3	Sep 6, 2022	SED	HOLD	1		
13	BFR-SED-69-SA1	Sep 6, 2022	SED		1		
14	BFR-SED-69-SA2	Sep 6, 2022	SED	HOLD	1		
15	BFR-SED-70-SA1	Sep 6, 2022	SED		1		
16	BFR-SED-70-SA2	Sep 6, 2022	SED	HOLD	1		
17	BFR-SED-70-SA3	Sep 6, 2022	SED	HOLD	1		
18	BFR-SED-71-SA1	Sep 6, 2022	SED		1		
19	BFR-SED-71-SA2	Sep 6, 2022	SED	HOLD	1		
20	BFR-SED-72-SA1	Sep 6, 2022	SED		1		
21	BFR-SED-72-SA2	Sep 6, 2022	SED	HOLD	1		
22	BFR-SED-72-SA3	Sep 6, 2022	SED	HOLD	1		
23	BFR-SED-72-SA4	Sep 6, 2022	SED	HOLD	1		
24	BFR-SED-72-DUP1	Sep 6, 2022	SED	HOLD	1		
25	BFR-SED-TCLP-SA1	Sep 6, 2022	SED	TCLP analysis	2		

	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: Total Organic Carbon (TOC)	Other: Grain Size + Moisture	Hazardous (Y/N)
1			☑	☑													☑					☑	☑	
2			☑	☑													☑					☑	☑	
3			☑	☑																			☑	
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6			☑	☑																			☑	
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25			☑	☑													☑						☑	

10:22AM

Samples Relinquished By (Print Name and Sign): Philippe Chevrette	Date/Time 2022/09/13	Samples Received By (Print Name and Sign):	Date/Time	Pink Copy - Client
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	Yellow Copy - AGAT
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time	White Copy- AGAT

Page 2 of 3

Nº:

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Chain of Custody Record

Report to:

Company: _____ Same as COC#: _____

	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS		
					VIALS / JARS	BAGS	BOTTLES
1	BFR-SED-TCLP-SA2	Sep 6,2022	Sed	TCLP analysis	2		
2	BFR-SS-TCLP-SA1	SEP 8,2022	S	TCLP analysis	2		
3	BFR-SS-TCLP-SA2	SEP 8,2022	S	TCLP analysis	2		
4	BFR-SED-DUP1	SEP 9,2022	S	hold	2		
5	BFR-LI-SED-DUP2	SEP 9, 2022	S	hold	2		
6	BFR-LI-SED-DUP3	SEP 11 2022	S	hold	2		
7							
8							
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	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other: TOC	Other: Grain Size+ Moisture	Hazardous (Y/N)
1			☑	☑													☑					☑	☑	
2			✓	✓													✓					✓	✓	
3			✓	✓													✓					✓	✓	
4			✓	✓													✓					✓	✓	
5			✓	✓													✓					✓	✓	
6			✓	✓													✓					✓	✓	

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Philippe Chevrette	20222/09/13		
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 3 of 3

N°:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600
ATTENTION TO: James Doyle
PROJECT: 22532464
AGAT WORK ORDER: 22X963097
SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
ULTRA TRACE REVIEWED BY: Roza Makhtari, Chimiste, AGAT Montréal
DATE REPORTED: Nov 02, 2022
PAGES (INCLUDING COVER): 12
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

TCLP Mercury

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-11-02

Parameter	Unit	G / S	RDL	BFR-SS-TCLP-SA1	BFR-SS-TCLP-SA2
SAMPLE DESCRIPTION:				BFR-SS-TCLP-SA1	BFR-SS-TCLP-SA2
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2022-09-08	2022-09-08
Mercury Leachate	ug/L		0.5	<0.5	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

TCLP Metals

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-11-02

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR-SS-TCLP-SA1 SAMPLE TYPE: Soil DATE SAMPLED: 2022-09-08 4311915	SAMPLE DESCRIPTION: BFR-SS-TCLP-SA2 SAMPLE TYPE: Soil DATE SAMPLED: 2022-09-08 4311916
Aluminum Leachate	mg/L		0.02	3.52	3.09
Antimony Leachate	mg/L		0.02	2.14	0.78
Arsenic Leachate	mg/L		0.02	0.05	<0.02
Barium Leachate	mg/L		0.02	0.20	0.62
Beryllium Leachate	mg/L		0.05	<0.05	<0.05
Bismuth Leachate	mg/L		0.02	<0.02	<0.02
Boron Leachate	mg/L		0.05	<0.05	0.06
Cadmium Leachate	mg/L		0.003	<0.003	<0.003
Chromium Leachate	mg/L		0.02	<0.02	<0.02
Cobalt Leachate	mg/L		0.01	<0.01	<0.01
Copper Leachate	mg/L		0.02	1.20	6.68
Iron Leachate	mg/L		0.2	0.3	<0.2
Lead Leachate	mg/L		0.005	283	57.7
Lithium Leachate	mg/L		0.02	<0.02	<0.02
Manganese Leachate	mg/L		0.02	0.18	0.26
Molybdenum Leachate	mg/L		0.02	<0.02	<0.02
Nickel Leachate	mg/L		0.02	<0.02	<0.02
Selenium Leachate	mg/L		0.02	<0.02	<0.02
Silver Leachate	mg/L		0.005	<0.005	<0.005
Strontium Leachate	mg/L		0.02	0.02	0.03
Thallium Leachate	mg/L		0.001	<0.001	<0.001
Tin Leachate	mg/L		0.02	<0.02	<0.02
Uranium Leachate	mg/L		0.001	0.002	0.002
Vanadium Leachate	mg/L		0.02	<0.02	<0.02
Zinc Leachate	mg/L		0.02	0.16	3.48

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PAHs (TCLP Extraction)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-11-02

Parameter	Unit	G / S	RDL	BFR-SS-TCLP-SA1	BFR-SS-TCLP-SA2
SAMPLE DESCRIPTION:				SA1	SA2
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2022-09-08	2022-09-08
				4311915	4311916
TCLP PAHs-EXTR				Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311915-4311916 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons - TCLP Leachate

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-11-02

SAMPLE DESCRIPTION:				BFR-SS-TCLP-SA1	BFR-SS-TCLP-SA2
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2022-09-08	2022-09-08
Parameter	Unit	G / S	RDL	4311915	4311916
1-Methylnaphthalene	ug/L		0.08	<0.08	<0.08
2-Methylnaphthalene	ug/L		0.03	0.03	<0.03
Acenaphthene	ug/L		0.01	0.03	0.03
Acenaphthylene	ug/L		0.02	<0.02	<0.02
Anthracene	ug/L		0.03	<0.03	<0.03
Acridine	ug/L		0.10	<0.10	<0.10
Benzo(e)pyrene	ug/L		0.06	<0.06	<0.06
Benzo(a)anthracene	ug/L		0.06	<0.06	<0.06
Benzo(a)pyrene	ug/L		0.06	<0.06	<0.06
Benzo(b)fluoranthene	ug/L		0.05	<0.05	0.07
Benzo(j+k)fluoranthene	µg/L		0.05	<0.05	0.14
Benzo(ghi)perylene	ug/L		0.03	<0.03	<0.03
Chrysene	ug/L		0.04	<0.04	<0.04
Dibenzo(a,h)anthracene	ug/L		0.03	<0.03	<0.03
Fluoranthene	ug/L		0.03	0.68	1.26
Fluorene	ug/L		0.05	0.06	0.05
Indeno(1,2,3-cd)pyrene	ug/L		0.08	<0.08	<0.08
Naphthalene	ug/L		0.02	<0.02	<0.02
Perylene	ug/L		0.06	<0.06	<0.06
Phenanthrene	ug/L		0.04	0.88	0.71
Pyrene	ug/L		0.03	0.49	0.94
Surrogate	Unit	Acceptable Limits			
Naphthalene-d8	%	50-140		81	75
Terphenyl-d14	%	50-140		63	66
Pyrene-d10	%	50-140		80	79

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4311915-4311916 Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Nitroaromatics, Nitroamines and Nitrate esters (Soil)

DATE RECEIVED: 2022-09-16

DATE REPORTED: 2022-11-02

				BFR-SS-TCLP-SA1	BFR-SS-TCLP-SA2
SAMPLE DESCRIPTION:				SA1	SA2
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2022-09-08	2022-09-08
Parameter	Unit	G / S	RDL	4311915	4311916
Octahydro1,3,5,7tetranitro1,3,5,7tetrazocine (HMX)	mg/kg		0.05	<0.05	<0.05
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	mg/kg		0.05	<0.05	<0.05
1,3,5-Trinitrobenzene (1,3,5-TNB)	mg/kg		0.05	<0.05	<0.05
1,3-Dinitrobenzene (1,3-DNB)	mg/kg		0.05	<0.05	<0.05
Nitrobenzene (NB)	mg/kg		0.05	<0.05	<0.05
3,5-Dinitroaniline	mg/kg		0.05	<0.05	<0.05
Nitroglycerin (NG)	mg/kg		0.05	0.07	1.68
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	mg/kg		0.05	<0.05	<0.05
2,4,6-Trinitrotoluene (2,4,6-TNT)	mg/kg		0.05	<0.05	<0.05
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	mg/kg		0.05	<0.05	<0.05
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	mg/kg		0.05	<0.05	<0.05
2,4-Dinitrotoluene (2,4-DNT)	mg/kg		0.05	<0.05	<0.05
2,6-Dinitrotoluene (2,6-DNT)	mg/kg		0.05	<0.05	<0.05
2-Nitrotoluene (2-NT)	mg/kg		0.05	<0.05	<0.05
4-Nitrotoluene (4-NT)	mg/kg		0.05	<0.05	<0.05
3-Nitrotoluene (3-NT)	mg/kg		0.05	<0.05	<0.05
Pentaerythritol tetranitrate (PETN)	mg/kg		0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
3,4-Dinitrotoluene (3,4-DNT)	%	40-140		91	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Nov 02, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
TCLP Mercury															
Mercury Leachate	4311915	4311915	<0.5	<0.5	NA	< 0.5	101%	80%	120%		80%	120%	NA	70%	130%

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 02, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons - TCLP Leachate															
1-Methylnaphthalene	1	4311915	< 0.08	< 0.08	NA	< 0.08	123%	50%	140%	106%	50%	140%	123%	50%	140%
2-Methylnaphthalene	1	4311915	0.03	0.03	NA	< 0.03	114%	50%	140%	96%	50%	140%	113%	50%	140%
Acenaphthene	1	4311915	0.03	0.02	NA	< 0.01	120%	50%	140%	104%	50%	140%	120%	50%	140%
Acenaphthylene	1	4311915	< 0.02	< 0.02	NA	< 0.02	114%	50%	140%	102%	50%	140%	117%	50%	140%
Anthracene	1	4311915	< 0.03	< 0.03	NA	< 0.03	97%	50%	140%	102%	50%	140%	108%	50%	140%
Acridine	1	4311915	< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	121%	50%	140%	118%	50%	140%
Benzo(e)pyrene	1	4311915	< 0.06	< 0.06	NA	< 0.06	97%	50%	140%	110%	50%	140%	112%	50%	140%
Benzo(a)anthracene	1	4311915	< 0.06	< 0.06	NA	< 0.06	104%	50%	140%	102%	50%	140%	109%	50%	140%
Benzo(a)pyrene	1	4311915	< 0.06	< 0.06	NA	< 0.06	87%	50%	140%	100%	50%	140%	106%	50%	140%
Benzo(b)fluoranthene	1	4311915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	72%	50%	140%	81%	50%	140%
Benzo(j+k)fluoranthene	1	4311915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	104%	50%	140%	109%	50%	140%
Benzo(ghi)perylene	1	4311915	< 0.03	< 0.03	NA	< 0.03	75%	50%	140%	93%	50%	140%	90%	50%	140%
Chrysene	1	4311915	< 0.04	< 0.04	NA	< 0.04	113%	50%	140%	121%	50%	140%	125%	50%	140%
Dibenzo(a,h)anthracene	1	4311915	< 0.03	< 0.03	NA	< 0.03	60%	50%	140%	76%	50%	140%	74%	50%	140%
Fluoranthene	1	4311915	0.68	0.60	12.5%	< 0.03	112%	50%	140%	118%	50%	140%	138%	50%	140%
Fluorene	1	4311915	0.06	0.05	NA	< 0.05	115%	50%	140%	112%	50%	140%	122%	50%	140%
Indeno(1,2,3-cd)pyrene	1	4311915	< 0.08	< 0.08	NA	< 0.08	72%	50%	140%	91%	50%	140%	105%	50%	140%
Naphthalene	1	4311915	< 0.02	< 0.02	NA	< 0.02	114%	50%	140%	102%	50%	140%	115%	50%	140%
Perylene	1	4311915	< 0.06	< 0.06	NA	< 0.06	134%	50%	140%	128%	50%	140%	126%	50%	140%
Phenanthrene	1	4311915	0.88	0.78	12.0%	< 0.04	128%	50%	140%	124%	50%	140%	136%	50%	140%
Pyrene	1	4311915	0.49	0.42	15.4%	< 0.03	114%	50%	140%	120%	50%	140%	133%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

Ultra Trace Analysis

RPT Date: Nov 02, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitroaromatics, Nitroamines and Nitrate esters (Soil)															
Octahydro1,3,5,7tetranitro1,3,5,7tetrazocine (HMX)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	91%	70%	130%	NA	70%	130%
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	88%	70%	130%	NA	70%	130%
1,3,5-Trinitrobenzene (1,3,5-TNB)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	96%	70%	130%	NA	70%	130%
1,3-Dinitrobenzene (1,3-DNB)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	88%	70%	130%	NA	70%	130%
Nitrobenzene (NB)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	87%	70%	130%	NA	70%	130%
3,5-Dinitroaniline	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	89%	70%	130%	NA	70%	130%
Nitroglycerin (NG)	1	4311915	0.07	< 0.05	NA	< 0.05	NA	70%	130%	90%	70%	130%	NA	70%	130%
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	118%	70%	130%	NA	70%	130%
2,4,6-Trinitrotoluene (2,4,6-TNT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	76%	70%	130%	NA	70%	130%
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	91%	70%	130%	NA	70%	130%
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	93%	70%	130%	NA	70%	130%
2,4-Dinitrotoluene (2,4-DNT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	86%	70%	130%	NA	70%	130%
2,6-Dinitrotoluene (2,6-DNT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	83%	70%	130%	NA	70%	130%
2-Nitrotoluene (2-NT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	90%	70%	130%	NA	70%	130%
4-Nitrotoluene (4-NT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	95%	70%	130%	NA	70%	130%
3-Nitrotoluene (3-NT)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	91%	70%	130%	NA	70%	130%
Pentaerythritol tetranitrate (PETN)	1	4311915	< 0.05	< 0.05	NA	< 0.05	NA	70%	130%	102%	70%	130%	NA	70%	130%
3,4-Dinitrotoluene (3,4-DNT)	1	4311915	91	88%	3.4%	95	NA	40%	140%	86%	40%	140%	NA	40%	140%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Duplicate not within acceptance limits. Sample non-homogeneous.

Certified By:

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Mercury Leachate	MET-121-6110 & MET-121-6107	EPA 245.1/In-house Leachate	CVAAS
Aluminum Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Antimony Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Arsenic Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Barium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Beryllium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Bismuth Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Boron Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Cadmium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Chromium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Cobalt Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Copper Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Iron Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Lead Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Lithium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Manganese Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Molybdenum Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Nickel Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Selenium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Silver Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Strontium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Thallium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Tin Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Uranium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Vanadium Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS
Zinc Leachate	MET-121-6108, MET-121-6105	EPA SW-846 6020A/SM1325 In-house leachate	ICP-MS

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

PROJECT: 22532464

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
TCLP PAHs-EXTR	LAB 4025	EPA SW-846 1311	PH METER
1-Methylnaphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
2-Methylnaphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acenaphthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acenaphthylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Acridine	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(e)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(a)anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(a)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(b)fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Benzo(ghi)perylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Chrysene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Fluoranthene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Fluorene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Naphthalene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Perylene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Phenanthrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Pyrene	ORG-120-5119/INOR-121-6039	EPA 3510C/8270E/1311	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3510C/8270E	GC/MS
Terphenyl-d14	ORG-120-5119	EPA 3510C/8270E	GC/MS
Pyrene-d10	ORG-120-5119	EPA 3510C/8270E	GC/MS

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 22X963097

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SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
Octahydro1,3,5,7tetranitro1,3,5,7tetrazocine (HMX)	TOX-151-19002F	EPA 8330B	HPLC
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	TOX-151-19002F	EPA 8330B	HPLC
1,3,5-Trinitrobenzene (1,3,5-TNB)	TOX-151-19002F	EPA 8330B	HPLC
1,3-Dinitrobenzene (1,3-DNB)	TOX-151-19002F	EPA 8330B	HPLC
Nitrobenzene (NB)	TOX-151-19002F	EPA 8330B	HPLC
3,5-Dinitroaniline	TOX-151-19002F	EPA 8330B	HPLC
Nitroglycerin (NG)	TOX-151-19002F	EPA 8330B	HPLC
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	TOX-151-19002F	EPA 8330B	HPLC
2,4,6-Trinitrotoluene (2,4,6-TNT)	TOX-151-19002F	EPA 8330B	HPLC
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	TOX-151-19002F	EPA 8330B	HPLC
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	TOX-151-19002F	EPA 8330B	HPLC
2,4-Dinitrotoluene (2,4-DNT)	TOX-151-19002F	EPA 8330B	HPLC
2,6-Dinitrotoluene (2,6-DNT)	TOX-151-19002F	EPA 8330B	HPLC
2-Nitrotoluene (2-NT)	TOX-151-19002F	EPA 8330B	HPLC
4-Nitrotoluene (4-NT)	TOX-151-19002F	EPA 8330B	HPLC
3-Nitrotoluene (3-NT)	TOX-151-19002F	EPA 8330B	HPLC
Pentaerythritol tetranitrate (PETN)	TOX-151-19002F	EPA 8330B	HPLC
3,4-Dinitrotoluene (3,4-DNT)	TOX-151-19002F	EPA 8330B	HPLC

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Chironomus dilutus
EPS 1/RM/32

SAMPLE IDENTIFICATION

Work Order :	250120	Shipped By :	AltiMax/Rd
Company :	WSP - Golder	Sample Volume/Container :	1 x 8 L pail
Location :	Nepean ON	Lab Storage :	4±2 °C
Sampling Method :	Grab	Test Initiation Date :	2022-09-23
Sampled By :	P. Chevrette	Test Completion Date :	2022-10-03

Test Method : Test for Survival and Growth in Sediment Using the larvae of Freshwater Midges (*Chironomus tentans* or *Chironomus riparius*). Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/32, December, 1997.

SAMPLE SUMMARY

Sample Number	Sample Name	Sample Date	Sample Type	Sample Time	Date Received	Temp. on Receipt (°C)
–	Control	2020-06-06	Control sediment	–	–	–
75454	**BFR_L1_SED58**	2022-09-12	Field-collected sediment	17:00	2022-09-16	20
75455	**BFR_L1_SED59**	2022-09-12	Field-collected sediment	17:30	2022-09-16	19
75456	**BFR_L1_SED60**	2022-09-12	Field-collected sediment	15:00	2022-09-16	20
75457	**BFR_L1_SED61**	2022-09-12	Field-collected sediment	15:30	2022-09-16	20
75458	**BFR_L1_SED62***	2022-09-11	Reference sediment	15:00	2022-09-16	20
75459	**BFR_L1_SED63***	2022-09-11	Reference sediment	16:00	2022-09-16	20
75460	**BFR_L1_SED64***	2022-09-11	Reference sediment	17:00	2022-09-16	20

*identified by the client as a reference site
"–" not available

REFERENCE TOXICANT DATA

Substance :	Potassium Chloride	LC50 :	3.15 g/L
Organism Batch :	CHd11/09/22	95% Confidence Limits :	2.66 - 3.73 g/L
Test Date :	2022-09-23	Historical Mean LC50 :	5.43 g/L
Test Duration :	96 hours	Warning Limits (± 2 SD) :	2.81 - 10.5 g/L

The reference toxicant test was conducted as a water only test, as specified in the test method.

COMMENTS

•All test validity criteria as specified in the test method were satisfied.
•The results reported relate only to the sample(s) tested and as received/prepared.
•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

Noted Deviation(s) :

•Measurements of test sediment particle size, percent water content, and total organic carbon were completed by the client, independent of AquaTox. Results of the analyses were not provided to AquaTox and cannot be presented in this report.

•Measurements of Control sediment particle size, percent water content, and total organic carbon are not currently available, but will be provided to the client as an addendum when available.

•Measurements of porewater pH and ammonia were not performed on each sample, at the request of the client.

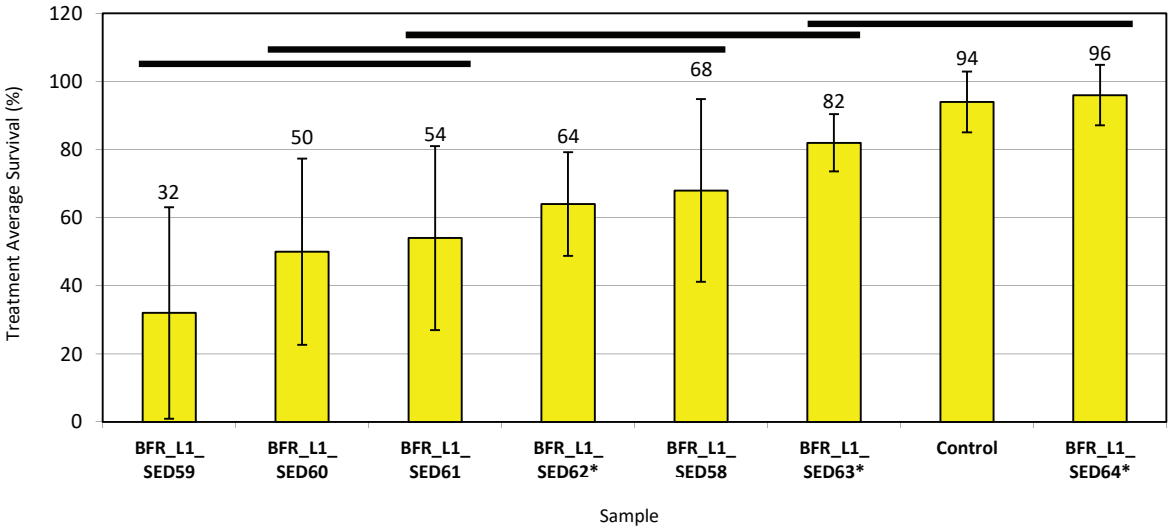
•Porewater pH and ammonia for the Control sediment. There is insufficient porewater in the sediment for measurement of these parameters.

Sarah Costantini
I am approving this document
2023-01-27 15:35-05:00

Approved by: _____
Project Manager

Work Order : 250120

10-DAY TEST RESULTS : SURVIVAL



Fisher Exact/Bonferroni-Holm Test (CETIS)[a]: Samples sharing the same line are not significantly different from one another (i.e. they are considered to be homogenous, that is, from the same population) (α =0.05).

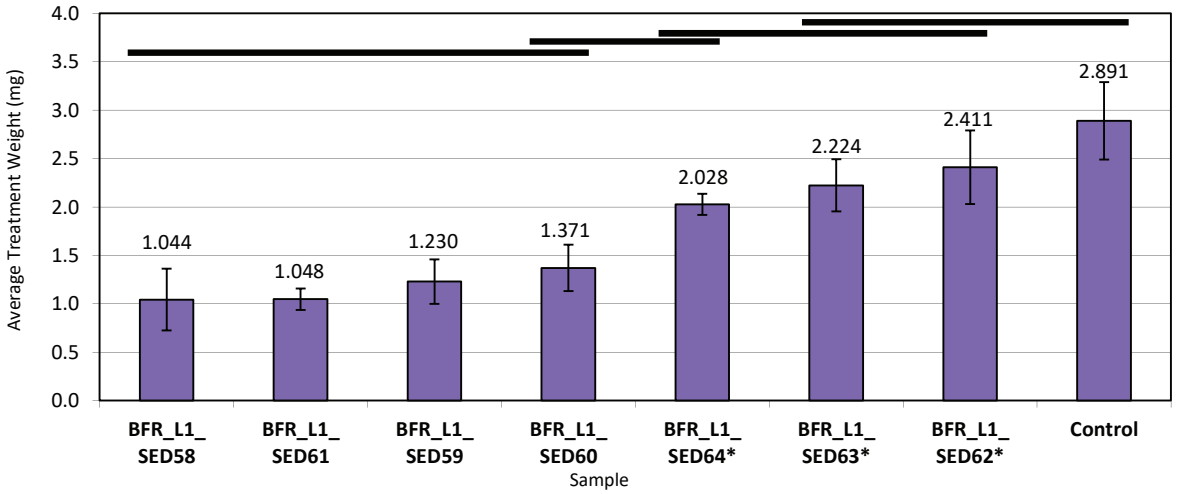
*Identified by the client as a reference sample

10-DAY SURVIVAL RESULTS : COMPARISON WITH REFERENCE SITES

Reference Site	Sample Number	Sample Name	Significantly Less than Reference Site? (α = 0.05)	Statistical Method
75458 BFR_L1_SED62	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	No	
	75459	BFR_L1_SED63	No	
	75460	BFR_L1_SED64	No	
75459 BFR_L1_SED63	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75458	BFR_L1_SED62	No	
	75460	BFR_L1_SED64	No	
75460 BFR_L1_SED64	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75458	BFR_L1_SED62	**Yes**	
	75459	BFR_L1_SED63	No	

Work Order : 250120

10-DAY TEST RESULTS : GROWTH



ANOVA/Tukey-Kramer Test (CETIS)[a]: Samples sharing the same line are not significantly different from one another (i.e. they are considered to be homogenous, that is, from the same population) (α =0.05). All data sets met the assumptions for normality and homogeneity of variance.

*Identified by the client as a reference sample

10-DAY GROWTH RESULTS : COMPARISON WITH REFERENCE SITES

Reference Site	Sample Number	Sample Name	Significantly Less than Reference Site? (α = 0.05)	Statistical Method
75458 BFR_L1_SED62	–	Control	No	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75459	BFR_L1_SED63	No	
	75460	BFR_L1_SED64	No	
75459 BFR_L1_SED63	–	Control	No	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75458	BFR_L1_SED62	No	
	75460	BFR_L1_SED64	No	
75460 BFR_L1_SED64	–	Control	No	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75458	BFR_L1_SED62	No	
	75459	BFR_L1_SED63	No	

TEST ORGANISM

Test Organism :	*Chironomus dilutus*	Mean Head Capsule Width :	0.40 mm
Organism Batch :	CHd11-09-22	Range of Head Capsule Widths	0.37 - 0.47 mm
Source :	In-house culture[1]	Life Stage on Test Day 0 :	Larva (3rd Instar)

[1]Nautilus Environmental Company Inc, Point Edward, ON, N7V 1X4

No organisms exhibiting unusual appearance, behavior, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static (no renewal)	Sediment Preparation :	Hand-homogenized
Test Duration :	10 days	Sediment Depth:	Approx. 3 cm
Renewal Frequency :	Not applicable	Sediment Volume:	100 mL per replicate
Field Replicates :	1	Overlying Water Volume:	175 mL per replicate
Test Replicates :	5	Control Sediment:	Canatara Beach Sand[3]
Organisms per Replicate :	10	Control Sediment Preparation :	Washed and dried before use
Organisms per Treatment :	50	Test Aeration :	Yes (all replicates)
Feed Type :	Flake food	Test Aeration Rate :	3-4 bubbles per second
Feeding Rate (per replicate) :	6 mg	Photoperiod (light/dark) :	16 h / 8 h
Feeding Frequency :	Once daily	Light Intensity :	597 - 786 lux
Test Vessel:	500 mL glass jar	Test Method Deviations :	Yes (see 'COMMENTS', page 1)
Equilibration Interval[2] :	~24 hours		

[2]Elapsed time between preparation of exposures and introduction of test organisms

[3]Point Edward, ON

CONTROL/TEST WATER CHARACTERISTICS

Source : Dechlorinated municipal water (no additional chemicals)

Date	Temperature (°C)	Dissolved O_2 (mg/L)	O_2 Saturation (%)	pH	Conductivity (µmhos/cm)
2022-09-23	24	8.1	98	7.8	272

REFERENCES

[a] CETIS™, © 2000-2022. V.2.4.1.0. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

SURVIVAL DATA									
Sample Number	**Sample Name**	**Replicate**	**Number Dead (n=10)**	**Mortality (%)**	**Survivors per Replicate (n=10)**	**Replicate Survival (%)**	**Treatment Average Survival (%)**	**Standard Deviation**	**CV (%)**
–	**Control**	1	1	10	9 (4)[1][3]	90	94	8.9	9.5
		2	2	20	8 [1][3]	80			
		3	0	0	10 (1)[3]	100			
		4	0	0	10 (2)[3]	100			
		5	0	0	10 (1)[3]	100			
75454	**BFR_L1_SED58**	1	2	20	8	80	68	26.8	39.5
		2	8	80	2	20			
		3	2	20	8	80			
		4	2	20	8	80			
		5	2	20	8	80			
75455	**BFR_L1_SED59**	1	9	90	1	10	32	31.1	97.3
		2	10	100	0	0			
		3	6	60	4	40			
		4	7	70	3	30			
		5	2	20	8	80			
75456	**BFR_L1_SED60**	1	7	70	3	30	50	27.4	54.8
		2	1	10	9	90			
		3	5	50	5	50			
		4	8	80	2	20			
		5	4	40	6	60			
75457	**BFR_L1_SED61**	1	7	70	3	30	54	27.0	50.0
		2	6	60	4	40			
		3	5	50	5	50			
		4	5	50	5	50			
		5	0	0	10	100			
75458	**BFR_L1_SED62***	1	2	20	8 (1)[3]	80	64	15.2	23.7
		2	5	50	5 (1)[3]	50			
		3	4	40	6 (1)[3]	60			
		4	2	20	8	80			
		5	5	50	5 (1)[3]	50			
75459	**BFR_L1_SED63***	1	1	10	9	90	82	8.4	10.2
		2	2	20	8	80			
		3	2	20	8	80			
		4	1	10	9 (1)[3]	90			
		5	3	30	7	70			
75460	**BFR_L1_SED64***	1	0	0	10	100	96	8.9	9.3
		2	0	0	10 (1)[3]	100			
		3	2	20	8 (1)[3]	80			
		4	0	0	10 (2)[3]	100			
		5	0	0	10	100			

NOTES : [3]Values in parentheses ( ) indicate number of surviving test organisms which had pupated during the exposure. Values in brackets [ ] indicate number of surviving test organisms which had become fliers during the exposure. Pupae and fliers were included in statistical analysis of survival endpoints, but excluded from statistical analysis of growth endpoints, since they were not weighed.

*Identified by the client as a reference sample

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-13

WEIGHT DATA

Sample Number	Sample Name	Replicate	Foil Weight (mg)	Dry Weight of Foil + Organisms (mg)	Number of Organisms Weighed	Average Dry Weight per Organism (mg)	Treatment Average Dry Weight per Organism (mg)	Standard Deviation	CV (%)
–	**Control**	1	799.60	819.32	4[3]	2.465	2.694	0.41	15.4
		2	802.65	821.04	7[3]	2.627			
		3	797.63	828.09	9[3]	3.046			
		4	795.40	827.08	8[3]	3.168			
		5	794.73	816.39	9[3]	2.166			
75454	**BFR_L1_SED58**	1	794.92	803.48	8	1.070	1.016	0.32	31.2
		2	801.79	802.84	2	0.525			
		3	803.47	813.81	8	1.292			
		4	811.79	822.02	8	1.279			
		5	813.32	820.61	8	0.911			
75455	**BFR_L1_SED59**	1	796.82	797.92	1	1.100	1.221	0.23	19.1
		2	817.37	817.37	0	–			
		3	805.57	810.42	4	1.212			
		4	808.06	812.71	3	1.550			
		5	810.53	818.69	8	1.020			
75456	**BFR_L1_SED60**	1	806.03	811.29	3	1.753	1.350	0.24	18.0
		2	808.12	819.03	9	1.212			
		3	806.45	813.48	5	1.406			
		4	806.50	808.91	2	1.205			
		5	806.42	813.46	6	1.173			
75457	**BFR_L1_SED61**	1	801.71	805.39	3	1.227	1.035	0.11	10.7
		2	804.42	808.44	4	1.005			
		3	804.50	809.59	5	1.018			
		4	791.95	796.74	5	0.958			
		5	801.33	810.99	10	0.966			
75458	**BFR_L1_SED62***	1	805.00	825.88	7[3]	2.610	2.328	0.38	16.5
		2	801.69	810.57	4[3]	1.776			
		3	804.63	818.90	5[3]	2.378			
		4	804.87	822.00	8	2.141			
		5	793.31	806.99	4[3]	2.736			
75459	**BFR_L1_SED63***	A	806.75	828.98	9	2.470	2.207	0.27	12.0
		B	794.63	811.45	8	2.103			
		C	798.66	817.02	8	2.295			
		D	798.98	815.15	8[3]	1.797			
		E	805.49	822.08	7	2.370			
75460	**BFR_L1_SED64***	A	814.09	832.72	10	1.863	2.004	0.11	5.2
		B	799.57	819.83	9[3]	2.026			
		C	803.22	820.43	7[3]	2.151			
		D	798.00	818.19	8[3]	2.019			
		E	800.68	820.28	10	1.960			

NOTES: [3]Pupae and fliers excluded from weights (see note on page 5).

•No outlying data points were detected according to Grubbs Test (CETIS)[a].

*Identified by the client as a reference sample

Test Data Reviewed By : VC (AquaTox)

Date : 2023-01-13

TEST DATA

Work Order : 250120
Sample Number : **Control**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Brown, odourless.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	23	2	7.2	355	8.0	0.47	0.02	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	23	1	7.3	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	1	8.1	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	5	7.1	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	2	7.2	397	8.1	0.00	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75454**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Dark brown, silty
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	22	1	7.9	115	7.0	0.61	0.00	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	2	6.7	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	3	7.4	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	1	7.0	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	3	7.2	129	7.7	0.91	0.02	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75455**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Dark brown, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	22	1	8.2	133	7.3	0.37	0.00	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	5	6.6	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	5	7.7	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	1	6.9	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	4	7.2	126	7.5	0.66	0.01	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75456**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Dark brown, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	22	1	7.7	149	6.8	0.20	0.00	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	1	6.6	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	1	7.3	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	2	7.2	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	4	5.5	128	7.4	0.36	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75457**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Light brown, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	23	4	7.4	178	7.1	0.30	0.00	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	4	7.0	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	4	7.6	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	5	7.3	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	2	7.2	158	7.4	0.00	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75458**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Light brown, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	23	1	7.3	114	7.2	0.08	0.00	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	1	7.1	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	4	7.7	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	1	7.2	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	2	6.7	108	7.4	0.36	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75459**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Tan, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	22	4	7.1	130	7.4	0.52	0.01	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	5	6.9	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	5	7.7	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	4	7.4	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	1	7.3	157	7.3	0.07	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

TEST DATA

Work Order : 250120
Sample Number : **75460**
Sediment pH : Not available
Pore Water pH : Not available
Pore Water Ammonia : Not available
Sample Description : Light brown, silty.
Time Start : 15:00

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[5]	NH3 (mg/L)[6]	Analyst(s)
0	2022-09-23	22	2	3.7	111	7.2	0.66	0.01	KF
1	2022-09-24	24	–	–	–	–	–	–	WL
2	2022-09-25	24	–	–	–	–	–	–	CD
3	2022-09-26	22	2	6.8	–	–	–	–	KF
4	2022-09-27	24	–	–	–	–	–	–	KF
5	2022-09-28	22	3	7.6	–	–	–	–	KF
6	2022-09-29	23	–	–	–	–	–	–	KF
7	2022-09-30	23	1	6.4	–	–	–	–	KF
8	2022-10-01	24	–	–	–	–	–	–	KF
9	2022-10-02	24	–	–	–	–	–	–	KF
10	2022-10-03	22	4	6.8	108	7.3	0.04	0.00	KF

"–" = not measured/not required
[5] TAN = Total ammonia (as N)
[6] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-20

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 250120

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13, 5:30

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SED58	75454		✔	✔								✔		1x8L
2022-09-12	17:30	BFR_L1_SED59	75455		✔	✔								✔		1x8L
2022-09-12	15:00	BFR_L1_SED60	75456		✔	✔								✔		1x8L
2022-09-12	15:30	BFR_L1_SED61	75457		✔	✔								✔		1x8L
2022-09-11	15:00	BFR_L1_SED62	75458		✔	✔								✔		1x8L
2022-09-11	16:00	BFR_L1_SED63	75459		✔	✔								✔		1x8L
2022-09-11	17:00	BFR_L1_SED64	75460		✔	✔								✔		1x8L

For Lab Use Only
Received By:
Date:
Time:
Storage Location:
Storage Temp.(°C)

Please list any special requests or instructions:

No Gen Chem required
Testing sent to Point Edward, ON; analyses requested was Hyallella & Chironomus.

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Hyalella azteca
EPS 1/RM/33

SAMPLE IDENTIFICATION

Work Order :	250120	Shipped By :	AltiMax/Rd
Company :	WSP - Golder	Sample Volume/Container :	1 x 8 L pail
Location :	Nepean ON	Lab Storage :	4±2 °C
Sampling Method :	Grab	Test Initiation Date :	2022-09-29
Sampled By :	P. Chevrette	Test Completion Date :	2022-10-13

Test Method : Test for Survival, Growth, and Reproduction in Sediment and Water Using the Freshwater Amphipod *Hyalella azteca* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/33 (3rd ed.), September 2017.

SAMPLE SUMMARY

Sample Number	Sample Name	Sample Date	Sample Type	Sample Time	Date Received	Temp. on Receipt (°C)
–	**Control**	2020-06-06	Control sediment	–	–	–
75454	**BFR_L1_SED58**	2022-09-12	Field-collected sediment	17:00	2022-09-16	20
75455	**BFR_L1_SED59**	2022-09-12	Field-collected sediment	17:30	2022-09-16	19
75456	**BFR_L1_SED60**	2022-09-12	Field-collected sediment	15:00	2022-09-16	20
75457	**BFR_L1_SED61**	2022-09-12	Field-collected sediment	15:30	2022-09-16	20
75458	**BFR_L1_SED62***	2022-09-11	Reference sediment	15:00	2022-09-16	20
75459	**BFR_L1_SED63***	2022-09-11	Reference sediment	16:00	2022-09-16	20
75460	**BFR_L1_SED64***	2022-09-11	Reference sediment	17:00	2022-09-16	20

*Identified by the client as a reference sample
"–" not available

REFERENCE TOXICANT DATA

Substance :	Potassium Chloride	LC50 :	0.5 g/L
Organism Batch :	26/09/22	95% Confidence Limits :	0.4 - 0.8 g/L
Test Date :	2022-09-29	Historical Mean LC50 :	0.4 g/L
Test Duration :	96 hours	Warning Limits (± 2 SD) :	0.3 - 0.7 g/L

The reference toxicant test was conducted as a water only test, as specified in the test method.

COMMENTS

•All test validity criteria as specified in the test method were satisfied.
•The results reported relate only to the sample(s) tested and as received/prepared.
•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

Noted Deviation(s) : According to the test method, a minimum of 5 replicate samples (i.e., field replicates or separate samples from different grabs or cores taken at the same station) of sediment must be taken at each discrete sampling station. However, no replicate field samples were provided.

•Measurements of test sediment particle size, percent water content, and total organic carbon were completed by the client, independent of AquaTox. Results of the analyses were not provided to AquaTox and cannot be presented in this report.

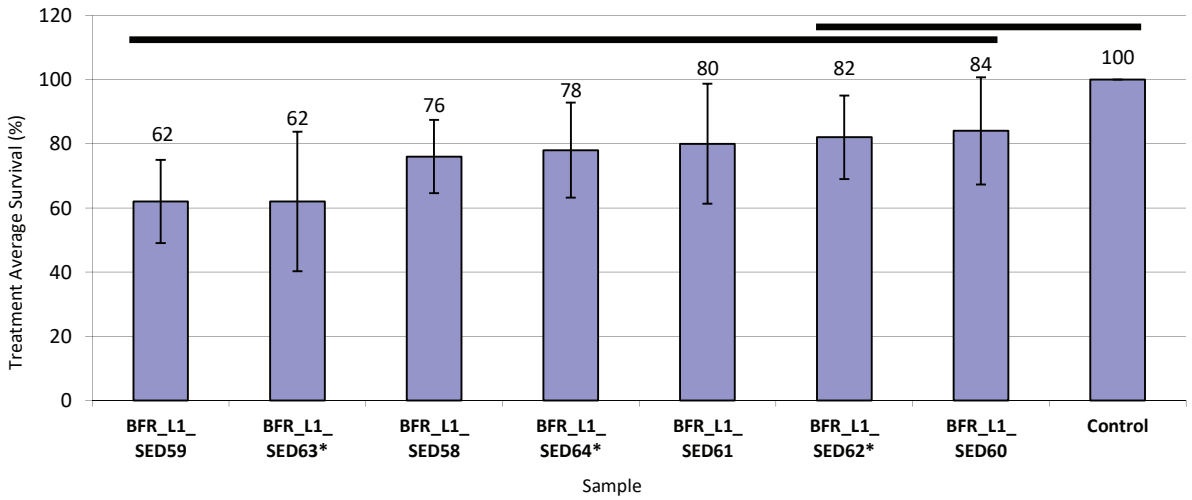
•Measurements of Control sediment particle size, percent water content, and total organic carbon are not currently available, but will be provided to the client as an addendum when available.

Approved by: Sarah Costantini
I am approving this document
2023-01-27 15:38-05:00

Project Manager

Work Order : 250120

14-DAY TEST RESULTS : SURVIVAL



Fisher Exact/Bonferroni-Holm Test (CETIS)[a]: Samples sharing the same line are not significantly different from one another (i.e. they are considered to be homogenous, that is, from the same population) (α =0.05).

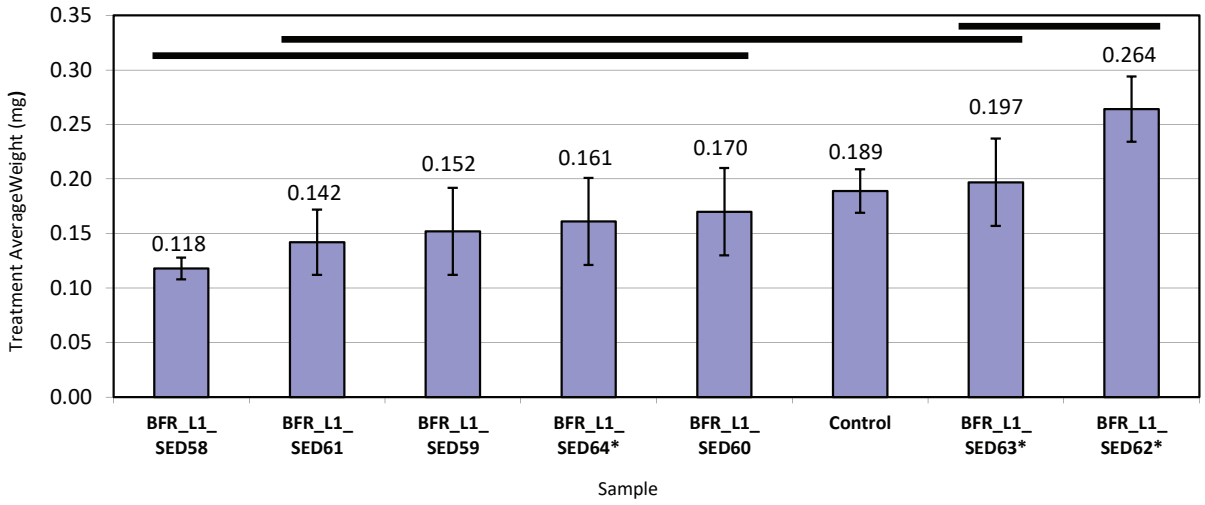
*Identified by the client as a reference sample

14-DAY SURVIVAL RESULTS : COMPARISON WITH REFERENCE SITES

Reference Site	Sample Number	Sample Name	Significantly Less than Reference Site? (α = 0.05)	Statistical Method
75458 BFR_L1_SED62	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	No	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	No	
	75459	BFR_L1_SED63	No	
	75460	BFR_L1_SED64	No	
75459 BFR_L1_SED63	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	No	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	No	
	75458	BFR_L1_SED62	No	
	75460	BFR_L1_SED64	No	
75460 BFR_L1_SED64	–	Control	No	Fisher Exact/Bonferroni-Holm Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	No	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	No	
	75458	BFR_L1_SED62	No	
	75459	BFR_L1_SED63	No	

Work Order : 250120

14-DAY TEST RESULTS : GROWTH



ANOVA/Tukey-Kramer Test (CETIS)[a]: Samples sharing the same line are not significantly different from one another (i.e. they are considered to be homogenous, that is, from the same population) (α =0.05). All data sets satisfied the assumptions for normality and homogeneity of variance.

*Identified by the client as a reference sample

14-DAY GROWTH RESULTS : COMPARISON WITH REFERENCE SITES

Reference Site	Sample Number	Sample Name	Significantly Less than Reference Site? (α = 0.05)	Statistical Method
75458 BFR_L1_SED62	–	Control	**Yes**	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	**Yes**	
	75456	BFR_L1_SED60	**Yes**	
	75457	BFR_L1_SED61	**Yes**	
	75459	BFR_L1_SED63	**Yes**	
	75460	BFR_L1_SED64	**Yes**	
75459 BFR_L1_SED63	–	Control	No	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	**Yes**	
	75455	BFR_L1_SED59	No	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	**Yes**	
	75458	BFR_L1_SED62	No	
	75460	BFR_L1_SED64	No	
75460 BFR_L1_SED64	–	Control	No	Dunnett Multiple Comparison Test (CETIS)[a]
	75454	BFR_L1_SED58	No	
	75455	BFR_L1_SED59	No	
	75456	BFR_L1_SED60	No	
	75457	BFR_L1_SED61	No	
	75458	BFR_L1_SED62	No	
	75459	BFR_L1_SED63	No	

Work Order : 250120

TEST ORGANISM

Test Organism :	*Hyalella azteca*	Mortality Rate :	0% (in 48 h preceding test)
Organism Batch :	26/09/22	Age on Test Day 0 :	8-9 days old
Source :	Aquatic Biosystems, inc.[1]	Life Stage on Test Day 0 :	Juvenile

[1]1300 Blue Spruce Drive, Suite C, Fort Collins, CO 80524

No organisms exhibiting unusual appearance, behavior, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static (no renewal)	Sediment Preparation :	Hand-homogenized
Test Duration :	14 days	Sediment Depth :	~3 cm
Renewal Frequency :	Not applicable	Sediment Volume :	100 mL per replicate
Field Replicates :	1	Overlying Water Volume :	175 mL per replicate
Test Replicates :	5 per field replicate	Control Sediment :	Long Point, Lake Erie
Organisms per Replicate :	10	Control Sediment Preparation :	Dry sieved (500 µm)
Organisms per Treatment :	50	Test Aeration :	Yes (all replicates)
Feed Type :	YCT	Test Aeration Rate :	2-3 bubbles per second
Feeding Rate (per replicate) :	1.5 mL YCT per replicate	Photoperiod (light/dark) :	16 h / 8 h
Equilibration Interval[2] :	~22 hours	Light Intensity :	597 - 786 lux
Test Vessel :	500 mL glass jar	Test Method Deviations :	Yes (see 'COMMENTS', page 1)

[2] elapsed time between preparation of exposures and test initiation (introduction of test organisms)

CONTROL/TEST WATER CHARACTERISTICS

Source : Dechlorinated municipal water (no additional chemicals)

Date	Temperature (°C)	Dissolved O_2 (mg/L)	O_2 Saturation (%)	pH	Conductivity (µmhos/cm)
2022-09-28	24	7.7	94	8.0	259

REFERENCES

[a] CETIS™, © 2000-2022. V.2.4.1.0. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

SURVIVAL DATA

Sample Number	Sample Name	Replicate	Number Dead	Mortality (%)	Survivors per Replicate (n=10)	Replicate Survival (%)	Treatment Average Survival (%)	Standard Deviation	CV (%)
–	**Control**	1	0	0	10	100	100	0.0	0.0
		2	0	0	10	100			
		3	0	0	10	100			
		4	0	0	10	100			
		5	0	0	10	100			
75454	**BFR_L1_SED58**	1	1	10	9	90	76	11.4	15.0
		2	2	20	8	80			
		3	3	30	7	70			
		4	4	40	6	60			
		5	2	20	8	80			
75455	**BFR_L1_SED59**	1	5	50	5	50	62	13.0	21.0
		2	5	50	5	50			
		3	2	20	8	80			
		4	3	30	7	70			
		5	4	40	6	60			
75456	**BFR_L1_SED60**	1	2	20	8	80	84	16.7	19.9
		2	2	20	8	80			
		3	4	40	6	60			
		4	0	0	10	100			
		5	0	0	10	100			
75457	**BFR_L1_SED61**	1	4	40	6	60	80	18.7	23.4
		2	3	30	7	70			
		3	0	0	10	100			
		4	3	30	7	70			
		5	0	0	10	100			
75458	**BFR_L1_SED62***	1	2	20	8	80	82	13.0	15.9
		2	3	30	7	70			
		3	0	0	10	100			
		4	1	10	9	90			
		5	3	30	7	70			
75459	**BFR_L1_SED63***	1	2	20	8	80	62	21.7	35.0
		2	1	10	9	90			
		3	6	60	4	40			
		4	5	50	5	50			
		5	5	50	5	50			
75460	**BFR_L1_SED64***	1	4	40	6	60	78	14.8	19.0
		2	2	20	8	80			
		3	0	0	10	100			
		4	3	30	7	70			
		5	2	20	8	80			

*Identified by the client as a reference sample

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

WEIGHT DATA

Sample Name	Sample Number	Replicate	Foil Weight (mg)	Dry Weight of Foil + Organisms (mg)	Number of Organisms Weighed	Replicate Average Dry Weight per Organism (mg)	Treatment Average Dry Weight per Organism (mg)	Standard Deviation	CV (%)
–	**Control**	1	806.85	808.71	10	0.186	0.189	0.02	12.70
		2	808.33	809.86	10	0.153			
		3	800.24	802.12	10	0.188			
		4	804.99	807.01	10	0.202			
		5	801.21	803.39	10	0.218			
75454	**BFR_L1_SED58**	1	804.37	805.59	9	0.136	0.118	0.01	10.00
		2	798.89	799.73	8	0.105			
		3	802.48	803.33	7	0.121			
		4	803.23	803.93	6	0.117			
		5	807.83	808.71	8	0.110			
75455	**BFR_L1_SED59**	1	794.49	795.05	5	0.112	0.152	0.04	23.35
		2	805.28	806.19	5	0.182			
		3	817.69	818.86	8	0.146			
		4	814.48	815.35	7	0.124			
		5	794.61	795.77	6	0.193			
75456	**BFR_L1_SED60**	1	800.67	802.23	8	0.195	0.170	0.04	23.38
		2	801.05	802.22	8	0.146			
		3	806.69	807.98	6	0.215			
		4	808.07	809.87	10	0.180			
		5	809.26	810.41	10	0.115			
75457	**BFR_L1_SED61**	1	806.72	807.86	6	0.190	0.142	0.03	19.19
		2	804.67	805.59	7	0.131			
		3	807.79	809.14	10	0.135			
		4	804.16	805.11	7	0.136			
		5	815.05	816.25	10	0.120			
75458	**BFR_L1_SED62***	1	825.74	827.71	8	0.246	0.264	0.03	13.14
		2	819.51	821.77	7	0.323			
		3	821.73	824.07	10	0.234			
		4	816.93	819.20	9	0.252			
		5	815.20	817.06	7	0.266			
75459	**BFR_L1_SED63***	1	804.45	805.91	8	0.182	0.197	0.04	21.78
		2	812.52	814.12	9	0.178			
		3	817.60	818.69	4	0.273			
		4	818.80	819.63	5	0.166			
		5	814.66	815.59	5	0.186			
75460	**BFR_L1_SED64***	1	801.91	802.65	6	0.123	0.161	0.04	23.17
		2	800.06	801.22	8	0.145			
		3	804.69	806.84	10	0.215			
		4	824.56	825.84	7	0.183			
		5	810.86	811.97	8	0.139			

•No outlying data points were detected according to Grubbs Test (CETIS)[a].

*Identified by the client as a reference sample

Test Data Reviewed By : VC (AquaTox)

Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **Control**
Description : Brown, odourless.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.4	569	8.1	0.00	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.6	679	8.2	0.01	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	1	7.3	719	8.2	0.18	0.01	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.8	830	8.4	0.33	0.03	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	24	2	7.7	811	8.3	0.04	0.00	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	1	7.4	879	8.2	0.00	0.00	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75454**
Description : Dark brown, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.0	92	7.0	0.73	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.7	102	7.1	0.36	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	1	7.3	114	7.2	–	–	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	3	6.8	115	6.5	–	–	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	24	5	6.6	107	6.3	–	–	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	23	2	7.1	121	6.3	2.87	0.00	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75455**
Description : Dark brown, silty
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.1	111	7.4	0.28	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.6	106	7.3	0.25	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	7.2	108	7.5	–	–	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.4	111	6.5	–	–	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	23	5	6.8	118	6.0	–	–	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	23	4	7.1	116	6.0	3.26	0.00	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75456**
Description : Dark brown, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.2	140	7.4	0.08	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.5	113	7.4	0.14	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	6.8	110	7.5	–	–	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.6	116	6.8	–	–	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	23	5	7.5	118	7.0	–	–	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	4	7.0	124	6.9	3.92	0.01	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75457**
Description : Light brown, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.2	159	7.3	0.18	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.8	133	7.4	0.15	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	7.2	151	7.3	–	–	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.8	157	7.5	–	–	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	23	5	7.6	151	7.5	–	–	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	4	7.2	131	7.2	2.32	0.02	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75458**
Description : Lighty brown, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.2	131	7.4	0.00	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	8.0	113	7.5	0.05	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	7.1	115	7.4	0.64	0.01	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	7.0	119	7.4	2.13	0.03	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	23	2	7.5	124	7.3	2.68	0.03	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	4	7.4	126	7.3	3.60	0.03	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75459**
Description : Tan, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.1	128	7.4	0.40	0.01	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.8	120	7.5	0.17	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	7.2	138	7.3	0.89	0.01	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.9	143	7.4	2.62	0.03	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	23	3	7.8	147	7.3	3.25	0.03	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	4	7.4	155	7.3	3.48	0.03	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

TEST DATA

Work Order : 250120
Sample Number : **75460**
Description : Light brown, silty.
Time Start: 16:30

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	TAN (mg/L)[3]	NH3 (mg/L)[4]	Analyst(s)
0	2022-09-29	23	1	7.1	102	7.4	0.34	0.00	KF
1	2022-09-30	24	–	–	–	–	–	–	KF
2	2022-10-01	24	–	–	–	–	–	–	KF
3	2022-10-02	24	–	–	–	–	–	–	KF
4	2022-10-03	23	5	7.8	106	7.4	0.23	0.00	KF/KK
5	2022-10-04	24	–	–	–	–	–	–	KK
6	2022-10-05	23	2	7.1	107	7.4	0.78	0.01	KF
7	2022-10-06	24	–	–	–	–	–	–	DS
8	2022-10-07	23	2	6.5	115	7.3	2.40	0.02	KF
9	2022-10-08	23	–	–	–	–	–	–	ET
10	2022-10-09	23	–	–	–	–	–	–	ET
11	2022-10-10	24	2	7.6	115	7.4	3.13	0.04	EP
12	2022-10-11	24	–	–	–	–	–	–	KF
13	2022-10-12	24	–	–	–	–	–	–	KF
14	2022-10-13	22	2	7.3	133	7.4	5.06	0.06	DS/KF

"–" = not measured/not required
[3] TAN = Total ammonia (as N)
[4] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : VC (AquaTox)
Date : 2023-01-11

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 250120

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13, 5:30

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SED58	75454		✔	✔								✔		1x8L
2022-09-12	17:30	BFR_L1_SED59	75455		✔	✔								✔		1x8L
2022-09-12	15:00	BFR_L1_SED60	75456		✔	✔								✔		1x8L
2022-09-12	15:30	BFR_L1_SED61	75457		✔	✔								✔		1x8L
2022-09-11	15:00	BFR_L1_SED62	75458		✔	✔								✔		1x8L
2022-09-11	16:00	BFR_L1_SED63	75459		✔	✔								✔		1x8L
2022-09-11	17:00	BFR_L1_SED64	75460		✔	✔								✔		1x8L

For Lab Use Only
Received By:
Date:
Time:
Storage Location:
Storage Temp.(°C)

Please list any special requests or instructions:

No Gen Chem required
Testing sent to Point Edward, ON; analyses requested was Hyallella & Chironomus.

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75389

SAMPLE IDENTIFICATION

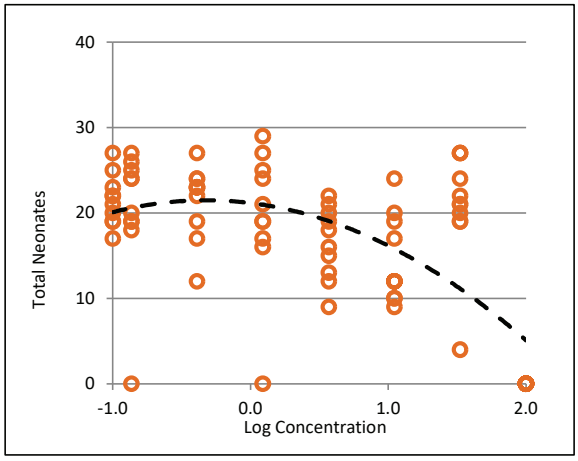
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:00
Substance :	BFR_L1_SW58	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

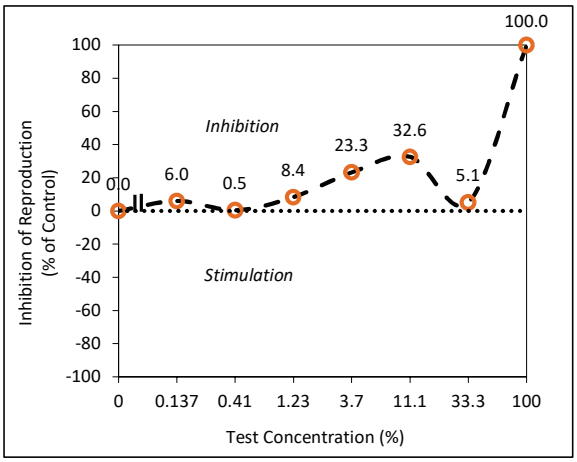
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	35.6%	1.16 - 39.2%	Linear Interpolation (CETIS)[a]
LC50	100%*	33.3% - *	Nonlinear Interpolation (Stephan)[c]

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

*The usefulness of any LC50 calculated from this data set is questionable because a concentration-effect relationship was not demonstrated over a reasonable range (i.e. <37 to >63 percent dead). A statistically valid upper 95% confidence limit could not be generated. At a confidence level of 95%, the binomial test shows that the LC50 is above 33.3%.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Approved By : Sarah Costantini
I am approving this document
2022-11-14 10:32-05:00

Project Manager

Work Order : 250085
Sample Number : 75389

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	10% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	19.8 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-147 [2]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[2]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	40
2022-09-20	4	0	0	0	0	0	0	0	50
2022-09-21	5	0	0	0	0	0	0	0	50
2022-09-22	6	0	0	0	0	10	0	0	50
Total Mortality (%) :		**0**	**0**	**0**	**0**	**10**	**0**	**0**	**50**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

[c] Stephan, C. E. 1977. Methods for calculating an LC50. pp 65-84 in : P. L. Mayer and J. L. Hamelink (eds.), Aquatic Toxicology and Hazard Evaluation. Amer. Soc. Testing and Materials, Philadelphia PA. ASTM STP 634.

Work Order : 250085
Sample Number : 75389

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 18:21
Test Completion Date : 2022-09-22

Control

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-19	3	4	0	3	0	0	2	3	2	2	2	1.8	EP
2022-09-20	4	9	12	11	0	12	8	8	4	6	3	7.3	WL
2022-09-21	5	0	0	0	9	0	0	0	13	0	18	4	EP
2022-09-22	6	12	5	7	10	15	10	11	0	14	0	8.4	EP
Total		**25**	**17**	**21**	**19**	**27**	**20**	**22**	**19**	**22**	**23**	**21.5 (±3.0)**	

3.7%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	2	5	3	2	0	0	2	0	2	1.6
2022-09-20	4	8	8	7	0	7	3	0	8	6	6	5.3
2022-09-21	5	0	0	0	6	0	5	0	0	0	0	1.1
2022-09-22	6	10	11	0 x 0		13	11	13	10	10	7	8.5
Total		**18**	**21**	**12**	**9**	**22**	**19**	**13**	**20**	**16**	**15**	**16.5 (±4.2)**

0.137%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	2	0	3	0	0	0	0	0	0	4	0.9
2022-09-20	4	7	7	7	0	5	9	1	0	9	9	5.4
2022-09-21	5	0	0	0	0	8	5	5	8	0	0	2.6
2022-09-22	6	10	18	14	0	13	10	12	12	10	14	11.3
Total		**19**	**25**	**24**	**0[3]**	**26**	**24**	**18**	**20**	**19**	**27**	**20.2 (±7.8)**

11.11%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	2	3	2	0	0	0	0	3	0	0	1
2022-09-20	4	10	6	5	7	0	0	1	9	7	2	4.7
2022-09-21	5	0	0	0	7	0	0	0	0	0	7	1.4
2022-09-22	6	8	10	10	10	10	12	11	0	3	0	7.4
Total		**20**	**19**	**17**	**24**	**10**	**12**	**12**	**12**	**10**	**9**	**14.5 (±5.1)**

0.41%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	2	2	0	3	0	0	0	2	0	0	0.9
2022-09-20	4	10	8	2	0	5	3	4	7	7	9	5.5
2022-09-21	5	0	0	0	7	5	9	10	0	7	8	4.6
2022-09-22	6	11	13	10	13	12	7	10	8	10	10	10.4
Total		**23**	**23**	**12[3]**	**23**	**22**	**19**	**24**	**17**	**24**	**27**	**21.4 (±4.3)**

33.33%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	4	2	2	0	0	0	2	0	0	1
2022-09-20	4	11	7	8	3	8	5	7	0	4	2	5.5
2022-09-21	5	0	0	0	14	0	6	8	10	0	6	4.4
2022-09-22	6	10	8	10	0	13	16	12	10	0	16	9.5
Total		**21**	**19**	**20**	**19**	**21**	**27**	**27**	**22**	**4[3]**	**24**	**20.4 (±6.5)**

1.23%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	2	3	0	0	0	0	0	2	0	0.7
2022-09-20	4	6	6	8	2	7	8	0	7	7	4	5.5
2022-09-21	5	0	0	0	7	7	6	0	0	0	11	3.1
2022-09-22	6	11	8	13	10	13	11	0	14	10	14	10.4
Total		**17**	**16**	**24**	**19**	**27**	**25**	**0[3]**	**21**	**19**	**29**	**19.7 (±8.2)**

100%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0 x 0		0	0 x 0 x 0		0	0	0	0 x 0		0
2022-09-20	4	0	0	0 x 0		0	0	0	0	0	0	0
2022-09-21	5	0	0	0	0	0	0	0	0	0	0	0
2022-09-22	6	0	0	0	0	0	0	0	0	0	0	0
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0 (±0.0)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[3] Outlier according to Grubbs Test[b] . Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-05

Work Order : 250085
Sample Number : 75389

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		25.8	25.1	25.7	24.7	24.5	25.1
	Dissolved O_2 (mg/L)		8.4	9.7	10.3	10.3	10.2	10.1
	pH		4.7	4.9	4.8	4.3	4.7	4.7
	Conductivity (µmhos/cm)		35	35	35	33	34	34
	Pre-aeration Time (min)[5]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	VF	KK	KP	ET	ET
		Final	KK	KK	KP	CD	ET	EP
Control	Temperature (°C)	Initial	26.4	26.3	26.4	26.3	25.7	25.6
		Final	24.7	26.1	23.8	24.5	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	7.7	7.4	7.4
		Final	7.3	6.5	6.7	7.3	6.9	7.5
	pH	Initial	8.3	8.2	8.3	8.3	8.1	8.3
		Final	7.9	7.8	7.8	7.9	7.9	8.1
	Conductivity (µmhos/cm)	Initial	463	465	464	459	451	471
0.137 %	Temperature (°C)	Initial	25.4	25.5	26.4	26.4	26.4	26.4
		Final	24.5	26.0	23.6	24.6	24.5	23.6
	Dissolved O_2 (mg/L)	Initial	7.3	7.0	7.5	7.6	7.4	7.2
		Final	6.9	6.1	7.1	7.1	7.0	7.3
	pH	Initial	8.2	7.5	8.3	8.3	8.3	8.3
		Final	7.9	7.7	7.8	7.9	8.0	8.2
	Conductivity (µmhos/cm)	Initial	449	462	457	465	455	470
3.7%	Temperature (°C)	Initial	25.5	25.5	26.4	26.4	26.3	26.3
		Final	24.6	25.9	23.7	24.6	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.3	7.2	7.5	7.7	7.3	7.2
		Final	6.9	5.8	5.9	7.2	6.8	7.4
	pH	Initial	8.2	7.8	8.2	8.3	8.2	8.3
		Final	7.9	7.7	7.6	7.9	7.9	8.2
	Conductivity (µmhos/cm)	Initial	437	444	447	451	444	466
100 %	Temperature (°C)	Initial	25.6	25.0	26.4	25.8	25.0	25.3
		Final	24.5	26.0	23.9	24.7	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	8.0	8.9	8.8	8.7	8.8
		Final	7.6	7.0	7.7	7.4	6.9	7.3
	pH	Initial	6.6	7.0	6.1	6.2	6.6	6.1
		Final	7.2	6.2	7.0	6.7	7.0	6.9
	Conductivity (µmhos/cm)	Initial	51.3	47.3	49.0	51.2	58.6	53.6
	Hardness (mg/L as $CaCO_3$)		4	–	–	–	–	–

"–" = not measured/not required
[5] ≤100 bubbles/minute

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-06

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75389

SAMPLE IDENTIFICATION

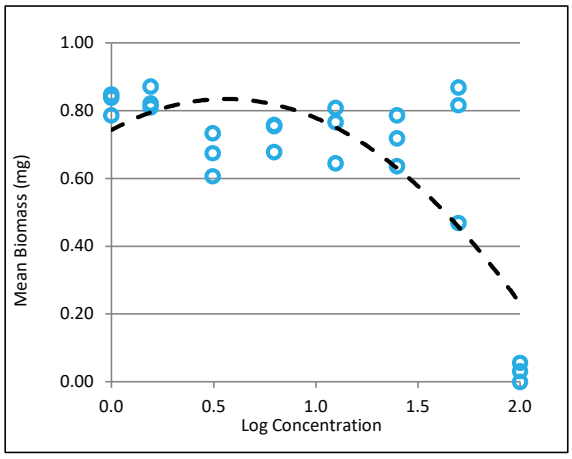
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:00
Substance :	BFR_L1_SW58	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

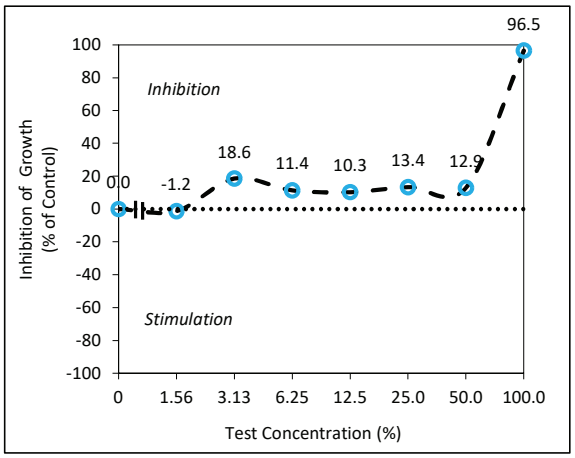
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Trim Level	Statistical Method
IC25 (Biomass)[1]	55.1%	9.72 - 59.2%	–	Linear Interpolation (CETIS)[a]
LC50	72.4%	66.3 - 79.1%	16.7%	Trimmed Spearman-Karber (CETIS)a

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Biomass)[1] endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a]. In test concentrations where hormesis was observed (1.56%), data were replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2005).

Approved By : Sarah Costantini
I am approving this document
2022-11-14 10:33-05:00

Project Manager

Work Order : 250085
Sample Number : 75389

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[3]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[3]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Environment Canada, 2005. Guidance Document on Statistical Methods for Environmental Toxicity Tests. Environmental Protection Series, Ottawa, Ont., Rept. EPS 1/RM/46.

Work Order : 250085
Sample Number : 75389

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 17:15
Initiation Date : 2022-09-16
Completion Date : 2022-09-23

Date :		Day 0 2022-09-16		Day 1 2022-09-17		Day 2 2022-09-18		Day 3 2022-09-19		Day 4 2022-09-20		Day 5 2022-09-21		Day 6 2022-09-22		Day 7 2022-09-23		Treatment Mean Mortality (± SD)
Analyst(s):		KK		VF		CD		CD		CD		CD		KP		WL		
Concentration		Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	**%**
%	**Replicate**																	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
3.13	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**13.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±15.28)
	C	0	**0**	0	**0**	0	**0**	0	**0**	3	**30**	3	**30**	3	**30**	3	**30**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
25	A	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**13.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	2	**20**	2	**20**	(±5.77)
	C	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	
50	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**10.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±17.32)
	C	0	**0**	1	**10**	1	**10**	2	**20**	2	**20**	2	**20**	3	**30**	3	**30**	
100	A	0	**0**	0	**0**	0	**0**	4	**40**	6	**60**	6	**60**	7	**70**	7	**70**	**83.33**
	B	0	**0**	0	**0**	1	**10**	7	**70**	7	**70**	7	**70**	7	**70**	8	**80**	(±15.28)
	C	0	**0**	0	**0**	0	**0**	9	**90**	10	**100**	10	**100**	10	**100**	10	**100**	

Aberrant behaviour or swimming impairment : 2022-09-19: One test organism in 100% replcate C is lethargic.

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-06

Work Order : 250085
Sample Number : 75389

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.838	0.824	0.033
	B	10	0.786		
	C	10	0.848		
1.56	A	10	0.821	0.834	0.033
	B	10	0.810		
	C	10	0.871		
3.13	A	10	0.674	0.671	0.064
	B	10	0.733		
	C	10	0.606		
6.25	A	10	0.758	0.730	0.045
	B	10	0.678[4]		
	C	10	0.754		
12.5	A	10	0.808	0.739	0.085
	B	10	0.766		
	C	10	0.644		
25	A	10	0.636	0.713	0.075
	B	10	0.718		
	C	10	0.786		
50	A	10	0.868	0.717	0.217
	B	10	0.816		
	C	10	0.468		
100	A	10	0.056	0.029	0.028
	B	10	0.031		
	C	10	0.000		

NOTES :

- [4]Outlier according to Grubbs Test[b] . Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.
- Control average dry weight per surviving organism = 0.824 mg

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-06

Work Order : 250085
Sample Number : 75389

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-16	Day 1 - 2 2022-09-17	Day 2 - 3 2022-09-18	Day 3 - 4 2022-09-19	Day 4 - 5 2022-09-20	Day 5 - 6 2022-09-21	Day 6 - 7 2022-09-22
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		25.8	25.1	25.7	24.7	24.5	25.1	24.0
	Dissolved O_2 (mg/L)		8.4	9.7	10.3	10.3	10.2	10.1	10.2
	pH		4.7	4.9	4.8	4.3	4.7	4.7	4.7
	Conductivity (µmhos/cm)		35	35	35	33	34	34	33
	Pre-aeration Time (min)[6]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	KP	KK	CS	ET	ET	KP
		Final	VF	CD	CS	CS	CS	KP	WL
Control	Temperature (°C)	Initial	26.1	25.3	26.2	25.5	25.8	26.3	24.6
		Final	24.9	24.9	24.7	24.9	26.0	24.4	24.5
	Dissolved O_2 (mg/L)	Initial	7.1	7.4	7.8	8.0	7.3	7.2	7.6
		Final	7.0	7.3	6.0	6.6	6.5	6.4	7.5
	pH	Initial	7.5	7.7	7.8	7.7	8.1	8.2	8.1
		Final	7.7	7.9	7.7	7.6	7.5	7.6	7.8
	Conductivity (µmhos/cm)	Initial	267	259	262	259	264	266	256
1.56 %	Temperature (°C)	Initial	25.8	25.0	26.2	26.3	26.3	26.3	24.9
		Final	24.6	24.9	24.9	25.0	25.0	24.4	24.4
	Dissolved O_2 (mg/L)	Initial	7.3	7.0	7.7	7.7	7.4	7.0	7.6
		Final	7.0	7.4	5.9	6.7	6.0	6.1	7.3
	pH	Initial	7.6	7.7	8.1	8.0	8.1	8.1	8.2
		Final	7.8	7.9	7.6	7.6	7.4	7.5	7.7
	Conductivity (µmhos/cm)	Initial	258	253	259	261	264	261	256
12.5%	Temperature (°C)	Initial	25.9	24.9	26.3	26.0	26.0	26.0	24.7
		Final	24.9	25.0	24.7	24.8	25.0	24.4	24.5
	Dissolved O_2 (mg/L)	Initial	7.3	7.7	7.8	8.0	7.6	7.3	7.7
		Final	6.9	7.5	5.8	6.6	5.9	6.1	7.5
	pH	Initial	7.6	7.7	8.1	8.2	8.0	8.0	8.1
		Final	7.8	7.9	7.5	7.6	7.4	7.5	7.8
	Conductivity (µmhos/cm)	Initial	233	229	242	237	239	239	232
100 %	Temperature (°C)	Initial	25.3	24.5	26.0	25.6	24.3	25.2	24.2
		Final	24.5	25.0	24.7	25.0	25.0	24.4	24.4
	Dissolved O_2 (mg/L)	Initial	8.0	8.4	9.1	8.8	9.0	8.5	9.1
		Final	7.4	7.5	5.9	6.6	6.1	6.3	7.5
	pH	Initial	5.0	5.2	5.1	5.2	5.8	5.0	5.1
		Final	6.0	6.1	6.2	6.3	6.2	5.8	5.7
	Conductivity (µmhos/cm)	Initial	34.1	34.2	34.0	36.0	33.8	38.0	33.2
	Hardness (mg/L as $CaCO_3$)		4	–	–	–	–	–	–

"–" = not measured/not required

[6] ≤100 bubbles/minute

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-06

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75389

SAMPLE IDENTIFICATION

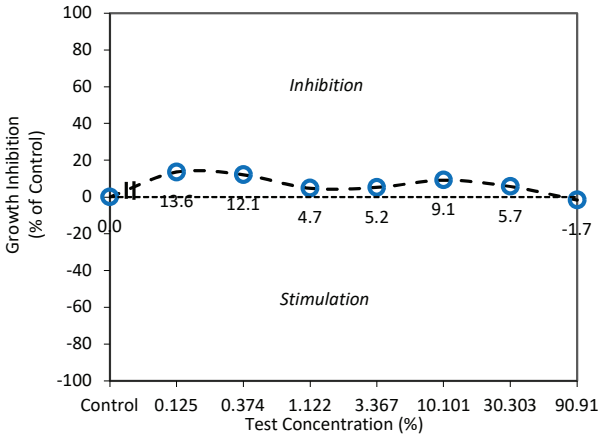
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:00
Substance :	BFR_L1_SW58	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-17

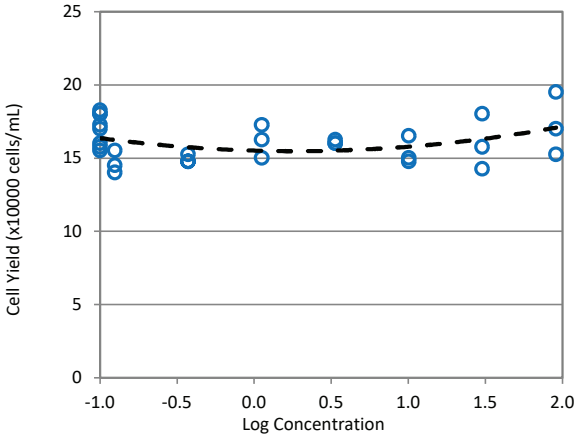
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
I am approving this document
2022-11-14 10:33-05:00

Project Manager

Work Order : 250085
Sample Number : 75389

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G6(I)a
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	9886 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	15 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.3°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	-
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.5
Enrichment Medium :	Stock 2A (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	CD	Control pH (at 0 hours) :	6.3
Date Counted :	2022-09-20	Control pH (at 72 hours) :	6.3
Counted By :	CD	Control Increase Factor :	18.2 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)			
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)
Control	16.5	18.3	18.0	19.0	17.0	19.3	16.8	19.0	16.98	1.10	6.5	–
0.18	–	–	–	–	–	–	–	–	–	–	–	–
0.35	–	–	–	–	–	–	–	–	–	–	–	–
0.71	–	–	–	–	–	–	–	–	–	–	–	–
0.13	15.5	15.0	16.5	–	–	–	–	–	14.68	0.76	5.2	-13.6
0.37	15.8	15.8	16.3	–	–	–	–	–	14.93	0.29	1.9	-12.1
1.12	16.0	17.3	18.3	–	–	–	–	–	16.18	1.13	7.0	-4.7
3.37	17.0	17.3	17.0	–	–	–	–	–	16.09	0.14	0.9	-5.2
10.10	16.0	15.8	17.5	–	–	–	–	–	15.43	0.95	6.1	-9.1
30.30	16.8	19.0	15.3	–	–	–	–	–	16.01	1.89	11.8	-5.7
90.91	20.5	18.0	16.3	–	–	–	–	–	17.26	2.14	12.4	1.7

NOTES : No significant stimulation (α=0.05) of cell yield was detected by ANOVA-Dunnett Multiple Comparison Test (CETIS)[a] at any test level compared to the control.

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : JL (AquaTox)

"–" = not counted/not required

Date : 2022-11-06

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75390

SAMPLE IDENTIFICATION

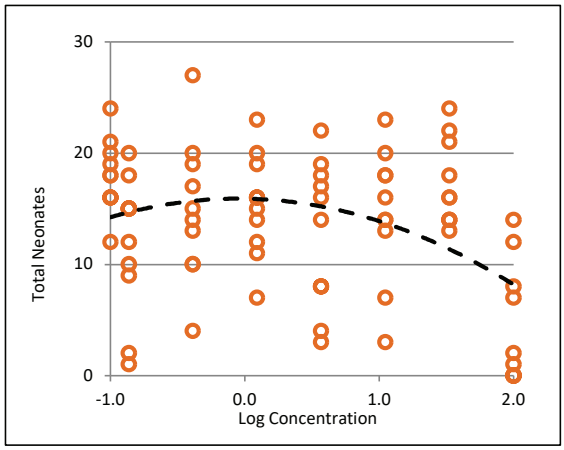
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:30
Substance :	BFR_L1_SW59	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

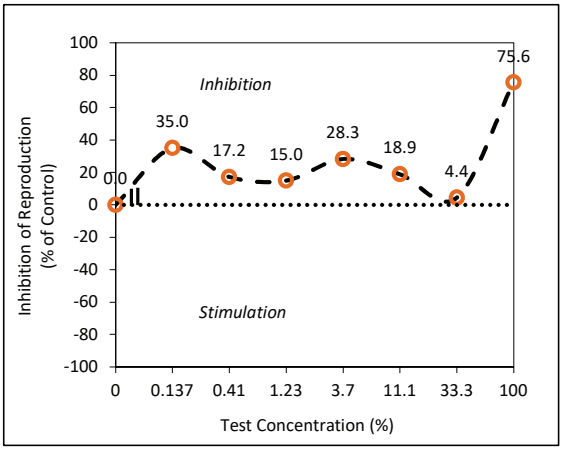
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	36.9%	0.12 - 45.2%	Linear Interpolation (CETIS)[a]
LC50	100%*	33.3% - *	Nonlinear Interpolation (Stephan)[c]

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

*The usefulness of any LC50 calculated from this data set is questionable because a concentration-effect relationship was not demonstrated over a reasonable range (i.e. <37 to >63 percent dead). A statistically valid upper 95% confidence limit could not be generated. At a confidence level of 95%, the binomial test shows that the LC50 is above 33.3%.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Sarah Costantini
I am approving this document
2022-11-23 14:40-05:00

Approved By : _____

Project Manager

Work Order : 250085
Sample Number : 75390

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	3.33% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	16.9 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-146 [2]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[2]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	30
2022-09-20	4	0	0	0	0	0	0	0	40
2022-09-21	5	0	0	0	10	0	0	0	50
2022-09-22	6	0	0	0	10	10	0	0	50
Total Mortality (%) :		**0**	**0**	**0**	**10**	**10**	**0**	**0**	**50**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

[c] Stephan, C. E. 1977. Methods for calculating an LC50. pp 65-84 in : P. L. Mayer and J. L. Hamelink (eds.), Aquatic Toxicology and Hazard Evaluation. Amer. Soc. Testing and Materials, Philadelphia PA. ASTM STP 634.

Work Order : 250085
Sample Number : 75390

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 18:30
Test Completion Date : 2022-09-22

Control

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	VF
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	KK
2022-09-19	3	0	0	2	3	3	2	4	2	0	0	1.6	EP
2022-09-20	4	4	2	6	0	5	6	0	7	5	4	3.9	KK
2022-09-21	5	4	4	0	7	0	0	7	0	0	8	3	EP
2022-09-22	6	8	10	10	10	8	11	10	3	13	12	9.5	EP
Total		**16**	**16**	**18**	**20**	**16**	**19**	**21**	**12**	**18**	**24**	**18.0 (±3.3)**	

3.7%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	2	2	0	3	4	3	2	1.6
2022-09-20	4	4	3	5	7	6	8	0	8	6	5	5.2
2022-09-21	5	0	0	0	0	0	0	7	0	8	11	2.6
2022-09-22	6	0	0	9 x	7	0	0	9	10	0	–	3.5
Total		**4**	**3**	**14**	**16**	**8**	**8**	**19**	**22**	**17**	**18**	**12.9 (±6.7)**

0.137%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	2	2	3	3	0	0	2	0	2	0	1.4
2022-09-20	4	0	0	6	6	5	3	0	0	9	1	3
2022-09-21	5	13	7	0	0	0	0	0	3	0	0	2.3
2022-09-22	6	0	6	9	3	10	7	0	6	9	0	5
Total		**15**	**15**	**18**	**12**	**15**	**10**	**2**	**9**	**20**	**1**	**11.7 (±6.3)**

11.11%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	2	0	3	3	0	3	0	0	0	1.1
2022-09-20	4	0	0	8	6	7	3	0	2	9	5	4
2022-09-21	5	7	7	0	5	0	0	5	4	0	11	3.9
2022-09-22	6	0	7	10	0	10	0	10	7	5	7	5.6
Total		**7**	**16**	**18**	**14**	**20**	**3**	**18**	**13**	**14**	**23**	**14.6 (±6.0)**

0.41%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	3	2	0	0	0	0	3	2	2	0	1.2
2022-09-20	4	0	0	4	6	5	0	0	7	0	6	2.8
2022-09-21	5	4	3	0	0	0	4	8	0	8	7	3.4
2022-09-22	6	3	10	10	4	8	0	9	8	9	14	7.5
Total		**10**	**15**	**14**	**10**	**13**	**4**	**20**	**17**	**19**	**27**	**14.9 (±6.4)**

33.33%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	4	0	0	0	3	2	3	2	0	1.4
2022-09-20	4	0	0	7	0	6	0	0	8	8	6	3.5
2022-09-21	5	7	8	0	6	0	0	4	0	0	9	3.4
2022-09-22	6	7	6	6	8	10	11	10	11	11	9	8.9
Total		**14**	**18**	**13**	**14**	**16**	**14**	**16**	**22**	**21**	**24**	**17.2 (±3.9)**

1.23%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	4	0	2	0	0	3	0	0.9
2022-09-20	4	5	0	4	5	0	0	0	5	7	6	3.2
2022-09-21	5	0	6	4	0	0	6	7 x	0	0	6	2.9
2022-09-22	6	10	6	8	7	11	11	0	9	10	11	8.3
Total		**15**	**12**	**16**	**16**	**11**	**19**	**7**	**14**	**20**	**23**	**15.3 (±4.7)**

100%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0 x	0	0	0	0 x	0	0	0	0
2022-09-20	4	1	2 x	0	0	3	0	0	7	5	1	1.9
2022-09-21	5	0 x	0	0	0	0	0	0	0	0	6	0.6
2022-09-22	6	0	0	0	0	4	0	0	5	3	7	1.9
Total		**1**	**2**	**0**	**0**	**7**	**0**	**0**	**12**	**8**	**14**	**4.4 (±5.4)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•No outlying data points were detected according to Grubbs Test[b] .

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-09

Work Order : 250085
Sample Number : 75390

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		26.4	26.3	24.8	26.6	25.8	26.4
	Dissolved O_2 (mg/L)		8.3	9.3	10.6	10.3	10.3	9.6
	pH		4.8	5.0	4.8	4.4	4.4	4.6
	Conductivity (µmhos/cm)		35	35	34	35	34	38
	Pre-aeration Time (min)[5]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	VF	KK	KP	ET	ET
		Final	VF	KK	EP	CD	ET	EP
Control	Temperature (°C)	Initial	26.4	26.3	26.4	26.4	25.7	25.6
		Final	25.0	25.8	26.2	24.7	24.6	23.9
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	6.6	7.4	7.4
		Final	7.1	6.9	6.7	6.0	7.1	7.2
	pH	Initial	8.3	8.2	8.3	6.6	8.1	8.3
		Final	7.7	7.9	7.7	7.3	8.1	8.0
	Conductivity (µmhos/cm)	Initial	463	465	464	459	451	471
0.137 %	Temperature (°C)	Initial	25.0	25.3	26.4	26.2	26.0	26.3
		Final	24.9	25.4	25.7	24.1	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.3	7.4	6.9	7.4	7.4
		Final	7.2	6.6	6.2	6.6	7.1	7.5
	pH	Initial	7.5	8.1	8.3	6.9	8.2	8.3
		Final	7.8	7.9	7.7	7.5	8.0	8.0
	Conductivity (µmhos/cm)	Initial	453	459	448	469	430	461
3.7%	Temperature (°C)	Initial	25.1	25.4	26.4	26.0	25.9	26.2
		Final	24.9	25.5	25.8	24.0	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	6.9	7.4	7.2
		Final	7.1	6.8	6.2	6.4	7.0	7.3
	pH	Initial	8.2	8.1	8.3	6.9	8.2	8.3
		Final	7.9	7.9	7.7	7.5	8.0	8.1
	Conductivity (µmhos/cm)	Initial	434	452	443	456	427	465
100 %	Temperature (°C)	Initial	24.9	25.2	26.4	25.8	25.4	25.8
		Final	24.8	26.0	26.1	24.3	24.7	23.8
	Dissolved O_2 (mg/L)	Initial	7.7	7.9	8.8	8.6	8.6	8.3
		Final	7.3	7.2	7.4	7.2	6.9	7.0
	pH	Initial	7.0	7.0	6.7	6.7	6.4	7.1
		Final	8.1	6.6	7.0	7.0	6.9	7.8
	Conductivity (µmhos/cm)	Initial	52.8	58.3	49.0	61.5	59.9	48.0
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–

"–" = not measured/not required
[5] ≤100 bubbles/minute

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-06

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75390

SAMPLE IDENTIFICATION

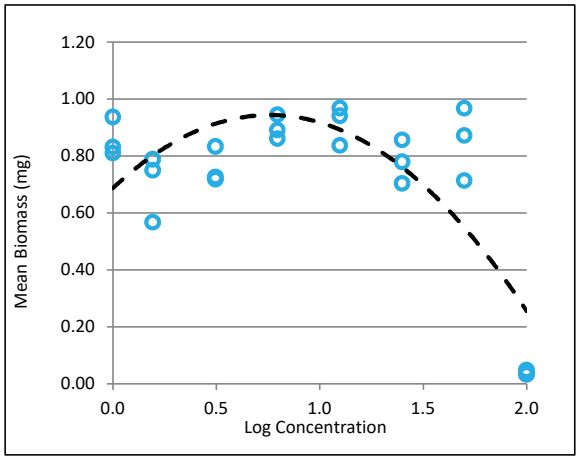
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:30
Substance :	BFR_L1_SW59	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

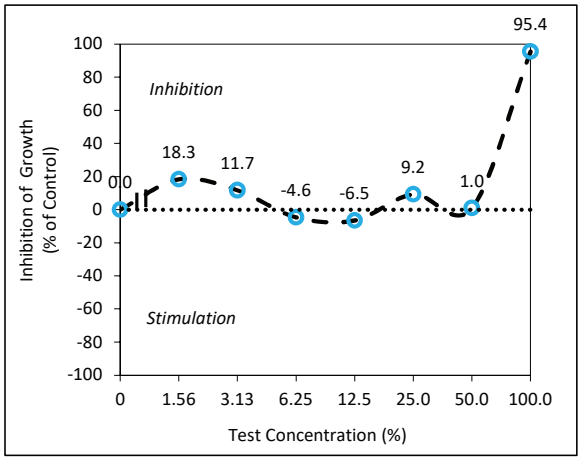
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	57.7%	51.0 - 62.6%	Linear Interpolation (CETIS)[a]
LC50	78.0%	48.8 - 88.6%	Linear Regression (MLE)(CETIS)[a]

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Biomass)[1] endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a]. In test concentrations where hormesis was observed (6.25% and 12.5%), data were replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2005).

Sarah Costantini
I am approving this document
2022-11-23 14:40-05:00

Approved By : _____

Project Manager

Work Order : 250085
Sample Number : 75390

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[3]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[3]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Environment Canada, 2005. Guidance Document on Statistical Methods for Environmental Toxicity Tests. Environmental Protection Series, Ottawa, Ont., Rept. EPS 1/RM/46.

Work Order : 250085
Sample Number : 75390

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 17:15
Initiation Date : 2022-09-16
Completion Date : 2022-09-23

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment Mean Mortality (± SD)
Date :		2022-09-16		2022-09-17		2022-09-18		2022-09-19		2022-09-20		2022-09-21		2022-09-22		2022-09-23		
Analyst(s):		KK		VF		CD		CD		CD		CD		KP		WL		
Concentration		Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	**%**
%	**Replicate**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**6.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	
3.13	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
50	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	A	0	**0**	0	**0**	0	**0**	6	**60**	7	**70**	9	**90**	9	**90**	9	**90**	**90.00**
	B	0	**0**	0	**0**	0	**0**	8	**80**	8	**80**	8	**80**	8	**80**	9	**90**	(±0.00)
	C	0	**0**	0	**0**	1	**10**	5	**50**	5	**50**	5	**50**	8	**80**	9	**90**	

Aberrant behaviour or swimming impairment : None

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-09

Work Order : 250085
Sample Number : 75390

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.810	0.859	0.068
	B	10	0.831		
	C	10	0.937		
1.56	A	10	0.567	0.702	0.118
	B	10	0.750		
	C	10	0.788		
3.13	A	10	0.718	0.759	0.064
	B	10	0.726		
	C	10	0.833		
6.25	A	10	0.861	0.899	0.043
	B	10	0.945		
	C	10	0.891		
12.5	A	10	0.837	0.915	0.069
	B	10	0.941		
	C	10	0.968		
25	A	10	0.704	0.780	0.077
	B	10	0.857		
	C	10	0.779		
50	A	10	0.714	0.851	0.128
	B	10	0.872		
	C	10	0.967		
100	A	10	0.048	0.039	0.008
	B	10	0.032		
	C	10	0.038		

NOTES :
- No outlying data points were detected according to Grubbs Test[b] .
- Control average dry weight per surviving organism = 0.859 mg

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-09

Work Order : 250085
Sample Number : 75390

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-16	Day 1 - 2 2022-09-17	Day 2 - 3 2022-09-18	Day 3 - 4 2022-09-19	Day 4 - 5 2022-09-20	Day 5 - 6 2022-09-21	Day 6 - 7 2022-09-22
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		26.4	26.3	24.8	26.6	25.8	26.4	24.6
	Dissolved O_2 (mg/L)		8.3	9.3	10.6	10.3	10.3	9.6	10.1
	pH		4.8	5.0	4.8	4.4	4.4	4.6	4.7
	Conductivity (µmhos/cm)		34.8	35.0	34.0	35.0	34.0	38.0	33.0
	Pre-aeration Time (min)[6]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	KP	KK	CS	ET	ET	KP
		Final	VF	KK	KP	CS	CD	KP	WL
Control	Temperature (°C)	Initial	26.1	25.3	26.2	25.5	25.8	26.3	24.6
		Final	25.0	25.0	24.8	25.0	25.0	24.6	24.7
	Dissolved O_2 (mg/L)	Initial	7.1	7.4	7.8	8.0	7.3	7.2	7.6
		Final	6.7	7.1	6.1	6.2	6.1	6.1	7.0
	pH	Initial	7.5	7.7	7.8	7.7	8.1	8.2	8.1
		Final	7.7	7.7	7.8	7.6	7.4	7.4	7.4
	Conductivity (µmhos/cm)	Initial	267	259	262	259	264	266	256
1.56 %	Temperature (°C)	Initial	26.1	25.0	26.2	26.3	26.2	26.2	24.7
		Final	25.0	25.1	24.8	25.1	25.0	24.6	24.7
	Dissolved O_2 (mg/L)	Initial	7.3	7.5	7.7	7.7	7.5	7.2	7.6
		Final	7.0	7.1	5.7	6.2	6.1	6.1	7.2
	pH	Initial	7.6	7.6	8.1	8.1	8.2	8.1	8.1
		Final	7.7	7.8	7.5	7.5	7.4	7.4	7.6
	Conductivity (µmhos/cm)	Initial	257	257	258	261	262	261	254
12.5%	Temperature (°C)	Initial	26.1	24.9	26.2	26.3	26.0	26.1	24.8
		Final	25.0	25.1	24.8	25.1	25.0	24.4	24.7
	Dissolved O_2 (mg/L)	Initial	7.3	7.8	8.0	7.9	7.6	7.3	7.7
		Final	6.8	7.0	5.7	6.1	6.0	6.0	7.2
	pH	Initial	7.6	7.7	8.0	8.0	8.1	8.1	8.0
		Final	7.8	7.7	7.5	7.5	7.4	7.4	7.6
	Conductivity (µmhos/cm)	Initial	234	229	235	234	238	239	231
100 %	Temperature (°C)	Initial	25.7	24.6	26.1	26.0	24.7	25.4	24.4
		Final	25.0	25.0	24.7	25.1	25.0	24.3	24.6
	Dissolved O_2 (mg/L)	Initial	7.9	8.4	9.2	8.8	8.8	8.3	9.0
		Final	6.9	7.5	6.3	6.6	6.4	6.6	7.7
	pH	Initial	5.3	5.3	5.1	5.2	5.2	5.0	4.8
		Final	7.9	5.9	6.4	6.4	6.4	6.0	5.8
	Conductivity (µmhos/cm)	Initial	34.4	34.5	34.0	36.0	33.4	35.0	33.0
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–	–

"–" = not measured/not required

[6] ≤100 bubbles/minute

Test Data Reviewed By : JL (AquaTox)
Date : 2022-11-09

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75390

SAMPLE IDENTIFICATION

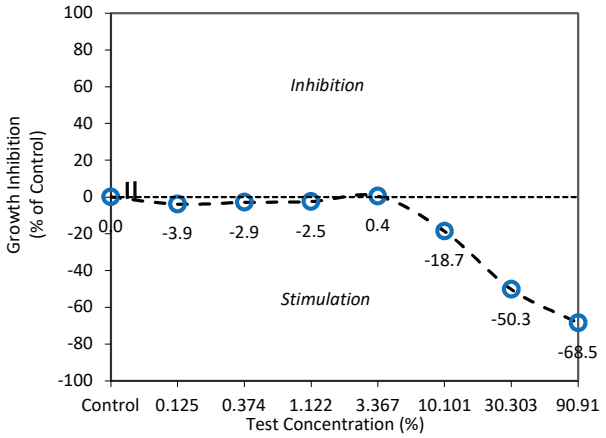
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:30
Substance :	BFR_L1_SW59	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-17

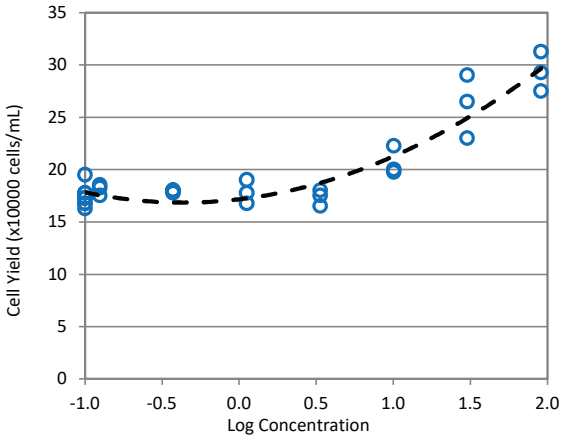
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23
14:40-05:00

Approved By : *Project Manager*

Work Order : 250085
Sample Number : 75390

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G6(I)a
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	9886 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	30 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.3°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.8
Enrichment Medium :	Stock 2A (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	CD	Control pH (at 0 hours) :	6.3
Date Counted :	2022-09-20	Control pH (at 72 hours) :	6.3
Counted By :	CD	Control Increase Factor :	18.6 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	17.3	18.8	20.5	18.3	18.3	17.8	18.8	17.8	17.42	0.99	5.7	–	
0.18	–	–	–	–	–	–	–	–	–	–	–	–	
0.35	–	–	–	–	–	–	–	–	–	–	–	–	
0.71	–	–	–	–	–	–	–	–	–	–	–	–	
0.13	19.5	19.3	18.5	–	–	–	–	–	18.09	0.52	2.9	3.9	
0.37	18.8	19.0	19.0	–	–	–	–	–	17.93	0.14	0.8	2.9	
1.12	20.0	18.8	17.8	–	–	–	–	–	17.84	1.13	6.3	2.5	
3.37	19.0	18.5	17.5	–	–	–	–	–	17.34	0.76	4.4	-0.4	
10.10	23.3	20.8	21.0	–	–	–	–	–	20.68	1.38	6.7	18.7	*
30.30	30.0	24.0	27.5	–	–	–	–	–	26.18	3.01	11.5	50.3	*
90.91	28.5	32.3	30.3	–	–	–	–	–	29.34	1.88	6.4	68.5	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : JL (AquaTox)

"–" = not counted/not required

Date : 2022-11-06

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75391

SAMPLE IDENTIFICATION

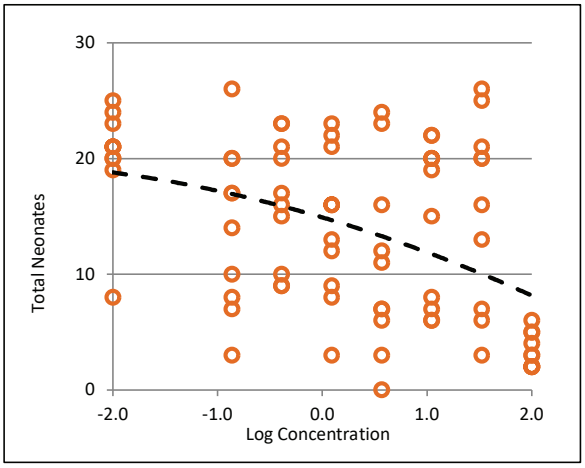
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	15:00
Substance :	BFR_L1_SW60	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.2 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-16

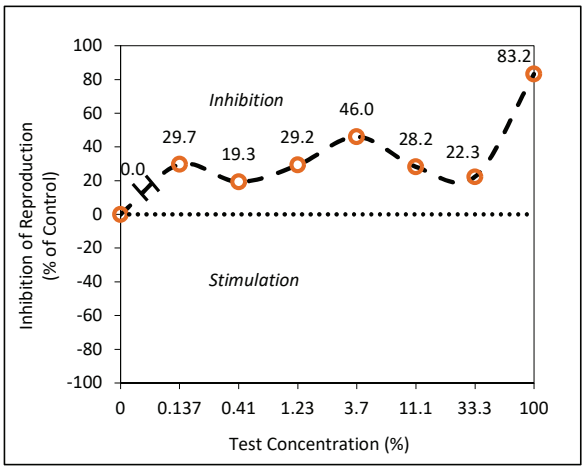
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	0.48%	0.09% - 37.8%	Linear Interpolation (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Sarah Costantini
I am approving this document
2022-11-23 14:41-05:00

Approved By : _____

Project Manager

Work Order : 250085
Sample Number : 75391

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	0% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	24.4 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-147 [1]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[1]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Untrimmed Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0
2022-09-20	4	0	0	0	0	0	0	0	0
2022-09-21	5	0	0	0	0	10	10	0	0
2022-09-22	6	0	0	0	0	20	10	10	0
Total Mortality (%) :		**0**	**0**	**0**	**0**	**20**	**10**	**10**	**0**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 250085
Sample Number : 75391

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 19:19
Test Completion Date : 2022-09-22

Control

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	KK
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	KK
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0	EP
2022-09-20	4	4	3	3	3	0	3	4	3	3	4	3	KK
2022-09-21	5	6	6	8	7	3	8	9	8	9	8	7.2	KK
2022-09-22	6	11	12	9	11	5	8	11	9	11	13	10	KK
Total		**21**	**21**	**20**	**21**	**8[2]**	**19**	**24**	**20**	**23**	**25**	**20.2 (±4.7)**	

3.7%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	2	4	3	0	2	0	0	2	4	0	1.7
2022-09-21	5	5	6	0	0	x 4	0	4	9	6	4	3.8
2022-09-22	6	0	6	4	0	6	3	x 7	12	14	2	5.4
Total		**7**	**16**	**7**	**0**	**12**	**3**	**11**	**23**	**24**	**6**	**10.9 (±8.0)**

0.137%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	0	0	2	3	2	0	4	4	4	0	1.9
2022-09-21	5	3	0	6	6	4	8	5	8	7	1	4.8
2022-09-22	6	0	10	9	11	8	0	8	14	9	6	7.5
Total		**3**	**10**	**17**	**20**	**14**	**8**	**17**	**26**	**20**	**7**	**14.2 (±7.1)**

11.11%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	3	4	3	2	1	0	3	4	3	0	2.3
2022-09-21	5	3	6	7	7	5	2	7	8	5	x 0	5
2022-09-22	6	9	12	10	11	0	5	9	10	0	6	7.2
Total		**15**	**22**	**20**	**20**	**6**	**7**	**19**	**22**	**8**	**6**	**14.5 (±7.0)**

0.41%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	3	0	4	2	3	3	2	4	2	2.7
2022-09-21	5	7	6	9	3	6	6	7	6	6	7	6.3
2022-09-22	6	12	6	12	9	9	0	0	12	13	0	7.3
Total		**23**	**15**	**21**	**16**	**17**	**9**	**10**	**20**	**23**	**9**	**16.3 (±5.5)**

33.33%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	2	0	4	4	4	4	3	4	4	0	2.9
2022-09-21	5	4	6	7	6	5	6	4	8	5	0	5.1
2022-09-22	6	0	7	9	11	7	15	0	x 14	11	3	7.7
Total		**6**	**13**	**20**	**21**	**16**	**25**	**7**	**26**	**20**	**3**	**15.7 (±8.1)**

1.23%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	2	3	2	2	0	2	3	4	0	0	1.8
2022-09-21	5	5	6	6	0	3	7	6	8	11	3	5.5
2022-09-22	6	5	12	0	11	0	7	7	10	12	6	7
Total		**12**	**21**	**8**	**13**	**3**	**16**	**16**	**22**	**23**	**9**	**14.3 (±6.6)**

100%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	0	2	4	2	0	1	0	1	0	2	1.2
2022-09-21	5	0	0	2	3	1	0	0	4	2	2	1.4
2022-09-22	6	2	1	0	0	2	1	2	0	0	0	0.8
Total		**2**	**3**	**6**	**5**	**3**	**2**	**2**	**5**	**2**	**4**	**3.4 (±1.5)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[2] Outlier according to Grubbs Test[b] . Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : EK
Date : 2022-11-15

Work Order : 250085
Sample Number : 75391

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		26.0	24.9	24.7	25.8	26.3	26.4
	Dissolved O_2 (mg/L)		8.3	9.8	10.5	10.4	10.4	9.7
	pH		5.8	5.3	5.4	5.0	5.0	5.2
	Conductivity (µmhos/cm)		34	33	33	34	33	34
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	VF	KK	KP	ET	ET
		Final	VF	KK	EP	ET	ET	EP
Control	Temperature (°C)	Initial	26.4	26.3	26.4	26.4	25.7	25.6
		Final	24.6	26.0	26.4	24.5	25.0	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	6.6	7.4	7.4
		Final	6.7	6.8	6.5	6.8	7.1	7.2
	pH	Initial	8.3	8.2	8.3	6.6	8.1	8.3
		Final	7.8	8.0	7.7	7.8	8.0	8.0
	Conductivity (µmhos/cm)	Initial	463	465	464	459	451	471
0.137 %	Temperature (°C)	Initial	25.3	25.7	26.4	26.2	25.7	26.4
		Final	24.4	25.6	26.4	24.4	24.5	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.1	7.4	7.1	7.4	7.0
		Final	6.8	6.3	6.2	6.7	7.1	7.4
	pH	Initial	8.2	8.2	8.3	7.0	8.2	8.3
		Final	7.8	7.9	7.7	7.7	8.0	8.1
	Conductivity (µmhos/cm)	Initial	449	465	453	471	438	462
11.11 %	Temperature (°C)	Initial	25.2	25.7	26.4	25.7	25.8	26.4
		Final	24.2	25.6	26.2	24.5	24.3	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.1	7.5	7.2	7.4	7.2
		Final	6.8	6.1	6.2	6.7	7.0	7.4
	pH	Initial	8.2	8.2	8.2	7.0	8.2	8.3
		Final	7.9	7.9	7.7	7.6	7.9	8.2
	Conductivity (µmhos/cm)	Initial	441	448	448	458	440	447
100 %	Temperature (°C)	Initial	25.2	25.4	26.4	25.5	25.2	26.1
		Final	24.4	26.3	26.3	24.6	24.4	23.8
	Dissolved O_2 (mg/L)	Initial	7.6	8.0	8.9	8.5	8.5	8.5
		Final	7.3	7.5	7.1	7.0	7.3	7.1
	pH	Initial	7.5	8.4	6.2	6.9	6.2	6.6
		Final	8.1	6.7	7.0	6.5	7.0	7.8
	Conductivity (µmhos/cm)	Initial	55.6	56.1	49	56.0	54.4	47
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–

"–" = not measured/not required
[3] ≤100 bubbles/minute

Test Data Reviewed By : EK
Date : 2022-11-15

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75391

SAMPLE IDENTIFICATION

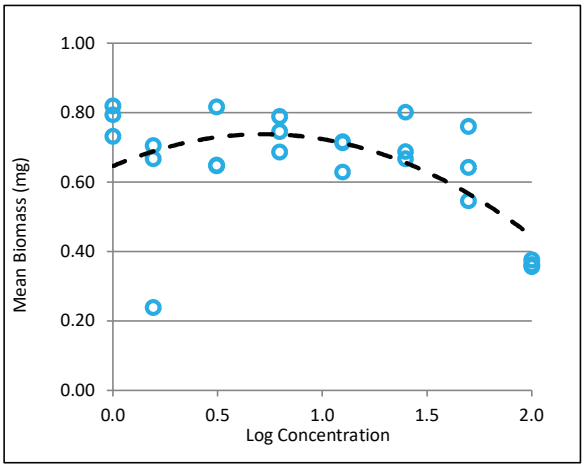
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	15:00
Substance :	BFR_L1_SW60	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.2 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-16

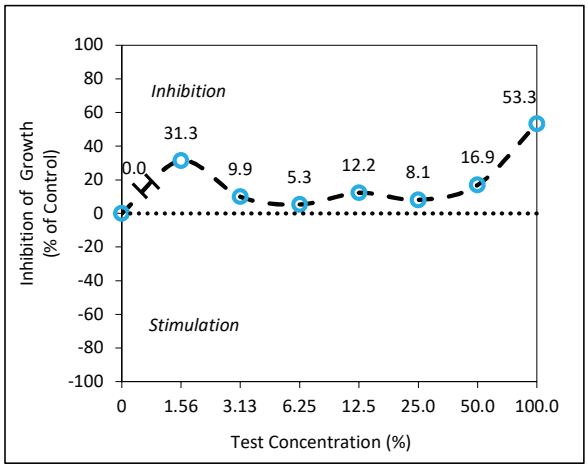
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	58.3%	18.8% - 73.9%	Linear Interpolation (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Biomass)[1] endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Sarah Costantini
I am approving this document
2022-11-23 14:42-05:00

Approved By :

Project Manager

Work Order : 250085
Sample Number : 75391

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[2]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 250085
Sample Number : 75391

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 18:30
Initiation Date : 2022-09-16
Completion Date : 2022-09-23

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment Mean Mortality (± SD)
Date :		2022-09-16		2022-09-17		2022-09-18		2022-09-19		2022-09-20		2022-09-21		2022-09-22		2022-09-23		
Analyst(s):		KK		CD		CD		CS		CS		CS		SO		WL		
Concentration		Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	**%**
%	**Replicate**																	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**26.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	(±37.86)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	2	**20**	4	**40**	7	**70**	
3.13	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**6.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±11.55)
	C	0	**0**	0	**0**	0	**0**	1	**10**	2	**20**	2	**20**	2	**20**	2	**20**	
25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	
50	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	**16.67**
	B	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	2	**20**	2	**20**	(±5.77)
	C	0	**0**	0	**0**	1	**10**	1	**10**	2	**20**	2	**20**	2	**20**	2	**20**	

Aberrant behaviour or swimming impairment : 2022-09-22: One test organism in 1.56% replicate C showed loss of equilibrium.

Test Data Reviewed By : EK
Date : 2022-11-15

Work Order : 250085
Sample Number : 75391

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.794	0.782	0.045
	B	10	0.819		
	C	10	0.732		
1.56	A	10	0.667	0.537	0.259
	B	10	0.705		
	C	10	0.238		
3.13	A	10	0.816[3]	0.704	0.097
	B	10	0.647		
	C	10	0.649		
6.25	A	10	0.686	0.740	0.052
	B	10	0.745		
	C	10	0.789		
12.5	A	10	0.716	0.686	0.049
	B	10	0.713		
	C	10	0.629[3]		
25	A	10	0.688	0.719	0.072
	B	10	0.801		
	C	10	0.667		
50	A	10	0.642	0.649	0.107
	B	10	0.546		
	C	10	0.760		
100	A	10	0.376	0.365	0.010
	B	10	0.362		
	C	10	0.356		

NOTES :

- [3]Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.
- Control average dry weight per surviving organism = 0.782 mg

Test Data Reviewed By : EK
Date : 2022-11-15

Work Order : 250085
Sample Number : 75391

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-16	Day 1 - 2 2022-09-17	Day 2 - 3 2022-09-18	Day 3 - 4 2022-09-19	Day 4 - 5 2022-09-20	Day 5 - 6 2022-09-21	Day 6 - 7 2022-09-22
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		26.0	24.9	24.7	25.8	26.3	26.4	23.7
	Dissolved O_2 (mg/L)		8.3	9.8	10.5	10.4	10.4	9.7	10.5
	pH		5.8	5.3	5.4	5.0	5.0	5.2	5.2
	Conductivity (µmhos/cm)		34	33	33	34	33	34	32
	Pre-aeration Time (min)[4]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	KP	KK	CS	ET	ET	KP
		Final	VF	KK	KP	CS	CS	KP	WL
Control	Temperature (°C)	Initial	26.4	24.4	26.4	25.5	25.8	26.3	24.6
		Final	25.0	25.2	24.9	25.1	25.1	24.6	24.7
	Dissolved O_2 (mg/L)	Initial	7.4	7.4	7.8	8.0	7.3	7.2	7.6
		Final	6.5	7.0	5.7	6.4	6.0	6.2	7.0
	pH	Initial	7.9	7.6	7.8	7.7	8.1	8.2	8.1
		Final	7.7	7.7	7.4	7.6	7.4	7.4	7.6
	Conductivity (µmhos/cm)	Initial	270	288	262	259	264	266	256
1.56 %	Temperature (°C)	Initial	25.2	25.5	26.3	26.4	26.4	26.1	24.8
		Final	25.0	25.1	24.9	25.1	25.0	24.6	24.6
	Dissolved O_2 (mg/L)	Initial	7.6	7.6	7.8	7.7	7.4	7.2	7.6
		Final	6.7	7.0	5.7	6.3	5.7	5.9	7.5
	pH	Initial	8.0	7.6	8.1	8.1	8.0	8.1	8.2
		Final	7.8	7.7	7.5	7.5	7.3	7.4	7.8
	Conductivity (µmhos/cm)	Initial	255	255	259	262	264	262	255
12.5%	Temperature (°C)	Initial	25.3	25.4	26.3	26.4	26.0	25.9	24.7
		Final	25.0	25.1	24.8	25.1	25.0	24.4	24.5
	Dissolved O_2 (mg/L)	Initial	7.7	7.6	7.9	7.9	7.5	7.3	7.7
		Final	6.8	7.4	8.5	6.0	6.2	6.2	6.9
	pH	Initial	8.0	7.6	8.0	8.0	7.9	8.0	8.1
		Final	7.8	7.8	7.4	7.5	7.4	7.8	7.6
	Conductivity (µmhos/cm)	Initial	231	232	235	237	237	238	231
100 %	Temperature (°C)	Initial	25.4	24.8	26.2	26.0	25.0	25.1	24.2
		Final	24.9	25.0	25.8	25.0	25.0	24.4	24.4
	Dissolved O_2 (mg/L)	Initial	8.0	8.5	8.7	8.8	8.9	8.6	8.9
		Final	6.6	7.0	6.1	6.6	6.0	6.1	7.2
	pH	Initial	5.7	5.7	5.6	5.7	5.4	5.6	5.4
		Final	7.9	6.1	6.1	6.4	6.2	6.1	5.8
	Conductivity (µmhos/cm)	Initial	34.2	34	35	37	33.9	34	33.3
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–	–

"–" = not measured/not required

[4] ≤100 bubbles/minute

Test Data Reviewed By : EK

Date : 2022-11-15

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75391

SAMPLE IDENTIFICATION

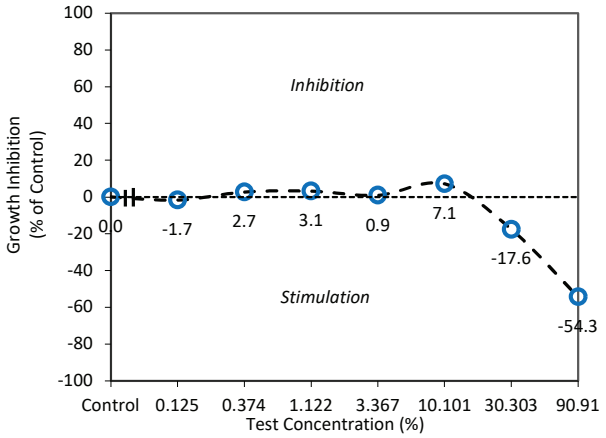
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	17:30
Substance :	BFR_L1_SW60	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-17

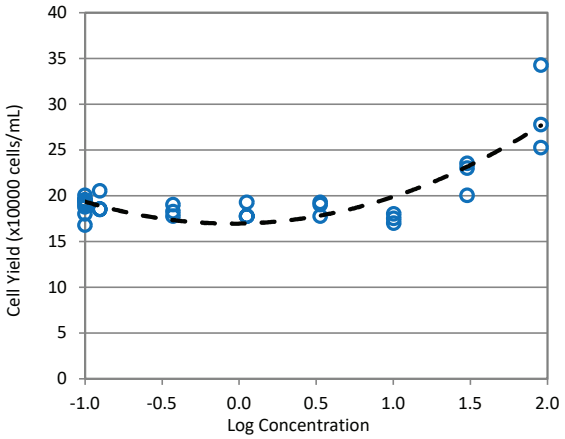
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23
14:42-05:00

Approved By :

Project Manager

Work Order : 250085
Sample Number : 75391

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G6(I)a
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	9886 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	30 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.4°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.8
Enrichment Medium :	Stock 2A (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	CD	Control pH (at 0 hours) :	6.3
Date Counted :	2022-09-20	Control pH (at 72 hours) :	6.4
Counted By :	CD	Control Increase Factor :	20.1 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	20.5	20.5	17.8	20.3	19.0	20.0	19.8	21.0	18.86	1.03	5.5	–	
0.18	–	–	–	–	–	–	–	–	–	–	–	–	
0.35	–	–	–	–	–	–	–	–	–	–	–	–	
0.71	–	–	–	–	–	–	–	–	–	–	–	–	
0.13	19.5	19.5	21.5	–	–	–	–	–	19.18	1.15	6.0	1.7	
0.37	20.0	18.8	19.3	–	–	–	–	–	18.34	0.63	3.4	-2.7	
1.12	18.8	18.8	20.3	–	–	–	–	–	18.26	0.87	4.7	-3.1	
3.37	20.3	20.0	18.8	–	–	–	–	–	18.68	0.80	4.3	-0.9	
10.10	18.0	18.5	19.0	–	–	–	–	–	17.51	0.50	2.9	-7.1	
30.30	24.5	21.0	24.0	–	–	–	–	–	22.18	1.89	8.5	17.6	*
90.91	26.3	35.3[2]	28.8	–	–	–	–	–	29.09	4.65	16.0	54.3	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- [2]Outlier according to Grubbs Test (CETIS)[a]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : JL (AquaTox)

"–" = not counted/not required

Date : 2022-11-21

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75392

SAMPLE IDENTIFICATION

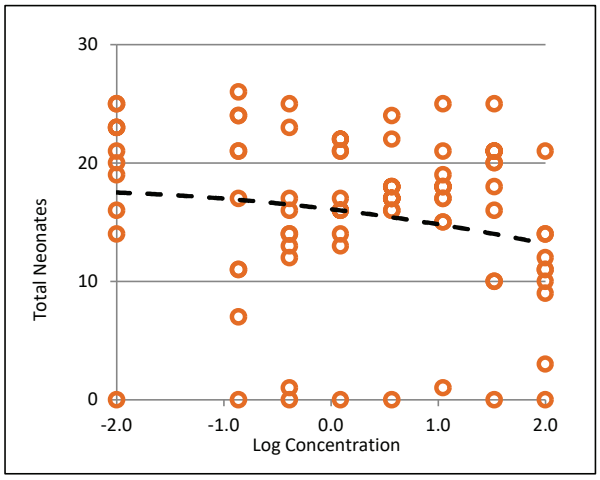
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	15:30
Substance :	BFR_L1_SW61	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.7 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-16

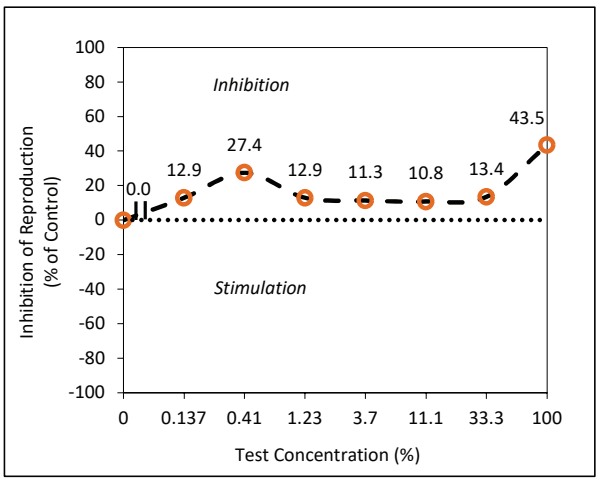
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	48.8%	0.30 - 81.6%	Linear Interpolation (Toxstat)[d]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (Toxstat)[d].

Sarah Costantini
I am approving this document
2022-11-23 14:44-05:00

Approved By : _____

Project Manager

Work Order : 250085
Sample Number : 75392

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	0% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	23.5 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-148 [1]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[1]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Untrimmed Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0
2022-09-20	4	0	0	0	0	0	0	0	0
2022-09-21	5	0	0	0	0	0	0	0	0
2022-09-22	6	0	0	0	0	0	0	0	0
Total Mortality (%) :		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

[d] West, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A.

Work Order : 250085
Sample Number : 75392

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 19:28
Test Completion Date : 2022-09-22

Control

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	KK
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	KF
2022-09-19	3	0	3	3	0	2	0	0	0	0	0.8	WL
2022-09-20	4	3	0	3	0	0	0	4	3	4	5	2.2	WL
2022-09-21	5	7	6	14	0	7	8	8	9	9	10	7.8	KK
2022-09-22	6	11	10	0	0	7	6	13	11	10	10	7.8	EP
Total		**21**	**19**	**20**	**0**[2]	**16**	**14**	**25**	**23**	**23**	**25**	**18.6 (±7.5)**	

3.7%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	2	3	0	0	0	0	0	0	0.5
2022-09-20	4	3	0	0	0	4	4	3	1	2	3	2
2022-09-21	5	7	7	6	0	8	9	6	8	7	7	6.5
2022-09-22	6	7	8	8	0	10	11	7	9	9	6	7.5
Total		**17**	**17**	**17**	**0**[2]	**22**	**24**	**16**	**18**	**18**	**16**	**16.5 (±6.4)**

0.137%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	2	0	0	0	0	0	0	0.2
2022-09-20	4	2	4	0	0	4	1	4	0	4	4	2.3
2022-09-21	5	4	9	9	0	5	7	6	7	5	6	5.8
2022-09-22	6	5	13	13	0	2	13	14	0	8	11	7.9
Total		**11**	**26**	**24**	**0**	**11**	**21**	**24**	**7**	**17**	**21**	**16.2 (±8.6)**

11.11%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	3	0	0.3
2022-09-20	4	4	1	3	1	4	2	4	5	0	4	2.8
2022-09-21	5	6	6	8	0	7	7	5	0	6	4	4.9
2022-09-22	6	7	8	10	0	14	10	8	10	9	10	8.6
Total		**17**	**15**	**21**	**1**[2]	**25**	**19**	**17**	**15**	**18**	**18**	**16.6 (±6.2)**

0.41%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	5	0	0.5
2022-09-20	4	4	4	2	0	4	0	3	2	0	3	2.2
2022-09-21	5	3	7	7	0	5	1	8	8	9	6	5.4
2022-09-22	6	6	6	3	0	7	0	12	4	11	5	5.4
Total		**13**	**17**	**12**	**0**	**16**	**1**	**23**	**14**	**25**	**14**	**13.5 (±8.0)**

33.33%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	2	0	0	0	0	0	0	0	0.2
2022-09-20	4	5	3	5	0	2	3	0	6	4	3	3.1
2022-09-21	5	6	3	0	0	8	0	11	8	7	9	5.2
2022-09-22	6	9	12	3	0	6	7	10	7	14	8	7.6
Total		**20**	**18**	**10**	**0**	**16**	**10**	**21**	**21**	**25**	**20**	**16.1 (±7.4)**

1.23%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	4	0	0	0	0	0	0	0	0.4
2022-09-20	4	3	2	0	0	2	4	4	5	5	4	2.9
2022-09-21	5	5	6	5	0	6	5	9	10	7	7	6
2022-09-22	6	5	8	7	0	6	8	8	7	10	10	6.9
Total		**13**	**16**	**16**	**0**[2]	**14**	**17**	**21**	**22**	**22**	**21**	**16.2 (±6.6)**

100%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	1	0.1
2022-09-20	4	1	3	2	0	3	2	4	5	4	4	2.8
2022-09-21	5	2	4	5	0	4	4	7	5	5	6	4.2
2022-09-22	6	0	4	7	0	3	3	0	2	5	10	3.4
Total		**3**	**11**	**14**	**0**	**10**	**9**	**11**	**12**	**14**	**21**	**10.5 (±5.8)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[2] Outlier according to Grubbs Test[b] . Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75392

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		26.4	24.4	26.4	26.9	25.6	24.7
	Dissolved O_2 (mg/L)		8.3	9.7	9.7	10.2	10.2	10.2
	pH		5.6	5.3	5.3	5.0	5.1	5.1
	Conductivity (µmhos/cm)		34.2	33	34	34	34	33
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	VF	KK	KP	ET	ET
		Final	VF	KK	KP	CS	ET	EP
Control	Temperature (°C)	Initial	24.5	26.3	26.4	26.4	25.7	25.6
		Final	25.1	25.7	25.0	24.3	24.6	24.1
	Dissolved O_2 (mg/L)	Initial	7.6	7.7	7.4	6.6	7.4	7.4
		Final	6.9	7.0	6.0	6.8	6.9	6.9
	pH	Initial	7.4	8.2	8.2	6.6	8.1	8.3
		Final	7.9	7.9	7.7	7.9	7.9	8.0
	Conductivity (µmhos/cm)	Initial	451	465	455	459	451	471
0.137 %	Temperature (°C)	Initial	24.5	25.3	26.4	25.3	26.2	25.9
		Final	25.0	25.7	25.1	24.1	24.2	24.3
	Dissolved O_2 (mg/L)	Initial	7.4	7.1	7.5	7.1	7.1	7.2
		Final	7.0	6.3	5.8	7.0	7.1	6.9
	pH	Initial	7.6	8.0	8.3	7.2	8.2	8.3
		Final	7.9	7.8	7.6	7.8	7.9	8.1
	Conductivity (µmhos/cm)	Initial	445	455	460	459	441	469
11.11 %	Temperature (°C)	Initial	24.7	25.5	26.4	25.4	26.0	25.9
		Final	25.0	25.8	24.9	24.1	24.1	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.3	7.4	7.4	7.4	7.3
		Final	7.0	6.3	5.8	6.9	7.0	7.0
	pH	Initial	7.6	8.1	8.2	7.2	8.2	8.3
		Final	7.9	7.8	7.6	7.6	7.9	8.1
	Conductivity (µmhos/cm)	Initial	431	445	449	448	441	440
100 %	Temperature (°C)	Initial	24.5	25.2	26.4	25.3	25.2	25.2
		Final	25.0	25.8	25.0	24.2	24.3	24.2
	Dissolved O_2 (mg/L)	Initial	7.5	8.0	8.4	8.5	8.6	8.5
		Final	7.3	7.4	7.4	7.1	7.0	7.0
	pH	Initial	7.3	8.1	6.7	6.7	6.3	6.6
		Final	8.0	6.7	7.0	7.0	6.9	7.0
	Conductivity (µmhos/cm)	Initial	54.8	55.9	57	54.6	48.5	52
	Hardness (mg/L as $CaCO_3$)		10	–	–	–	–	–

"–" = not measured/not required
[3] ≤100 bubbles/minute

Test Data Reviewed By : EK
Date : 2022-11-18

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75392

SAMPLE IDENTIFICATION

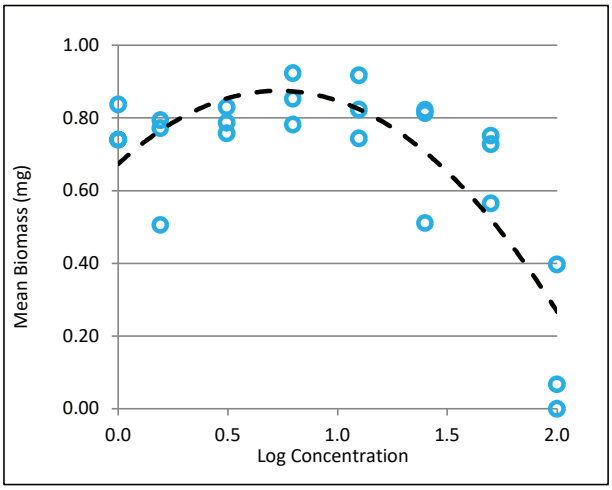
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	15:30
Substance :	BFR_L1_SW61	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.7 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-16

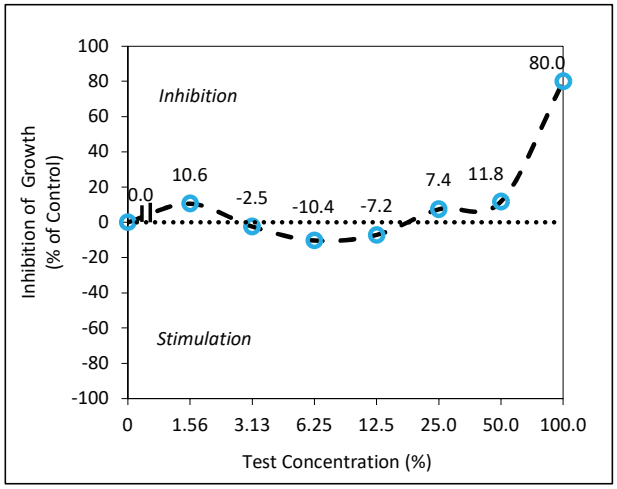
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Trim Level	Statistical Method
IC25 (Biomass)[1]	60.7%	26.5% - 77.3%	-	Non-Linear Regression (CETIS)[a]
LC50	79.4%	69.3% - 90.9%	30%	Spearman-Karber (CETIS)[a]

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
Sarah Costantini
I am approving this document
2022-11-23 14:45-05:00

Project Manager

Work Order : 250085
Sample Number : 75392

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[2]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Work Order : 250085
Sample Number : 75392

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 20:00
Initiation Date : 2022-09-16
Completion Date : 2022-09-23

Date :		**Day 0** 2022-09-16		**Day 1** 2022-09-17		**Day 2** 2022-09-18		**Day 3** 2022-09-19		**Day 4** 2022-09-20		**Day 5** 2022-09-21		**Day 6** 2022-09-22		**Day 7** 2022-09-23		**Treatment Mean Mortality (± SD)**
Analyst(s):		KK		CD		CD		CS		CS		CS		KP		WL		
Concentration		Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	**%**
%	**Replicate**																	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
Control	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**10.00**
1.56	B	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	2	**20**	2	**20**	(±10.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	**3.33**
3.13	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
6.25	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
12.5	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**10.00**
25	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±17.32)
	C	0	**0**	1	**10**	1	**10**	1	**10**	2	**20**	2	**20**	3	**30**	3	**30**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**10.00**
50	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	(±10.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	2	**20**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	4	**40**	8	**80**	9	**90**	**70.00**
100	B	0	**0**	0	**0**	0	**0**	2	**20**	3	**30**	6	**60**	10	**100**	10	**100**	(±43.59)
	C	0	**0**	0	**0**	0	**0**	2	**20**	2	**20**	2	**20**	2	**20**	2	**20**	

Aberrant behaviour or swimming impairment : 2022-09-22: One test organism in 100% replicate A showed loss of equilibrium.

Test Data Reviewed By : EK
Date : 2022-11-15

Work Order : 250085
Sample Number : 75392

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.741	0.773	0.056
	B	10	0.740		
	C	10	0.837		
1.56	A	10	0.794	0.691	0.160
	B	10	0.506		
	C	10	0.772		
3.13	A	10	0.830	0.792	0.036
	B	10	0.758		
	C	10	0.787		
6.25	A	10	0.782	0.853	0.071
	B	10	0.923		
	C	10	0.853		
12.5	A	10	0.823	0.828	0.087
	B	10	0.744		
	C	10	0.917		
25	A	10	0.813	0.715	0.177
	B	10	0.822		
	C	10	0.511		
50	A	10	0.728	0.681	0.101
	B	10	0.565		
	C	10	0.751		
100	A	10	0.067	0.155	0.213
	B	10	0.000		
	C	10	0.397		

NOTES : •No outlying data points were detected according to Grubbs Test (CETIS)[a].

• Control average dry weight per surviving organism = 0.773 mg

Test Data Reviewed By : EK
Date : 2022-11-15

Work Order : 250085
Sample Number : 75392

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-16	Day 1 - 2 2022-09-17	Day 2 - 3 2022-09-18	Day 3 - 4 2022-09-19	Day 4 - 5 2022-09-20	Day 5 - 6 2022-09-21	Day 6 - 7 2022-09-22
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		26.4	24.4	26.4	26.9	25.6	24.7	24.8
	Dissolved O_2 (mg/L)		8.3	9.7	9.7	10.2	10.2	10.2	10.1
	pH		5.6	5.3	5.3	5.0	5.0	5.1	5.2
	Conductivity (µmhos/cm)		34.2	33	34	34	34	33	33
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	KP	KK	CS	ET	ET	KP
		Final	VF	KK	KP	CS	CS	KP	WL
Control	Temperature (°C)	Initial	26.4	25.9	26.2	25.5	25.8	26.3	24.6
		Final	25.0	25.1	24.9	24.8	24.9	24.6	24.6
	Dissolved O_2 (mg/L)	Initial	7.4	7.7	7.8	8.0	7.3	7.2	7.6
		Final	6.8	6.5	5.8	6.3	6.0	6.0	6.9
	pH	Initial	7.9	8.2	7.8	7.7	8.1	8.2	8.1
		Final	7.7	7.6	7.5	7.6	7.6	7.4	7.5
	Conductivity (µmhos/cm)	Initial	270	275	262	259	264	266	256
1.56 %	Temperature (°C)	Initial	25.1	25.4	26.2	26.4	26.3	26.1	24.6
		Final	25.0	25.1	24.9	25.1	25.0	24.6	25.0
	Dissolved O_2 (mg/L)	Initial	7.6	7.7	7.7	7.6	7.4	7.2	7.7
		Final	6.7	7.0	5.8	6.9	5.7	5.8	6.7
	pH	Initial	8.1	8.1	8.1	8.1	8.1	8.1	8.1
		Final	7.8	7.8	7.5	7.6	7.5	7.4	7.5
	Conductivity (µmhos/cm)	Initial	254	255	258	262	263	260	254
12.5%	Temperature (°C)	Initial	25.1	25.2	26.2	26.3	26.1	25.9	24.5
		Final	24.9	25.1	24.8	25.0	25.0	24.4	24.4
	Dissolved O_2 (mg/L)	Initial	7.7	7.8	7.8	7.7	7.5	7.3	7.8
		Final	6.6	6.7	5.7	6.3	5.8	5.6	6.9
	pH	Initial	8.0	8.0	8.0	8.0	8.0	8.0	8.1
		Final	7.8	7.6	7.8	7.6	7.4	7.4	7.5
	Conductivity (µmhos/cm)	Initial	231	230	234	237	239	235	231
100 %	Temperature (°C)	Initial	25.3	24.7	26.3	26.0	24.8	25.9	24.5
		Final	24.9	25.1	24.8	25.0	25.0	24.3	24.5
	Dissolved O_2 (mg/L)	Initial	7.9	8.5	8.9	8.7	9.0	8.5	8.9
		Final	6.8	7.1	6.0	6.5	5.9	6.2	7.5
	pH	Initial	5.7	5.7	5.6	5.7	5.4	5.5	5.4
		Final	8.0	6.1	6.1	6.5	6.6	5.9	5.9
	Conductivity (µmhos/cm)	Initial	33.8	35	35	35	34.6	35	33.5
	Hardness (mg/L as $CaCO_3$)		10	–	–	–	–	–	–

"–" = not measured/not required

[3] ≤100 bubbles/minute

Test Data Reviewed By : EK

Date : 2022-11-15

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75392

SAMPLE IDENTIFICATION

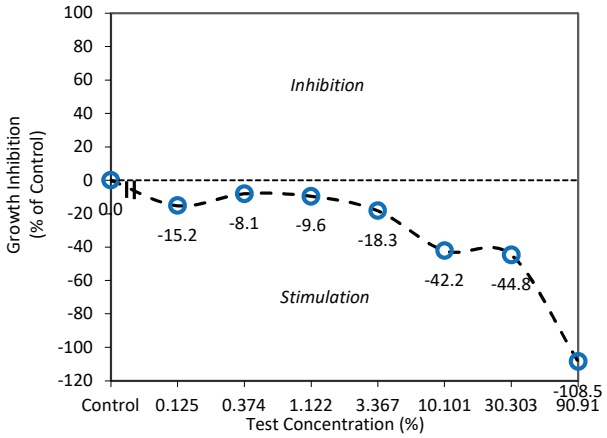
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	15:30
Substance :	BFR_L1_SW61	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.7 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-17

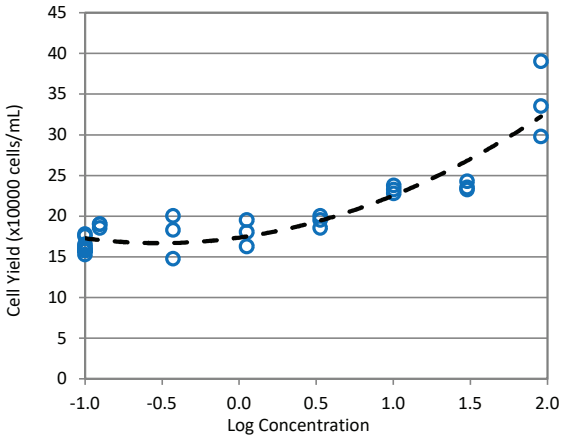
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23 14:45-05:00

Approved By : *Project Manager*

Work Order : 250085
Sample Number : 75392

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G6(I)a
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	9886 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	45 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.4°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.6
Enrichment Medium :	Stock 2A (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	CD	Control pH (at 0 hours) :	6.3
Date Counted :	2022-09-15	Control pH (at 72 hours) :	6.3
Counted By :	CD	Control Increase Factor :	17.5 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	18.5	17.0	18.8	16.3	16.8	16.8	17.3	17.5	16.36	0.88	5.4	–	
0.18	–	–	–	–	–	–	–	–	–	–	–	–	
0.35	–	–	–	–	–	–	–	–	–	–	–	–	
0.71	–	–	–	–	–	–	–	–	–	–	–	–	
0.13	20.0	19.5	20.0	–	–	–	–	–	18.84	0.29	1.5	15.2	*
0.37	15.8	21.0	19.3	–	–	–	–	–	17.68	2.67	15.1	8.1	
1.12	20.5	17.3	19.0	–	–	–	–	–	17.93	1.63	9.1	9.6	
3.37	19.5	20.5	21.0	–	–	–	–	–	19.34	0.76	3.9	18.3	*
10.10	23.8	24.8	24.3	–	–	–	–	–	23.26	0.50	2.1	42.2	*
30.30	24.3	25.3	24.5	–	–	–	–	–	23.68	0.52	2.2	44.8	*
90.91	40.0	30.8	34.5	–	–	–	–	–	34.09	4.65	13.6	108.5	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : JL (AquaTox)

"–" = not counted/not required

Date : 2022-11-21

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75393

SAMPLE IDENTIFICATION

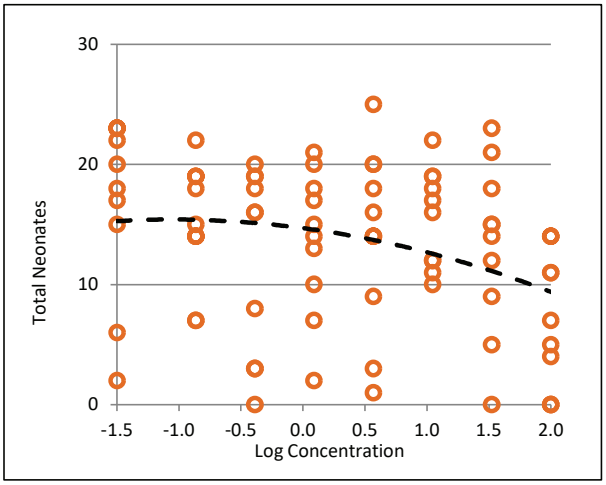
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:00
Substance :	BFR_L1_SW62	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

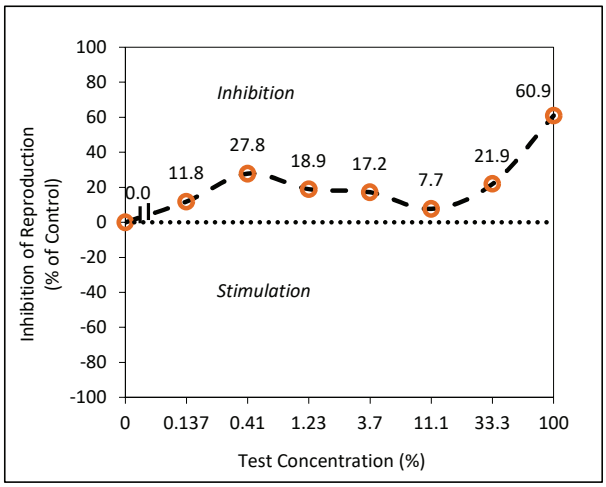
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	36.4%	0.11 - 58.3%	Linear Interpolation (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Approved By : Sarah Costantini
I am approving this document
2022-11-23 14:53-05:00

Project Manager

Work Order : 250085
Sample Number : 75393

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	0% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	19.3 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-148 [1]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[1]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Untrimmed Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0
2022-09-20	4	0	0	0	0	10	0	0	10
2022-09-21	5	0	0	0	0	10	0	0	10
2022-09-22	6	0	0	0	0	10	0	0	10
Total Mortality (%) :		**0**	**0**	**0**	**0**	**10**	**0**	**0**	**10**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 250085
Sample Number : 75393

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 19:35
Test Completion Date : 2022-09-22

Control

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0	WL
2022-09-20	4	3	2	3	0	5	3	5	2	4	3	3	KK
2022-09-21	5	6	6	4	2	5	8	6	5	7	3	5.2	EP
2022-09-22	6	11	10	8	0	13	12	11	10	12	0	8.7	EP
Total		**20**	**18**	**15**	**2**	**23**	**23**	**22**	**17**	**23**	**6**	**16.9 (±7.4)**	

3.7%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	3	1 x	1	2	0	5	3	4	2	3	2.4
2022-09-21	5	5	0	6	5	3	8	6	9	7	8	5.7
2022-09-22	6	10	0	7	7	0	12	7	7	0	9	5.9
Total		**18**	**1**	**14**	**14**	**3**	**25**	**16**	**20**	**9**	**20**	**14.0 (±7.7)**

0.137%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	1	3	3	2	3	4	4	2	2	2.8
2022-09-21	5	6	4	2	5	5	6	5	8	4	5	5
2022-09-22	6	8	10	2	6	0	10	10	10	8	7	7.1
Total		**18**	**15**	**7**	**14**	**7**	**19**	**19**	**22**	**14**	**14**	**14.9 (±5.0)**

11.11%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	3	3	3	2	4	0	1	3	0	2.3
2022-09-21	5	10	8	6	4	6	6	6	3	0	2	5.1
2022-09-22	6	8	8	9	5	8	9	11	8	8	8	8.2
Total		**22**	**19**	**18**	**12**	**16**	**19**	**17**	**12**	**11**	**10**	**15.6 (±4.1)**

0.41%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	0	0	4	0	3	3	2	0	5	2.1
2022-09-21	5	4	3	8	5	0	6	5	8	3	5	4.7
2022-09-22	6	8	0	0	10	0	7	10	9	0	10	5.4
Total		**16**	**3**	**8**	**19**	**0**	**16**	**18**	**19**	**3**	**20**	**12.2 (±7.8)**

33.33%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	3	0	0	3	0	4	2	3	1	0	1.6
2022-09-21	5	0	5	8	6	0	9	8	3	5	3	4.7
2022-09-22	6	9	10	10	0	0	10	11	8	9	2	6.9
Total		**12**	**15**	**18**	**9**	**0**	**23**	**21**	**14**	**15**	**5**	**13.2 (±7.1)**

1.23%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	1	0	3	6	0	0	0	4	3	0	1.7
2022-09-21	5	9	0	7	0	3	3	2	5	6	7	4.2
2022-09-22	6	7	7	8	7	7	11	0	11	12	8	7.8
Total		**17**	**7**	**18**	**13**	**10**	**14**	**2**	**20**	**21**	**15**	**13.7 (±6.0)**

100%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	0	3	4	0 x	0	2	0	2	1	0	1.2
2022-09-21	5	0	6	6	0	2	4	0	0	4	3	2.5
2022-09-22	6	0	5	4	0	2	5	0	5	0	8	2.9
Total		**0**	**14**	**14**	**0**	**4**	**11**	**0**	**7**	**5**	**11**	**6.6 (±5.7)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•No outlying data points were detected according to Grubbs Test[b].

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75393

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		25.5	25.2	24.4	25.4	25.7	24.4
	Dissolved O_2 (mg/L)		8.7	9.5	10.6	10.5	10.3	10.0
	pH		6.3	5.6	5.7	5.4	5.6	5.7
	Conductivity (µmhos/cm)		33	30	30	31	31	32
	Pre-aeration Time (min)[2]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	KK	KK	KP	ET	ET
		Final	KK	KK	KP	CD	ET	EP
Control	Temperature (°C)	Initial	26.4	26.3	26.4	26.3	25.7	25.6
		Final	24.2	26.0	24.5	24.9	24.1	25.1
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	7.7	7.4	7.4
		Final	7.2	7.0	6.0	6.8	6.9	7.8
	pH	Initial	8.3	8.2	8.3	8.3	8.1	8.3
		Final	8.0	8.0	7.8	7.8	7.9	7.3
	Conductivity (µmhos/cm)	Initial	463	465	464	459	451	471
0.137 %	Temperature (°C)	Initial	25.0	25.8	26.4	25.7	26.4	26.1
		Final	24.1	25.8	24.2	24.7	23.8	25.1
	Dissolved O_2 (mg/L)	Initial	7.3	7.5	7.4	7.5	7.3	7.2
		Final	7.1	6.4	6.4	6.8	6.9	7.4
	pH	Initial	8.2	8.2	8.3	8.3	8.2	8.3
		Final	7.9	7.8	7.7	7.9	7.9	7.6
	Conductivity (µmhos/cm)	Initial	443	455	456	456	434	471
3.7%	Temperature (°C)	Initial	25.0	25.6	26.4	25.7	26.3	25.9
		Final	24.0	26.0	23.9	24.7	24.0	25.1
	Dissolved O_2 (mg/L)	Initial	7.3	7.7	7.5	7.7	7.4	7.3
		Final	7.6	6.0	6.3	6.8	7.2	7.1
	pH	Initial	8.2	8.3	8.2	8.3	8.2	8.3
		Final	8.0	7.7	7.7	7.8	8.1	8.0
	Conductivity (µmhos/cm)	Initial	433	436	450	446	430	459
100 %	Temperature (°C)	Initial	25.0	25.2	26.2	25.7	25.4	25.2
		Final	23.6	26.1	23.9	24.9	24.2	25.1
	Dissolved O_2 (mg/L)	Initial	7.3	8.3	8.9	8.7	8.7	8.4
		Final	8.1	7.1	7.4	6.9	7.1	6.8
	pH	Initial	8.2	7.1	6.7	6.7	6.4	6.6
		Final	7.0	6.4	6.9	6.7	6.7	6.9
	Conductivity (µmhos/cm)	Initial	55.9	49	47	52.1	52.9	51.1
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–

"–" = not measured/not required
[2] ≤100 bubbles/minute

Test Data Reviewed By : EK
Date : 2022-11-18

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75393

SAMPLE IDENTIFICATION

Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:00
Substance :	BFR_L1_SW62	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-17

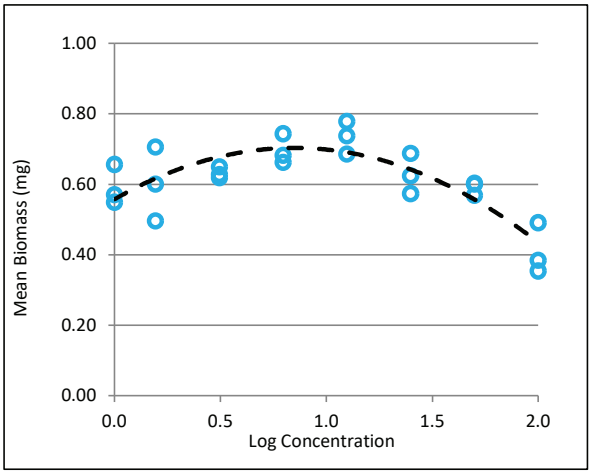
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

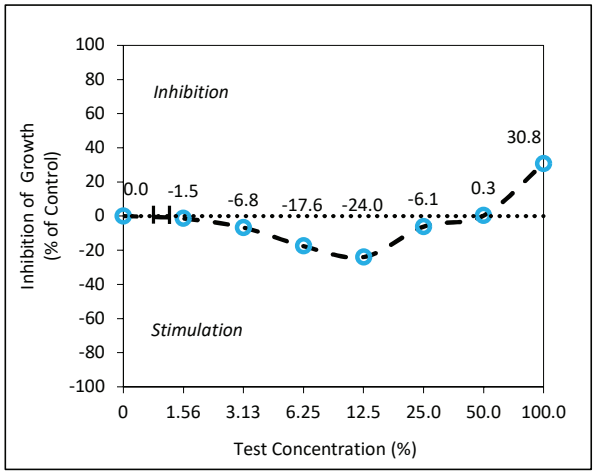
7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	87.7%	67.3 - 116%*	Non-Linear Regression (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.

Confidence limits >100% are statistically valid.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

*An upper 95% confidence limit greater than 100% is statistically valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
I am approving this document
2022-11-23 14:54-05:00

Project Manager

Work Order : 250085
Sample Number : 75393

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[2]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Work Order : 250085
Sample Number : 75393

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23	2022-09-24
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 15:45
Initiation Date : 2022-09-17
Completion Date : 2022-09-24

		Day 0		**Day 1**		**Day 2**		**Day 3**		**Day 4**		**Day 5**		**Day 6**		**Day 7**		**Treatment Mean Mortality (± SD)**
Date :		2022-09-17		2022-09-18		2022-09-19		2022-09-20		2022-09-21		2022-09-22		2022-09-23		2022-09-24		
Analyst(s):		KK		KP		WL		SO		SO		EP		WL		EP		
Concentration		Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	**%**
%	**Replicate**																	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**6.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
3.13	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
50	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**6.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	2	**20**	2	**20**	**16.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	2	**20**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	

Aberrant behaviour or swimming impairment : None.

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75393

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.549	0.592	0.057
	B	10	0.656		
	C	10	0.570		
1.56	A	10	0.496	0.600	0.105
	B	10	0.600		
	C	10	0.705		
3.13	A	10	0.628	0.632	0.016
	B	10	0.618		
	C	10	0.649		
6.25	A	10	0.743	0.696	0.042
	B	10	0.662		
	C	10	0.682		
12.5	A	10	0.737	0.734	0.046
	B	10	0.778		
	C	10	0.686		
25	A	10	0.687	0.628	0.057
	B	10	0.573		
	C	10	0.624		
50	A	10	0.568	0.590	0.019
	B	10	0.600		
	C	10	0.602		
100	A	10	0.384	0.410	0.072
	B	10	0.354		
	C	10	0.491		

NOTES : •No outlying data points were detected according to Grubbs Test (CETIS)[a].

• Control average dry weight per surviving organism = 0.592 mg

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75393

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-17	Day 1 - 2 2022-09-18	Day 2 - 3 2022-09-19	Day 3 - 4 2022-09-20	Day 4 - 5 2022-09-21	Day 5 - 6 2022-09-22	Day 6 - 7 2022-09-23
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		25.2	24.4	25.4	25.7	24.4	25.6	24.9
	Dissolved O_2 (mg/L)		9.5	10.6	10.5	10.3	10.0	10.2	10.0
	pH		5.6	5.7	5.4	5.6	5.7	5.3	5.7
	Conductivity (µmhos/cm)		30	30	31	31	32	30	32
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	VF	EP	ET	WL	KP	ET
		Final	KP	WL	SO	SO	EP	WL	EP
Control	Temperature (°C)	Initial	25.3	25.5	25.5	24.2	25.2	24.6	26.4
		Final	25.3	25.2	24.9	25.0	24.0	25.0	24.6
	Dissolved O_2 (mg/L)	Initial	7.4	7.1	8.0	7.7	7.2	7.6	7.8
		Final	6.7	6.3	5.8	6.2	6.6	6.6	7.2
	pH	Initial	7.7	7.5	7.7	7.7	7.6	8.1	8.2
		Final	7.7	7.6	7.4	7.4	7.6	7.7	7.4
	Conductivity (µmhos/cm)	Initial	259	260	259	255	260	256	281
1.56 %	Temperature (°C)	Initial	25.3	26.0	25.4	24.6	25.3	24.3	25.4
		Final	25.3	25.1	24.9	24.9	24.1	25.0	24.7
	Dissolved O_2 (mg/L)	Initial	7.6	7.3	7.8	7.6	7.3	7.7	7.9
		Final	7.0	6.3	6.1	6.1	6.2	6.4	6.4
	pH	Initial	7.8	7.9	8.0	7.7	7.6	8.1	8.1
		Final	7.8	7.6	7.4	7.5	7.5	7.6	7.7
	Conductivity (µmhos/cm)	Initial	255	258	265	254	257	252	270
12.5%	Temperature (°C)	Initial	25.2	26.0	25.6	24.7	25.3	24.5	24.7
		Final	25.3	25.2	24.8	24.9	24.0	25.0	24.0
	Dissolved O_2 (mg/L)	Initial	7.7	7.4	7.9	7.7	7.4	7.8	8.1
		Final	7.0	6.2	6.0	6.1	6.2	6.3	6.4
	pH	Initial	7.7	7.9	7.9	7.7	7.6	8.1	8.0
		Final	7.9	7.5	7.4	7.5	7.5	7.6	7.5
	Conductivity (µmhos/cm)	Initial	231	235	235	231	234	–	240
100 %	Temperature (°C)	Initial	24.7	24.8	26.0	24.7	25.2	24.6	24.4
		Final	25.3	25.1	24.8	25.0	24.1	25.0	24.5
	Dissolved O_2 (mg/L)	Initial	8.4	8.3	8.5	8.7	8.3	8.7	8.3
		Final	6.8	6.9	6.4	6.5	6.8	6.8	6.5
	pH	Initial	6.1	6.6	6.4	5.7	5.7	5.7	6.0
		Final	7.0	6.3	5.6	5.8	5.9	6.0	7.0
	Conductivity (µmhos/cm)	Initial	32.3	34.4	38	31.3	31	31.2	36
	Hardness (mg/L as $CaCO_3$)		6	–	–	–	–	–	–

"–" = not measured/not required

[3] ≤100 bubbles/minute

Test Data Reviewed By : EK

Date : 2022-11-18

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75393

SAMPLE IDENTIFICATION

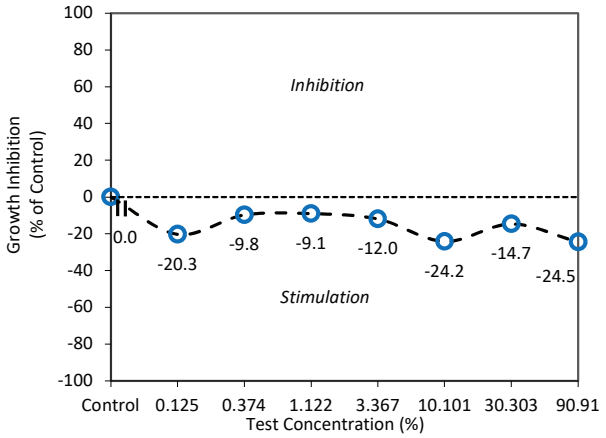
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:00
Substance :	BFR_L1_SW62	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.5 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-24

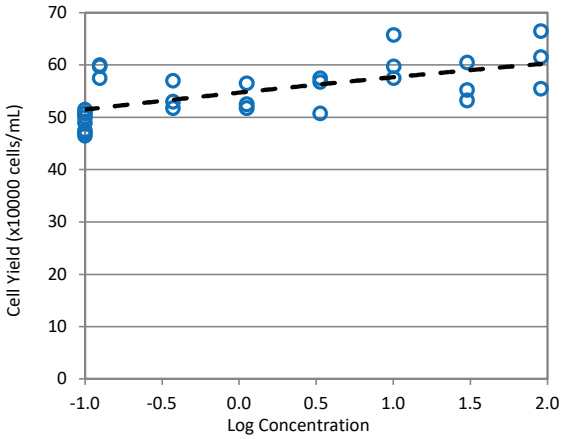
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23
14:55-05:00

Approved By : *Project Manager*

Work Order : 250085
Sample Number : 75393

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G7(I)b
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	10455 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	10 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.4°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.2
Enrichment Medium :	NUT2201 (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	EP	Control pH (at 0 hours) :	6.5
Date Counted :	2022-09-27	Control pH (at 72 hours) :	6.5
Counted By :	EP	Control Increase Factor :	47.9 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	48.0	50.0	52.5	51.8	51.0	48.5	47.5	51.8	49.08	1.92	3.9	–	
0.005	–	–	–	–	–	–	–	–	–	–	–	–	
0.14	–	–	–	–	–	–	–	–	–	–	–	–	
0.042	–	–	–	–	–	–	–	–	–	–	–	–	
0.125	58.5	61.0	60.8	–	–	–	–	–	59.04	1.38	2.3	20.3	*
0.374	58.0	52.8	54.0	–	–	–	–	–	53.87	2.74	5.1	9.8	
1.12	53.5	57.5	52.8	–	–	–	–	–	53.54	2.55	4.8	9.1	
3.37	58.5	51.8	57.8	–	–	–	–	–	54.95	3.70	6.7	12.0	*
10.10	60.8	66.8	58.5	–	–	–	–	–	60.95	4.26	7.0	24.2	*
30.30	54.3	56.3	61.5	–	–	–	–	–	56.29	3.74	6.7	14.7	*
90.91	56.5	62.5	67.5	–	–	–	–	–	61.12	5.51	9.0	24.5	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : EK

"–" = not counted/not required

Date : 2022-11-22

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75394

SAMPLE IDENTIFICATION

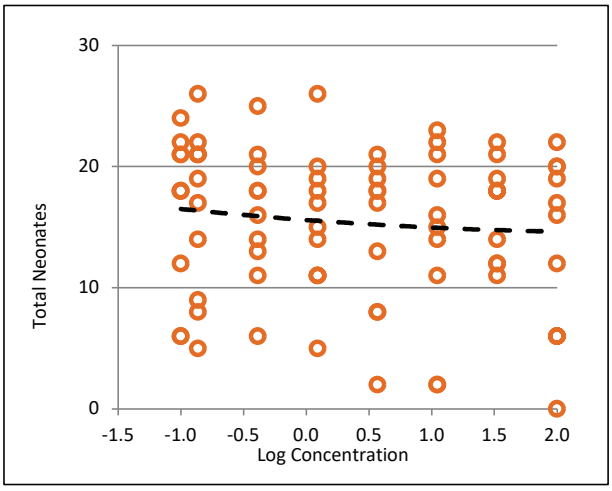
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:30
Substance :	BFR_L1_SW63	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-16

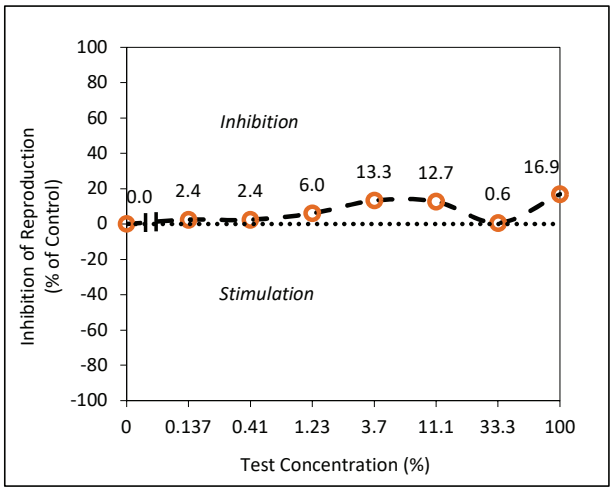
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	>100%	–	–
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
I am approving this document
2022-11-23 15:10-05:00

Project Manager

Work Order : 250085
Sample Number : 75394

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	0% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	24.9 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-148 [1]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[1]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.8 mg/L
Statistical Method :	Untrimmed Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	10	0	0	10
2022-09-20	4	0	0	0	0	10	0	0	10
2022-09-21	5	0	0	0	0	10	0	0	10
2022-09-22	6	0	0	0	0	10	0	0	10
Total Mortality (%) :		**0**	**0**	**0**	**0**	**10**	**0**	**0**	**10**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 250085
Sample Number : 75394

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 19:41
Test Completion Date : 2022-09-22

Control

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	VF
2022-09-19	3	0	3	3	0	0	3	3	0	0	3	1.5	EP
2022-09-20	4	4	2	0	4	0	0	0	0	3	0	1.3	WL
2022-09-21	5	5	7	8	8	6	7	8	3	7	11	7	KK
2022-09-22	6	9	–	10	10	0	8	10	3	8	10	6.8	EP
Total		**18**	**12**	**21**	**22**	**6**	**18**	**21**	**6**	**18**	**24**	**16.6 (±6.4)**	

3.7%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	2	x 0	2	0	2	2	0	0	0.8
2022-09-20	4	2	0	0	0	0	4	2	0	0	3	1.1
2022-09-21	5	4	5	0	7	8	7	13	8	6	0	5.8
2022-09-22	6	2	8	0	11	11	8	0	10	12	5	6.7
Total		**8**	**13**	**2**	**18**	**21**	**19**	**17**	**20**	**18**	**8**	**14.4 (±6.4)**

0.137%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	2	0	3	0	2	2	2	0	1.1
2022-09-20	4	1	5	0	0	0	5	0	0	0	5	1.6
2022-09-21	5	3	7	6	5	10	5	7	4	3	5	5.5
2022-09-22	6	5	10	0	9	13	11	12	11	0	9	8
Total		**9**	**22**	**8**	**14**	**26**	**21**	**21**	**17**	**5**	**19**	**16.2 (±6.9)**

11.11%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	5	0	3	0	2	0	2	0	1.2
2022-09-20	4	3	3	0	3	0	4	3	2	0	0	1.8
2022-09-21	5	5	4	6	5	3	6	6	0	9	2	4.6
2022-09-22	6	6	9	10	14	9	9	0	0	12	0	6.9
Total		**14**	**16**	**21**	**22**	**15**	**19**	**11**	**2**	**23**	**2**	**14.5 (±7.6)**

0.41%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	3	0	0	0	2	0	0	0	0.5
2022-09-20	4	1	3	0	4	2	2	0	4	1	0	1.7
2022-09-21	5	5	5	8	8	7	4	6	0	9	8	6
2022-09-22	6	0	8	10	13	4	5	10	10	10	10	8
Total		**6**	**16**	**21**	**25**	**13**	**11**	**18**	**14**	**20**	**18**	**16.2 (±5.5)**

33.33%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	2	0	0	2	0	0	0.4
2022-09-20	4	4	5	3	4	0	3	0	0	0	3	2.2
2022-09-21	5	8	7	6	4	5	8	6	6	6	8	6.4
2022-09-22	6	0	10	9	10	5	10	12	11	5	3	7.5
Total		**12**	**22**	**18**	**18**	**12**	**21**	**18**	**19**	**11**	**14**	**16.5 (±4.0)**

1.23%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	3	3	4	0	0	0	1
2022-09-20	4	3	0	0	4	0	0	0	0	0	6	1.3
2022-09-21	5	7	5	6	10	8	8	7	4	4	11	7
2022-09-22	6	8	0	13	12	0	0	9	10	11	0	6.3
Total		**18**	**5**	**19**	**26**	**11**	**11**	**20**	**14**	**15**	**17**	**15.6 (±5.8)**

100%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	x 0	0	0	0	3	4	0	0.7
2022-09-20	4	4	6	0	2	3	0	4	0	0	4	2.3
2022-09-21	5	6	7	0	8	0	6	6	7	7	0	4.7
2022-09-22	6	7	6	0	10	3	0	6	10	11	8	6.1
Total		**17**	**19**	**0**	**20**	**6**	**6**	**16**	**20**	**22**	**12**	**13.8 (±7.5)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•No outlying data points were detected according to Grubbs Test[b].

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75394

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		25.5	23.8	26.4	26.0	26.1	26.4
	Dissolved O_2 (mg/L)		8.2	9.4	9.6	9.1	10.1	9.8
	pH		6.3	6.4	5.8	5.9	5.5	6.2
	Conductivity (µmhos/cm)		32	32	32	39	31	34
	Pre-aeration Time (min)[2]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	KK	KK	KP	ET	KK
		Final	KK	VF	KP	ET	ET	EP
Control	Temperature (°C)	Initial	26.4	26.0	26.4	26.4	25.7	25.6
		Final	25.4	25.7	24.7	24.3	25.1	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.6	7.4	6.6	7.4	7.4
		Final	6.8	6.5	7.3	7.4	7.2	7.2
	pH	Initial	8.3	8.3	8.2	6.6	8.1	8.3
		Final	7.9	7.7	8.1	8.0	8.1	7.9
	Conductivity (µmhos/cm)	Initial	463	455	455	459	451	471
0.137 %	Temperature (°C)	Initial	25.3	25.4	26.4	26.4	25.7	26.4
		Final	25.1	25.5	24.6	24.3	24.7	23.8
	Dissolved O_2 (mg/L)	Initial	7.3	7.6	7.4	7.2	7.4	7.4
		Final	6.6	6.1	7.3	7.3	7.3	7.3
	pH	Initial	8.2	8.3	8.2	7.0	8.2	8.3
		Final	7.9	7.8	8.0	7.9	8.1	8.1
	Conductivity (µmhos/cm)	Initial	448	432	457	463	432	479
11.11 %	Temperature (°C)	Initial	25.0	24.9	26.4	26.5	25.5	26.4
		Final	25.2	25.4	24.6	24.4	24.7	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.9	7.5	7.0	7.5	7.4
		Final	6.1	5.6	7.8	7.3	7.2	7.2
	pH	Initial	8.2	8.2	8.2	7.0	8.2	8.3
		Final	7.8	7.7	8.0	7.8	8.1	8.1
	Conductivity (µmhos/cm)	Initial	423	428	452	454	423	468
100 %	Temperature (°C)	Initial	25.0	24.5	26.4	26.1	25.4	26.2
		Final	25.0	25.5	24.6	24.3	24.8	23.9
	Dissolved O_2 (mg/L)	Initial	7.5	8.4	8.7	8.1	8.7	7.9
		Final	7.4	7.0	7.6	7.5	7.1	7.1
	pH	Initial	6.9	6.7	6.4	6.6	6.3	6.8
		Final	7.0	7.2	7.2	6.8	6.7	6.8
	Conductivity (µmhos/cm)	Initial	49	49	45	56	50	52
	Hardness (mg/L as $CaCO_3$)		18	–	–	–	–	–

"–" = not measured/not required
[2] ≤100 bubbles/minute

Test Data Reviewed By : EK
Date : 2022-11-18

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 250085
Sample Number : 75394

SAMPLE IDENTIFICATION

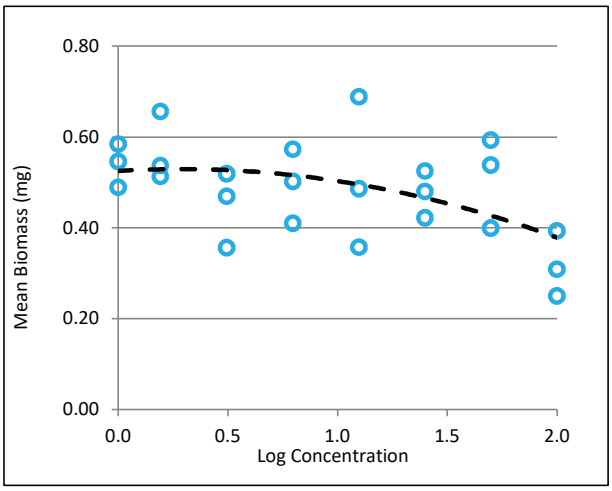
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:30
Substance :	BFR_L1_SW63	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-17

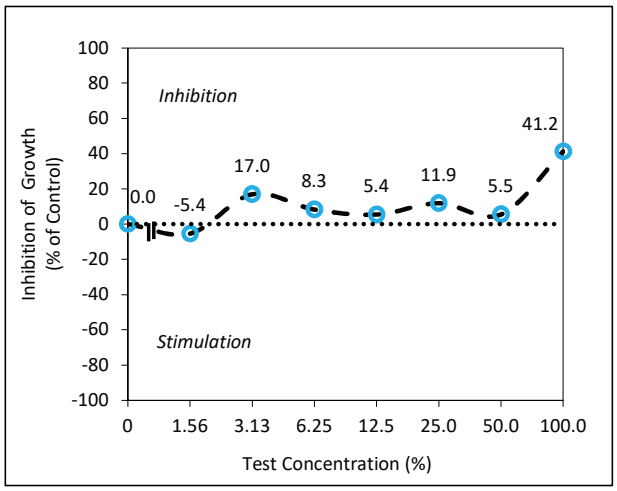
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	74.4%	30.6 - 127%*	Non-Linear Regression (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

*An upper 95% confidence limit greater than 100% is statistically valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
I am approving this document
2022-11-23 15:10-05:00

Project Manager

Work Order : 250085
Sample Number : 75394

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[2]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Work Order : 250085
Sample Number : 75394

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23	2022-09-24
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 19:15
Initiation Date : 2022-09-17
Completion Date : 2022-09-24

Date :		Day 0 2022-09-17		Day 1 2022-09-18		Day 2 2022-09-19		Day 3 2022-09-20		Day 4 2022-09-21		Day 5 2022-09-22		Day 6 2022-09-23		Day 7 2022-09-24		Treatment Mean Mortality (± SD)
Analyst(s):		KK		KK		ET		ET		KK		ET		CD		EP		
Concentration		Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	Number Dead	% Dead	%
%	**Replicate**																	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
3.13	A	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**10.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	2	**20**	2	**20**	(±10.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**13.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	2	**20**	2	**20**	(±11.55)
	C	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	2	**20**	2	**20**	
25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	
50	A	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	3	**30**	3	**30**	3	**30**	**20.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	(±10.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	2	**20**	2	**20**	2	**20**	

Aberrant behaviour or swimming impairment :

- 2022-09-18: One fish in 3.13% replicate B has a kinked tail.
- 2022-09-19: One fish in 6.25% replicate B, and 100% replicate A moving abnormally. One fish in 3.13% replicate B, and 50% replicate B has a kinked tail.
- 2022-09-20: One fish in 6.25% replicate B, and 100% replicate A is moving abnormally. One fish in 3.13% replicate B, and 50% replicate B has a kinked tail.
- 2022-09-21: One fish in 6.25% replicate B moving abnormally. One fish in 3.13% replicate B, and Two fish in 12.5% replicate B have kinked tails. Fish with kinked tail in 3.13%, and 100% replicate A showing loss of equilibrium.
- 2022-09-22: One fish in 6.25% replicate B moving abnormally. One fish in 3.13% replicate B, and 12.5% replicate B has a kinked tail. Fish with kinked tail in 3.13% showing loss of equilibrium.

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75394

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.489	0.540	0.048
	B	10	0.546		
	C	10	0.584		
1.56	A	10	0.513	0.569	0.077
	B	10	0.656		
	C	10	0.537		
3.13	A	10	0.469	0.448	0.084
	B	10	0.519		
	C	10	0.356		
6.25	A	10	0.410	0.495	0.082
	B	10	0.573		
	C	10	0.502		
12.5	A	10	0.688	0.510	0.167
	B	10	0.357		
	C	10	0.486		
25	A	10	0.480	0.476	0.052
	B	10	0.525		
	C	10	0.422		
50	A	10	0.538	0.510	0.100
	B	10	0.399		
	C	10	0.593		
100	A	10	0.250	0.317	0.072
	B	10	0.393		
	C	10	0.309		

NOTES : •No outlying data points were detected according to Grubbs Test (CETIS)[a].

• Control average dry weight per surviving organism = 0.540 mg

Test Data Reviewed By : EK
Date : 2022-11-18

Work Order : 250085
Sample Number : 75394

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-17	Day 1 - 2 2022-09-18	Day 2 - 3 2022-09-19	Day 3 - 4 2022-09-20	Day 4 - 5 2022-09-21	Day 5 - 6 2022-09-22	Day 6 - 7 2022-09-23
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		23.8	26.4	25.3	26.1	25.1	24.3	24.8
	Dissolved O_2 (mg/L)		9.4	9.6	10.8	10.1	10.4	10.3	10.9
	pH		6.4	5.8	6.4	5.5	5.8	5.6	5.5
	Conductivity (µmhos/cm)		32	32	31	31	31	30	31
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	VF	EP	ET	WL	KP	ET
		Final	KK	ET	ET	KK	ET	CD	EP
Control	Temperature (°C)	Initial	25.1	26.2	25.5	24.2	25.2	25.4	26.4
		Final	25.3	25.0	24.7	25.1	24.8	25.2	24.8
	Dissolved O_2 (mg/L)	Initial	7.7	7.8	8.0	7.7	7.2	7.1	7.8
		Final	6.9	6.7	6.6	6.3	6.4	6.8	7.0
	pH	Initial	7.5	7.9	7.7	7.7	7.6	7.5	8.2
		Final	7.7	7.6	7.7	7.5	7.6	7.6	7.1
	Conductivity (µmhos/cm)	Initial	257	262	259	255	260	262	271
1.56 %	Temperature (°C)	Initial	24.9	24.9	25.5	24.5	25.2	24.2	25.6
		Final	25.4	25.1	24.8	25.2	24.8	25.1	24.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.2	7.9	7.6	7.3	7.6	7.8
		Final	6.7	6.2	6.5	6.3	6.1	6.5	6.5
	pH	Initial	7.6	7.7	7.8	7.8	7.5	7.6	8.2
		Final	7.8	7.4	7.7	7.6	7.5	7.6	7.3
	Conductivity (µmhos/cm)	Initial	252	254	267	255	257	250	271
12.5%	Temperature (°C)	Initial	24.9	25.0	25.6	24.5	25.2	24.3	25.5
		Final	25.4	25.1	24.9	25.2	24.9	25.1	25.7
	Dissolved O_2 (mg/L)	Initial	7.6	7.2	8.0	7.7	7.4	7.7	7.8
		Final	6.9	6.6	6.2	6.1	6.1	6.9	6.5
	pH	Initial	7.5	7.7	7.9	7.7	7.6	7.6	8.1
		Final	7.8	7.4	7.6	7.5	7.5	7.6	7.4
	Conductivity (µmhos/cm)	Initial	229	231	234	230	233	227	244
100 %	Temperature (°C)	Initial	24.7	25.5	26.2	24.4	25.2	24.7	25.2
		Final	25.5	25.1	25.0	25.3	24.9	25.1	24.7
	Dissolved O_2 (mg/L)	Initial	8.3	7.9	8.6	8.7	8.3	8.8	8.7
		Final	6.7	6.7	6.4	6.4	6.1	6.9	6.7
	pH	Initial	6.1	6.1	6.7	6.0	6.3	5.9	6.1
		Final	7.0	6.2	6.0	5.9	5.8	5.9	6.8
	Conductivity (µmhos/cm)	Initial	31.5	36.7	37	32	32	32	33
	Hardness (mg/L as $CaCO_3$)		18	–	–	–	–	–	–

"–" = not measured/not required

[3] ≤100 bubbles/minute

Test Data Reviewed By : EK

Date : 2022-11-18

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75394

SAMPLE IDENTIFICATION

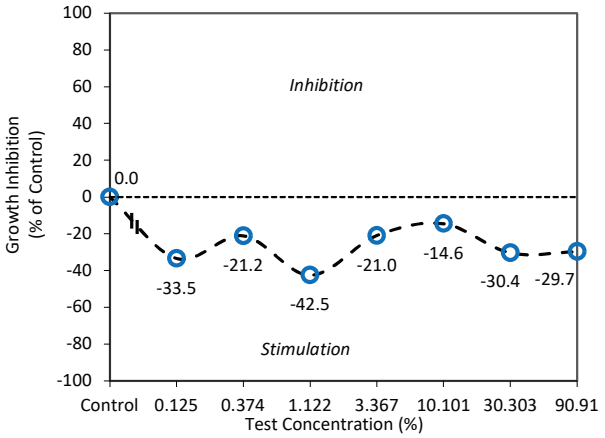
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	18:30
Substance :	BFR_L1_SW63	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.9 °C
Sample Description :	Clear, pale brown	Date Tested :	2022-09-24

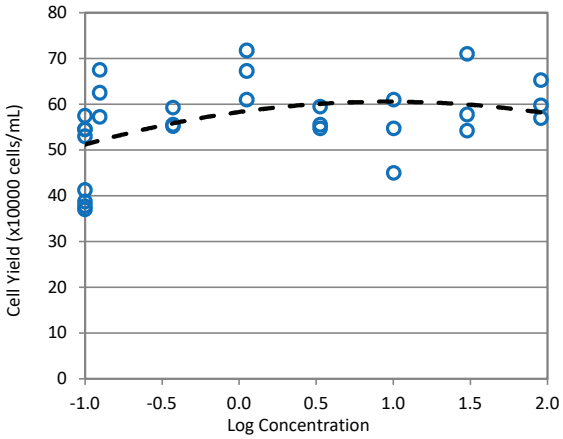
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23
15:11-05:00

Approved By : *Project Manager*

Work Order : 250085
Sample Number : 75394

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G7(l)b
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	10455 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	15 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.4°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.5
Enrichment Medium :	NUT2201 (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	EP	Control pH (at 0 hours) :	6.5
Date Counted :	2022-09-27	Control pH (at 72 hours) :	6.5
Counted By :	EP	Control Increase Factor :	45.7 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL) Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
%	1	2	3	4	7	8	9	10					
Control	55.5	58.5	42.3	38.8	38.0	39.8	54.0	55.5	46.74	8.82	18.9	–	
0.005	–	–	–	–	–	–	–	–	–	–	–	–	
0.014	–	–	–	–	–	–	–	–	–	–	–	–	
0.042	–	–	–	–	–	–	–	–	–	–	–	–	
0.125	68.5	63.5	58.3	–	–	–	–	–	62.37	5.13	8.2	33.5	*
0.374	60.3	56.5	56.3	–	–	–	–	–	56.62	2.24	4.0	21.2	
1.12	68.3	72.8	62.0	–	–	–	–	–	66.62	5.40	8.1	42.5	*
3.37	56.5	60.5	55.8	–	–	–	–	–	56.54	2.55	4.5	21.0	
10.10	62.0	55.8	46.0	–	–	–	–	–	53.54	8.06	15.1	14.6	
30.30	55.3	58.8	72.0	–	–	–	–	–	60.95	8.84	14.5	30.4	*
90.91	60.8	58.0	66.3	–	–	–	–	–	60.62	4.20	6.9	29.7	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : EK(Aquatox)

"–" = not counted/not required

Date : 2022-11-22

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 250085
Sample Number : 75395

SAMPLE IDENTIFICATION

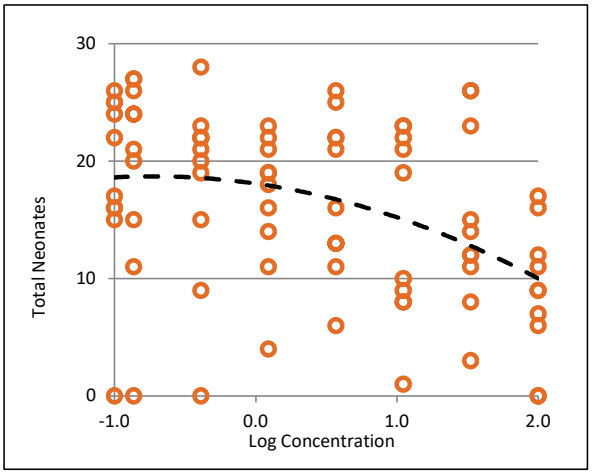
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	19:00
Substance :	BFR_L1_SW64	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.8 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-16

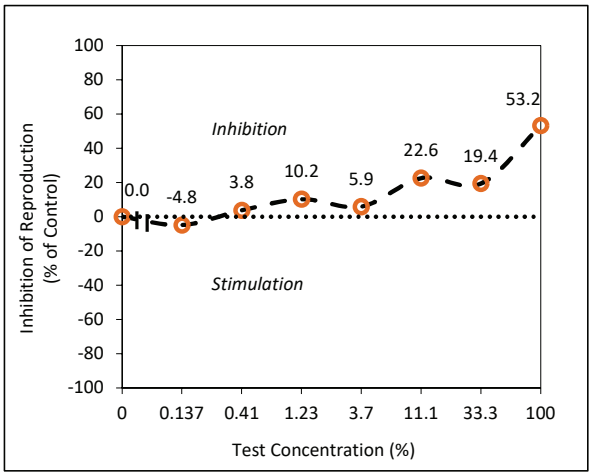
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	38.3%	0.40 - 55.0%	Linear Interpolation (CETIS)[a]
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, since a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (CETIS)[a]. In test concentrations where hormesis was observed (0.137%), data were replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2005).

Approved By : Sarah Costantini
I am approving this document
2022-11-23 15:34-05:00

Project Manager

Work Order : 250085
Sample Number : 75395

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	<24 h; within 12 h of one another
Organism Origin :	Single in-house mass culture	Mean Brood Organism Mortality :	0% (previous 7 days)
Test Organism Origin :	Individual in-house cultures	Average Total Neonates :	24.1 (first three broods)
Ephippia in Culture :	None	Average Neonates :	≥8 (3rd or subsequent brood)

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	CD22-148 [1]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	17 mL polystyrene cylinder
Sample Filtration :	None	Depth of Test Solution :	4.5 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

[1]Reconstituted/Dechlorinated Municipal Drinking Water, and Distilled Water (no additional chemicals)

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	8.25 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	7.23 - 9.41 mg/L
Test Duration :	3 broods	Historical Mean LC50 :	6.80 mg/L
Statistical Method :	Untrimmed Spearman-Kärber	Warning Limits (± 2SD) :	4.17 - 11.10 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.137**	**0.41**	**1.23**	**3.7**	**11.11**	**33.33**	**100**
2022-09-17	1	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0
2022-09-20	4	0	0	0	0	0	0	0	0
2022-09-21	5	0	0	0	0	10	0	0	0
2022-09-22	6	0	0	0	0	10	0	0	0
Total Mortality (%) :		**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0**

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 250085
Sample Number : 75395

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2022-09-16
Initiated By : CD
Initiation Time : 19:48
Test Completion Date : 2022-09-22

Control

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0	KF
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0	VF
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0	EP
2022-09-20	4	5	4	6	5	4	4	6	6	5	0	4.5	KK
2022-09-21	5	8	7	4	0	7	8	8	10	5	0	5.7	EP
2022-09-22	6	12	5	7	10	15	10	11	0	14	0	8.4	EP
Total		**25**	**16**	**17**	**15**	**26**	**22**	**25**	**16**	**24**	**0[2]**	**18.6 (±7.8)**	

3.7%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	6	0	6	6	4	3	5	5	3	4	4.2
2022-09-21	5	10	5	5	x 0	8	8	3	7	10	8	6.4
2022-09-22	6	10	11	0	0	13	11	13	10	0	1	6.9
Total		**26**	**16**	**11**	**6**	**25**	**22**	**21**	**22**	**13**	**13**	**17.5 (±6.7)**

0.137%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	3	6	0	6	5	5	4	0	6	3.9
2022-09-21	5	6	4	6	0	8	9	7	5	0	7	5.2
2022-09-22	6	10	8	14	11	13	10	12	12	0	14	10.4
Total		**20**	**15**	**26**	**11**	**27**	**24**	**24**	**21**	**0[2]**	**27**	**19.5 (±8.6)**

11.11%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	5	1	4	5	6	3	4	3	0	3	3.4
2022-09-21	5	10	0	4	7	5	4	8	6	5	7	5.6
2022-09-22	6	8	0	0	10	10	12	11	0	3	0	5.4
Total		**23**	**1**	**8**	**22**	**21**	**19**	**23**	**9**	**8**	**10**	**14.4 (±8.0)**

0.41%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	5	4	4	6	4	1	2	5	0	5	3.6
2022-09-21	5	6	5	5	9	5	7	8	6	0	8	5.9
2022-09-22	6	11	13	0	13	12	7	10	8	0	10	8.4
Total		**22**	**22**	**9**	**28**	**21**	**15**	**20**	**19**	**0[2]**	**23**	**17.9 (±8.1)**

33.33%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	6	3	3	6	4	3	4	5	4	4.2
2022-09-21	5	4	0	8	0	7	6	0	8	7	3	4.3
2022-09-22	6	0	8	0	0	13	16	12	0	0	16	6.5
Total		**8**	**14**	**11**	**3**	**26**	**26**	**15**	**12**	**12**	**23**	**15.0 (±7.7)**

1.23%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	3	3	4	4	3	4	4	6	2	3	3.6
2022-09-21	5	7	7	7	2	3	8	7	9	2	4	5.6
2022-09-22	6	11	8	3	10	13	11	11	4	0	4	7.5
Total		**21**	**18**	**14**	**16**	**19**	**23**	**22**	**19**	**4[2]**	**11**	**16.7 (±5.8)**

100%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2022-09-17	1	0	0	0	0	0	0	0	0	0	0	0
2022-09-18	2	0	0	0	0	0	0	0	0	0	0	0
2022-09-19	3	0	0	0	0	0	0	0	0	0	0	0
2022-09-20	4	4	4	4	5	5	5	0	5	4	0	3.6
2022-09-21	5	3	2	5	4	2	0	0	3	5	0	2.4
2022-09-22	6	0	0	0	7	5	4	0	9	2	0	2.7
Total		**7**	**6**	**9**	**16**	**12**	**9**	**0**	**17**	**11**	**0**	**8.7 (±5.8)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[2] Outlier according to Grubbs Test[b] . Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– =4th brood (see 'NOTES')

Test Data Reviewed By : EK
Date : 2022-11-22

Work Order : 250085
Sample Number : 75395

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2022-09-16	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		25.5	24.2	26.3	26.1	26.2	26.3
	Dissolved O_2 (mg/L)		8.3	9.6	9.8	9.9	10.0	10.0
	pH		6.5	5.8	5.6	5.6	5.5	5.9
	Conductivity (µmhos/cm)		32	30	32	34	31	33
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s)	Initial	KP	KK	KK	KP	ET	ET
		Final	KK	VF	KP	ET	ET	EP
Control	Temperature (°C)	Initial	26.4	26.0	26.4	26.3	25.7	25.6
		Final	25.1	25.7	24.7	24.4	24.6	23.6
	Dissolved O_2 (mg/L)	Initial	7.5	7.6	7.4	7.7	7.4	7.4
		Final	6.7	6.1	7.3	7.3	7.3	7.8
	pH	Initial	8.3	8.3	8.2	8.3	8.1	8.3
		Final	7.9	7.9	8.1	8.1	8.1	8.1
	Conductivity (µmhos/cm)	Initial	463	455	455	459	451	471
0.137 %	Temperature (°C)	Initial	24.7	25.9	26.4	25.8	25.7	25.5
		Final	25.1	25.5	24.4	24.4	24.6	23.8
	Dissolved O_2 (mg/L)	Initial	7.4	7.6	7.5	7.6	7.4	7.3
		Final	6.7	5.6	7.2	7.4	7.0	7.1
	pH	Initial	8.0	8.2	8.2	8.2	8.2	8.3
		Final	7.8	7.8	8.0	8.1	8.0	8.1
	Conductivity (µmhos/cm)	Initial	444	450	459	456	446	468
3.7%	Temperature (°C)	Initial	24.9	25.6	26.4	25.9	26.1	25.3
		Final	25.1	25.5	24.2	24.3	24.4	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	7.7	7.5	7.7	7.4	7.2
		Final	6.2	5.8	7.3	7.4	7.0	7.1
	pH	Initial	8.2	8.3	8.2	8.2	8.2	8.2
		Final	7.8	7.8	7.9	8.1	8.0	8.1
	Conductivity (µmhos/cm)	Initial	414	442	450	444	432	436
100 %	Temperature (°C)	Initial	24.9	24.9	26.4	25.8	24.9	25.4
		Final	25.1	25.7	24.2	24.5	24.7	23.8
	Dissolved O_2 (mg/L)	Initial	7.5	8.4	8.6	8.6	8.5	8.1
		Final	7.3	6.9	7.5	7.2	6.9	7.3
	pH	Initial	7.5	6.9	6.7	7.0	6.7	6.9
		Final	7.0	7.8	7.2	7.1	6.7	7.6
	Conductivity (µmhos/cm)	Initial	39.8	50	48	56.2	52.5	57
	Hardness (mg/L as $CaCO_3$)		8	–	–	–	–	–

"–" = not measured/not required
[3] ≤100 bubbles/minute

Test Data Reviewed By : EK
Date : 2022-11-22

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead Minnow
EPS 1/RM/22

Work Order : 750085
Sample Number : 75395

SAMPLE IDENTIFICATION

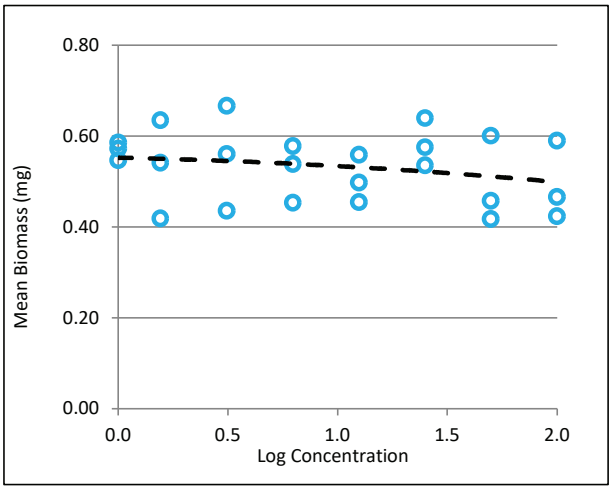
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	19:00
Substance :	BFR_L1_SW64	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.8 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-17

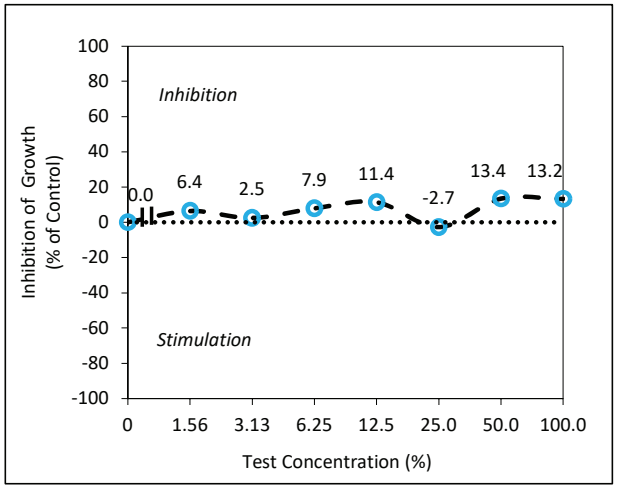
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	>100%	–	–
LC50	>100%	–	–

The results reported relate only to the sample tested and as received.





COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

[1]as a measure of Growth

•All test validity criteria as specified in the test method cited above were satisfied.

Approved By : Sarah Costantini
I am approving this document
2022-11-23 15:34-05:00

Project Manager

Work Order : 750085
Sample Number : 75395

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.6 % (previous 7 days)
Organism Batch :	FH0621/0122	Organism Age :	< 24 hours at test initiation
Source :	A.B.S. Inc., Colorado USA		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Dechlorinated municipal water[2]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	533 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	1000 mL polypropylene cylinder
Sample Filtration :	None	Depth of Test Solution :	7.9 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	Yes (see 'COMMENTS')

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Phenol	LC50 :	20.14 mg/L
Date Tested :	2022-09-22	95% Confidence Limits :	16.77 - 24.20 mg/L
Test Duration :	7 days	Historical Mean LC50 :	23.38 mg/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	15.00 - 36.44 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2019. V.1.9.6.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 750085
Sample Number : 75395

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2022-09-17	2022-09-18	2022-09-19	2022-09-20	2022-09-21	2022-09-22	2022-09-23	2022-09-24
Mortality/Impairment :	0.00%	0.00%	0.00%	3.33%	3.33%	3.33%	3.33%	3.33%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±5.8)	(±5.8)	(±5.8)	(±5.8)	(±5.8)

CUMULATIVE DAILY MORTALITY

Initiation Time : 16:30
Initiation Date : 2022-09-17
Completion Date : 2022-09-24

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment Mean Mortality (± SD)
Date :		2022-09-17		2022-09-18		2022-09-19		2022-09-20		2022-09-21		2022-09-22		2022-09-23		2022-09-24		
Analyst(s):		KK		VF		ET		SO		SO		KK		CD		EP		
Concentration		Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	Number Dead	**% Dead**	**%**
%	**Replicate**																	
Control	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
3.13	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	**6.67**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	
6.25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	
12.5	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
25	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	
50	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	

Aberrant behaviour or swimming impairment :

- 2022-09-19 - 2022-09-20: One fish in 3.13% replicate C with a kinked tail.
- 2022-09-20 - 2022-09-24: Control fish in replicate C exhibiting loss of equilibrium.
- 2022-09-21: One fish in 50% replicate B exhibiting loss of equilibrium.

Test Data Reviewed By : EK
Date : 2022-11-22

Work Order : 750085
Sample Number : 75395

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.586	0.569	0.020
	B	10	0.573		
	C	10	0.547		
1.56	A	10	0.419	0.532	0.108
	B	10	0.542		
	C	10	0.635		
3.13	A	10	0.561	0.555	0.116
	B	10	0.667		
	C	10	0.436		
6.25	A	10	0.578	0.524	0.063
	B	10	0.539		
	C	10	0.454		
12.5	A	10	0.455	0.504	0.052
	B	10	0.559		
	C	10	0.498		
25	A	10	0.576	0.584	0.052
	B	10	0.640		
	C	10	0.536		
50	A	10	0.418	0.492	0.096
	B	10	0.458		
	C	10	0.601		
100	A	10	0.466	0.493	0.086
	B	10	0.590		
	C	10	0.424		

NOTES : •No outlying data points were detected according to Grubbs Test[b].

• Control average dry weight per surviving organism = 0.569 mg

Test Data Reviewed By : EK
Date : 2022-11-22

Work Order : 750085
Sample Number : 75395

WATER CHEMISTRY DATA

			Day 0 - 1 2022-09-17	Day 1 - 2 2022-09-18	Day 2 - 3 2022-09-19	Day 3 - 4 2022-09-20	Day 4 - 5 2022-09-21	Day 5 - 6 2022-09-22	Day 6 - 7 2022-09-23
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		24.2	26.3	25.5	26.2	25.1	26.1	24.4
	Dissolved O_2 (mg/L)		9.6	9.8	10.5	10.0	10.4	9.9	11.1
	pH		5.8	5.6	5.4	5.5	5.7	5.3	5.6
	Conductivity (µmhos/cm)		30	32	32	31	31	31	30
	Pre-aeration Time (min)[3]		≤20	≤20	≤20	≤20	≤20	≤20	≤20
	Analyst(s) :	Initial	KP	VF	EP	ET	WL	KP	ET
		Final	VF	ET	SO	SO	KK	CD	EP
Control	Temperature (°C)	Initial	25.3	26.2	25.5	25.8	25.2	25.4	26.4
		Final	25.3	25.1	24.8	25.0	24.1	25.0	24.3
	Dissolved O_2 (mg/L)	Initial	7.4	7.8	8.0	8.1	7.2	7.1	7.8
		Final	6.8	6.8	6.6	6.4	6.7	6.5	6.3
	pH	Initial	7.7	7.8	7.7	7.3	7.6	7.5	8.2
		Final	7.6	7.6	7.6	7.6	7.6	7.5	7.6
	Conductivity (µmhos/cm)	Initial	259	262	259	264	260	262	281
1.56 %	Temperature (°C)	Initial	25.1	25.0	25.4	25.6	25.2	24.0	25.4
		Final	25.3	25.0	24.8	24.9	24.1	25.0	26.1
	Dissolved O_2 (mg/L)	Initial	7.6	7.3	8.0	8.2	7.4	7.6	7.9
		Final	6.8	6.7	6.1	6.7	6.3	6.4	6.0
	pH	Initial	7.8	7.6	7.8	7.5	7.6	7.6	8.2
		Final	7.7	7.5	7.4	7.7	7.5	7.5	7.6
	Conductivity (µmhos/cm)	Initial	253	253	258	260	257	250	270
12.5%	Temperature (°C)	Initial	25.0	25.0	25.5	25.7	25.2	24.1	25..2
		Final	25.2	25.0	24.8	24.9	24.0	25.0	25.0
	Dissolved O_2 (mg/L)	Initial	7.7	7.2	8.0	7.6	7.4	7.6	8.1
		Final	6.9	6.9	6.1	6.2	6.4	6.6	5.8
	pH	Initial	7.8	7.6	7.8	8.2	7.6	7.6	8.1
		Final	7.8	7.5	7.4	7.5	7.5	7.5	7.5
	Conductivity (µmhos/cm)	Initial	230	232	232	236	234	227	243
100 %	Temperature (°C)	Initial	24.5	25.4	26.2	25.1	25.2	24.9	25.3
		Final	25.3	24.9	24.8	24.9	24.0	24.9	24.8
	Dissolved O_2 (mg/L)	Initial	8.4	7.8	8.7	8.6	8.4	8.4	8.8
		Final	6.9	7.2	6.4	6.6	6.9	6.6	7.9
	pH	Initial	6.1	6.1	7.0	5.8	6.0	5.8	6.3
		Final	7.9	5.9	5.7	5.7	6.1	5.9	7.0
	Conductivity (µmhos/cm)	Initial	31.7	36.5	37	32	36	32.2	32
	Hardness (mg/L as $CaCO_3$)		8	–	–	–	–	–	–

"–" = not measured/not required

[3] ≤100 bubbles/minute

Test Data Reviewed By : EK

Date : 2022-11-22

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 250085
Sample Number : 75395

SAMPLE IDENTIFICATION

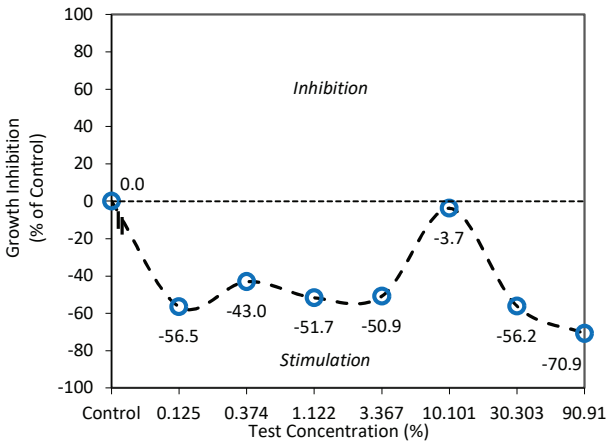
Company :	Golder Associates Ltd., Ottawa	Sample Date :	2022-09-12
Location :	Ottawa ON	Time Collected :	19:00
Substance :	BFR_L1_SW64	Date Received :	2022-09-16
Sampling Method :	Grab	Time Received :	11:00
Sampled By :	P. Chevrette	Temperature at Receipt :	20.8 °C
Sample Description :	Clear, brown	Date Tested :	2022-09-24

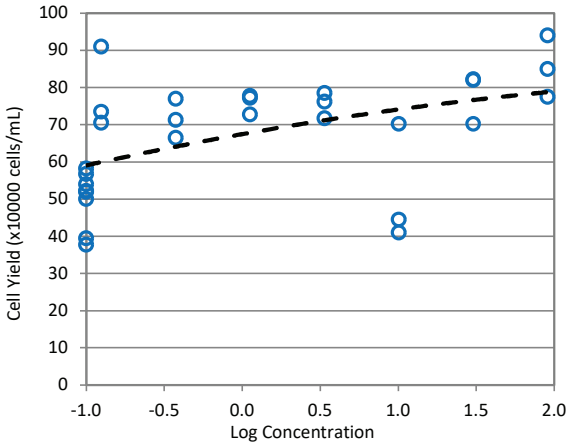
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Phenol	IC25 Growth :	52.47 mg/L
Date Tested :	2022-09-26	95% Confidence Limits :	45.83 - 60.40 mg/L
Test Duration :	72 hours	Historical Mean IC25 :	54.33 mg/L
Statistical Method :	Linear Interpolation	Warning Limits (± 2SD) :	26.16 - 112.84 mg/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•Noted Deviation(s): The maximum sample holding time of 3 days allowed by the test method was exceeded. The sample was tested with the client's consent. There were no other unusual conditions or deviations from the test method, and the test is considered to be valid.

•Testing was conducted at Nautilus Environmental Company Inc., Point Edward, ON, N7V 1X4

•All test validity criteria as specified in the test method cited above were satisfied.

Sarah Costantini
I am approving this document
2022-11-23 15:34-05:00

Approved By : *Project Manager*

Work Order : 250085
Sample Number : 75395

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	G7(l)b
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	10455 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	28 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	4 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.4°C (± 0.1)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	3600-4400 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.6
Enrichment Medium :	NUT2201 (EDTA not reduced)	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	Yes (see 'COMMENTS')

CELL COUNTS AT 72-HOURS

Initiated By :	EP	Control pH (at 0 hours) :	6.8
Date Counted :	2022-09-27	Control pH (at 72 hours) :	6.8
Counted By :	EP	Control Increase Factor :	48.8 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL) Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
%	1	2	3	4	7	8	9	10					
Control	53.3	51.0	38.8	40.5	53.0	57.8	55.0	59.3	50.02	7.55	15.1	–	
0.005	–	–	–	–	–	–	–	–	–	–	–	–	
0.014	–	–	–	–	–	–	–	–	–	–	–	–	
0.042	–	–	–	–	–	–	–	–	–	–	–	–	
0.125	71.5	74.5	92.0	–	–	–	–	–	78.29	11.07	14.1	56.5	*
0.374	78.0	72.3	67.5	–	–	–	–	–	71.54	5.26	7.3	43.0	*
1.12	73.8	78.3	78.8	–	–	–	–	–	75.87	2.75	3.6	51.7	*
3.37	77.3	79.5	72.8	–	–	–	–	–	75.45	3.44	4.6	50.9	*
10.10	42.0	45.5	71.3	–	–	–	–	–	51.87	15.97	30.8	3.7	
30.30	83.0	71.3	83.3	–	–	–	–	–	78.12	6.86	8.8	56.2	*
90.91	95.0	78.5	86.0	–	–	–	–	–	85.45	8.26	9.7	70.9	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)[a], (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

Test Data Reviewed By : EK (Aquatox)

"–" = not counted/not required

Date : 2022-11-22

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: **250085**

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 162706160 22
Field Sampler Name (print): Philipe Chevrette
Signature: Philipe Chevrette
Affiliation: WSP - Golder
Sample Storage (prior to shipping): On Ice
Custody Relinquished by: Philipe Chevrette
Date/Time Shipped: 2022-09-13

Client: WSP - Golder
1931 Robertson Road
Nepean
Ontario

Phone: (613) 592-9600
Fax:
Contact: James Doyle (james.doyle@wsp.com)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2022-09-12	17:00	BFR_L1_SW58	75389	20.9					✔	✔		✔		✔		4x8L
2022-09-12	17:30	BFR_L1_SW59	75390	20.5					✔	✔		✔		✔		4x8L
2022-09-12	15:00	BFR_L1_SW60	75391	20.2					✔	✔		✔		✔		4x8L
2022-09-12	15:30	BFR_L1_SW61	75392	20.7					✔	✔		✔		✔		4x8L
2022-09-12	18:00	BFR_L1_SW62	75393	20.5					✔	✔		✔		✔		4x8L
2022-09-12	18:30	BFR_L1_SW63	75394	20.9					✔	✔		✔		✔		4x8L
2022-09-12	19:00	BFR_L1_SW64	75395	20.8					✔	✔		✔		✔		4x8L

For Lab Use Only
Received By: Nautilus, Point Edward
Date: 2022-09-16
Time: 11:00
Storage Location:
Storage Temp.(°C): 4+-2 degrees C

Please list any special requests or instructions:

No Gen chem required
Testing conducted at Nautilus, Point Edward ON

APPENDIX E

NCSCS

CCME National Classification System for Contaminated Sites (2008) version 1.3
Pre-Screening Checklist

Question	Response (yes / no)	Comment
1. Are **Radioactive material**, **Bacterial contamination** or **Biological hazards** likely to be present at the site?	No	If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately.
2. Are there **no contamination exceedances** (known or suspected)? Determination of exceedances may be based on: 1) CCME environmental quality guidelines; 2) equivalent provincial guidelines/standards if no CCME guideline exists for a specific chemical in a relevant medium; or 3) toxicity benchmarks derived from the literature for chemicals not covered by CCME or provincial guidelines/standards; or 4) background concentration.	No	If yes (*i.e.* , there are no exceedances), do not proceed through the NCSCS.
3. Have **partial/incompleted or no environmental site investigations** been conducted for the Site?	No	If yes, do not proceed through the NCSCS.
4. Is there direct and significant evidence of **impacts to humans** at the site, or off-site due to migration of contaminants from the site?	No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated.
5. Is there direct and significant evidence of **impacts to ecological receptors** at the site, or off-site due to migration of contaminants from the site?	No	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are considered to be severe, the site may be categorized as Class 1, regardless of the numerical total NCSCS score. For the purpose of application of the NCSCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction.
6. Are there indicators of significant **adverse effects in the exposure zone** (*i.e* ., the zone in which receptors may come into contact with contaminants)? Some examples are as follows: -Hydrocarbon sheen or NAPL in the exposure zone -Severely stressed biota or devoid of biota; -Presence of material at ground surface or sediment with suspected high concentration of contaminants such as ore tailings, sandblasting grit, slag, and coal tar.	No	To answer “yes”, two scenarios should be satisfied; (1) there has to be a high probability that receptors will be exposed to the contaminant source in the near future, and (2) the predicted impacts to ecological receptors after exposure must be significant (see question 5). A low probability of exposure resulting in significant impacts, or a high probability of exposure but with only low to moderate effects expected should not result in a Class 1 designation, neither would a low probability of exposure resulting in low-to-moderate effects. If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated.
7. Do measured concentrations of volatiles or unexploded ordnances represent an **explosion hazard**?	No	If yes, do not proceed through the NCSCS. Do not continue until the safety risks have been addressed. Consult your jurisdiction's occupational health and safety guidance or legislation on exposive hazards and measurement of lower explosive limits.

CCME National Classification System for Contaminated Sites (2008) version 1.3
Pre-Screening Checklist

Rationale for not proceeding with NCSCS **(document any assumptions, reports, or site-specific information to support selection of "Yes" in Pre-Screening checklist)**

If none of the above applies, proceed with the NCSCS scoring.

CCME National Classification System for Contaminated Sites (2008) version 1.3
Summary of Site Conditions

Site:	Site will be identified by:	Site Common Name
Civic Address: *(or other description of location)*	Reach Road, Burgeo, NL	
Site Common Name: *(if applicable)*	Burgeo Range	
Code identifier: *(e.g., FCSI 8-digit identifier)*		
Site Owner or Custodian: *(Organization and Contact Person)*	Department of National Defence	
Legal description *or* metes and bounds:	Burgeo Range is located on the east and west side of Reach Road (Route 480), aproximately 3.5 km north of the Town of Burgeo.	
Approximate Site area:	638 Ha	
Parcel Identifier(s) [PID]: *(or Parcel Identification Numbers [PIN] if untitled Crown land)*		
Centre of site: *(provide latitude/longitude or UTM coordinates)*	Latitude:_____ degrees _____ min _____ secs; Longitude:_____ degrees _____ min _____ secs	
	UTM Coordinate: Northing 5277505.16 Easting 452616.85	
Site Land Use:	Current:	Agricultural
	Proposed:	Agricultural
Site Plan	**To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.**	
Provide a brief description of the Site:	The Burgeo Range - Location 1 - is located on the east side of Reach Road (Route 480), aproximately 3.5 km north of the Town of Burgeo. There is a small, approximately 200 m long, gravel access road on the far west side of the Site extending from Reach Road. There are "No Trespassing" and "Range Closed" signs present at the entrance to the Range. A second location (Location 2), near Location 1 but across the road, was also been used as a firing range by 5CRPG. The Site has a total approximate area of 638 Ha (319 Ha in Location 1 and 319 Ha in Location 2) and is an open area comprised mostly of boggy terrain with exposed bedrock outcrops and several waterbodies. There are no buildings or structures onsite.	

CCME National Classification System for Contaminated Sites (2008) version 1.3
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	Soil - PHCs, PAHs, metals Sediment - PHCs, PAHs, metals Surface water - PHCs, PAHs, metals Groundwater - PHCs, PAHs, metals

Please fill in the "letter" that best describes the level of information available for the site being assessed

Site Letter Grade **C**

If letter grade is F, <u>do not</u> continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent

Scoring Completed By:	WSP Canada Inc.
Date Scoring Completed:	23-Feb-23

CCME National Classification System for Contaminated Sites (2008) version 1.3
User's Guide - Instructions

1) Please review the following overview of contents. The revised CCME National Classification System for Contaminated Sites (NCSCS) consists of a pre-screening checklist, summary of site conditions, summary score sheet, and three instruction/worksheet pages for the user to fill out: Contaminant Characteristics, Migration Potential and Exposure. For ease of printing, the method of evaluation for scoring each section of the worksheet is provided in a separate Instructions tab. Reference material is also provided to assist with the evaluation. A brief description of each sheet is as follows:

Pre-Screening Checklist - Used to determine if the Site can either be considered a Class 1 site (to be remediated immediately) or if more information must be collected before the Site can be classified, or other hazards exist at the Site that must be addressed first before the Site can be classified using the revised NCSCS.

Site Description Sheet - Summarizes Site information. It also indicates the level of information available (Site Letter Grade) for the site to conduct the NCSCS scoring evaluation. The known/potential contaminants of concern and affected media will also be summarized here.

Contaminant Characteristics Instructions & Worksheet - Prompts the user for information related to the contaminants of potential concern (COPC) found at the site.

Migration Potential Instructions & Worksheet - Prompts the user for information related to physical transport processes which may move contamination to neighboring sites or re-distribute contamination within a site. Migration potential includes many of the exposure pathways, but is not limited to exposure pathways. Migration potential does not require clearly defined receptors.

Exposure Instructions & Worksheet - Prompts the user for information related to exposure pathways and receptors which may be located on the site.

Summary Score Sheet - Generates a total site score by adding up the scores generated on each of the three worksheets and provides the corresponding Site Classification. It also provides an estimate of certainty in the score provided (Certainty Percentage).

Reference Material - Additional information which may be useful to refer to when conducting the evaluation.
- Contaminant Hazard Ranking
- Examples of Persistent Substances
- Examples of Substances in the Various Chemical Classes
- Chemical-specific Properties
- Range of Values of Hydraulic Conductivity and Permeability

The worksheet titles and sub headings are as follows.

I. Contaminant Characteristics

1. Residency Media
2. Chemical Hazard
3. Contaminant Exceedance Factor
4. Contaminant Quantity
5. Modifying Factors

II. Migration Potential

1. Groundwater Movement
2. Surface water Movement
3. Soil
4. Vapour
5. Sediment Movement
6. Modifying Factors

III. Exposure

1. Human Receptors
   - A. Known Impact
   - B Potential
     - a. Land Use
     - b. Accessibility
     - c. Exposure Route
2. Human Modifying Factors
3. Ecological Receptors
   - A. Known Impact
   - B. Potential
     - a. Terrestrial
     - b. Aquatic
4. Ecological Modifying Factors
   - a. Species at Risk
   - b. Aesthetics
5. Other Receptors
   - a. Permafrost

CCME National Classification System for Contaminated Sites (2008) version 1.3
User's Guide - Instructions

2) This is an electronic form which will prompt the user for information. Based on the answers provided, a score is calculated for the contaminated site in question. In most cases, the user will be asked to select amongst two or more choices in a drop down checklist. To access the drop down checklist, move the mouse towards the right side of the "action box". If a drop down is available, an arrow will appear, which must be selected to access the drop down choices. An "action box" requires input from the user. All action boxes have an amber background.

action box

3) When assigning scores for each factor, it is highly recommended to give a rationale (a column has been provided for this purpose in Worksheets I, II and III). Information that would be useful in justifying the scores assigned may include: a statement of any assumptions, a description of site-specific information, and references for any data sources (e.g., site visit, personal interview, site assessment reports, or other documents consulted).

4) The Site Letter Grade is related to the level of information available for the Site (as defined by the User) and provides an indication of completeness of information based on the level of investigation and remediation work that has been carried out at the site. More detailed descriptions of the various categories are provided below.

Site Letter Grade:	*Detailed Descriptions:*
F	***Pre Phase I ESA –*** No environmental investigations have been conducted or there are only partial or incomplete Phase I ESA for the Site. It is not recommended to continue through the NCSCS when insufficient data are available. In these cases, it will generally be necessary to conduct a Phase I ESA or other site investigation tasks in order to complete the NCSCS scoring.
E	***Phase I ESA –*** A preliminary desk-top type study has been conducted, involving non-intrusive data collection to determine whether there is a potential for the Site to be contaminated and to provide information to direct any intrusive investigations. Data collected may include a review of available information on current site conditions and history of the property, a site inspection and interviews with personnel familiar with the Site. [Note: This stage is similar to "Phase I: Site Information Assessment" as described in Guidance Document on the Management of Contaminated Sites in Canada (CCME 1997).]
D	***Limited Phase II ESA –*** An initial intrusive investigation and assessment of the property has been conducted, generally focusing on potential sources of contamination, to determine whether there is contamination present above the relevant screening guidelines or criteria, and to broadly define soil and groundwater conditions; samples have been collected and analyzed to identify, characterize and quantify contamination that may be present in air, soil, groundwater, surface water or building materials. [Note: This stage is similar to "Phase II: Reconnaissance Testing Program" as described in Guidance Document on the Management of Contaminated Sites in Canada (CCME 1997).]
C	***Detailed Phase II ESA –*** Further intrusive investigations have been conducted to characterize and delineate the contamination, to obtain detailed information on the soil and groundwater conditions, to identify the contaminant pathways, and to provide other information required to develop a remediation plan. [Note: This stage is similar to "Phase III: Detailed Testing Program" as described in Guidance Document on the Management of Contaminated Sites in Canada (CCME 1997).]
B	***Risk Assessment with or without Remedial Plan or Risk Management Strategy –*** A risk assessment has been completed, and if the risk was found to be unacceptable, a site-specific remedial action plan has been designed to mitigate environmental and health concerns associated with the Site, or a risk management strategy has been developed.
A	***Confirmation Sampling –*** Remedial work, monitoring, and/or compliance testing have been conducted and confirmatory sampling demonstrates whether contamination has been removed or stabilized effectively and whether cleanup or risk management objectives have been attained.

5) A few terms are used throughout which require definition, they are as follows:

Known - refers to scores that are assigned based on documented scientific and/or technical observations

Potential - refers to scores that are assigned when something is not known, though it may be suspected

Allowed Potential - If, in a given category, known and potential scores are provided by the user, the checklist will typically default to the "known" score. If a "known" score is provided, the "allowed potential" score will equal zero. Exceptions can be found within the Modifying Factors categories in each worksheet where there are often several independent questions. Therefore, "known" and "potential" scores are allowed to contribute to the total modifying factor score.

Raw - refers to score totals which have not been adjusted down to the total maximum score for the given category. In most cases the possible total raw score is greater than the maximum allowed

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Note: For some questions in the worksheets, the option selected will determine whether a "known" or "potential" score is assigned. In these cases, if "Do Not Know" is selected, a score will automatically be listed as "potential", whereas all of the other options in the list will provide a "known" score.

6) Certainty Percentage: The ratio of “Known” to “Potential” responses reflects the relative certainty, or confidence, of the resulting final score and the classification. The NCSCS system defines this ratio as the “Certainty Percentage”. The Certainty Percentage is generated from the number of sections assigned scores based on “known” information divided by the total number of sections. A high percentage indicates that more is known about the Site, and therefore there is more confidence in the classification, whereas a low percentage suggests that the classification should be treated with caution.

7) Site Classification Categories: Sites should not be ranked relative to one another. Sites must be classifed on their individual characteristics in order to determine the appropriate classification (Class 1, 2, 3, or N) according to their priority for action, or Class INS (Insufficient Information) for sites that require further information before they can be classifed. The classification groupings are as follows:

Class 1 - High Priority for Action (Total NCSCS Score greater than 70)

The available information indicates that action (*e.g.,* futher site characterization, risk management, remediation, etc.) is required to address existing concerns. Typically, Class 1 sites indicate high concern for several factors, and measured or observed impacts have been documented.

Class 2 - Medium Priority for Action (Total NCSCS Score between 50 and 69.9)

The available information indicates that there is high potential for adverse impacts, although the threat to human health and the environment is generally not imminent. There will tend not to be indication of off-site contamination, however, the potential for this was rated high and therefore some action is likely required.

Class 3 - Low Priority for Action (Total NCSCS Score between 37 and 49.9)

The available information indicates that this site is currently not a high concern. However, additional investigation may be carried out to confirm the site classification, and some degree of action may be required.

Class N - Not a Priority for Action (Total NCSCS Score less than 37)

The available information indicates there is probably no significant environmental impact or human health threats. There is likely no need for action unless new information becomes available indicating greater concerns, in which case the site should be re-examined.

Class INS - Insufficient Information (≥15% of Responses are "Do Not Know", or a site letter grade of F has been assigned)

There is insufficient information to classify the site. In this event, additional information is required to address data gaps.

8) Additional Complementary Tools to the NCSCS

The CCME Soil Quality Index (SoQI) is a complementary tool that focuses more on evaluating the relative hazard, by comparing contaminant concentrations with their respective soil quality guidelines. The SoQI uses three factors for its calculations, namely: 1) scope (% of contaminants that do not meet their respective guidelines), 2) frequency (% of individual tests of contaminants that do not meet their respective guidelines), and 3) amplitude (the amount by which the contaminants do not meet their respective guidelines). The soil quality index can be used to compare different contaminated sites with similar types of contamination as well as to see if the jurisdictional requirements have been met after remediation of a particular site.

The NCSCS was not developed for and is not readily applicable for the assessment of sites with a significant marine or aquatic component. Environmental conditions at marine and aquatic sites are best measured in the bed sediments as they act as long-term reservoirs of chemicals to the aquatic environment and to organisms living in or having direct contact with sediments. The CCME Sediment Quality Index (SeQI) provides a convenient means of summarizing sediment quality data and can complement the NCSCS. The SeQI provides a mathematical framework for assessing sediment quality conditions by comparing contaminant concentrations with their respective sediment quality guidelines.

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(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? **yes** = has an exceedance or strongly suspected to have an exceedance **no** = does not have an exceedance or strongly suspected not to have an exceedance		It should be noted that exceedances are based on the guidelines provided by the province of Newfoundland - including Atlantic RBCA and CCME guidelines, where applicable. Exceedances include: Soil - metals Sediment - PHC, PAHs, metals Surface water - metals Groundwater - metals	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://st-ts.ccme.ca/ For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	Yes			
Yes / No / Do Not Know				
B. Groundwater	Yes			
Yes / No / Do Not Know				
C. Surface water	Yes			
Yes / No / Do Not Know				
D. Sediment	Yes			
Yes / No / Do Not Know				
"Known" -score	8			
"Potential" - score	---			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)?	High	Exceedances reported include: Soil - metals Sediment - PHC, PAHs, metals Surface water - metals Groundwater - metals	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. *See Attached Reference Material for Contaminant Hazard Rankings.*	Hazard as defined in the revised NCSCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
High / Medium / Low / Do Not Know				
"Known" -score	8			
"Potential" - score	---			

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(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? NAPL (mobile or immobile) High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	Soil: modified total petroleum hydrocarbons (mTPH) exceeded applicable guidelines by 1.11 times at BFR_SS21_SA1. Samples with mTPH exceedances contained organic peat (i.e., natural hydrocarbons) and the elevated concentrations are attributed to this as per communication with the laboratory. Cadmium exceeded applicable guidelines up to 2.2 times Copper exceeded applicable guidelines up to 1.1 times Lead exceeded applicable guidelines by up to 30.4 times Selenium exceeded applicable guidelines up to 8.0 times Tin exceeded applicable guidelines by 3.2 times Zinc exceeded applicable guidelines by 1.1 times Sediment: mTPH exceeded applicable guidelines byup to 69.8 . However, these elevated concentrations are attributed to organic material present in the samples. Chrysene exceeded applicable guidelines by up to 2.10 times Fluoranthene exceeded applicable guidelines by up to 1.4 times Pyrene exceeded applicable guidelines by up to 2.1 times Arsenic exceeded applicable guidelines by up to 3.1 Chromium exceeded applicable guidelines by up to 2.7 times Lead exceeded applicable guidelines by up to 22.0 times Mercury exceeded applicable guidelines by up to 1.9 times Surface water: Aluminum exceeded applicable guidelines by up to 104.0 times Copper exceeded applicable guidelines by up to 1.1 times Iron exceeded applicable guidelines by up to 4.0 times Lead exceeded applicable guidelines by up to to 8.6 times Mercury exceeded applicable guidelines by up to 2.0 Groundwater: Aluminum exceeded applicable guidelines by up to 3.5 times Cadmium exceeded applicable guidelines by up to 8.8 times Copper exceeded applicable guidelines by up to 16.0 times Iron exceeded applicable guidelines by up to 2.9 times Lead exceeded applicable guidelines by up to to 2.7 times Manganese exceeded applicable guidelines by up to 2.1 times	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the *most conservative media-specific and land-use appropriate CCME* environmental quality guidelines. **Ranking should be based on contaminant with greatest exceedance of CCME guidelines.** Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines NAPL (LNAPL or DNAPL) = Contaminant is a non-aqueous phase liquid (*i.e.,* due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (*i.e.* , greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Any amount of NAPL should be scored, *i.e* . small amounts and sheens cannot be ignored. The presence of a NAPL (mobile or immoblie or regardless of amount) may be considered unnaceptable by some jurisidcations. If NAPL is present, consult jurisdiction on how to proceed with NCSCS. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (*i.e.* , CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
"Known" -score	4			
"Potential" - score	---			
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m^3 2 to 10 ha or 1000 to 5000 m^3 <2 ha or 1000 m^3 Do Not Know	>10 hectare (ha) or 5000 m3	Estimated areas of impact were not calculated as delineation was not completed.	Measure or estimate the area or quantity of total contamination (*i.e* , all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" -score	9			
"Potential" - score	---			

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(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	Yes		Persistent chemicals, *e.g.,* PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. Elements do not degrade, therefore treat any metal, metalloid, or halogen COPC as persistent.	*Examples of Persistent Substances are provided in attached Reference Materials*
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No	Based on the known COCs for the Site, damage (corrosion, etc.) to utilities and infrastructure is not anticipated.	If answered Yes, in Rationale for Score column document the location and extent of the infrastructure that is/may be damaged, verify the mode of contact between contaminants of potential concern (COPCs) and infrastructure, list the specific COPCs that could cause damage, and note the expected effect on specific infrastructure.	Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	PHCs, PAHs, metals.	For the purposes of the revised NCSCS, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	*Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.*
"Known" - Score	4			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Score- "Known"	33	
Raw Total Score- "Potential"	---	
Raw Combined Total Score (Known + Potential)	33	
Adjusted Total Score (Raw Combined / 40 * 33)	**27.2**	maximum 33

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
i) For **potable groundwater environments**, 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For **non-potable environments** (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.	12	Select metals (aluminum, cadmium, cobalt, copper, iron, and zinc) exceeded the applicable groundwater standards.	Review chemical data and evaluate groundwater quality. The evaluation method concentrates on 1) a potable or non-potable groundwater environment; 2) the groundwater flow system and its potential to be an exposure pathway to known or potential receptors An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis. Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils. Seeps and springs are considered part of the groundwater pathway. In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.	The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries. Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links. Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered. **Selected References** Potable Environments Guidelines for Canadian Drinking Water Quality: http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php Non-Potable Environments CCME. 1999. Canadian Water Quality Guidelines for Protection of Aquatic Life. http://ceqg-rcqe.ccme.ca/ Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.
ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.	9			
iii) Meets GCDWQ for potable environments; meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (*i.e.,* there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).	0			
	12			
Score	12			
NOTE: If a score is assigned here for Known COPC Exceedances, then you should skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
a. Relative mobility of contaminant High Moderate Low Insignificant Do Not Know			Organics Koc (L/kg) — Metals with higher mobility at acidic conditions — Metals with higher mobility at alkaline conditions Koc < 500 (*i.e.,* log Koc < 2.7) — pH < 5 — pH > 8.5 Koc = 500 to 5000 (*i.e.,* log Koc = 2.7 to 3.7) — pH = 5 to 6 — pH = 7.5 to 8.5 Koc = 5,000 to 100,000 (*i.e.,* log Koc = 3.7 to 5) — pH > 6 — pH < 7.5 Koc > 100,000 (*i.e.,* log Koc > 5) For PHC fractions; score F1 as Moderate, F2 as Low, and F3 and F4 as Insignificant.	Reference: US EPA Soil Screening Guidance (Part 5 - Table 39) If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.
	Do Not Know			
Score	2			
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know			Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved. Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for "Full Containment" scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.	Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links. **Selected Resources:** United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.
	Do Not Know			
Score	1.5			
c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway 3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know			The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow. Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway. The evaluation of this category is based on: 1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or 2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (*e.g.,* water table aquifer, first hydrostratigraphic unit or other groundwater pathway).	
	Do Not Know			
Score	0.5			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
d. Hydraulic conductivity of confining layer >10^{-4} cm/s or no confining layer 10^{-4} to 10^{-6} cm/s <10^{-6} cm/s Do Not Know	Do Not Know	Water located within bedrock.	Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on: 1) The presence and hydraulic conductivity ("K") of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or 2) The presence and permeability ("k") of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.	
Score	0.5			
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High (infiltration score > 0.6) Moderate (0.4 < infiltration score ≤ 0.6) Low (0.2 < infiltration score ≤ 0.4) Very Low (0 < infiltration score ≤ 0.2) None (infiltration score = 0) Do Not Know	Do Not Know	Burnt Pond Climate Station (1981-2010) used - closest to site. Avg. rainfall = 1087.9 mm Avg. snowfall = 362.4 cm = 3624 mm Total avg. precipitation = 4711.9 mm Score = 4711.9/1000 = 4.7 Permeability: assume 0.6 for sand 4.7 x 0.6 = 2.82	<u>Precipitation</u> Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide annual precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (*e.g.,* 667 mm = 0.7 score). <u>Permeability</u> For surface soil relative permeability (*i.e.* , infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate (*e.g.,* precipitation factor of 0.7 from above x 0.6 (sand) = 0.42 or "Moderate").	Selected Sources: Environment Canada web page link: <u>http://climate.weather.gc.ca/climate_normals/index_e.html</u> Snow to rainfall conversion apply ratio of 10(snow):1(water) <u>https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=108C6C74-1</u>
Score	0.4			
f. Hydraulic conductivity of aquifer >10^{-2} cm/s 10^{-2} to 10^{-4} cm/s <10^{-4} cm/s Do Not Know	Do Not Know	Water located within bedrock.	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Score	1			
Potential groundwater pathway total	5.9			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	**12**			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (*e.g.,* toxicity testing; or other indicator testing of exposure). ii) Same as (i) except the information is not known but strongly suspected based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (*e.g.,* Distance to nearest surface water is > 5 km.) Score	12 8 0 12 12	Metals (aluminum, copper, iron, lead, mercury and zinc) in surface water are >1x applicable guidelines.	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, *e.g.,* recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life. Examples of indirect evidence may include observed staining of sediment and/or river banks, but surface water has not been tested.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life http://ceqg-rcqe.ccme.ca/ CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) http://ceqg-rcqe.ccme.ca/ Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you should skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
a. Presence of containment No containment Partial containment Full containment Do Not Know Score	 Do Not Know 3		Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know Score	 Do Not Know 2		Review available mapping and survey data to determine distance to nearest surface water bodies.	
c. Topography Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know Score	 Do Not Know 1		Review engineering documents on the topography of the site and the slope of surrounding terrain. Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (*e.g.,* trench, above ground, etc.).	
d. Run-off potential High (run-off score > 0.6) Moderate (0.4 < run-off score ≤ 0.6) Low (0.2 < run-off score ≤ 0.4) Very Low (0 < run-off score ≤ 0.2) None (run-off score = 0) Do Not Know Score	 Do Not Know 0.4		Precipitation Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (*e.g.* , 667 mm = 0.7 score). Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the permeability (infiltration) factor with precipitation factor to obtain Run-off potential score (*e.g.* , precipitation factor of 0.7 from above x 0.6 (loam) = 0.42 or "Moderate").	Selected Sources: Environment Canada web page link: http://climate.weather.gc.ca/climate_normals/index_e.html Snow to rainfall conversion apply ratio of 10(snow):1(water) https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=108C6C74-1
e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years not in floodplain Do Not Know Score	 Do Not Know 0.5		Review published data such as flood plain mapping or flood potential (*e.g.,* spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.	
Potential surface water pathway total Allowed Potential score	6.9 ---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	**12**			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
COPCs measured in surface soils exceed the CCME soil quality guideline. Strongly suspected that soils exceed guidelines. COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).	12 9 0	Metals (antimony, cadmium, copper, boron, iron, lead, manganese, selenium, tin, vanadium) exceed applicable criteria.	Collect all available information on quality of surface soils (*i.e.,* top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (*i.e,* agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (*i.e.,* coarse or fine). Examples of strongly suspected exceedences of soil guidelines may include evidence of staining, odours, or significant debris infill materials.	Selected References: CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. http://ceqg-rcqe.ccme.ca/
	12			
Score	12			
NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you should skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)				
B. Potential for a surface soils (top 1.5 m) migration pathway				
a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know			Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit. Landscaped surface soils must include a minimum of 0.5 m of topsoil.	The possibility of contaminants in blowing snow have not been included in the revised NCSCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.
	Exposed			
Score	6			
b. For what proportion of the year does the site remain covered by snow? 0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know			Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).	
	10-30% of year			
Score	3			
Potential surface soil pathway total	9	Note: If a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	---			
Soil pathway total	**12**			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Data not available.	Consult previous investigations, including human health risk assessments, for reports of vapours detected. Due to the potential for significant spatial and temporal variation in soil vapour concentrations, limited vapour monitoring studies (*e.g.*, single point in time "snap-shot") that do not detect vapour at sites where volatiles are suspected, does not necessarily mean that vapours are not an issue at the site. In this case, section B " Potential for COPCs in vapour" should be completed.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured (i.e. not detected) and volatile hydrocarbons have not been found in site soils or groundwater, or vapour has been measured (indoor or outdoor) in concentrations not exceeding risk based concentrations.	0			
	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you should skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H' (dimensionless) High (H' > 1.0E-1) Moderate (H' = 1.0E-1 to 1.0E-3) Low (H' < 1.0E-3) Not Volatile Do Not Know	Not Volatile		Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) *Provided in Attached Reference Materials* For PHC fractions; score F1 as High, F2 as Moderate, and F3 and F4 as Not Volatile. Substance is considered Not Volatile (*i.e.* , pathway not a concern) if the product of the water solubility and unitless Henry's law constant does not exceed published or derived tolerable concentration or risk-specific concentration. If NAPL is present, see Appendix D of the CCME soil vapour quality guideline protocol (CCME 2014) for further guidance.	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5. Selected References: CCME. 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. Winnipeg, Manitoba. http://ceqg-rcqe.ccme.ca
Score	0			
b. What is the soil grain size? Fine Coarse Do Not Know	Coarse	Lab grain size analysis determined predominently coarse soil onsite.	Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	0			
c. Is the depth to the source less than 10m? Yes No Do Not Know	Yes		Review groundwater depths below grade for the site.	
Score	0			
d. Are there any preferential pathways? Yes No Do Not Know	No	No preferential pathways were identified.	Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathyways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	0			
Potential vapour pathway total	0			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	**0**			

CCME National Classification System (2008) version 1.3

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	Sediments in surface water may migrate through streams and creeks on Site	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future. or Sediment meets CCME sediment quality guidelines or absence of sediment exposure pathway (*i.e.,* within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
	9			
Score	9			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you should skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")?	No	Only small to waterbodies onsite.	Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
Yes No Do Not Know	4			
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash?	No		Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
Yes No Do Not Know	0			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring?	No		Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional may become scoured. If the sediments present at the site are in a lake or marine habitat, select "no" for this question.	
Yes No Do Not Know	0			
Potential sediment pathway total	4			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Sediment pathway total	**9**			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination?	No		Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Yes No Do Not Know				
Known	0			
Potential	---			

Migration Potential Total

Raw Total Score- "Known"	45	Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore,
Raw Total Score- "Potential"	---	the total "Potential" Score may not reflect the sum of the individual "Potential" scores.
Raw Combined Total Score (Known + Potential)	45	
Adjusted Total Score (Raw Combined / 64 * 33)	**23.2**	maximum 33

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(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22		*Where adverse effects on humans are documented, the site should be automatically designated as a Class 1 site (*i.e.,* action required). Known impacts could include blood test results (*e.g.,* blood lead > 10 µg/dL) or results of other health based studies and tests. There is no need to proceed through the NCSCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired. A score of 22 can also be assigned when Hazard Quotients (or Hazard Index) >> 1.0 or incremental lifetime cancer risks considerably exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals. The category, "Strongly suspected", can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) > 0.2 (excluding the Estimated Daily Intake) or > 1.0 with Estimated Daily Intake and/or incremental lifetime cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either >10^{-5} or >10^{-6}). The category, no exposure/impacts, can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) of ≤ 0.2 (excluding the Estimated Daily Intake) or ≤ 1.0 with Estimated Daily Intake AND incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10^{-6} or 10^{-5}).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. **Selected References:** Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Heath Screening Level Risk Assessments, available at http://www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index-eng.php United States Environmental Protection Agency, Integrated Risk Information System (IRIS), available at http://toxnet.nlm.nih.gov
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
	Go to Potential			
Score	---			
NOTE: If a score is assigned here for Known Exposure, then you should skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know			Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (*e.g.,* greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Parkland includes campgrounds, but excludes wildlands such as national or provincial parks. Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (*e.g.,* children).
	Agricultural			
Score	3			
b) Indicate the level of accessibility to the contaminated portion of the site (*e.g.,* the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know		Site is easily accessible although "Range Closed" and "No Trespassing" signs are erected at entrance. Site has vegetation cover.	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
	Access, not covered			
Score	2			
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know		Metals impacts in surface soils.	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
	Yes			
Score	3			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
ii) inhalation (*i.e.,* inhalation of dust, vapour)		Metals impacts in surface soils. Soils are coarse grained.		Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.
Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)?			If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B.a), *Potential for COPCs in Vapour* for a definition of volatility.	Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Yes No Do Not Know	No			General Notes; Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.
Score	0			
Dust - If there is contaminated surface soil (*e.g.,* top 1.5 m) , indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero.			Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.	Selected References; Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332. http://ceqg-rcqe.ccme.ca/ Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Fine Coarse Surface soil is not contaminated or absent (bedrock) Do Not Know Texture	Coarse			
Score	1			
inhalation total	1			
B. Potential for human exposure				
iii) Ingestion (*i.e.,* ingestion of food items, water and soils [for children]), including traditional foods.		Town of Burgeo municipal water supply approx 1 km south of Site, however Site waterbodies themselves are apart of provincially protected water supply.	Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (*e.g.,* provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.	**Selected References:** Guidelines for Canadian Drinking Water Quality: http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php
Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).			The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of flow and contaminant transport.	Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.
0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present No potential for aquifer contamination Do Not Know	0 to 100 m		For aquifers, examples of "No drinking water present" includes municipal bylaws prohibiting water wells for potable water use and naturally non-potable (*e.g.,* saline) shallow groundwater.	Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.
Score	3		Groundwater used for drinking water may not be at risk from contamination due to a lack of hydrological connection between contaminated soil or groundwater, or the drinking water is sufficiently up-gradient of the contamination source. Selection of "No potential for aquifer contamination" must be supported with sufficient documentation, *e.g.,* lithological and contaminant properties, well capture zones (map drawn to scale), and capture zone delineation methodology.	
Is an alternative water supply readily available?				
Yes No Not Applicable Do Not Know	Do Not Know		Answer Not Applicable if "No drinking water present" or "No potential for aquifer contamination" was selected in previous question.	
Score	0.5			
Is human ingestion of contaminated soils possible?		Metals impacts in surface soils. Edible plants found on Site.	If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.	
Yes No Do Not Know	Yes			
Score	3			
Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?		Hunting wildlife from the Site is possible, edible plants located on Site.	Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (*e.g.,* large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.	
Yes No Do Not Know	Yes			
Score	1			
Ingestion total	7.5			
Human Health Total "Potential" Score	16.5	Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
Allowed "Potential" Score	16.5			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
2. Human Exposure Modifying Factors				
a) Strong reliance of local people on natural resources for survival (*i.e.,* food, water, shelter, etc.) in contaminated area. Yes No Do Not Know	No	The Site is not intended for public access and has "No Trespassing" and "Range Closed" signs at entrance.		
Human Exposure Modifying Factors - "Known"	0			
Human Exposure Modifying Factors - "Potential"	---			
Raw Human "Known" total	0			
Raw Human "Potential" total	16.5			
Raw Combined Total Human Score	16.5			
Adjusted Total Human Score (max 22)	**16.5**			
3. Ecological				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.	18		Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (*i.e.,* a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired.	CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life. CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses. http://ceqg-rcqe.ccme.ca/ Sensitive receptors- review: Canadian Council on Ecological Areas; www.ccea.org Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in *A Framework for Ecological Risk Assessment: General Guidance* (CCME 1996). Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	12		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.	
No quantified or suspected exposures/impacts in terrestrial or aquatic organisms	0		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.	
Score	Go to Potential ---			
NOTE: If a score is assigned here for Known Exposure, then you should skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)				
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial i) Land use Agricultural (or Wild lands) Residential / Parkland Commercial Industrial Do Not Know	Agricultural (or Wild lands)		Review zoning and land use maps. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (*e.g.,* greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
Score	3			
ii) Uptake potential Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Yes	Metals impacts in surface soils.	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
Score	1			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
iii) Ingestion (*i.e.,* wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site?			Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Yes				
No				
Do Not Know	Yes			
Score	1			
Are terrestrial animals likely to be ingesting contaminated soils at the site?		Metals impacts in surface soils, surface water, and groundwater. Metals and PAH impacts in sediment.	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Yes				
No				
Do Not Know	Yes			
Score	1			
Can the contamination identified bioaccumulate?		Mercury present in surface water and sediment	Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) or Soil Quality Guideline for Soil and Food Ingestion for the protection of secondary (SQG_{2C}) and/or tertiary consumers (SQG_{3C}). • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5. If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative. Petroleum hydrocarbons F1 to F4 are not considered bioaccumulative.	*See attached Reference Material including log(Kow)* Consult *CEPA (1999) Persistence and Bioaccumulation Regulations* for additional guidance; http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html
Yes				
No				
Do Not Know	Yes			
Score	1			
Distance to sensitive terrestrial ecological area			It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
0 to 300 m				
300 m to 1 km				
1 to 5 km				
> 5 km				
Do Not Know				
	Do Not Know			
Score	1.5			
Raw Terrestrial "Potential" total	8.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Terrestrial "Potential" total	8.5			
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic			"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
i) Classification of aquatic environment				
Sensitive				
Typical				
Not Applicable (no aquatic environment present)				
Do Not Know				
	Typical			
Score	1			
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact?		Groundwater at GW4 (connected to nearby ponds) exceeds CCME WQG for various metals.	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Yes				
No (or Not Applicable)				
Do Not Know	Yes			
Score	1			
Distance from the contaminated site to an important surface water resource		Town of Burgeo municipal water supply approx 1 km south of Site, however Site waterbodies themselves are apart of provincially protected water supply.	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.
0 to 300 m				
300 m to 1 km				
1 to 5 km				
> 5 km				
Do Not Know				
	0 to 300 m			
Score	3			
Are aquatic species (*i.e.,* forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues?			Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5. If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative.	*See attached Reference Material including log(Kow)* Consult *CEPA (1999) Persistence and Bioaccumulation Regulations* for additional guidance; http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html
Yes				
No				
Do Not Know				
	Do Not Know			
Score	0.5			
Raw Aquatic "Potential" total	5.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Aquatic "Potential" total	5.5			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Ecological Exposure Modifying Factors				
a) Known, or potential, occurrence of a species at risk.		SAR assessment conducted. Four species were identifide as potential SAR on Site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as NatureServe Explorer (http://explorer.natureserve.org/). Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance. To assess the potential for a species at risk to be present, the site (or surroundings) should be located within range of a species at risk (using on-line resources and consultation with knowledgeable government departments or biologists, see above), and there should be an assessment of habitat suitability for any identified potential species at risk.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act, available at: http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1 Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCMWLAP. 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection. http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk
Is there a potential for a species at risk to be present at the site, or a known presence?	Yes			
Yes	2			
No				
Do Not Know	---			
b) Potential impact of aesthetics (*e.g.,* enrichment of a lake or tainting of food flavour).				
Is there evidence of aesthetic impact to receiving water bodies?	No		Documentation may consist of environmental investigation reports, press articles, petitions or other records.	This Item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
Yes	0			
No				
Do Not Know	---			
Is there evidence of olfactory impact (*i.e.,* unpleasant smell)?	No		Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.	
Yes	0			
No				
Do Not Know	---			
Is there evidence of increase in plant growth in the lake or water body?	No		A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients *e.g.,* nitrogen or phosphorous releases to an aquatic body can act as a fertilizer.	
Yes	0			
No				
Do Not Know	---			
Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different?	No		Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	
Yes	0			
No				
Do Not Know	---			
Ecological Modifying Factors Total - Known	2			
Ecological Modifying Factors Total - Potential	---			
Raw Ecological "Known" total	2			
Raw Ecological "Potential" total	14			
Raw Combined Total Ecological Score	16			
Adjusted Total Ecological Score (Max 18)	**16**			
5. Other Potential Contaminant Receptors				
a) Exposure of permafrost (leading to erosion and structural concerns)				Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
Are there improvements (roads, buildings) at the site dependant upon the permafrost for structural integrity?	No		Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.	
Yes	0			
No				
Do Not Know	---			
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?	No		Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	
Yes	0			
No				
Do Not Know	---			
Other Potential Receptors Total - Known	0			
Other Potential Receptors Total - Potential	---			

Exposure Total		
Raw Human Health + Ecological Total + Other Receptors - "Known"	2	
Raw Human Health + Ecological Total + Other Receptors - "Potential"	30.5	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.
Raw Total Exposure Score (not adjusted)	32.5	HH or Eco Total score has not yet been capped at 22 and 18, respectively.
Adjusted Total Score (Adjusted Total Exposure / 46 * 34)	**24.0**	maximum 34

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Score Summary

Site: Burgeo Range

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCSCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	8	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	9	---
5. Modifying Factors	4	---
Raw Total Score	33	---
Raw Combined Total Score (Known + Potential)	33	
Adjusted Total Score (Raw Combined Total/40*33)	**27.2**	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	12	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	9	---
6. Modifying Factors	0	---
Raw Total Score	45	---
Raw Combined Total Score (Known + Potential)	45	
Adjusted Total Score (Raw Combined Total/64*33)	**23.2**	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B Potential		
a. Land Use		3
b. Accessibility		2
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		7.5
2. Human Receptors Modifying Factors	0	---
Raw Total Human Score	0	16.5
Raw Combined Total Human Score (Known + Potential)	16.5	
Adjusted Total Human Score	16.5	(maximum 22)
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		8.5
b. Aquatic		5.5
4. Ecological Receptors Modifying Factors	2	---
Raw Total Ecological Score	2	14
Raw Combined Total Ecological Score (Known + Potential)	16	
Adjusted Total Ecological Score	16	(maximum 18)
5. Other Receptors	0	---
Total Other Receptors Score (Known + Potential)	0	
Total Exposure Score (Human + Ecological + Other)	32.5	
Adjusted Total Score (Total Exposure/46*34)	**24.0**	(maximum 34)

Site Score

Site Letter Grade	**C**
Certainty Percentage	**88%**
% Responses that are "Do Not Know"	**5%**
Total NCSCS Score for site	**74.4**
Site Classification Category	**1**

Site Classification Categories*:
Class 1 - High Priority for Action (Total NCS Score >70)
Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
Class N - Not a Priority for Action (Total NCS Score <37)
Class INS - Insufficient Information (≥15% of responses are "Do Not Know", or a site letter grade of F has been assigned)

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

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Contaminant Hazard Ranking

(Based on the Proposed Hazard Ranking developed for the FCSAP Contaminated Sites Classification System)

This information is used in Sheet I (Contaminant Characteristics), section 2 (Chemical Hazard).

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
Acetaldehyde	H	*	PHC	
Acetone	L			
Acrolein	H	*		
Acrylonitrile	H	*	PHC	
Alachlor	M			
Aldicarb	H			
Aldrin	H			
Allyl Alcohol	H			
Aluminum	L			
Ammonia	L	*		
Antimony	H			
Arsenic	H	*		
Atrazine	M			
Azinphos-Methyl	H			
Barium	L			
Bendiocarb	H			
Benzene	H	*	CHC	BTEX
Benzidine	H	*	CHC	
Beryllium	H		CHC	
Biphenyl, 1,1-	M			
2,3,4,5-Bis(2-Butylene)tetrahydro-2-furfural	H			
Bis(Chloromethyl)Ether	H	*	CHC	
Bis(2-Chloroethyl)Ether	H		CHC	
Bis(2-Chloroisopropyl)Ether	H			
Bis(2-Ethylhexyl)Phthalate	H	*		PH
Boron	L			
Bromacil	M			
Bromate	M			
Bromochlorodifluoromethane	M	*		HM
Bromochloromethane	H	*		HM
Bromodichloromethane	H			HM
Bromoform (Tribromomethane)	H		PHC	HM
Bromomethane	M			HM
Bromotrifluoromethane	M	*		HM
Bromoxynil	H			
Butadiene, 1,3-	H	*	CHC	
Cadmium	H	*	CHC	
Carbofuran	M			
Carbon Tetrachloride (Tetrachloromethane)	H		PHC	HM
Captafol	M			
Chloramines	M	*		
Chloride	L			
Chloroaniline, P-	H			
Chlorobenzene (mono)	M			
Chlorobenzilate	M			
Chlorodimeform	M			
Chloroform	H		PHC	HM
Chloromethane	M			
Chloromethyl Methyl Ether	M	*		
(4-Chlorophenyl)Cyclopropylmethanone, O-((4-Nitrophenyl)Methyl)Oxime	H			

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
Chlorinated Benzenes				
Monochlorobenzene	M			
Dichlorobenzene, 1,2- (O-DCB)	M			
Dichlorobenzene, 1,3- (M-DCB)	M			
Dichlorobenzene, 1,4- (P-DCB)	H			
Trichlorobenzene, 1,2,3-	M			
Trichlorobenzene, 1,2,4-	M			
Trichlorobenzene, 1,3,5-	M			
Tetrachlorobenzene, 1,2,3,4-	M			
Tetrachlorobenzene, 1,2,3,5-	M			
Tetrachlorobenzene, 1,2,4,5-	M			
Pentachlorobenzene	M			
Hexachlorobenzene	H			
Chlorinated Ethanes				
Dichloroethane, 1,1-	M			
Dichloroethane, 1,2- (Ethylene Dichloride (EDC))	H		PHC	
Trichloroethane, 1,1,1-	H	*		
Trichloroethane, 1,1,2-	M			
Tetrachloroethane, 1,1,1,2-	M			
Tetrachloroethane, 1,1,2,2-	M			
Chlorinated Ethenes				
Monochloroethene (Vinyl Chloride)	H	*	CHC	
Dichloroeth(yl)ene, 1,1-	H			
Dichloroeth(yl)ene, 1,2- (cis or trans)	M			
Trichloroeth(yl)ene (TCE)	H	*		
Tetrachloroeth(yl)ene (PCE)	H	*		
Chlorinated Phenols		*		
Monochlorophenols	M			
Chlorophenol, 2-	M			
Dichlorophenols				
Dichlorophenol, 2,4-	M			
Trichlorophenols				
Trichlorophenol, 2,4,5-	H			
Trichlorophenol, 2,4,6-	H		PHC	
Tetrachlorophenols				
Tetrachlorophenol, 2,3,4,6-	H			
Pentachlorophenol (PCP)	H			
Chloromethane	M			HM
Chlorophenol, 2-	M			CP
Chlorothalonil	H			
Chlorpyrifos	H			
Chromium (Total)	M	*		
Chromium (III)	L	*		
Chromium (VI)	H	*	CHC	
Coal Tar	H		CHC	Refer to PAHs
Cobalt	L			
Copper	L			
Creosote	M	*		Refer to PAHs
Crocidolite	L			
Cyanide (Free)	H			
Cyanazine	M			

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
Dibenzofuran	H	*		DF
Dibromoethane, 1,2- (Ethylene Dibromide (EDB))	H		PHC	
1,2-Dibromo-3-Chloropropane	H		PHC	
Dibromochloromethane	M	*		HM
Dibromotetrafluoroethane	M			
Dichlorobenzene, 1,2- (O-DCB)	M			CB
Dichlorobenzene, 1,3- (M-DCB)	M			CB
Dichlorobenzene, 1,4- (P-DCB)	H			CB
Dichlorobenzidine, 3,3'-	H		PHC	
DDD	H			
DDE	H			
DDT	H		PHC	
Deltamethrin	M			
Diazinon	M			
Dicamba	H			
Dichloroethane, 1,1-	H			CEA
Dichloroethane, 1,2- (EDC)	H		PHC	CEA
Dichloroeth(yl)ene, 1,1-	H			CEE
Dichloroeth(yl)ene, Cis-1,2-	M			CEE
Dichloroeth(yl)ene, Trans-1,2-	M			CEE
Dichloromethane (Methylene Chloride)	H		PHC	HM
Dichlorophenol, 2,4-	M			CP
Dichloropropane, 1,2-	H			
Dichloropropene, 1,3-	H		PHC	
Diclofop-Methyl	H			
Didecyl Dimethyl Ammonium Chloride	H			
Dieldrin	H			
Dimethoate	H			
Diethyl Phthalate	M			PH
Diethylene Glycol	L			GL
Dimethyl Phthalate	M			PH
Dimethylphenol, 2,4-	L			
Dinitrophenol, 2,4-	M			
Dinitrotoluene, 2,4-	H			
Dinoseb	H			
Di-n-octyl Phthalate	H			
Dioxane, 1,4-	H		PHC	
Dioxins/Furans	H			
Diquat	M			
Diuron	M			
Endosulfan	H			
Endrin	H			
Ethylbenzene	M			BTEX
Ethylene Dibromide (EDB)	H		PHC	
Ethylene Glycol	L			GL
Ethylene Oxide	H		CHC	
Fluoroacetamide	M			
Fluorides	L	*		
Glycols				
Ethylene Glycol	L			
Diethylene Glycol	L			
Propylene Glycol	L			
Glyphosate	M			

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
Halogenated Methanes				
Bromochlorodifluoromethane	M	*		
Bromochloromethane	M	*		
Bromodichloromethane	H		PHC	
Bromomethane	M			
Bromotrifluoromethane	M	*		
Chloroform	M		PHC	HM
Chloromethane	M			
Dibromochloromethane	M			
Dichloromethane (Methylene Chloride)	H		PHC	
Methyl Bromide	M	*		
Tetrachloromethane (Carbon Tetrachloride)	H			
Tribromomethane (Bromoform)	H			
Trihalomethanes (THM)	M			
Heptachlor	H			
Heptachlor Epoxide	H			
Hexachlorobenzene	H		PHC	
Hexachlorobutadiene	H			
Hexachlorocyclohexane, Gamma	H		PHC	
Hexachloroethane	H		PHC	
Hydrobromofluorocarbons (HBFCS)	M	*		
Hydrochlorofluorocarbons (HCFCS)	M	*		
3-Iodo-2-propynyl Butyl Carbamate	H			
Iron	L			
Lead	H	*		neurotoxins / teratogens
Lead Arsenate	H			
Leptophos	H			
Lindane	H			
Linuron	H			
Lithium	L			
Malathion	M			
Manganese	L			
Mercury	H	*		
Methamidophos	H			
Methoxylchlor	H			
Methyl Bromide (Bromomethane)	M	*		
2-Methyl-4-chloro-phenoxy Acetic Acid	M			
Methyl Ethyl Ketone	L			
Methyl Isobutyl Ketone	L			
Methyl Mercury	H			
Methyl-Parathion	H			
Methyl Tert Butyl Ether (MTBE)	M			
Metolachlor	M			
Metribuzin	H			
Molybdenum	L			
Monochloramine	M			
Monocrotophos	H			
Nickel	H	*		CEPA - inhalation
Nitrilotriacetic Acid	H		PHC	
Nitrate	L			
Nitrite	M			
Nonylphenol + Ethoxylates	H	*		

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
Organotins				
Tributyltin	H			
Tricyclohexyltin	H			
Triphenyltin	H			
Parathion	H			
Paraquat (as Dichloride)	H			
Pentachlorobenzene	M			CB
Pentachlorophenol (PCP)	H			CP
Petroleum Hydrocarbons				Ranking based upon fraction of toxic and mobile components in product. Lighter compounds such as benzene are more toxic and mobile.
Petroleum Hydrocarbons (Gasoline)	H			
Petroleum Hydrocarbons (Kerosene incl. Jet Fuels)	H			
Petroleum Hydrocarbons (Diesel incl Heating Oil)	M			
Petroleum Hydrocarbons (Heavy Oils)	L			
Petroleum Hydrocarbons (CCME F1)	H			
Petroleum Hydrocarbons (CCME F2)	M			
Petroleum Hydrocarbons (CCME F3)	L			
Petroleum Hydrocarbons (CCME F4)	L			
Phenol	L			
Phenoxy Herbicides	M			
Phorate	H			
Phosphamidon	H			
Phthalate Esters				
Bis(2-Ethylhexyl)Phthalate	H	*		
Diethyl Phthalate	H			
Dimethyl Phthalate	H			
Di-n-octyl Phthalate	H			
Polybrominated Biphenyls (PBB)	H	*		
Polychlorinated Biphenyls (PCB)	H			
Polychlorinated Terphenyls	H	*		
Polycyclic Aromatic Hydrocarbons	H	*	PHC	
Acenaphthene	M			
Acenaphthylene	M			
Acridine	H			
Anthracene	M			
Benzo(a)anthracene	H		PHC	
Benzo(a)pyrene	H		PHC	
Benzo(b)fluoranthene	H		PHC	
Benzo(g,h,i)perylene	H			
Benzo(k)fluoranthene	H		PHC	
Chrysene	M			
Dibenzo(a,h)anthracene	H		PHC	
Fluoranthene	M			
Fluorene	M			
Indeno(1,2,3-c,d)pyrene	H		PHC	
Methylnaphthalenes	M			
Naphthalene	M			
Phenanthrene	M			
Pyrene	M			
Quinoline	H			
Propylene Glycol	L			GL
Radium	H			
Radon	H			
Selenium	M			
Silver	L			
Simazine	M			
Sodium	L			
Strontium-90	H			
Strychnine	H			
Styrene	H			
Sulphate	L			
Sulphide	L			

Chemical/Parameter	Hazard	CEPA	Carcinogenicity	Notes
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD)	H	*		DF
Tebuthiuron	H			
Tetrachloroeth(yl)ene (PCE)	H	*		CEE
Tetraethyl Lead	H			
Tetrachlorobenzene, 1,2,3,4-	H			CB
Tetrachlorobenzene, 1,2,3,5-	H			CB
Tetrachlorobenzene, 1,2,4,5-	H			CB
Tetrachloroethane, 1,1,1,2-	M			CEA
Tetrachloroethane, 1,1,2,2-	M			CEA
Tetrachlorophenol, 2,3,4,6-	H			CP
Tetramethyl Lead	H	*		
Thallium	M			
Thiophene	M			
Tin	L			
Toluene	M			BTEX
Toxaphene	H			
Triallate	M			
Tribromomethane (Bromoform)	H			HM
Tributyltetradecylphosphonium Chloride	H	*		
Trichlorobenzene, 1,2,3-	H			CB
Trichlorobenzene, 1,2,4-	H			CB
Trichlorobenzene, 1,3,5-	H			CB
Trichloroethane, 1,1,1-	H	*		CEA
Trichloroethane, 1,1,2-	M			CEA
Trichloroeth(yl)ene (TCE)	H	*		CEE
Tricyclohexyltin Hydroxide	H			
Trichlorophenol, 2,4,5-	H			CP
Trichlorophenol, 2,4,6-	H		PHC	CP
Trifluralin	H			
Trihalomethanes (THM)	M			
Tris(2,3-Dibromopropyl)phosphate	H			
Tritium	L			
Uranium (Non-radioactive) / (Radioactive)	M/H			
Vanadium	M			
Vinyl Chloride	H	*	CHC	CEE
Xylenes	M			BTEX
Zinc	L			

H = High Hazard
M = Medium Hazard
L = Low Hazard
Hazard ratings based on a number of factors including potential human and ecological health effects.

PHC = Potential Human Carcinogen
CHC = Confirmed Human Carcinogen

BTEX = benzene, toluene, ethylbenzene, and xylenes
CB = chlorobenzenes
CEA = chlorinated ethanes
CEE = chlorinated ethenes
CP = chlorophenols
DF = dioxins and furans
GL = glycols
HM = halomethanes
PAH = polycyclic aromatic hydrocarbons
PH = phthalate esters

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Reference Material (Information to assist in scoring)

Examples of Persistent Substances

This information is used in Sheet I (Chemical Characteristics), section 5 (Modifying Factors).

aldrin	dieldrin	PCBs
benzo(a)pyrene	hexachlorobenzene	PCDDs/PCDFs (dioxins and furans)
chlordane	methylmercury	toxaphene
DDT	mirex	alkylated lead
DDE	octachlorostyrene	

Examples of Substances in the Various Chemical Classes

This information is used in Sheet I (Chemical Characteristics), section 5 (Modifying Factors).

Chemical Class	Examples *
inorganic substances (including metals)	arsenic, barium, cadmium, hexavalent chromium, copper, cyanide, fluoride, lead, mercury, nickel, selenium, sulphur, zinc; brines or salts
volatile petroleum hydrocarbons	benzene, toluene, ethylbenzene, xylenes, PHC F1
light extractable petroleum hydrocarbons	PHC F2
heavy extractable petroleum hydrocarbons	PHC F3
PAHs	Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h0anthracene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, pyrene
phenolic substances	phenol, pentachlorophenol, chlorophenols, nonchlorinated phenols (*e.g.,* 2,4-dinitrophenol, cresol, etc.)
chlorinated hydrocarbons	PCBs, tetrachloroethylene, trichloroethylene, dioxins and furans, trichlorobenzene, tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene
halogenated methanes	carbon tetrachloride, chloroform, dichloromethane
phthalate esters	di-isononyl phthalate (DINP), di-isodecyl phthalate (DIDP), di-2-ethylhexyl phthalate (DEHP)
pesticides	DDT, hexachlorocyclohexane

* Note: Specific chemicals that belong to the various classes are not limited to those listed in this table. These lists are not exhaustive and are meant just to provide examples of substances that are typically encountered.

Chemical-specific Properties
(Adapted from USEPA Soil Screening Criteria)

The information on Koc is used in Sheet II (Migration Potential), section 1,B,a (Relative Mobility).
The information on the dimensionless Henry's law constant is used in Sheet II (Migration Potential), section 4,B,a (Relative Volatility).
The information on log Kow is used in Sheet III (Exposure), section 3,B,a,iii (Potential for Ecological Exposure - terrestrial ingestion), and section 3,B,b,ii (Potential for Ecological Exposure - aquatic uptake potential).

CAS No.	Compound	Solubility in Water @ 20-25°C (mg/L)	Henry's Law Constant (atm-m3/mol)	Dimensionless Henry's law constant (HLC [atm-m3/mol] * 41) (25 °C).	log Kow	Log Koc (L/kg)
83-32-9	Acenaphthene	4.24E+00	1.55E-04	6.36E-03	3.92	3.85
67-64-1	Acetone	1.00E+06	3.88E-05	1.59E-03	-0.24	-0.24
309-00-2	Aldrin	1.80E-01	1.70E-04	6.97E-03	6.5	6.39
120-12-7	Anthracene	4.34E-02	6.50E-05	2.67E-03	4.55	4.47
56-55-3	Benz(a)anthracene	9.40E-03	3.35E-06	1.37E-04	5.7	5.6
71-43-2	Benzene	1.75E+03	5.55E-03	2.28E-01	2.13	1.77
205-99-2	Benzo(b)fluoranthene	1.50E-03	1.11E-04	4.55E-03	6.2	6.09
207-08-9	Benzo(k)fluoranthene	8.00E-04	8.29E-07	3.40E-05	6.2	6.09
65-85-0	Benzoic acid	3.50E+03	1.54E-06	6.31E-05	1.86	—
50-32-8	Benzo(a)pyrene	1.62E-03	1.13E-06	4.63E-05	6.11	6.01
111-44-4	Bis(2-chloroethyl)ether	1.72E+04	1.80E-05	7.38E-04	1.21	1.19
117-81-7	Bis(2-ethylhexyl)phthalate	3.40E-01	1.02E-07	4.18E-06	7.3	7.18
75-27-4	Bromodichloromethane	6.74E+03	1.60E-03	6.56E-02	2.1	1.74
75-25-2	Bromoform	3.10E+03	5.35E-04	2.19E-02	2.35	1.94
71-36-3	Butanol	7.40E+04	8.81E-06	3.61E-04	0.85	0.84
85-68-7	Butyl benzyl phthalate	2.69E+00	1.26E-06	5.17E-05	4.84	4.76
86-74-8	Carbazole	7.48E+00	1.53E-08	6.26E-07	3.59	3.53
75-15-0	Carbon disulfide	1.19E+03	3.03E-02	1.24E+00	2	1.66
56-23-5	Carbon tetrachloride	7.93E+02	3.04E-02	1.25E+00	2.73	2.24
57-74-9	Chlordane	5.60E-02	4.86E-05	1.99E-03	6.32	5.08
106-47-8	*p-Chloroaniline*	5.30E+03	3.31E-07	1.36E-05	1.85	1.82
108-90-7	Chlorobenzene	4.72E+02	3.70E-03	1.52E-01	2.86	2.34
124-48-1	Chlorodibromomethane	2.60E+03	7.83E-04	3.21E-02	2.17	1.8
67-66-3	Chloroform	7.92E+03	3.67E-03	1.50E-01	1.92	1.6
95-57-8	2-Chlorophenol	2.20E+04	3.91E-04	1.60E-02	2.15	—
218-01-9	Chrysene	1.60E-03	9.46E-05	3.88E-03	5.7	5.6
72-54-8	DDD	9.00E-02	4.00E-06	1.64E-04	6.1	6
72-55-9	DDE	1.20E-01	2.10E-05	8.61E-04	6.76	6.65
50-29-3	DDT	2.50E-02	8.10E-06	3.32E-04	6.53	6.42
53-70-3	Dibenz(a,h)anthracene	2.49E-03	1.47E-08	6.03E-07	6.69	6.58
84-74-2	Di-n-butyl phthalate	1.12E+01	9.38E-10	3.85E-08	4.61	4.53
95-50-1	1,2-Dichlorobenzene	1.56E+02	1.90E-03	7.79E-02	3.43	2.79

CAS No.	Compound	Solubility in Water @ 20-25°C (mg/L)	Henry's Law Constant (atm-m3/mol)	Dimensionless Henry's law constant (HLC [atm-m3/mol] * 41) (25 °C).	log Kow	Log Koc (L/kg)
106-46-7	1,4-Dichlorobenzene	7.38E+01	2.43E-03	9.96E-02	3.42	2.79
91-94-1	3,3-Dichlorobenzidine	3.11E+00	4.00E-09	1.64E-07	3.51	2.86
75-34-3	1,1-Dichloroethane	5.06E+03	5.62E-03	2.30E-01	1.79	1.5
107-06-2	1,2-Dichloroethane	8.52E+03	9.79E-04	4.01E-02	1.47	1.24
75-35-4	1,1-Dichloroethylene	2.25E+03	2.61E-02	1.07E+00	2.13	1.77
156-59-2	cis-1,2-Dichloroethylene	3.50E+03	4.08E-03	1.67E-01	1.86	1.55
156-60-5	trans-1,2-Dichloroethylene	6.30E+03	9.38E-03	3.85E-01	2.07	1.72
120-83-2	2,4-Dichlorophenol	4.50E+03	3.16E-06	1.30E-04	3.08	—
78-87-5	1,2-Dichloropropane	2.80E+03	2.80E-03	1.15E-01	1.97	1.64
542-75-6	1,3-Dichloropropene	2.80E+03	1.77E-02	7.26E-01	2	1.66
60-57-1	Dieldrin	1.95E-01	1.51E-05	6.19E-04	5.37	4.33
84-66-2	Diethylphthalate	1.08E+03	4.50E-07	1.85E-05	2.5	2.46
105-67-9	2,4-Dimethylphenol	7.87E+03	2.00E-06	8.20E-05	2.36	2.32
51-28-5	2,4-Dinitrophenol	2.79E+03	4.43E-07	1.82E-05	1.55	—
121-14-2	2,4-Dinitrotoluene	2.70E+02	9.26E-08	3.80E-06	2.01	1.98
606-20-2	2,6-Dinitrotoluene	1.82E+02	7.47E-07	3.06E-05	1.87	1.84
117-84-0	Di-n-octyl phthalate	2.00E-02	6.68E-05	2.74E-03	8.06	7.92
115-29-7	Endosulfan	5.10E-01	1.12E-05	4.59E-04	4.1	3.33
72-20-8	Endrin	2.50E-01	7.52E-06	3.08E-04	5.06	4.09
100-41-4	Ethylbenzene	1.69E+02	7.88E-03	3.23E-01	3.14	2.56
206-44-0	Fluoranthene	2.06E-01	1.61E-05	6.60E-04	5.12	5.03
86-73-7	Fluorene	1.98E+00	6.36E-05	2.61E-03	4.21	4.14
76-44-8	Heptachlor	1.80E-01	1.09E-03	4.47E-02	6.26	6.15
1024-57-3	Heptachlor epoxide	2.00E-01	9.50E-06	3.90E-04	5	4.92
118-74-1	Hexachlorobenzene	6.20E+00	1.32E-03	5.41E-02	5.89	4.74
87-68-3	Hexachloro-1,3-butadiene	3.23E+00	8.15E-03	3.34E-01	4.81	4.73
319-84-6	a-HCH (a-BHC)	2.00E+00	1.06E-05	4.35E-04	3.8	3.09
319-85-7	b-HCH (b-BHC)	2.40E-01	7.43E-07	3.05E-05	3.81	3.1
58-89-9	g -HCH (Lindane)	6.80E+00	1.40E-05	5.74E-04	3.73	3.03
77-47-4	Hexachlorocyclopentadiene	1.80E+00	2.70E-02	1.11E+00	5.39	5.3
67-72-1	Hexachloroethane	5.00E+01	3.89E-03	1.59E-01	4	3.25
193-39-5	Indeno(1,2,3-cd)pyrene	2.20E-05	1.60E-06	6.56E-05	6.65	6.54
78-59-1	Isophorone	1.20E+04	6.64E-06	2.72E-04	1.7	1.67
7439-97-6	Mercury	—	1.14E-02	4.67E-01	—	—
72-43-5	Methoxychlor	4.50E-02	1.58E-05	6.48E-04	5.08	4.99
74-83-9	Methyl bromide	1.52E+04	6.24E-03	2.56E-01	1.19	1.02
75-09-2	Methylene chloride	1.30E+04	2.19E-03	8.98E-02	1.25	1.07
95-48-7	2-Methylphenol	2.60E+04	1.20E-06	4.92E-05	1.99	1.96
91-20-3	Naphthalene	3.10E+01	4.83E-04	1.98E-02	3.36	3.3
98-95-3	Nitrobenzene	2.09E+03	2.40E-05	9.84E-04	1.84	1.81

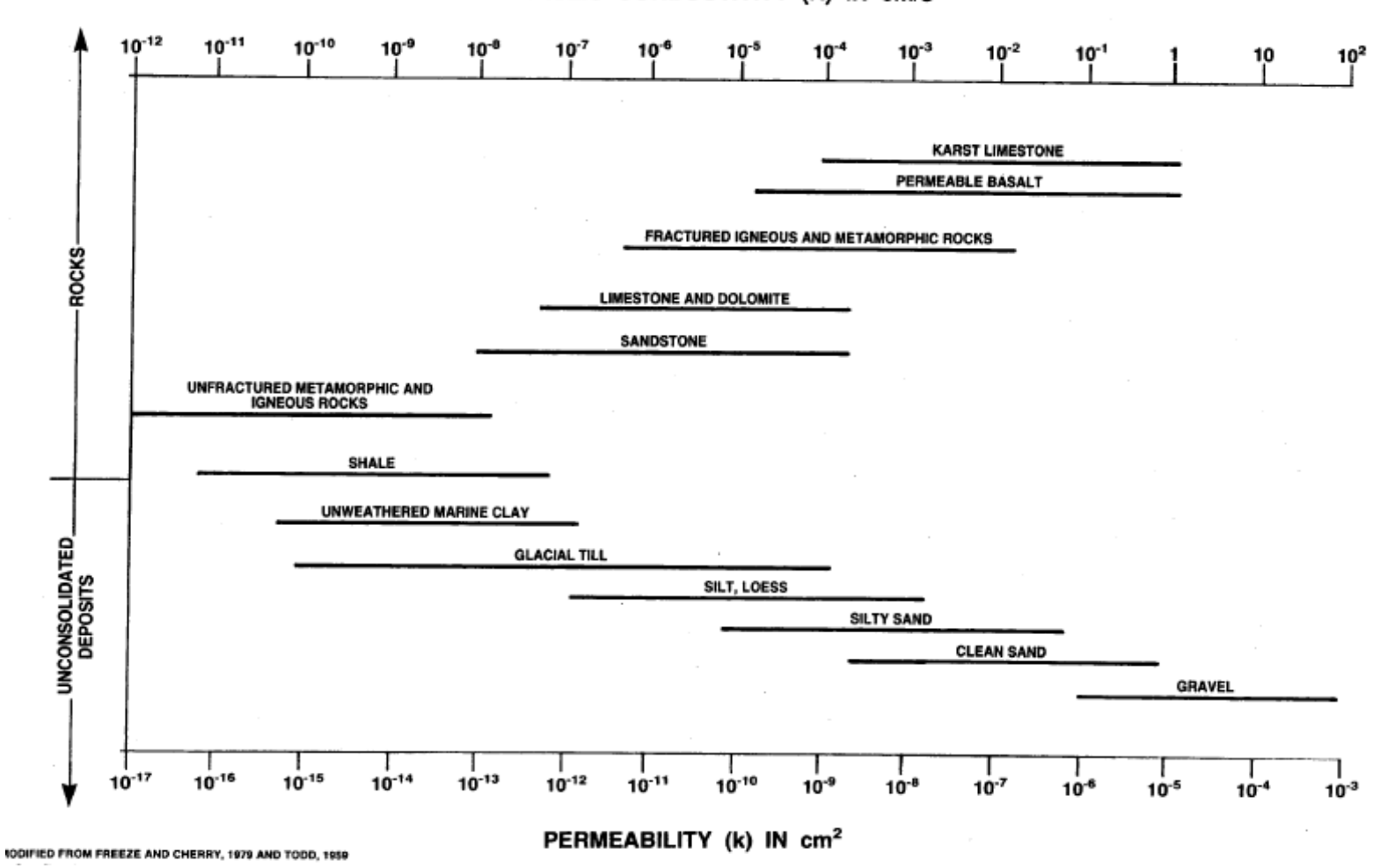
CAS No.	Compound	Solubility in Water @ 20-25°C (mg/L)	Henry's Law Constant (atm-m3/mol)	Dimensionless Henry's law constant (HLC [atm-m3/mol] * 41) (25 °C).	log Kow	Log Koc (L/kg)
86-30-6	N-Nitrosodiphenylamine	3.51E+01	5.00E-06	2.05E-04	3.16	3.11
621-64-7	N-Nitrosodi-n-propylamine	9.89E+03	2.25E-06	9.23E-05	1.4	1.38
1336-36-3	PCBs	—	—	—	5.58	5.49
87-86-5	Pentachlorophenol	1.95E+03	2.44E-08	1.00E-06	5.09	—
108-95-2	Phenol	8.28E+04	3.97E-07	1.63E-05	1.48	1.46
129-00-0	Pyrene	1.35E-01	1.10E-05	4.51E-04	5.11	5.02
100-42-5	Styrene	3.10E+02	2.75E-03	1.13E-01	2.94	2.89
79-34-5	1,1,2,2-Tetrachloroethane	2.97E+03	3.45E-04	1.41E-02	2.39	1.97
127-18-4	Tetrachloroethylene	2.00E+02	1.84E-02	7.54E-01	2.67	2.19
108-88-3	Toluene	5.26E+02	6.64E-03	2.72E-01	2.75	2.26
8001-35-2	Toxaphene	7.40E-01	6.00E-06	2.46E-04	5.5	5.41
120-82-1	1,2,4-Trichlorobenzene	3.00E+02	1.42E-03	5.82E-02	4.01	3.25
71-55-6	1,1,1-Trichloroethane	1.33E+03	1.72E-02	7.05E-01	2.48	2.04
79-00-5	1,1,2-Trichloroethane	4.42E+03	9.13E-04	3.74E-02	2.05	1.7
79-01-6	Trichloroethylene	1.10E+03	1.03E-02	4.22E-01	2.71	2.22
95-95-4	2,4,5-Trichlorophenol	1.20E+03	4.33E-06	1.78E-04	3.9	—
88-06-2	2,4,6-Trichlorophenol	8.00E+02	7.79E-06	3.19E-04	3.7	—
108-05-4	Vinyl acetate	2.00E+04	5.11E-04	2.10E-02	0.73	0.72
75-01-4	Vinyl chloride	2.76E+03	2.70E-02	1.11E+00	1.5	1.27
108-38-3	m-Xylene	1.61E+02	7.34E-03	3.01E-01	3.2	2.61
95-47-6	o-Xylene	1.78E+02	5.19E-03	2.13E-01	3.13	2.56
106-42-3	p-Xylene	1.85E+02	7.66E-03	3.14E-01	3.17	2.59

Source: United States Environmental Protection Agency. 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128 (Part 5: Chemical-Specific Parameters)

CAS = Chemical Abstracts Service
Kow = Octanol/water partition coefficient

RANGE OF VALUES OF HYDRAULIC CONDUCTIVITY AND PERMEABILITY

The information on Koc is used in Sheet II (Migration Potential), section 1,B,f (Hydraulic Conductivity)



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APPENDIX F

Species at Risk Assessment

TECHNICAL MEMORANDUM

DATE March 30, 2023 **Project No.** 22532464

TO Annette Murphy
DCC

CC James Doyle, WSP

FROM Fergus Nicoll **EMAIL** Fergus.Nicoll@wsp.com

TERRESTRIAL AND AQUATIC HABITAT, PLANT HEALTH, AND SPECIES AT RISK ASSESSMENT DEFENCE CONSTRUCTION CANADA FORMER RIFLE RANGE, BURGEO, NEWFOUNDLAND

Introduction and Background

To support a Human-Health and Ecological Risk Assessment (HHERA), WSP Canada Inc. (WSP) (formerly Golder Associates Ltd.) conducted a habitat assessment and an update to a species at risk (SAR) assessment for Defence Construction Canada (DCC), at the former rifle range, Burgeo, Newfoundland (the Site).

A desktop SAR screening was completed for the Site in March 2022 (Golder 2022). To confirm the results of this screening, and to provide additional information characterizing terrestrial and aquatic habitat on the Site, a qualitative assessment was carried out and is presented in this memorandum. In addition, as part of this assessment, two waterbodies, that are representative of the Site (Ponds 3 and 4, see Figure 1 for location plan), and a candidate reference waterbody off-Site, were identified and confirmed as suitable sampling locations.

Species at Risk Act

The Canada *Species at Risk Act* (SARA) was created in 2003 as part of a strategy for protecting species at risk (SAR), in conjunction with an Accord for the Protection of Species at Risk and a Habitat Stewardship Program for Species at Risk. SARA is intended to prevent the extinction of species, subspecies or distinct populations, as well as provide populations with the opportunity to recover. This was accomplished through the establishment of an independent body to assess and identify SAR in Canada: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Endangered Species Act

The Newfoundland and Labrador *Endangered Species Act* (ESA) was created in 2001 and provides protection for plant and animal SAR in the province, and fulfils a commitment made under the National Accord for the Protection of Species at Risk. Species are designated under the ESA following recommendations from COSEWIC and/or the Species Status Advisory Committee (SSAC).

Methodology

A field survey at the Site was conducted by a qualified biologist, Fergus Nicoll, on September 6, and September 7, 2022. The study area assessed as part of the field survey is outlined on Figure 1.

Habitat Assessment

To conduct the habitat assessment, the majority of the Site was walked, using an area search method. Aquatic features were not surveyed by boat, but an attempt was made to walk the shorelines of most waterbodies, where habitat observations were made. In addition, water quality data (i.e., water temperature, pH, and dissolved oxygen) was collected on a sub-set of the aquatic features on the Site. An off-site candidate reference water body, approximately 250 meters (m) northwest of the Site, was also surveyed.

The field survey was conducted near the end of the growing season for many plants and outside the survey windows for most wildlife. However, all wildlife observed utilizing the Site were noted, as well as any notable behaviours. Aquatic sampling was not conducted; however, an attempt was made to collect visual observations of aquatic plants and animals where possible. In shallow littoral zones, observations were made visually using polarized glass, and debris such as rocks and wood were lifted to assess for presence of aquatic invertebrates. An effort was also made to identify potential habitat for wildlife species, both terrestrial and aquatic species.

Plant Health Assessment

To assess the health of the vegetation, loose transects were established in the field across the majority of the exposure area and surrounding vicinity. The exposure area is represented by the Firing Area labelled on Figure 1, which has the highest concentrations of contaminants associated with previous Site activities. In some areas rough terrain and dense vegetation did not allow for transects to be safely walked. In these locations an area search method was used, accessing as many areas as possible.

A visual inspection of all plants encountered was undertaken, allowing for the assessment of general condition and vigour of individual plants and plant communities. When large numbers of individual stems were encountered in a small area, overall health of groupings of plants were assessed.

Stressed plants or plant communities may be the result of normal dieback and natural conditions (e.g., drought, leaf senescence), anthropogenic physical factors (e.g., human use and disturbance), or soil contamination. To identify the signs of stress, the natural processes of individual species and the plant communities present, as well factors such as soil type, moisture regime and local climate were considered, where possible. The causes of any bare patches of soil (e.g., soil contamination or other natural or anthropogenic sources of disturbances) were determined, if possible.

Results and Discussion

Plant Community and Terrestrial Habitat Description

Overall, the Site has plant communities typical of coastal barrens, including a mosaic of bedrock barrens, low and tall shrub thickets, as well as small patches of meadow and stunted treed areas. The terrain was complex, with bedrock areas of higher elevations, sometimes with steep slopes, as well as some valleys, lowland areas, and gentle slopes. Substrate ranged from bare or almost bare bedrock to boulders and cobbles, shallow silt and sand, and organic peat ranging from shallow to deep. Rocky and open areas contain lichens, liverworts mosses, and a variety of low shrubs, forbs, and graminoids such as black crowberry (*Empetrum nigrum*), creeping juniper (*Juniperus horizontalis*), Canada burnet (*Sanguisorba canadensis*), bunchberry (*Cornus canadensis*), sedges (*Carex* spp.), and oat grasses (*Danthonia* spp.). In some areas, such as along valleys, and other areas with deeper soils, taller woody vegetation dominates, including shrubs and trees such as green alder (*Alnus alnobetula*), American mountain ash (*Sorbus americana*), mountain holly (*Ilex mucronata*), serviceberry (*Amelanchier* sp.), white birch (*Betula papyrifera*), black spruce (*Picea glauca*), and balsam fir (*Abies balsamea*).

No true forests occur, although moderately larger trees are found scattered and in patches, particularly along north facing slopes.

The vast majority of the Site contains native, naturally occurring, plant communities. The only indication of anthropogenically influenced plant communities are very small patches in and around the disturbed areas, immediately adjacent to the Site access road. The disturbed areas include very small patches of vegetation that is typical of cultural meadows, such as Timothy grass (*Phleum pratensis*), quack grass (*Elymus repens*), and dandelion (*Taraxacum officinale*). The source of the disturbed plant communities is likely from vehicular traffic and other minimal anthropogenic use (e.g. foot traffic, littering, bonfires etc.). The approximate locations of the disturbed plant communities are shown on Figure 1.

Although a detailed survey of potentially edible plants was not completed as part of this assessment, some edible plants were noted. For example, blueberries (*Vaccinium angustifolium)*, small cranberry (*Vaccninium oxycoccus*), and to a lesser extent cloudberry (*Rubus chamaemorus*), were widespread and abundant throughout the Study Area, including the exposure area.

Wetland Habitat Description

Wetlands are common throughout the Site, although because of the rocky soil and plant species present, the boundary between wetland and upland is sometimes hard to discern. Wetlands on the Site are dominated by bogs and fens, with the bog areas being hydrologically isolated, and the fens associated with the permanent and intermittent streams and other waterbodies on the Site. Additional shallow water marshy areas occur in the shallow portions of some of the lakes on the Site. The bogs and fens are somewhat similar in their plant community, with a variety of wetland species present such as sphagnum moss (*Sphagnum* spp.), Labrador tea (*Rhododendron groenlandicum*), small cranberry (*Vaccinium oxycoccos*), sundews (*Drosera* spp.), pitcher plant (*Sarracenia purpurea*), bog aster (*Oclemena nemoralis*), and bog buckbean (*Menyanthes trifoliata*).

Aquatic Habitat Description

The Site contains several surface water features, including many small to medium sized lakes, ponds, and wetland pools. There are also a few streams, both intermittent and permanent, that hydrologically connect many of the lakes and ponds together. Some of the smaller lakes and ponds on the Site appear to be hydrologically isolated, particularly those smaller ponds that are associated with the wetlands on the Site.

None of these waterbodies were surveyed by boat, so maximum depth, and habitat characteristics of deeper portions of the basins is not known. However, those areas that could be observed and accessed from shore were assessed. In the larger waterbodies, depths ranged from 0.2 m to over 5 m, and substrate was a mixture of bedrock, boulders, cobbles, sand, and silt, with some areas of shallow organics. Within some of the larger waterbodies are shallow bays where aquatic vegetation persists, including emergent, submergent, and floating plants such as spadderdock (*Nuphar variegata*), pipewort (*Eriocaulon aquaticum*), floating heart (*Nymphoides* sp.), and common bladderwort (*Utricularia vulgaris*). There are also algae present throughout most waterbodies and streams. Where measured, in these larger waterbodies, water temperature ranged from 17 to 19.5 °C, pH ranged from 6.2 to 7.0, and dissolved oxygen ranged from to 7.1 to 8.3 mg/L. Green frogs (*Lithobates clamitans*) were also in and adjacent to several waterbodies throughout the Site. Many of these waterbodies are fish habitat, confirmed by actual observations of fish, or inferred due to hydrological connections with other waterbodies. However, surface water connections could not be confirmed for all of these waterbodies. Small-bodied fish

including small salmonids were observed in several of these features, although no large schools of fish were observed.

The streams include larger more permanent streams, with a series of riffles, runs and pools, where fish occur or are assumed to occur. Smaller, intermittent streams also occur, sometimes flowing through the wetland features. The source of some of these smaller streams is unknown, but they appear to be primarily fed through rain and snow melt, and no springs or seeps were identified. Some aquatic invertebrates (e.g., caddisfly larva), were observed in the permanent streams, as well as small-bodied fish, including salmonids.

The smaller isolated wetland pools ranged from 0.1 m to over 2 m deep. These pools were typical of bog pools and on average were more acidic than the larger connected waterbodies, with pH ranging from 5.8 to 6.3. These pools are unlikely to support fish, however green frogs were observed utilizing them as habitat.

While several of the surface water features on Site are confirmed or potential fish habitat, Ponds 1 and 2 are not fish habitat. These two ponds are small and isolated from other surface water features on the Site.

Representative Waterbodies On-Site

Two waterbodies, relatively close to the exposure area, were narrowed down as potential representative waterbodies for the HHERA and associated sediment and surface water sampling. This includes the waterbody where surface water stations BFR-L1-SW60 and -61 were collected (Pond 3), and the waterbody where surface water stations BFR-L1-SW58 and -59 were collected (Pond 4).

Pond 3 is a moderately sized lake near the southern edge of the Site. It ranges in depth from 0.1 m along the shoreline to > 2 m further out in the main basin. The substrate is a mixture of bedrock, cobbles, and coarse sand, with some organics observed. There is at least one shallow bay at the eastern edge of the basin, where aquatic vegetation is relatively abundant. At the time of the field survey the water temperature was 18.7 °C, the pH was 6.9, and dissolved oxygen was 7.69 mg/L. A few individual small-bodied fish were observed, along with caddisfly larva and whirligig beetles. This waterbody has at least one permanent stream that flows into it, which appears to be connected with other waterbodies both on and off the Site. A small flock of Canada geese (*Branta canadensis*), as well as a few individual green frogs, were observed loafing here during surveys.

Pond 4 is a smaller lake near the western edge of the Site. It ranges in depth from 0.1 m along the shoreline to > 2 m. The substrate is similar to Pond 3, but with more boulders and organics observed. A moderate amount of aquatic vegetation was observed throughout, especially in the shallower littoral zone. At the time of the field survey the water temperature was 18.1 °C, the pH was 6.2, and dissolved oxygen was 7.18 mg/L. No fish were observed at this pond, but whirligig beetles were. It appears that this waterbody is hydrologically isolated, at least during the time of the field survey, from other adjacent waterbodies.

Although no two waterbodies will ever be exactly alike, when compared with the rest of the waterbodies on the Site, these two waterbodies appear to be representative and cover the majority of the broad range of aquatic conditions encountered throughout the Site.

Reference Waterbody

The reference waterbody is a medium to relatively large lake, approximately 500 m northwest of the Site. It is also the location of surface water stations BFR-L1-SW62, -63, and -64. The portions accessed range from 0.1 m to >2 m deep. The substrate is a mixture of bedrock, cobbles, gravel, and coarse sand, with some organics observed. There are shallow bays, where aquatic vegetation is relatively abundant, as well as deeper portions

further out in the basin. At the time of the field survey the water temperature was 18.7 °C, the pH was 7.0, and dissolved oxygen was 7.69 mg/L. A few individual small-bodied fish were observed, along with caddisfly larva, and whirligig beetles. This waterbody has at least two permanent streams that flow into it, which appear to be connected with other waterbodies both on and off the Site. A small flock of American black duck (*Anas rubripes*) as well as a few individual green frogs, were observed loafing here during surveys.

Plant Health Assessment

All of the plants and plant communities are well established and showing vigour. The only portions of the Site that show any anthropogenic effects are in the immediate area of the access road. In this area, some plants have been knocked over and stunted due to physical disturbance (e.g., vehicular traffic and campfires). None of the plants are showing any signs of effects from contamination (e.g. chlorosis, necrosis), and there were no abnormal signs of delayed growth or unusual dieback.

Species at Risk

In March 2022, a desktop SAR assessment was completed that identified four SAR as having a moderate to high likelihood of occurrence at the Site (Golder 2022). Although taxa-specific surveys within the appropriate timing windows were not completed for these SAR, with the exception of boreal felt lichen, habitat information was collected during the field survey, and the SAR assessment was updated based on this. Refer to Table 1 below for the updated SAR assessment. Table 1 includes all the SAR originally assessed as having a moderate to high likelihood of occurrence, as well as the updated likelihood, if any. No actual SAR were observed during the field survey.

The one SAR that had its likelihood of occurrence re-assessed was boreal felt lichen. Given that this species is conspicuous and present all year round, it was searched for and not found. Potential suitable habitat for other SAR species was confirmed to be present during the field survey.

Table 1: Updated SAR Assessment

Common Name	Scientific Name	COSEWIC[a]	SARA[b]	ESA[c]	Updated Likelihood of Occurrence on the Site, after Habitat Surveys.
Boreal felt lichen	*Erioderma pedicellatum*	Endangered	Endangered	Vulnerable	Low – this species was searched for during the field survey and not observed.
Short-eared owl	*Asio flammeus*	Special Concern	Special Concern	Vulnerable	Moderate– the open areas that make up the majority of the Site provide suitable foraging and nesting habitat for this species.
American eel	*Anguilla rostrata*	Threatened	No Status	Vulnerable	Moderate – larger waterbodies, connected by streams on the Site, may be suitable habitat for this species.
Banded killifish	*Fundulus diaphanus*	Special Concern	Special Concern	Vulnerable	Moderate – several of the waterbodies on the Site are suitable habitat for this species.

Notes:

[a] Committee on the Status of Endangered Wildlife in Canada

[b] Canada *Species at Risk Act* (Schedule 1)

[c] Newfoundland and Labrador *Endangered Species Act* (ESA)

Aquatic and Terrestrial Wildlife

Wildlife activity and evidence on the Site during the field survey was relatively low, with the exception of a few species. This is likely due, at least in part, the timing of the survey (i.e., outside the breeding window for birds), but also potentially due to the habitat present. A few species of birds were observed foraging on and flying over the Site. This included moderate numbers of savannah sparrow (*Passerculus sandwichensis*), a small flock of Canada geese, and scattered individuals of American black duck, American robin (*Turdus migratorius*), American crow (C*orvus brachyrhynchos)*, common yellowthroat (*Geothlypis trichas*), hermit thrush (*Catharus guttatus*), and yellow-rumped warbler (*Setophaga coronata*). Very little evidence of mammals was present. However, a few tracks and trails of what appeared to be moose (*Alces alces*) and/or boreal woodland caribou (*Rangifer tarandus caribou*) did occur sporadically. Both of these species are known to occur in the region (iNaturalist 2022). A single meadow vole (*Microtus pennsylvanicus*) was observed, but its likely that this species only occurs in small numbers due to minimal available habitat (i.e., grassy areas). Herptile activity was limited to several green frogs seen throughout many of the waterbodies and other surface water features on the Site. Terrestrial invertebrates seen included several mourning cloak (*Nymphalis antiopa*) and American lady (*Vanessa virginiensis*) butterflies, a few unidentified dragonflies, and numbers of ants.

Aquatic species observed included small unidentified Salmonids in the larger lakes and streams on the Site, including one brook trout (*Salvelinus fontinalis*) and a few individual three-spined stickleback (*Gasterosteus aculeatus*). In addition, aquatic invertebrates such as caddisfly larva (Trichoptera), dragonfly nymphs (Odonata), stonefly nymphs (Plecoptera), whirligig beetles (Gyrinidae), and a single leach (Hirudinea) were observed.

WSP Canada Inc.

Fergus Nicoll
Senior Ecological Technician

FN/JD/LF/sg
https://golderassociates.sharepoint.com/sites/164365/project files/6 deliverables/2. report/final/appendix f - sar/22532464-burgeo habitat assessment 2022.docx

Attachments: Figure 1 - Habitat Assessment

References:

Golder Associates Ltd (Golder) 2022. Additional Assessment – Steps 5 to 7 of the Federal Approach to Contaminated Sites. Former Burgeo Rifle Range, Burgeo, NL. Golder Report # 21497139.

iNaturalist. Available from https://www.inaturalist.org. Accessed [October 2022].

LEGEND

- ROADWAY
- WATERCOURSE
- WATERBODY
- DISTURBED AREA
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- ECOLOGICAL STUDY AREA
- SITE

0 100 200 400

1:5,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HIS MAJESTY THE KING IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE

HABITAT ASSESSMENT

CONSULTANT

wsp

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	FN
APPROVED	JD

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0003	0	**1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: S:\Clients\Defence_Construction_Canada\Burgeo_Range_Site_NL\99_PROJ\22532464_DCC_Enviro\40_PROD\0003_Habitat_Assessment\22532464-0003-HS-0001.mxd

APPENDIX G

Remediation & Risk Management Strategy

REPORT

Remedial and Risk Management Strategy

Former Burgeo Rifle Range, Burgeo, NL

Submitted to:

Defence Construction Canada

6231 Engineer's Bay, Bldg WL7
Halifax, NS
B3K 5M6

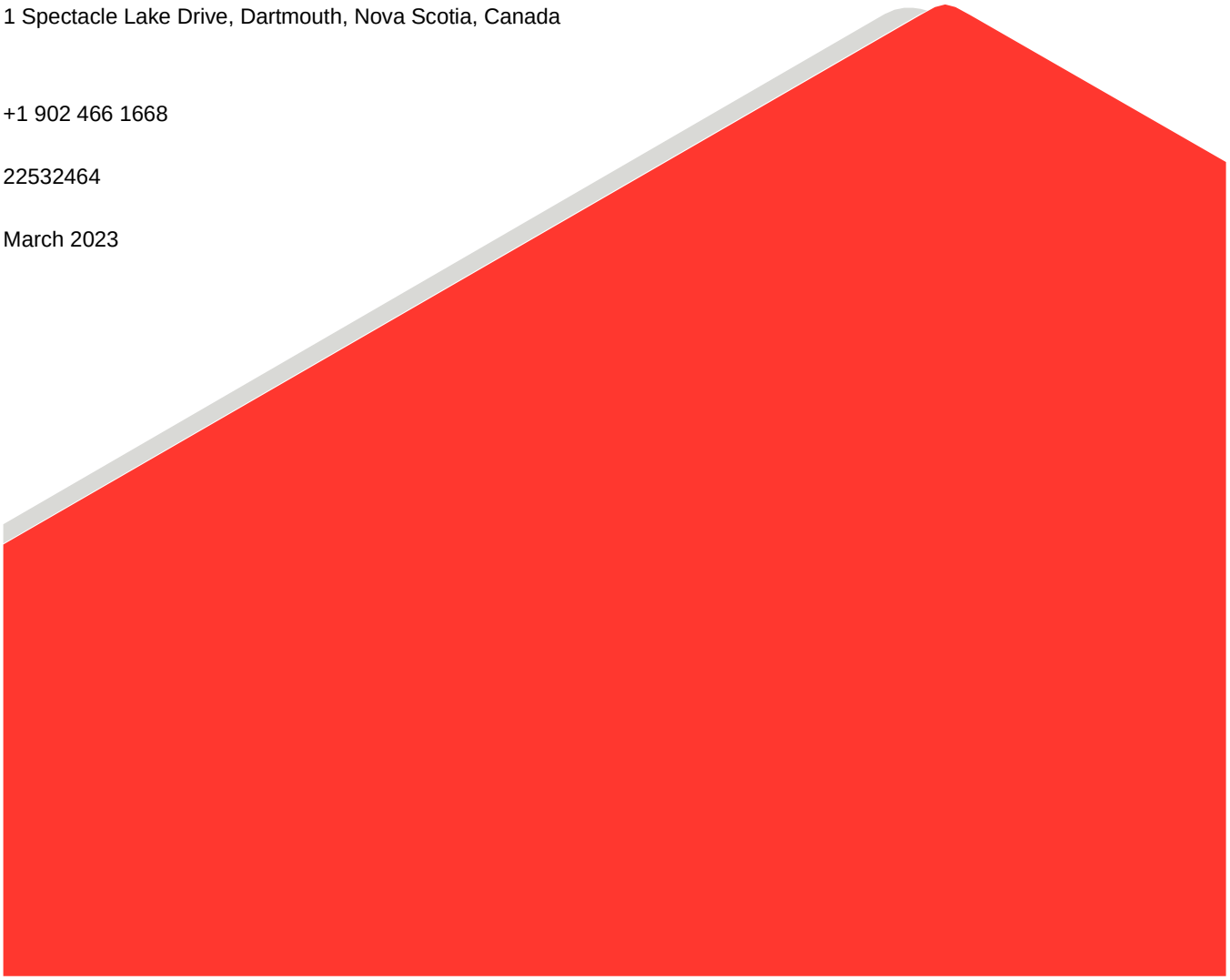
Submitted by:

WSP Canada Inc.
1 Spectacle Lake Drive, Dartmouth, Nova Scotia, Canada

+1 902 466 1668

22532464

March 2023



Distribution List

1 copy - DND

1 e-copy - DCC

1 e-copy - WSP Canada Inc.

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1.0 INTRODUCTION

WSP Canada Inc. (WSP) formerly Golder Associates Ltd. (Golder), is pleased to submit this Remedial and Risk Management Strategy (RRMS) to Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), for the Burgeo Range, Burgeo, NL, in accordance with the Contaminated Site Management Working Group's Federal Approach to Contaminated Sites (FACS). This report is based on the Statement of Work (SOW) provided by DCC, dated September 2021 (file number GR082101), and Golder's proposal dated July 8, 2022.

1.1 Scope of Work

The RRMS includes the following main items:

- A summary of previous investigations, identifying substances of concern (SOCs), affected media, and quality of materials to be managed.
- A summary of the quantity and make-up of debris to be managed.
- A summary of the overall Site closure strategy.
- Details on remedial excavation, backfilling, sediment dredging, surface water pumping, and Site restoration. This includes an implementation plan for remediation which outlines control measures to minimize risks of contaminant release into the environment, and logistics management.
- Details on the process of debris clean-up.
- Details on regulatory and administrative requirements for the proposed undertaking.

2.0 BACKGROUND

2.1 Site Description

DND is responsible for a former small arms rifle range set up near the Town of Burgeo (the former Burgeo range). The property was leased from the Government of Newfoundland and Labrador (NL) (Crown lands) for use by the 5th Canadian Ranger Patrol Group (5CRPG) in 2008 (referred to as Location 1 – see Site plan provided in Figure 1). Use of the Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Province of NL (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required. The actual firing range is located just to the south of the property boundary of the leased lands. The firing range and its immediate surroundings are referred to as the 'firing area' throughout this report (see Figure 1). A number of ponds/lakes and wetland areas are located within Location 1.

A second location (Location 2), near Location 1 but across the road, to the north and west, was also used as a firing range by 5CRPG. This range was originally put in place by the Local Wildlife Office and 5 CRPG planned to use a portion of this range. There is a small stream flowing through Location 2, as well as a few small ponds and marshes. Figure 1 shows the Site plan, including Locations 1 and 2.

In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though

'No Trespassing' and 'Range Closed' signs had been installed at the Range. Initial assessment work was completed at Location 1 in 2020 (Golder, 2021), along with additional assessment at Location 1 and initial assessment at Location 2 in 2021 (Golder, 2022). The final detailed assessment at Location 1 was conducted in 2022 (WSP, 2023). General findings indicated soil, groundwater, sediment and/or surface water impacts for various metals and/or Polycyclic Aromatic Hydrocarbons (PAHs) in comparison to applicable guidelines.

There is limited infrastructure on Site (a gravel access road to Location 1) and no engineered controls. A provincially protected water supply (for Long Pond – which supplies water for the town of Burgeo) intersects the Site. The location of the provincially protected water supply is shown on Figure 1. Two small ponds (Ponds 1 and 2) are located immediately adjacent to the firing backstops/bullet catches in the firing area, also shown on Figure 1.

2.1.1 Golder 2021 Report on Steps 1 to 4 of the FACS

The Golder 2021 report entitled "Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL" provided an initial testing program for the Site. The Site was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zone 3 is located approximately 1,150 m away from the zone 1 high-risk area and is considered to be representative of background conditions. Based on the findings of the analytical program, petroleum hydrocarbon (PHC) exceedances were identified in soil and sediment at the Site. However, additional analyses conducted by the laboratory indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several elevated concentrations of metals were identified in soil, sediment, and surface water were identified, but many were considered naturally occurring due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggested that the elevated concentrations of these metals are common to the Site and suggested that zone 3 can be considered representative of background conditions. However, presence of lead, tin and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1, were attributed to bullets and casings from firing activities which included the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Soil, surface water and sediment exceedances on the Site that are not considered naturally occurring are located in the area of the former firing range. Lead and iron concentrations in surface water are present in the pond adjacent to the former firing range, which discharges to the south toward Long Pond (a drinking water source for the Town of Burgeo), located approximately 1.2 km hydraulically down-gradient of the Site. Elevated iron concentrations are noted in the source water database for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal (collected from 1998 to 2018) suggesting iron is associated with background concentrations in the region. Lead concentrations in Long Pond source water data have been below the Guidelines for Canadian Drinking Water Quality.

Data gaps were identified with regards to site-specific background concentrations, potential leachate from soil to groundwater and delineation of localized metals contamination in soil, sediment, and surface water. As such, additional assessment was recommended to mitigate the identified impacts at the Site including collection of soil samples to laterally delineate the identified impacts and evaluate potential leaching into groundwater. In order to

evaluate groundwater quality at the Site, installation of monitoring wells was recommended. Additional soil, sediment and surface water samples to establish Site-specific background concentrations were also recommended. A species at risk public registry search was recommended to be completed to confirm if species at risk are documented on or near the Site and to identify if the Site is considered critical habitat. It was noted that mitigation measures may involve risk assessment followed by remedial option evaluation.

2.1.2 Golder 2022 Report on Steps 5 to 7 of the FACS

The Golder 2022 report entitled “Steps 5 to 7 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL” provided an extended testing program for the Site in addition to previous testing. This testing program included additional assessment (at Location 1) and initial assessment (at Location 2), delineation of previously found contamination, and a re-classification of the Site.

Based on the findings of the analytical program, PHC and PAH concentrations in all soil samples analyzed were below the applicable guidelines. Several metal exceedances in soil were identified and many were attributed to the elevated background concentrations common to the Site and surrounding area. Exceedances of boron, cadmium, iron, and selenium were inferred to be due to naturally elevated background concentrations. However, the elevated presence of antimony, copper, lead, manganese, tin, vanadium and zinc in soil at Location 1 and Location 2 was identified and attributed to site activities. Exceedances near the firing locations and bullet catches were considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice. The same metals exceedances found in samples collected outside of the immediate vicinity of the firing area may be due to firing activities at the Site, however, this was not confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, wind transport and deposition from the firing area, or other sources may be the reasons for impacts outside the immediate vicinity of the firing area.

Based on the findings of the analytical program, PHC exceedances were identified in sediment at the Site. However, additional analyses conducted by the laboratory indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Exceedances of PAHs were identified and likely related to historical activities that occurred at the DND firing range. Sediment exceedances of arsenic, cadmium, lead, and mercury in samples collected from waterbodies in the vicinity of the firing area in Location 1 – Zone 1 and Location 2 were considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possible hunting). Sediment exceedances of chromium, iron, and selenium were considered elevated due to naturally occurring background concentrations that were not associated with historical activities at the Site. Full delineation was not achieved as there were delineation samples with results similar to what was found in previous sampling programs.

The PHCs and PAHs concentrations in all surface water samples analyzed were below the applicable guidelines and regulations. Exceedances of iron, copper, lead, and zinc were identified. The exceedances of lead and copper are considered to have likely resulted from the firing activities; exceedances of iron and zinc are considered background for the region.

The PHCs and PAHs concentrations in all groundwater samples analyzed were below the applicable guidelines and regulations. Exceedances of the applicable guidelines of cadmium, cobalt, copper, iron and zinc were found in groundwater samples collected on Site. It is possible that exceedances are related to firing activities; however, comparisons to background data have yet to be completed, and therefore the source of the exceedances cannot be confirmed as of the writing of this report.

Based on the findings of the assessment, a NCSCS score of 62.0 was calculated for the Burgeo Range, leading to a Site Letter Grade C Class 2 site with a medium priority for action. Elevated impacts in soil, sediment, and surface water in the firing area in Location 1 were recommended to be addressed through remedial measures, while scattered impacts in soil, sediment, and surface water in areas of the Site not in close proximity to the former DND firing range were recommended to be addressed through a risk management approach. Additional assessment was recommended to assess data gaps to support both the remediation strategy in the firing area as well as future risk management work for the farther out areas.

2.1.3 WSP 2023 Report on Steps 5 to 7 of the FACS

The WSP 2023 report entitled “Steps 5 to 7 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL” provided an extended testing program for the Site. The investigation program included delineation of previously found impacts and further characterization of the Site and background conditions.

Based on the findings of the analytical program, metals concentrations in soil (Location 1), sediment (Locations 1 and 2), surface water (Locations 1 and 2), and groundwater (Location 1), as well as PAH concentrations in sediment (Locations 1 and 2), have been found to exceed the applicable guidelines, and are attributed or likely attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Based on the findings of the investigation, the NCSCS score was calculated to be 74.4 for the former Burgeo Range. As such, the former Burgeo Range was re-classified as a Site Letter Grade C, Class 1 site with a high priority for action.

Horizontal and vertical delineation of impacts in soil was reasonably achieved. Given that the firing backstop material was found to contain hazardous concentrations of leachable lead, and that lead was elevated in the backstop locations, impacts were delineated around these two locations, and were recommended to be remediated through source removal. The remaining impacts in soil on-Site, were carried forward for Risk Assessment. A Site-Specific Human-Health Ecological Risk Assessment was prepared.

Concentrations of lead in surface water exceeding the Newfoundland and Labrador Drinking Water Quality Guidelines (NL DWQ) and Health Canada Drinking Water Quality Guidelines (HC GCDWQ) (applicable to the provincially protected water supply for the Town of Burgeo) were only found in BFR_L1_SW4, which was collected from Pond 2 (one of the two small ponds adjacent to the firing area). Lead concentrations in Pond 1 were only marginally below the NL DWQ and HC GCDWQ. Lead concentrations in sediment in Ponds 1 and 2 were found up to 770 mg/kg, over 5 times as high as anywhere else on-Site. As such, it was recommended that the surface water and sediment in Ponds 1 and 2 be remediated, to remove all media with the potential to impact the provincially protected water supply for the Town of Burgeo. The remaining impacts in sediment and surface water on-Site were carried forward for Risk Assessment.

2.1.4 Site Setting, Topography, Geology, and Hydrology

Most of the Site consists of vacant tundra-type landscape. The site is vegetated with grasses, shrubs, and small trees. Bedrock outcrops are present on Site and make up a significant portion of the Site area. Location 1 is accessed by a gravel road off of the highway. Location 2 does not have an access road. It was previously accessible directly off the highway, through a small parking lot; however, a ditch was constructed between the highway and the parking lot that has blocked off vehicle access to the Site. A water reservoir for the Town of Burgeo is located approximately 1.2 km south of the Site. The associated protected water supply area intersects Location 1 (see Figure 1).

Based on area mapping, the surficial geology in the vicinity of the Site is expected to consist predominantly of exposed bedrock with little or no soil or vegetation cover and with rare patches of till and other surficial soil types (Liverman and Taylor, 1994). The bedrock geology in the vicinity of the Site consists of weakly foliated to massive, coarse grained, variably K-feldspar porphyritic, biotite granite and adamellite (Gander Zone, Burgeo Granite) (O'Brien and Dickson, 1986).

Based on observations made during previous field programs, the surficial geology at the Site consisted of dark brown silt to sand, with significant covering of silty peat and bog. Soil depth varied highly from non-existent (bedrock outcrops) to 2.4 metres below ground surface (mbgs).

The topography of Location 1 is undulating hills with rocky outcrops and low-lying pond/wetland areas. In Location 2, a large rocky outcrop is found to the west of the firing point and acts as a natural backstop for rifle fire.

Non-potable groundwater conditions are applicable as no potable wells are in the vicinity of the Site; however, surface water bodies on the Site are hydraulically connected (through a series of creeks and ponds) to Long Pond, located approximately 1.2 km to the south (Figure 1). Long Pond is the water supply for the Town of Burgeo. Based on topography and Site observations, surface water is generally inferred to flow from north to south across the Site.

3.0 REMEDIAL / RISK MANAGEMENT OBJECTIVE

The overall objective for the Site is to address contamination to support DND in receiving regulatory closure of the Site from the Government of Newfoundland and Labrador (NL) (provincial regulator). In addition, surficial debris on the Site require management because of concerns such as safety and aesthetic issues. This RRMS has been developed to outline the approach for remediation and risk management required to bring the Site to closure.

3.1 Approach to Site Closure

To achieve the overall objective, the following remedial options were considered for the Site:

- Remediation of impacted media (soil, sediment, and surface water) to meet applicable criteria, specifically:
  - **Soil Excavation and Off-Site Disposal:** impacted soil is excavated using heavy machinery where accessible, or smaller equipment on steep and difficult to access areas and loaded into trucks for transport and disposal at engineered landfills licensed to accept the hazardous contaminated soil present at the Site. Clean fill can be imported to the Site and used to backfill the excavated areas.
  - **Sediment Dredging and Off-Site Disposal:** the ponds containing impacted sediment are proposed to be pumped dry prior to excavation using heavy machinery where accessible **or** hydraulically dredging the remaining sediment using hydraulic vacuuming. The sediment would then be loaded into trucks for

transport and disposal at engineered landfills licensed to accept the impacted material. The proposed water bodies (Ponds 1 and 2, see Figure 1) to be dredged are not considered fish habitat (WSP, 2023).

  - **Treatment of Impacted Surface Water by Pumping for On-Site Treatment:** impacted surface water is pumped out of ponds/wetlands for on Site treatment and treated water is discharged to the adjacent water bodies.

- **Risk Management, specifically:**

  - Human-Health and Ecological Risk Assessment completed in accordance with federal guidance to identify risks associated with the impacts present on-Site. Based on the results of the risk assessment, risk management measures required to address unacceptable risks may be required.

To assess the feasibility and practicality of the site management approach, as described above, the following factors were taken into account:

- The extent of impacted media is widespread across zone 1 of Location 1, and the area of Location 2 closest to the firing point. In Location 1, identified impacts in soil and sediment were found up to 1.2 km from the firing point. It should be noted that practical delineation of the extent of impacts has been achieved.
- Given the widespread contamination in the area of Location 1, not in the immediate vicinity of the firing range, significant investigative effort would be required to delineate impacts. Soil investigation to date in zone 1 of Location 1 included one sample location for approximately every 8,000 m^2. Sediment investigation to date generally included one or two shallow (0-0.15 m) samples in each of the many ponds/wetlands located on Site. While the previous sampling programs achieved their objective of characterizing the Site, extensive additional assessment would be required to properly delineate every impact in soil and sediment.
- Given that impacts were found in numerous locations in soil, sediment, and surface water in Location 1 and Location 2, a full-scale remediation of impacts to meet applicable generic criteria would be a large and unsustainable undertaking and cause ecosystem/habitat destruction.
- Metals and PAH exceedances found in impacted media, outside of the immediate vicinity of the firing area of Location 1, were marginally above the applicable criteria. In addition, given the exceedances found, it appears as though impacts in soil are localized and heterogenous, as opposed to being found in consistent concentrations across wider areas.
- Full-scale remediation using heavy equipment would be logistically challenging due to the boggy and rocky landscape. Use of heavy equipment would also likely result in habitat destruction to the areas that are to be traversed or excavated/dredged.

Based on the above factors, full-scale remediation is not practical or cost-effective. It was recommended to pursue a blended approach with remediation of the firing area of Location 1 (where the highest concentrations of contaminants are found) with risk assessment/management to address the areas of Location 1 outside of the immediate vicinity of the firing area, as well as Location 2 (where contaminant concentrations are found to be only marginally above the applicable criteria in select locations). The source impacts in the firing area have been delineated. Impacts in soil to be remediated were delineated to concentrations that could not be managed through risk assessment/risk management (and contain hazardous levels of leachable lead (WSP, 2023)). The area can be generally described as the immediate vicinity around the firing backstops/bullet catches, in Location 1. The delineated areas of soil prescribed for source remediation are found on Figure 2. Cross sections of the areas can

be found on Figures 3A and 3B. Surface water and sediment impacts to be remediated are in water bodies adjacent to the firing backstop/bullet catches with concentrations of lead in water greater than the NL DWQ. The remediation is targeted to address on-Site impacts that could potentially affect the downstream provincially protected water supply. Given that there were no nearby potable groundwater users, impacted groundwater was carried forward for risk assessment (WSP, 2023).

The report sections below detail the proposed approach for the following:

- Remediation of soil, sediment, and surface water in the firing area;
- Removal of debris from Site;
- Risk assessment and risk management;

4.0 REMEDIATION OF FIRING AREA

The impacts found in the firing area, as described in Section 3.1, are proposed to be addressed through remediation of soil (areas shown on Figure 2), sediment (Ponds 1 and 2), and surface water (Ponds 1 and 2).

4.1 Material and Infrastructure to be Removed and/or Decommissioned

The Golder 2022 and WSP 2023 Reports on Steps 5 to 7 of the FACS were completed to assess the impacts found on-Site and create an inventory of debris material to be removed.

As discussed in Section 3.1, the extent of impacts in the firing area have been delineated. The following impacted material exists on-Site, within the firing area:

- Metals (antimony, copper, lead, manganese, tin, vanadium) impacted soil.
- Metals (lead, mercury, arsenic, cadmium, selenium) impacted sediment in the two small ponds located adjacent to the north of the firing range bullet catch.
- Metals (copper, lead) impacted surface water in the two small ponds located adjacent to the north of the firing range bullet catch.

Debris to be removed from Location 1 and Location 2 primarily includes materials related to firing activities, consisting of wooden stakes, stands and targets, metal targets, spent rifle as well as shotgun ammunition and shells. Household waste such as a broken vacuum cleaner was also found on-Site.

4.2 Description of Remedial Work

This section provides a summary of the scope of work and sequence of main operations for the remediation of impacted soil, sediment, and surface water in the firing area.

4.2.1 Health and Safety Plan

Given the leachable and hazardous concentrations of lead identified in the remedial area, there is potential risk of exposure to a remediation worker through direct soil contact (i.e., incidental ingestion, dermal contact, and inhalation of soil particulates). A remediation worker may also be exposed to COCs identified in groundwater through direct contact during remedial excavations (i.e., incidental ingestion, dermal contact).

As such, a project-specific HASP must be prepared and reviewed by a qualified health and safety professional and a Qualified Person when intrusive investigations or subsurface construction/repair work are to be undertaken

at the Site. Preparation of a project-specific HASP is expected to be a standard component of any construction work and to include site-specific construction activities for issues unrelated to the COCs such as, but not limited to, working with heavy equipment. However, additional provisions must be included related to the potential hazards associated with the identified contamination. The HASP shall be prepared by a Qualified Person having knowledge of occupational health and safety practices pertaining to exposures to the COCs and the level of human health protection required to meet the objectives of the RA (WSP, 2023B). The construction HASP is intended to supplement the contractors' own health and safety program, which may not include appropriate controls for the chemical-specific hazards associated with soil and groundwater. The HASP will be used to communicate the potential concerns related to worker exposure to the COCs through the inhalation of trench air, incidental ingestion of soil, dermal contact with soil and inhalation of soil dust and incidental ingestion of groundwater and to provide recommendations for worker protection. A copy of the HASP shall be available at the Site for review by workers for the duration of all construction activities with the potential to encounter impacted trench air, soil and water.

At a minimum, the HASP shall include the following measures to address potential risks:

- Dewatering of excavations if standing water is present in the trench;
- Specifications for appropriate personal protective equipment; and,
- The use of appropriate decontamination protocols to remove COCs from equipment, tools and workers.

The HASP will be present on Site at all times during the work and will include the appropriate emergency contact numbers as well as the route to the nearest hospital.

4.2.2 Definition of Roles

For the purposes of this report, the following roles are defined:

- "Engineer": suitably qualified consultant or equivalent, responsible for remedial oversight and approval of work completed by the Contractor
- "Contractor": remediation contractor responsible for execution of specifications

4.2.3 Mobilization, Utility Locates and Site Preparation

Activities will include the completion of the layout of access as well as equipment lay-down and storage areas. There are no utilities expected to be within the remediation area based on current conditions. The Contractor is responsible for obtaining confirmatory locates.

4.2.4 Fencing

The Contractor may wish to enclose the laydown areas at the Site with fencing. Temporary construction fencing will be placed around active excavation areas to limit access to pedestrians and vehicles.

4.2.5 Protection of Utilities

There are no utilities expected to be within the remediation area requiring protection based on current conditions. The Contractor is responsible for obtaining confirmatory locates.

4.2.6 Groundwater Seepage or Stormwater Run-Off into Excavation

Excavation below the water table is not anticipated to be required at the Site. Groundwater depth on the Site was found to be between 2.3 and 6.7 mbgs, within the bedrock. However, the peat bog material present on-Site typically retains water and is anticipated to drain into the excavation. A hydraulic conductivity test was performed on a well installed directly into the peat bog and a horizontal hydraulic conductivity of 9.2×10^{-9} m/s was estimated.

It is important to keep all excavations dry and free of groundwater or storm water runoff. If groundwater is encountered within the excavation, it should be pumped and removed from the excavation. Contractors should also be prepared to treat excavation water prior to discharge to reduce contaminants to acceptable levels.

4.2.7 Decommissioning of Groundwater Monitoring Wells

Groundwater monitoring wells located within the limits of excavation may be decommissioned by a licenced well technician prior to removal. Decommissioning must adhere to provincial guidance.

4.2.8 Removal of Surficial Debris

Eighteen debris items were observed as part of the Golder 2022 Report on Steps 5 to 7 of the FACS. No changes to the debris inventory were noted during the WSP 2023 investigation. Debris at Location 1 amounts to approximately 5 m^3 of debris, including, but not limited to general refuse found at firing backstop, consisting of household waste, wooden states, cardboard and plastic targets, rusted material used as a target, spent shotgun shells, spent rifle cartridges, and spent ammunition. Debris at Location 2 amounts to approximately 13 m^3 of debris, including, but not limited to wooden states and gun stands, cardboard, plastic and wooden (plywood) targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.

Remediation will include removal of the debris. Manual removal, by hand, will be required for the debris. Debris will need to be disposed of as waste to a licenced waste disposal site.

The locations of the debris items are shown in Figures 4 and 5. The debris inventory is provided in Table 1 below.

Table 1: Debris Inventory

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m^3
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m^3
L1_DEB_3	Wooden stakes and cardboard target	~1m^3
L1_DEB_4	Rusted drum used as target. Includes spent ammunition, spent rifle cartridges, and spent ammunition.	~1m^3
L1_DEB_5	Rusted sink used as target. Includes spent ammunition.	<1m^3
L2_DEB_1	Wooden stake target and spent ammunition.	<1m^3
L2_DEB_2	Wooden stakes and spent shotgun shells	<1m^3

Debris ID	Description	Approximate Quantity
L2_DEB_3	Wooden stakes and cardboard target.	<1m^3
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m^3
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_6	Wooden plank target	<1m^3
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m^3
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m^3
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m^3
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_13	Wooden stake and spent shot gun shells	~1m^3

Created by: AB
Checked by: JTD

4.2.9 Clearing of Vegetation

Clearing of alders around the backstop is required to remove impacted material. The total area of alders is approximately 850 m^2, corresponding to an approximate volume of 5 m^3 shredded. Grubbing is not expected.

4.2.10 Access to Contaminated Soil

An access pathway extending approximately 50 m, will be required in order access the easternmost area of impacted soil. To avoid disturbing the unimpacted vegetated/peat bog areas, the contractor should use cribbing and mats as a temporary access measure.

4.2.11 Excavation of Contaminated Soil

Contaminated soil is to be removed from Site and will require the use of an excavator and/or backhoe. The soil will be excavated to the extent prescribed by the Engineer. Certain areas may be hard to access with large excavators due to naturally occurring obstacles or severe sloping of bedrock – in these cases, manual removal or use of smaller machinery may be required. Where bedrock is encountered, it is to be mechanically scraped of contaminated soil. Contaminated soil must be treated as hazardous waste due to leachable lead, previously characterized using TCLP analysis (WSP, 2023).

The horizontal extent of impacted soil to be removed can be found on Figure 2. Cross-sections (with estimated depth) of impacted soil to be removed can be found on Figures 3A and 3B. Approximately 650 m^3 of impacted soil is to be removed.

Impacted soil prescribed for removal is considered to be hazardous, and should be disposed of at a licenced hazardous waste treatment facility.

4.2.12 Cleaning of Heavy Machinery

Soil adhering to trucks and equipment will be removed before leaving Site. A designated decontamination area will be established to clean trucks through dry means. Wash water should only be used if dry means are not adequate. Heavy machinery used to excavate or transport of impacted material should not traverse overtop impacted material. The excavation should move from west to east to avoid the wheels or tracks of heavy equipment coming into contact with impacted material.

4.2.13 Dredging of Contaminated Sediment

Contaminated sediment is to be removed by excavation/dredging using heavy equipment or by hydraulic dredging (using vacuum). In either case, the Ponds should be dewatered first, to provide visibility of the sediment. The contractor can then select the best method for sediment removal. Given that the only areas proposed to be dredged as part of the remediation (Pond 1 and 2) are approximately 9 m in width, it is not expected that a dredging barge will be required. It should be noted that the boggy shoreline may not be stable for heavy equipment. If mechanical excavation/dredging is selected, an excavator may need to be positioned away from the immediate shoreline. The treatment of dewatering water is discussed in Section 4.2.14. Upon removal, impacted sediment may be further dewatered on-Site to reduce the volume sent to landfill. Sediment dewatering should be done in a watertight contained cell (e.g. filter bag or tank) to eliminate the risk of cross-contamination. Dewatering water should be treated on-Site prior to recycling to a nearby on-Site water body.

The depth of the impacted sediment extends to approximately 0.6 meters below the bottom of the ponds. The approximate area of the impacted ponds (Ponds 1 and 2) is 300 m^2. As such, sediment quantities have been estimated to be 180 m^3.

The sediment on-Site is considered to be non-hazardous and should be disposed of at a licenced waste facility.

4.2.14 Pumping and Treatment/Recycle of Contaminated Surface Water

Contaminated surface water from Ponds 1 and 2 is to be pumped and treated on-Site. The ponds have an approximate maximum depth of about 2 m, however this has not been confirmed due to the difficulty of measuring the pond bottom due to the presence of suspended sediment. An average depth of water of 1.5 m has been estimated. As such, water quantities have been estimated to 450 m^3 assuming no contribution from groundwater or precipitation. Removal of surface water may be conducted simultaneously with the removal of sediment (hydraulic dredging) or prior to its removal. Any water removed from impacted sediment during sediment dewatering should be considered impacted water and sent for on-Site treatment. It is expected that water treatment will require the passage of water through bag/mechanical filters and a secondary filter media.

The treated surface water must meet the NL DWQ and HC GCDWQ, prior to discharge back to an adjacent surface water body. Pond 3, located on Figure 1, would be an acceptable receiving water body. It is noted that only the chemical, health-based guidelines are required to be met for discharge. This includes a guideline of 0.005 mg/L of lead.

Ponds 1 and 2 were determined to not be active fish habitat (WSP, 2023), and therefore, no alternative habitat considerations are required.

4.2.15 Handling/Treatment of Dewatering Water, and Precipitation/Groundwater Seepage into Excavation and Ponds 1 and 2 (once Dewatered)

The excavation will be conducted in a manner that minimizes the suspension of soils in water (groundwater or stormwater runoff) that has seeped into the excavation and minimizes the spread of suspended solids. The contractor should proceed with the soil excavation to limit the contact of impacted soil with precipitation, and facilitate any dewatering if needed.

Upon completion of an excavation area where water seepage has occurred (e.g. below water table or area draining stormwater), the excavation should promptly be backfilled to a level to inhibit seepage, following inspection by the Engineer.

4.2.16 Confirmatory Sampling of Excavated/Dredged Areas

The total extent of impacted soil and sediment to be removed has been determined to be approximately 650 m^3 and 180 m^3 respectively. The final limits, both vertical and horizontal, will be determined in the field by the Engineer, once the extents of delineated contamination have been reached. Soil and sediment samples will be collected to confirm that the impacted material has been removed. If the samples collected have concentrations exceeding the applicable criteria, further excavation/dredging will be required.

In absence of local requirements, sampling will be conducted in accordance with the sampling frequency outlined in the Nova Scotia Confirmation of Remediation Protocol (NSE, 2013). These sampling requirements are provided in Table 2 below.

Table 2: Minimum Confirmation Sampling Requirements for Excavation

Floor Area (m^2)	Floor Samples	Sidewall Samples
<25	1	1
>25-50	1	2
>50-100	2	2
>100-250	2	4
>250-500	3	5
>500-750	3	6
>750-1000	4	7

Sidewall samples should not all be taken from the same wall and should represent worst-case. The final number of verification samples will depend on the final excavation size. The western area of impacted soil is approximately 850 m^2 (Figure 2). The eastern area of impacted soil is approximately 990 m^2 (Figure 2).
The Contractor will be required to facilitate and allow reasonable time in their project schedule to collect soil verification samples using excavation equipment at the direction of the Engineer and for analysis of the samples. If excavation is terminated on bedrock (expected in a majority of the excavated area), no sampling will be required as there will be no soil to sample.

4.2.17 Excavation Support

Excavation support will be required where the excavation depths are too great to maintain a safe excavation face. Excavations less than 1.2 metres may be able to be near vertical; however, excavations greater than 1.2 metres may remain unsupported if sloped at a slope of 1:1 (above the water table). Where excavation extends below the water table or water inflow is present (not expected), a three horizontal to one vertical slope may be required. Excavation support for deeper excavation is subject to Engineer's approval. Special considerations for dredging of Ponds 1 and 2 may need to be considered if mechanical dredging using an excavator is the selected method of removal.

4.2.18 Dust Control and Monitoring

In addition to the nuisance caused by dust, the presence of contamination in the overburden to be excavated will require strict control of dust. Use of water and/or environmentally compatible dust suppressants will be required. Any stockpiles of contaminated material (soil or sediment) will need to be lined beneath, and covered atop, to prevent leaching since the material is hazardous. If weather conditions require it, dust monitoring will be implemented at the discretion of the Engineer. The Contractor will be required to implement corrective actions to manage unacceptable dust generation.

4.2.19 Material Tracking

Waste and recyclables will be tracked with manifests from the disposal facilities. Overburden material and dewatered sediment will be measured by weight as measured at the disposal facility. Copies of tracking manifests from the disposal or treatment facility will be collected for each truck load to track the transport of the impacted material and prevent illegal dumping. Water treatment will be measured in volume using a calibrated flow meter. Quantities will be used for pricing by the Contractor.

4.2.20 Backfilling and Site Restoration

It is not expected that backfill will be required, as impacts are only expected to be found in shallow soil and sediment/surface water. Should it be determined that backfill is required, all imported material used within the remediation limits must comply with the applicable criteria for background Site conditions. Imported fill will be tested by the Engineer in accordance with the requirements. Testing of backfill will include, at a minimum, select metals, pH, PAHs and PHCs. The testing suite may be reduced based on the nature and source of fill. A Phase I ESA can be completed at the fill source to determine a more appropriate testing package at the discretion of the Engineer.

Material used for backfilling must be selected material from excavation or other sources, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse, recycled materials (such as reused asphalt) or other deleterious materials with minimal fines.

Backfill should be placed in 300 mm lifts and compacted to a minimum of 95% Standard Proctor Maximum Dry Density (SPMDD). The areas on Site that are currently graveled shall be reinstated with gravel following the remediation.

In the areas that are currently covered with shallow soil, the backfilled area will be covered with not less than a 15-centimetre thickness of topsoil and seeded with a mix of native grass and sedge species, as appropriate for the Site characteristics and local climate.

Results of the verification samples should be confirmed to meet the applicable criteria for the Site prior to an area being backfilled.

4.2.21 Confirmation of No Cross-Contamination

Upon completion of the remediation of the Site and removal of all materials and equipment from Site, areas used for access, laydown, storage, and other site activities maybe tested for soil quality upon completion of the works to confirm that no impacts have been caused during the remediation.

4.2.22 Landscaping

In the areas outside of the roadway/parking lot, the backfilled areas will be covered with not less than a 15-centimetre thickness of topsoil sourced from a licenced topsoil provider and seeded with a mix of native grass species, as appropriate for the Site characteristics and local climate.

4.2.23 Demobilization

Upon completion of the scope of work, all equipment and wastes will be removed from Site.

4.2.24 Reporting

Following completion of the remediation, the Engineer will prepare a remediation report documenting the final condition of the Site, including:

- A summary of Site activities
- Photo documentation
- Analytical results from confirmatory sampling
- Quality control testing results
- Dewatering discharge water sampling results, should they be required

The Contractor will be responsible for all final submittals including:

- Final volumes of materials
- Soil quality sampling results for any imported material
- Records of proper disposal and treatment of impacted material

5.0 ENVIRONMENTAL MONITORING

The following activities will be monitored by the Engineer during remediation.

5.1 Soil and Sediment

The Engineer will be present during all excavation works to monitor that Site activities are completed in accordance with the technical specifications. The Engineer will also collect confirmatory soil samples ensuring that all impacted soil prescribed for removal has been excavated in the remediation area.

5.2 Seepage Water in Excavation/Ponds 1 and 2 (After Initial Dewatering)

The Engineer will ensure seepage water pumped out of the active excavation/Ponds 1 and 2 is sent for on-Site water treatment, prior to discharge to a receiving water body.

5.3 Sediment and Surface Water

Sampling will be required to verify that impacted water, once treated, meets the NL DWQ and HC GCDWQ, prior to discharge to a receiving water body. The Contractor should allow for on-Site storage of treated water, to allow time for confirmatory sample results to be received (at least 72 hours of storage, based on estimated shipping time and rush turnaround of results).

5.4 Dust Monitoring

If weather conditions require it, dust monitoring will be implemented at the discretion of the Engineer. The Engineer will ensure that the requirements for dust control listed in Section 4.2.18 are implemented correctly.

6.0 RISK ASSESSMENT AND RISK MANAGEMENT

A human health and ecological risk assessment (HHERA) has been completed for the Site that incorporates the Site characterization (including characterization of priority contaminants of concerns (COCs)), habitat assessment (including species at risk) and toxicity testing (surface water and sediment) (WSP, 2023b). The risk assessment is completed in accordance with applicable federal guidelines (e.g., Federal Contaminated Sites Action Plan (FCSAP) and Canadian Council of Ministers of the Environment (CCME)). The HHERA includes a problem formulation which documents the contaminants of concern, human and ecological receptors and exposure pathways.

The HHERA evaluates potential risks to the local ecosystem and consider potential human exposure and risks associated with site visitors (trespassers, hunters, recreational users, etc.) for impacts that are proposed to be left on-Site (e.g. not remediated, as described in Sections 3.0 through 5.0).

Potential risk to Site-specific ecological receptors are evaluated using a weight of evidence (WOE) approach which is consistent with the recent FCSAP and CCME ecological risk assessment guidance. The WOE approach gathers and evaluates information from different lines of evidence to determine the possibility or degree of harm to receptors of concern. Specific lines of evidence include: comparison of measured chemical concentrations compared to literature-based toxicity values; results of the aquatic and terrestrial habitat assessment completed at the Site (described in Section 6.1).

The conclusions and recommendations of the HHERA with respect to human health were as follows:

- The HHERA evaluated potential risks to a Recreational User from direct contact with soil, sediment, and surface water, as well as the consumption of country foods.
- Based on screening against human health criteria, direct contact with soil was retained for further assessment of potential risks from soil COCs (aluminium, manganese, vanadium).
- Risks were negligible for a Recreational User; therefore, risk management measures (RMMs) are not required for these receptors.
- Potential off-Site health risks to the provincially protected watershed were also negligible as no COCs were identified in surface water above drinking water criteria.
- It is possible that a Subsurface Worker, who may be involved in future construction or other intrusive work, may also be exposed to COCs on the RA Property. However, no planned intrusive work is proposed outside of the remedial areas and there are no development plans that may require intrusive work. As any potential exposures are short-term and are mitigated through an industry standard HASP, this receptor was not evaluated in the HHERA.

The conclusions and recommendations of the HHERA with respect to ecological health were as follows:

- Primary producers (terrestrial plants), soil invertebrates, mammals, birds, and amphibians were identified as receptor groups for the terrestrial ecosystem. No terrestrial species at risk (SAR) were identified as a receptor of concern (ROC).
- Primary producers (aquatic plants, algae), pelagic invertebrates, benthic invertebrates, fish, and amphibians were identified as receptor groups for the aquatic ecosystem (collectively referred to as aquatic life). Fish SAR were identified as ROCs (American eel and banded killfish).
- Based on screening against ecological criteria, terrestrial plants and soil invertebrates were retained for further assessment of potential risks from soil COCs (tin), and aquatic life were retained for further assessment of potential risks from sediment and surface water COCs (lead).
- Protection goals included maintenance of communities of ecological receptors that are similar to reference areas and protection of individual SAR.
- Several lines of evidence (LOEs) were used to characterize risks to terrestrial and aquatic ecosystems. These LOEs included hazard quotients (HQs; where COC concentrations are compared to literature-based toxicity information), Site-specific toxicity studies, and Site-specific biological studies.
- Risks to terrestrial plants and soil invertebrates from soil COCs were found to be negligible based on a vegetation health and community study.
- Risks to aquatic life from sediment COCs were found to be negligible based on HQs that considered average concentrations and site-specific toxicity testing.
- Risks to aquatic life from surface water COCs were found to be negligible based on site-specific toxicity testing.
- Based on these results, no further work or RMMs are recommended for ecological receptors.

The HHERA can be found under separate cover (WSP, 2023b).

7.0 APPROXIMATE SCHEDULE FOR IMPLEMENTATION OF NEXT STEPS

The following is an approximate timeline for implementation of next steps of the RRMS and remediation:

- Spring/Summer 2022-23: Remediation tendering process
- Fall 2023: Remediation

8.0 CONCLUSIONS

A Remedial and Risk Management Strategy has been developed. This report includes the extents of impacts in the firing area, and quantities of impacted material to be remediated. Results of the risk assessment are covered under separate cover. A Class A cost estimate is provided under separate cover.

9.0 LIMITATIONS

This report was prepared for the exclusive use of DCC and DND for the express purpose of providing advice with respect to the environmental condition of the Site. In evaluating the Site, WSP Canada Inc. has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties. If a third party require reliance on this Report, written authorization from WSP is required. Failing such authorization, WSP disclaims responsibility to third parties of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The scope and the period of WSP's assessment are described in this Report, and are subject to the restrictions, assumptions and limitations described herein. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within WSP's proposal. WSP did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Report. Conditions may therefore exist which were not detected given the limited nature of the assessment WSP was retained to undertake with respect to the Site and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. WSP's opinions are based upon information that existed at the time of the writing of the Report. It is understood that the services provided for in the scope of work allowed WSP to form no more than an opinion of the actual conditions at the Site at the time the Site was visited, and cannot be used to assess the effect of any subsequent changes in any laws, regulations, the environmental quality of the Site or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Site is free from any and all contamination from past or current practices.

10.0 REFERENCES

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Signature Page

WSP Canada Inc.

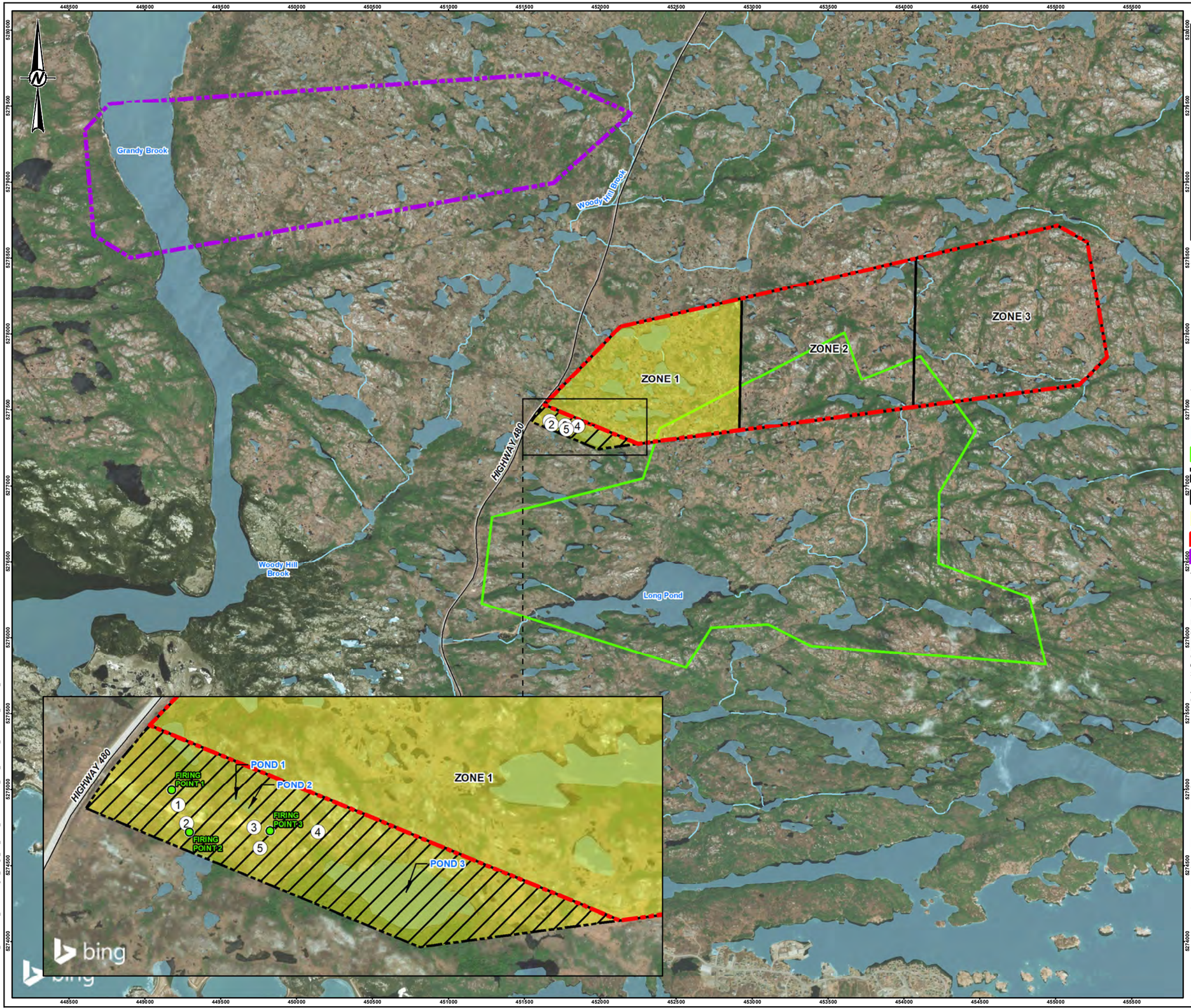
James Doyle, P.Eng., M.A.Sc.
Environmental Engineer

Stefano Marconetto, M.Sc., P.Eng. (ON, BC)
Senior Principal Environmental Engineer

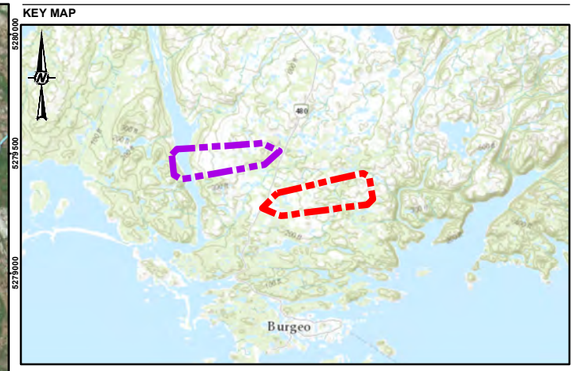
PC/JD/sg

https://golderassociates.sharepoint.com/sites/164365/project files/6 deliverables/2. report/final/appendix g - remediation and risk management strategy/final/22532464-burgeo remedial strategy_march 31 2023_final.docx

Figures



KEY MAP



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LEGEND

1. APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
2. APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
3. APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
4. APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
5. APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

- ROADWAY
- WATERCOURSE
- WATERBODY
- PROTECTED PUBLIC WATER SUPPLY
- ADDITIONAL PROPOSED LEASED LANDS/FIRING AREA
- ZONE BOUNDARY
- RISK ASSESSMENT AREA
- LOCATION 1
- LOCATION 2

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. KEY MAP: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

3. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

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CLIENT

DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT

BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE

SITE PLAN

CONSULTANT

wsp

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	JEM
REVIEWED	JD
APPROVED	SM

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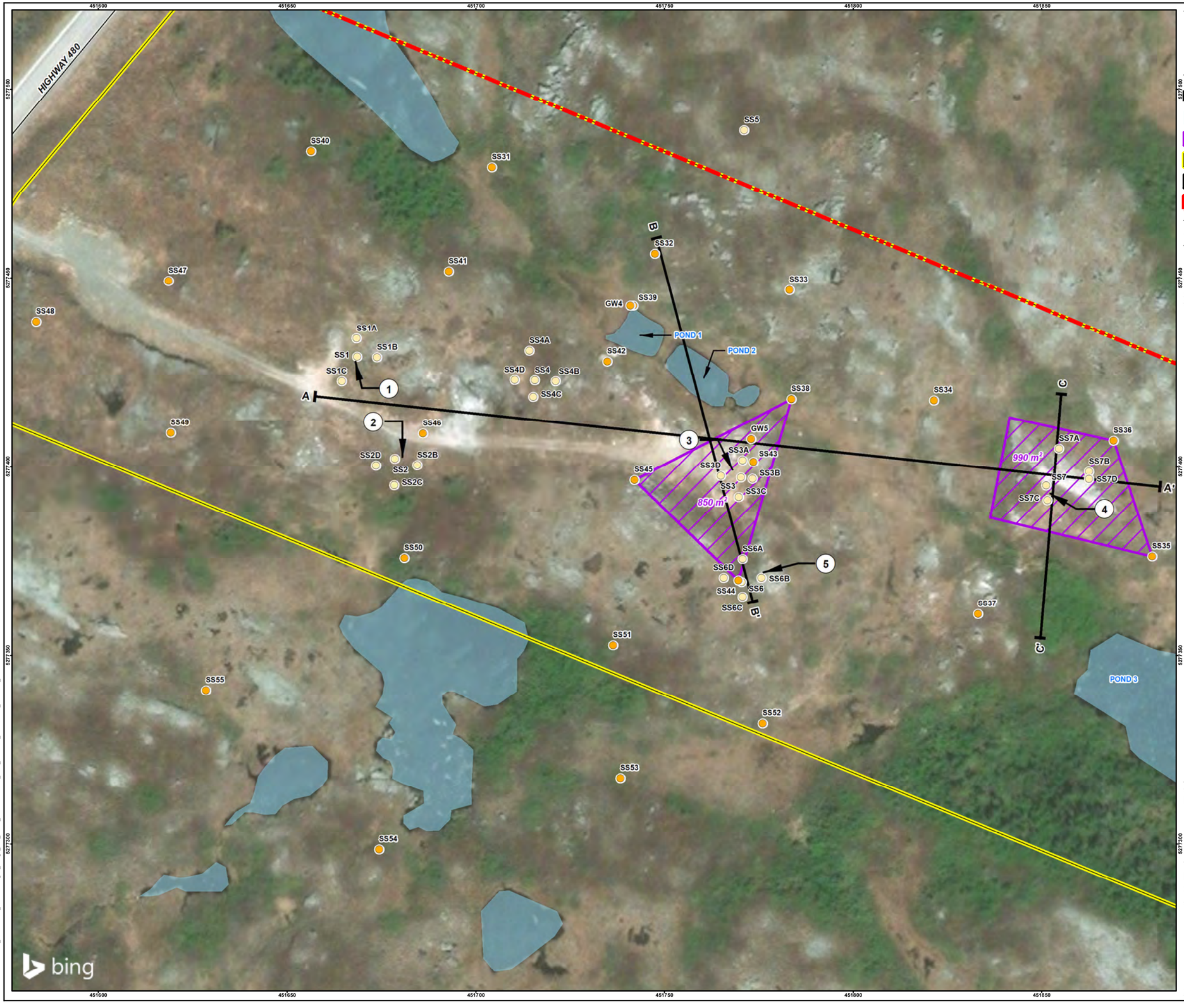

LEGEND

- APPROXIMATE SOIL SAMPLE LOCATION (2022)
- APPROXIMATE SOIL SAMPLE LOCATION (2020/21)
- ROADWAY
- CROSS-SECTION LOCATION
- WATERBODY
- PROPOSED DELINEATION AREA
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 15 30 60

1:1,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE
LOCATION 1 - ZONE 1 - FIRING AREA - DELINEATION OF CONTAMINATED SOIL

CONSULTANT

wsp

YYYY-MM-DD	2023-03-29
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0004	0	**2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

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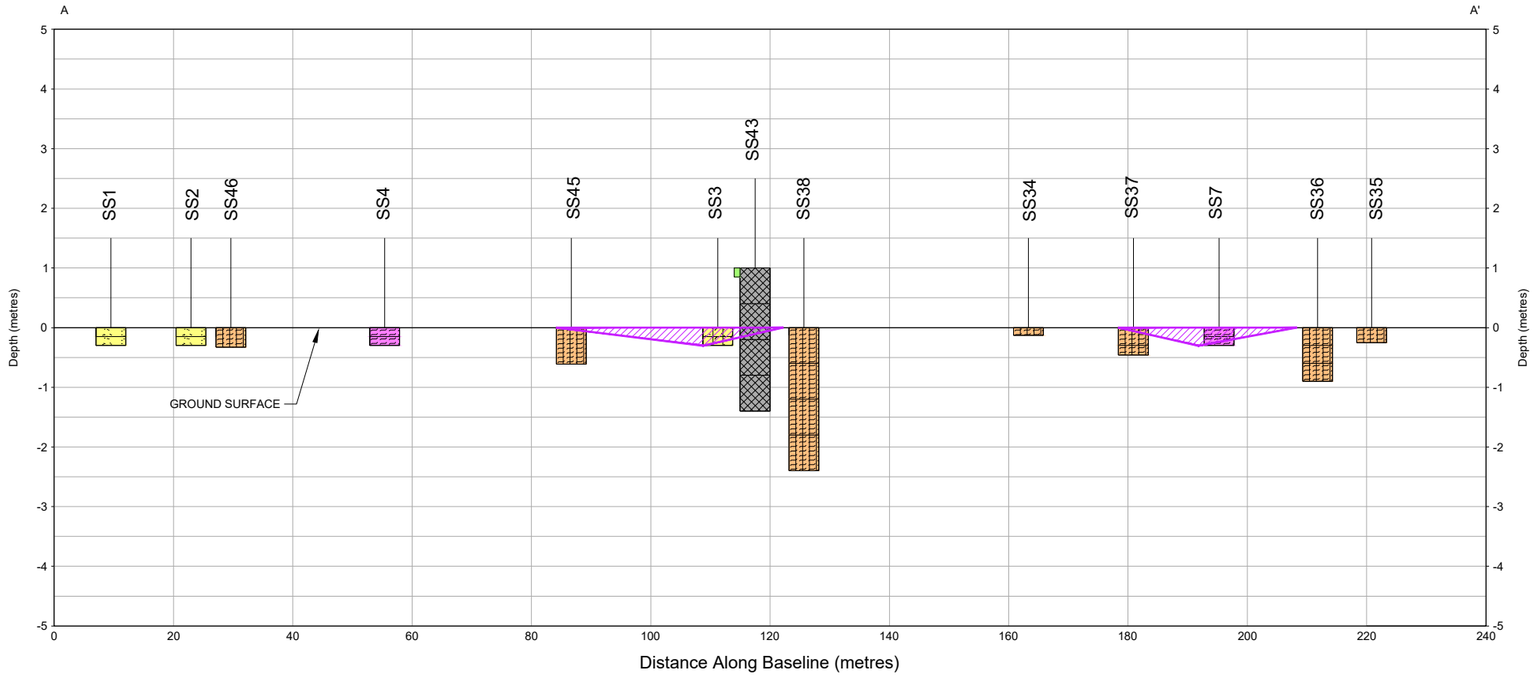

LEGEND

- BOREHOLE/MONITORING IDENTIFIER — SS1
- GROUNDWATER LEVEL
- STRATIGRAPHY
- WELL SCREEN
- SAND
- SILTY SAND
- ORGANIC SILT
- TOPSOIL
- FILL
- EXTENT OF SOIL IMPACTS

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FOR DETAILED STRATIGRAPHY SEE RECORD OF BOREHOLE LOGS
3. FOR CROSS-SECTION LOCATION SEE FIGURE 10B
4. ALL SOIL, SEDIMENT, AND SURFACE WATER LOCATIONS ARE APPROXIMATE, MONITORING WELLS HAVE BEEN SURVEYED

0 2.5 5
1:100 VERTICAL METRES

0 25 50
1:1,000 HORIZONTAL METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE
CROSS-SECTION A-A'

CONSULTANT

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	DM/SA
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0004	0	3A

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

0 25 mm

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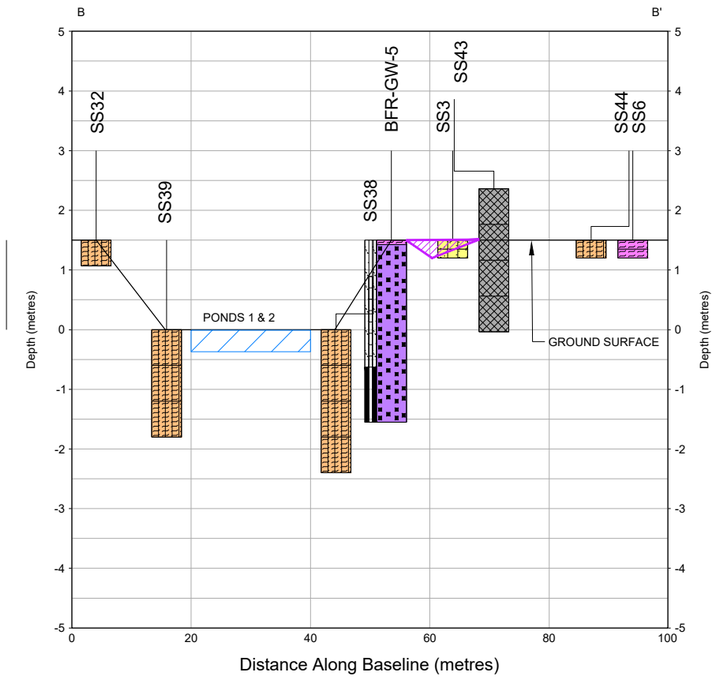
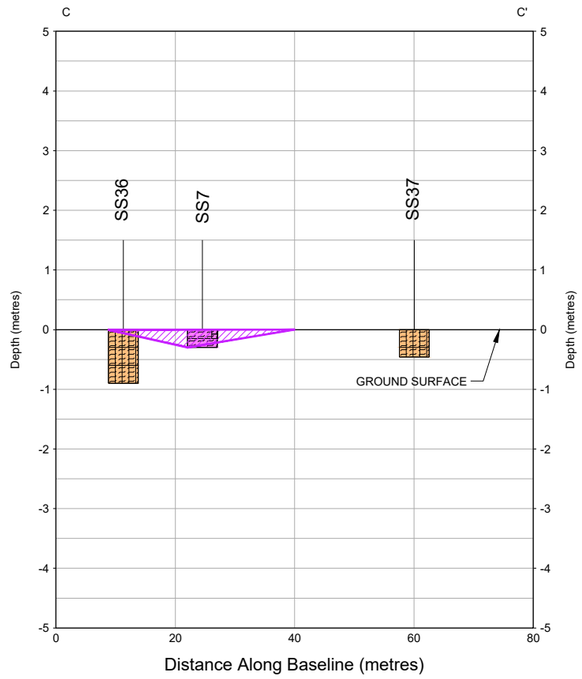
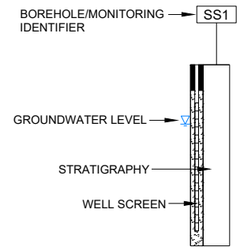




LEGEND



DIORITE
SAND
SILTY SAND
ORGANIC SILT
TOPSOIL
FILL
EXTENT OF SOIL IMPACTS

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FOR DETAILED STRATIGRAPHY SEE RECORD OF BOREHOLE LOGS
3. FOR CROSS-SECTION LOCATION SEE FIGURE 10B
4. ALL SOIL, SEDIMENT, AND SURFACE WATER LOCATIONS ARE APPROXIMATE, MONITORING WELLS HAVE BEEN SURVEYED

0 2.5 5
1:100 VERTICAL METRES

0 25 50
1:1,000 HORIZONTAL METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE
CROSS-SECTION'S B-B' AND C-C'

CONSULTANT

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	DM/SA
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0004	0	3B

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

0 25 mm

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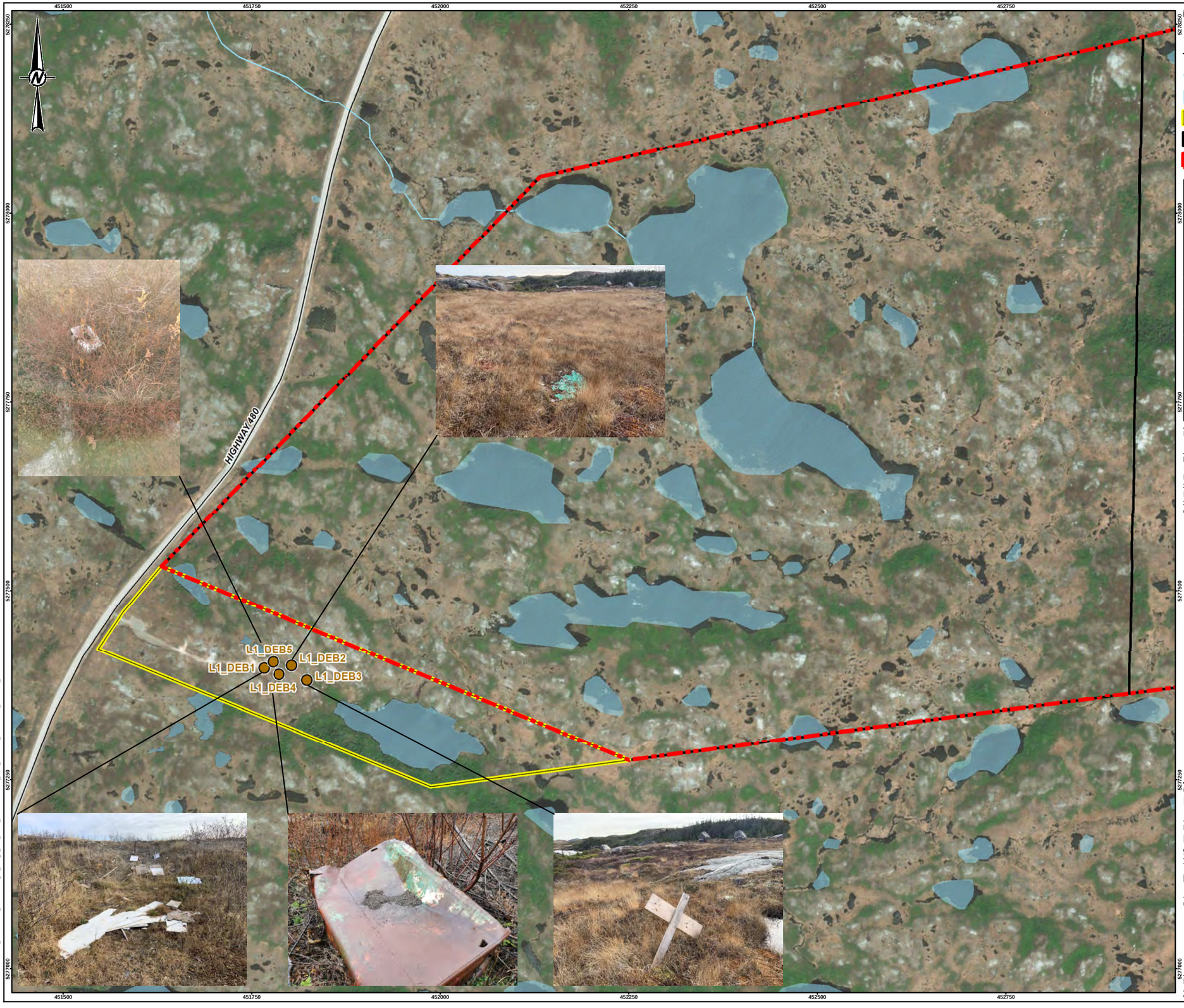

LEGEND

- APPROXIMATE DEBRIS LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m^3
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m^3
L1_DEB_3	Wooden stakes and cardboard target.	~1m^3
L1_DEB_4	Rusted tank used as target. Includes spent ammunition, spent rifle cartridges and spent ammunition.	~1m^3
L1_DEB_5	Rusted Kitchen sink used as target. Includes spent ammunition.	<1m^3

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 50 100 200
1:5,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE
LOCATION 1 - DEBRIS LOCATIONS

CONSULTANT
wsp

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0004	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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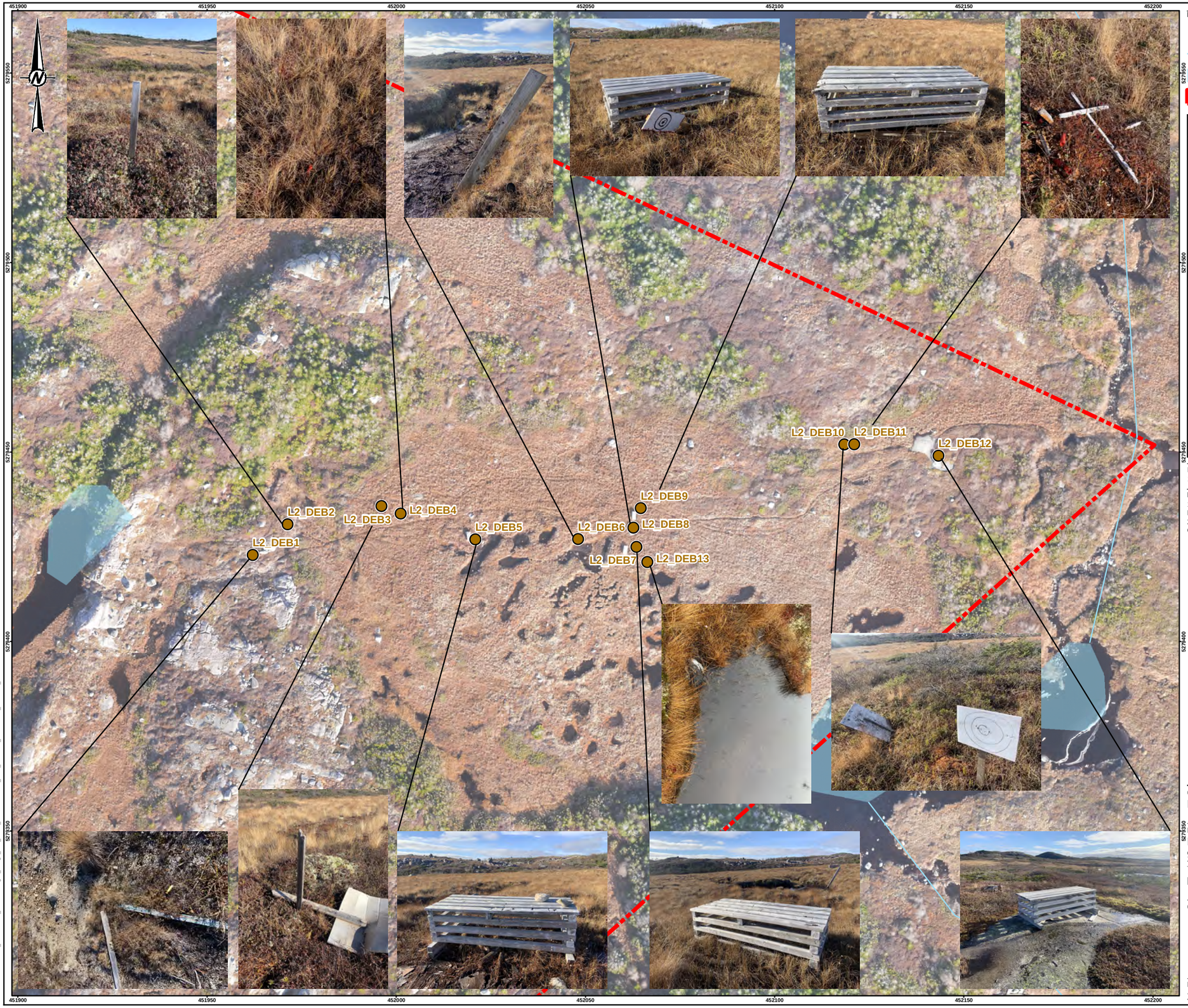

LEGEND

- APPROXIMATE DEBRIS LOCATION
- WATERCOURSE
- WATERBODY
- SITE

Debris ID	Description	Approximate Quantity
L2_DEB_1	Wooden stake target and spent ammunition.	<1m^3
L2_DEB_2	Wooden stakes and spent shotgun shells.	<1m^3
L2_DEB_3	Wooden stakes and cardboard target.	<1m^3
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m^3
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_6	Wooden plank target	<1m^3
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m^3
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m^3
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m^3
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m^3
L2_DEB_13	Wooden stake and spent shot gun shells	~1m^3

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

0 10 20 40
1:1,000 METRES

CLIENT
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT
BURGEO FIRING RANGE
9 WING GANDER, NL

TITLE
LOCATION 2 - DEBRIS LOCATIONS

CONSULTANT
wsp

YYYY-MM-DD	2023-03-03
DESIGNED	----
PREPARED	JEM/MG
REVIEWED	JD
APPROVED	SM

PROJECT NO.	CONTROL	REV.	FIGURE
22532464	0004	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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