

MARINE ATLANTIC INC.

Port aux Basques Harbour Navigation Improvement Project Marine Sediment Sampling Program (Dredge)

Port aux Basques, NL

Final



Marine Atlantic
Marine Atlantique

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Acronyms and Abbreviations

CALA	Canadian Association for Laboratory Accreditation
CBCL	CBCL Limited
CCME	Canadian Council Ministers of Environment
CEPA	Canadian Environmental Protection Act
COC	contaminants of concern
CWS	Canada Wide Standards
DAS	Disposal at Sea
ESLs	Ecological Screening Levels
ISQG	Interim Sediment Quality Guidelines
MAI	Marine Atlantic Inc.
mbgs	metres below ground surface
MSSP	marine sediment sampling program
NL	Newfoundland and Labrador
NS	Nova Scotia
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PELs	Marine Probable Effects Levels
PHCs	Petroleum Hydrocarbons
QA/QC	Quality Assurance/Quality Control
RBCA	Risk Based Corrective Action
RDL	Reportable Detection Limit
RPD	Relative Percent Difference
SAR	Sodium Adsorption Ratio
SCC	Standards Council of Canada
SQGs	Soil Quality Guidelines
TOC	Total Organic Carbon
UBHS	Underwater Benthic Habitat Survey

Marine Atlantic Inc. (MAI) is proposing improvements to the navigation conditions in Port aux Basques Harbour, Newfoundland and Labrador (NL) (the Project) (Figure 1, Appendix A). The proposed navigational improvements in the harbour involve realignment of the navigation channel and establishment of a new turning basin. Activities required to achieve these navigational improvements include deepening the realigned channel and new turning basin, removal of Vardy's Island, partial removal of Baldwin Rock, and re-use and/or disposal of the dredged material.

CBCL Limited (CBCL) conducted a marine sediment sampling program (MSSP) within the Port aux Basques Harbour to characterize the sediment in the area proposed to be dredged for the south turning basin, as well as sediment between the south turning basin and the Town wharves. The purpose of the MSSP is to support the design of the Project, including investigation of the feasibility of a breakwater adjacent to the town wharves, and to support applications for environmental approvals.

This MSSP was conducted in conjunction with an Underwater Benthic Habitat Survey (UBHS); results of the UBHS are provided under separate cover. This report presents the findings of the MSSP, which generally included the collection of marine sediment samples for various laboratory analysis from two areas, including:

- Town Wharves Breakwater – potential breakwater location located northeast of the Town wharves
- South Turning Basin – potential dredge area located in the southwest corner of the turning basin and navigational channel in the inner harbour

1.1 Scope and Methodology

CBCL field staff and a sub-contracted commercial diving company (Sparkes Subsea Construction) completed the MSSP in Port aux Basques Harbour on July 28 and 29, 2020. CBCL and Sparkes Subsea Construction (Sparkes) deployed to each sediment sampling location on a small landing craft owned and operated by Sparkes for dive tendering services. Divers from Sparkes recorded digital still images and retrieved sediment at the proposed sediment sampling locations.

Two main sample areas, referred to as the Town Wharves Breakwater (TW-SED) and South Turning Basin (STB), established the sample naming conventions used in this report. The selected number of samples obtained for each site is based on the requirements set out by the *Canadian Environmental Protection Act, 1999 (CEPA)* Disposal at Sea Regulations, as well as calculated transect sizes deemed appropriate to gather representative data from the areas of interest.

Sediment samples were collected and submitted for laboratory analysis of various chemicals of concern (COCs), as well as total organic carbon (TOC) concentrations and grain size. The sediment sample locations are shown on Figure 2 in Appendix A. Photographs of sediment collected at each of the sampling locations are provided in Appendix B. Coordinates of the sediment sample locations are provided in Table 1.1, below.

Table 1.1: Sediment Sample Coordinates (NAD 83 – decimal degrees)

SAMPLE ID	EASTING	NORTHING	LATITUDE	LONGITUDE
TW-SED-01	339167.755	5271290.223	47.575082	-59.138600
TW-SED-02	339154.191	5271314.942	47.575301	-59.138790
TW-SED-03	339136.326	5271306.643	47.575222	-59.139024
TW-SED-04	339100.413	5271332.654	47.575447	-59.139511
TW-SED-05	339110.387	5271349.963	47.575605	-59.139384
TW-SED-06	339082.914	5271362.217	47.575708	-59.139754
STB-01	339213.601	5271353.879	47.575665	-59.138014
STB-02	339173.721	5271359.037	47.575702	-59.138546
STB-03	339157.771	5271370.973	47.575805	-59.138763
STB-04	339123.214	5271396.947	47.576030	-59.139231
STB-05	339153.474	5271387.321	47.575951	-59.138826
STB-06	339183.751	5271378.371	47.575878	-59.138420
STB-07	339211.940	5271367.451	47.575787	-59.138041
STB-08*	339211.415	5271422.241	47.576280	-59.138068
STP-09	339167.755	5271290.223	47.575082	-59.138600

Note: *Unable to collect sample at this location

Marine sediment samples were collected from 14 locations within the two sites (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-01, STB-02, STB-03, STB-04, STB-05, STB-06, STB-07, and STB-09) on July 28 and 29, 2020, and submitted to Bureau Veritas laboratory in Sydney, Nova Scotia (NS) for laboratory analysis. A sediment sample could not be collected from one of the proposed locations (STB-08), as this location was composed of mostly bedrock and was therefore omitted from the program. Laboratory analysis consisted of the following parameters: petroleum hydrocarbons (PHCs), metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), sodium adsorption ratio (SAR), conductivity, total organic carbon (TOC), and grain size analysis. To remove interference from organic materials, silica gel clean-up was also requested for each sample.

Bureau Veritas is accredited by the Standards Council of Canada (SCC) to criteria set by the Canadian Association for Laboratory Accreditation (CALA) for each of the analytical methods utilized and has in-house QA/QC protocols to govern sample analysis, including replicates. All analyses performed by Bureau Veritas are accredited to ISO/IEC 17025 standards (and subsequent revisions). The laboratory analytical results are discussed in Chapter 3 and tabulated in Appendix C. The laboratory Certificates of Analysis are provided in Appendix D.

To facilitate the evaluation of disposal options for the material proposed to be dredged, the marine sediment analytical results were compared to the following guidelines, where applicable:

- The Canadian Council Ministers of Environment (CCME) Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health in Agricultural, Residential/Parkland, and Commercial/Industrial applications
- The CCME Canada Wide Standards (CWS) for Petroleum Hydrocarbons in Soil (PHCs only)
- The CCME Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Sediment Quality Guidelines (ISQG), Marine Probable Effects Levels (PELs)
- The CEPA Disposal at Sea Regulations;
- NL Department of Environment and Conservation Protocol for the Management of Excavated Soils, Concrete, Rubble and Dredged Materials (PHCs only)
- NL Department of Environment, GD-PPD-26.1 - Leachable Toxic Waste, Testing and Disposal
- The Atlantic Risk Based Corrective Action (RBCA) Version 3.0 Tier I Risk-Based Screening Levels (RBSLs) for PHCs

A total of 15 marine sediment samples (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-01, STB-02, STB-03, STB-04, STB-05, STB-06, STB-07, STB-09 and one blind field duplicate sample (STB-DUP)) were submitted for laboratory analysis of PHCs (RBCA and CCME methodology), metals, PAHs, SAR, electrical conductivity, and TOC during the July 2020 field program.

The laboratory analytical results for the marine sediment samples collected and analyzed from the Port aux Basques Harbour are summarized below for those parameters with established regulatory guidelines. The analytical tables are provided in Appendix C. The laboratory Certificates of Analysis for all parameters tested are provided in Appendix D.

3.1 Petroleum Hydrocarbons in Sediment

The analytical results for PHCs in marine sediment are provided in Table C.1 in Appendix C.

The CEPA Disposal at Sea Regulations and the CCME ISQG and PELs were checked but no criteria exist for PHCs.

3.1.1 CCME Soil Quality Guidelines

All benzene, toluene and ethylbenzene concentrations were non-detect and below the CCME SQGs in the analyzed sediment samples.

3.1.2 CCME Canada Wide Standards

The PHC concentrations were below the CCME CWSs in the analyzed sediment samples.

3.1.3 NL MAE

Modified TPH concentrations were below the NL Department of Environment and Conservation Protocol for the Management of Excavated Soils, and the Concrete Rubble and Dredged Materials in the analyzed sediment samples.

3.1.4 RBCA Tier I RBSL

Modified TPH concentrations exceeded the RBCA Tier I RBSLs for Agricultural and Residential/Parkland land use at five sample locations (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05 and TW-SED-06). All BTEX and modified TPH concentrations were reported below the RBCA Tier I RBSLs for commercial/industrial land use.

3.1.5 RBCA Tier I ESLs

Modified TPH concentrations exceeded the RBCA Tier I sediment ecological screening levels (ESLs) for marine aquatic life at five sample locations (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05 and TWD-SED-06). All BTEX and modified TPH concentrations were reported below the RBCA Tier I ESLs.

3.2 Metals in Sediment

The analytical results for metals in marine sediment are provided in Table C.2 in Appendix C.

3.2.1 CEPA Disposal at Sea Regulations

Concentrations of cadmium exceeded the CEPA Disposal at Sea Regulations at four locations, including TW-SED-01, TW-SED-02, TW-SED-03 and TW-SED-06. All other metal concentrations were either non-detect or reported below the CEPA Disposal at Sea Guidelines.

3.2.2 CCME Sediment Quality Guidelines

3.2.2.1 INTERIM SEDIMENT QUALITY GUIDELINES (ISQGs)

Concentrations of arsenic and cadmium exceeded the CCME ISQGs at three locations, including TW-SED-01, TW-SED-02, and TWD-SED-03. The concentrations of chromium were exceeded at 12 sample locations (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-02, STB-03, STB-04, STB-05, STB-06, and STB-07). Concentrations of copper were reported above the CCME ISQGs at 13 sample locations (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-01, STB-02, STB-03, STB-04, STB-05, STB-06 and STB-07). Lead concentrations exceeded the ISQGs at six sample locations, including TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05, TWD-SED-06 and STB-07. Zinc exceedances were reported at TWD-SED-01, TW-SED-02, and TWD-SED-03. All other metals concentrations were non-detect or reported below the CCME ISQGs.

3.2.2.2 MARINE PROBABLE EFFECTS LEVELS (PELs)

All metal concentrations were non-detect or reported below the PELs in the analyzed sediment samples.

3.2.3 CCME Soil Quality Guidelines

3.2.3.1 AGRICULTURAL

Boron concentrations exceeded the CCME SQGs for Agricultural land use at three sample locations, including TW-SED-01, TW-SED-02 and TWD-SED-03. Chromium was exceeded at sample locations TW-SED-02, STB-03, and STB-04. Copper was exceeded at sample locations TW-SED-01 and TW-SED-02. Lead was exceeded at sample locations TW-SED-01 and STB-07. Molybdenum concentrations exceeded the CCME SQGs at TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05. Nickel concentrations were exceeded at TW-SED-02, STB-03 and STB-04. Selenium concentrations were exceeded at TW-SED-01, TW-SED-02 and TW-SED-03. Tin concentrations were exceeded at TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05 and TW-SED-06. All other metal concentrations were non-detect or reported below the agricultural SQGs in the analyzed sediment samples.

3.2.3.2 RESIDENTIAL/PARKLAND

Chromium concentrations exceeded the CCME SQGs for Residential/Parkland land use at three sample locations, including TW-SED-02, STB-03 and STB-04. Copper concentrations were exceeded at TW-SED-01 and TW-SED-02, and nickel concentrations exceeded guidelines at TW-SED-02, STB-03 and STB-04. Selenium concentrations were exceeded at TW-SED-01, TW-SED-02 and TW-SED-03. All other metal concentrations were non-detect or reported below the residential/parkland SQGs in the analyzed sediment samples.

3.2.3.3 COMMERCIAL & INDUSTRIAL

No metals concentrations were reported to exceed the CCME SQGs for commercial or industrial land uses at any of the sediment sample locations.

3.3 Polycyclic Aromatic Hydrocarbons in Sediment

There was at least one PAH parameter exceeded in all of the analyzed sediment samples when comparing the concentrations against applicable guidelines. The analytical results for PAHs in marine sediment are provided in Table C.3 in Appendix C.

3.3.1 CEPA Disposal at Sea Regulations

Total PAH concentrations exceeded the CEPA Disposal at Sea Regulations at nine sample locations, including TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-02, STB-03 and STB-04.

3.3.2 CCME Sediment Quality Guidelines

3.3.2.1 INTERIM SEDIMENT QUALITY GUIDELINES (ISQGs)

All analyzed sediment samples had at least one PAH parameter that exceeded the CCME ISQGs. STB-09 was the sample with the least number of exceedances detected (only fluoranthene) and TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, and TW-SED-06 all exceeded the same 12 parameters and had the highest number of parameters exceeded overall (2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, benzo(a)anthracene, benzo(a)pyrene and chrysene).

3.3.2.2 MARINE PROBABLE EFFECTS LEVELS (PELs)

Various PAH concentrations exceeded PELs in the analyzed sediment samples. STB-09 was the only sample in which PAH concentrations did not exceed PELs. TW-SED-01 and TW-SED-03 had the greatest PEL PAH parameter exceedances (ten) including acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, phenanthrene, pyrene, benzo(a)anthracene, benzo(a)pyrene, and chrysene. All other PAH parameter concentrations were non-detect or reported below the PELs in the analyzed sediment samples.

3.3.3 CCME Soil Quality Guidelines

3.3.3.1 AGRICULTURAL

PAH Exceedances of the SQGs for Agricultural land use were detected at every sample location with the exception of STB-09. Besides STB-09, STB-01 contained the least number of PAH parameter exceedances (six) including naphthalene, phenanthrene, pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(b/j)fluoranthene. TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-02, STB-03, STB-04, and STB-DUP all exceeded the same number of PAH concentrations (nine) including naphthalene, phenanthrene, pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(b/j)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. Calculated IACR exceeded CCME SQGs for Agricultural land uses at all sediment sample locations with the exception of STB-09.

3.3.3.2 RESIDENTIAL/PARKLAND

Concentrations of various PAHs exceeded SQGs for Residential/Parkland land use at every sample location with the exception of STB-09. Besides STB-09, STB-02, STB-03, STB-04, STB-05, STB-06, STB-07 all contained the lowest number of PAH exceedances (two) including naphthalene, and phenanthrene. TW-SED-01 had the highest number of PAH exceedances at six which consisted of naphthalene, phenanthrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(b/j)fluoranthene, benzo(k)fluoranthene. All other PAH parameter concentrations were non-detect or reported below the ISQGs. Calculated IACR exceeded CCME SQGs for Residential/Parkland land uses at all sediment sample locations with the exception of STB-09.

3.3.3.3 COMMERCIAL & INDUSTRIAL

Concentrations of naphthalene and phenanthrene exceeded SQGs for Commercial/Industrial Land Use at every sample location except for STB-09. Calculated IACR exceeded CCME SQGs for Commercial and Industrial land uses at all sediment sample locations with the exception of STB-09.

3.4 PAH Leachate

One sediment sample (TW-SED-01) was submitted for PAH leachate analysis for potential landfill-based disposal of dredged materials. Analytical results were compared to the NL leachate disposal criteria. Concentrations of PAH leachate did not exceed the NL leachate disposal criteria.

Laboratory analytical results for PAH leachate are provided in Table C.5 of Appendix C.

3.5 Polychlorinated Biphenyls in Sediment

The analytical results for PCBs in marine sediment are provided in Table C.5 of Appendix C. A full PCB package was tested for, however, the only parameter tested for with limits specified in the guidelines are Total PCBs.

3.5.1 CEPA Disposal at Sea Regulations

The concentration of Total PCBs exceeded the CEPA Disposal at Sea criteria in seven samples including TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, STB-01 and STB-03.

3.5.2 CCME Sediment Quality Guidelines

3.5.2.1 INTERIM SEDIMENT QUALITY GUIDELINES (ISQGs)

ISQGs for Total PCB concentrations were exceeded in nine samples including TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-01, STB-02, and STB-03.

3.5.2.2 MARINE PROBABLE EFFECTS LEVELS (PELs)

PELs for Total PCB concentrations were exceeded in five samples including TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, and TW-SED-05.

3.5.3 CCME Soil Quality Guidelines

No concentrations of Total PCBs were reported to exceed the CCME SQGs for Agricultural, Residential/ Parkland, Commercial and Industrial Land Use.

3.6 Sodium Adsorption Ratio and Conductivity in Sediment

The analytical results for SAR and conductivity in marine sediment are provided in Table C.6 of Appendix C.

3.6.1 CEPA Disposal at Sea Regulations

There are no criteria for SAR or conductivity within the Regulations.

3.6.2 CCME Sediment Quality Guidelines

There are no criteria for SAR or conductivity within the guidelines.

3.6.3 CCME Soil Quality Guidelines

Concentrations of SAR exceeded CCME SQGs for all land uses at all sediment sample locations. Conductivity exceeded CCME SQGs for agricultural and residential/parkland land uses at all sediment sample locations, and sediment samples TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05, TW-SED-06, and STB-04 also exceeded CCME SQGs for commercial and industrial land uses.

3.7 Total Organic Carbon (TOC)

The analytical results for TOC in marine sediment are provided in Table C.7 of Appendix C.

The concentrations of TOC ranged from 5,900 mg/kg to 74,000 mg/kg. TOC is a general indicative parameter and therefore no guidelines are available for direct comparison.

3.8 Grain Size in Sediment

A total of 15 sediment samples (TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-04, TW-SED-05, TW-SED-06, STB-01, STB-02, STB-03, STB-04, STB-05, STB-06, STB-07, STB-09 and STB-DUP) were submitted for grain size analysis and were determined to be largely composed of sand with some silt and clay among the sand grains, along with traces of gravel.

The results for grain size in soil are provided in Table C.8 in Appendix C. The laboratory Certificates of Analysis are provided in Appendix D.

The analytical grain-size results were used to generate Shepard Sand-Silt-Clay ternary diagrams for the Town Wharves Breakwater area (Figure 3.1) and the South Turning Basin area (Figure 3.2) using the SEDPLOT sediment classification program. The Shepard Sand-Silt-Clay plot indicates that sediment collected from both the Town Wharves Breakwater and South Turning Basin areas consists primarily of sand.

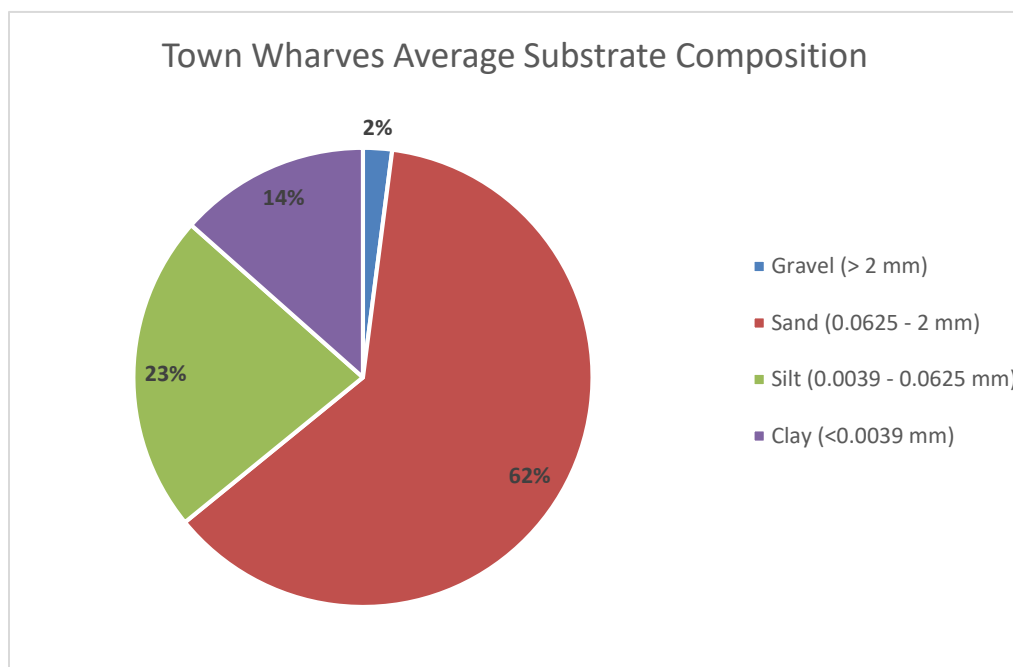


Figure 3.1: Average substrate composition for composite sediment samples collected from the Town Wharves Breakwater area.

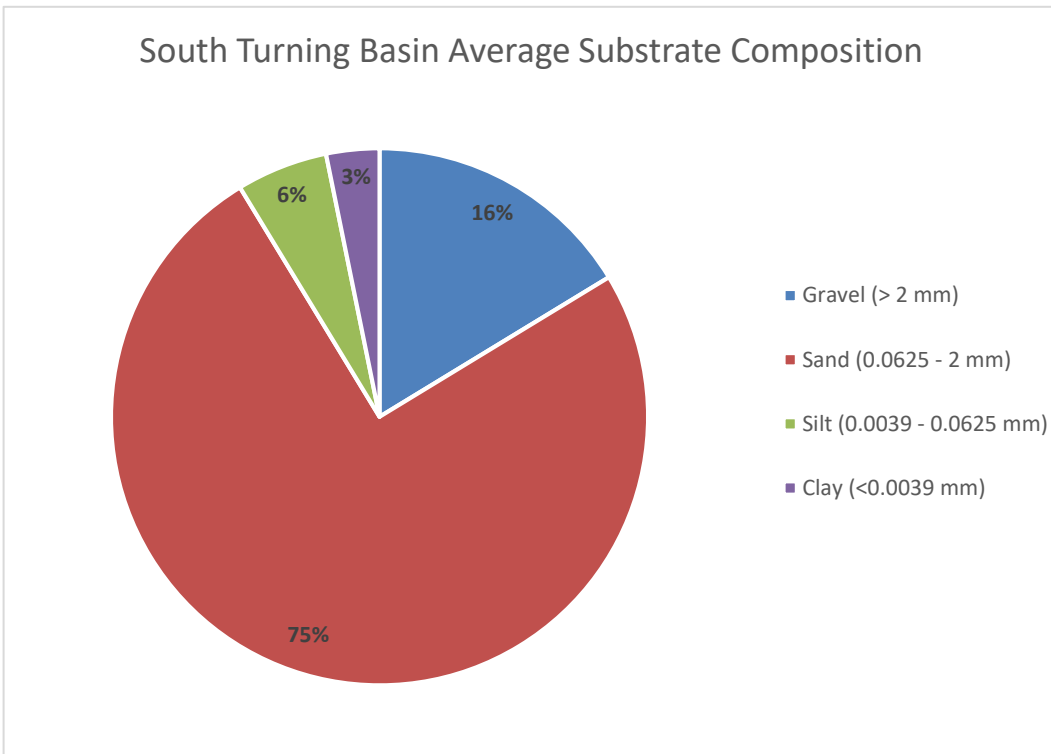


Figure 3.2: Average substrate composition for composite sediment samples collected from the South Turning Basin area.

The SEDPLOT program was used to classify the sediment and plot it on a Ternary Shepard diagram, the outputs for the Town Wharves Breakwater area are presented in Figures 3.3 and 3.4. Sediment sample locations TW-SED-01, TW-SED-02, TW-SED-03, TW-SED-05 and TW-SED-06 were classified as silty sand. Sediment sample location TW-SED-04 was classified as sand.



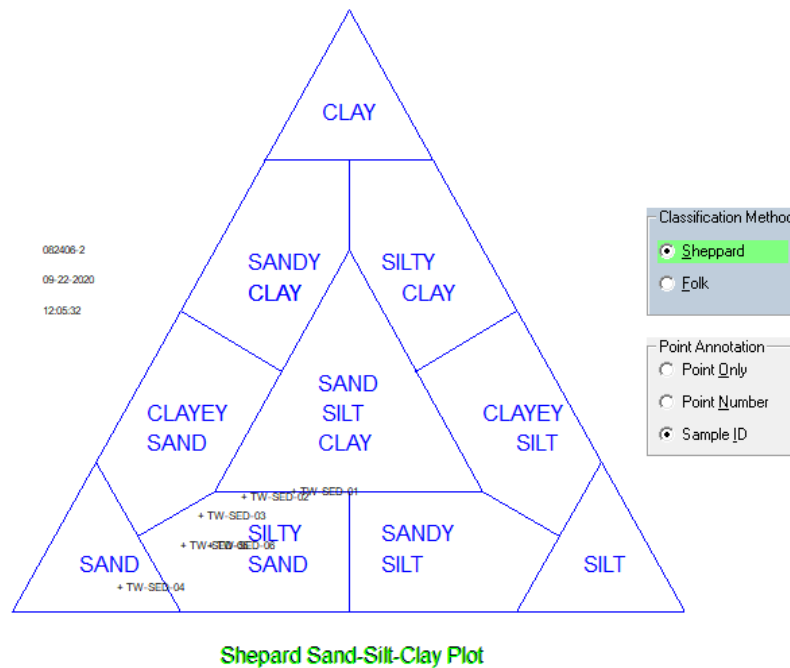


Figure 3.4: Ternary diagram displaying the Shepard Gravel Plot for sediment samples analysed from the Town Wharves Breakwater area.

The SEDPLOT program was used to classify the sediment and plot it on a Ternary Shepard diagram, the outputs for the South Turning Basin area are presented in Figures 3.5 and 3.6. Sediment sample locations STB-01, STB-02, STB-04, STB-07, STB-09 and STP-DUP were classified as gravelly sediment. Sediment sample locations STB-03, STB-05 and STB-06 were classified as sand.

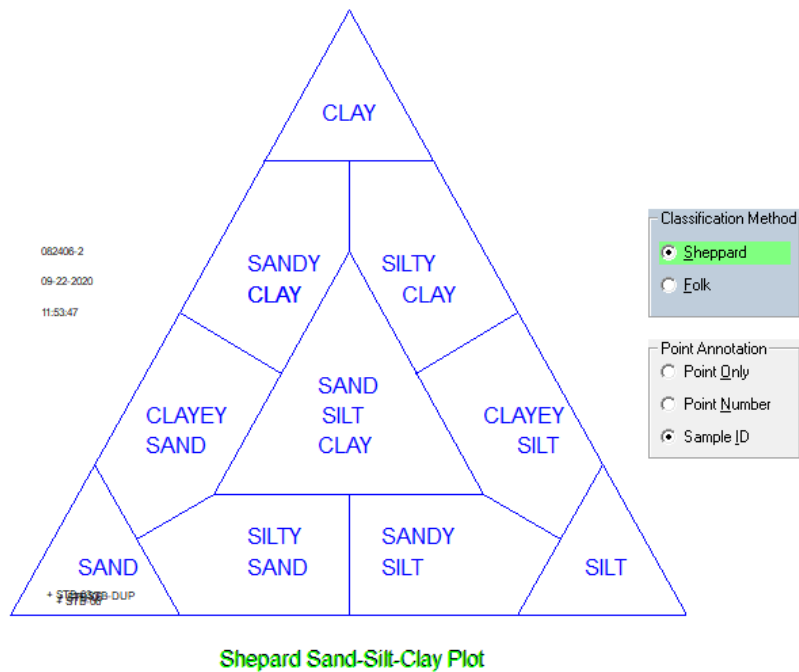


Figure 3.5: Ternary diagram displaying the Shepard Sand, Silt, Clay Plot for sediment samples analysed from the South Turning Basin area.

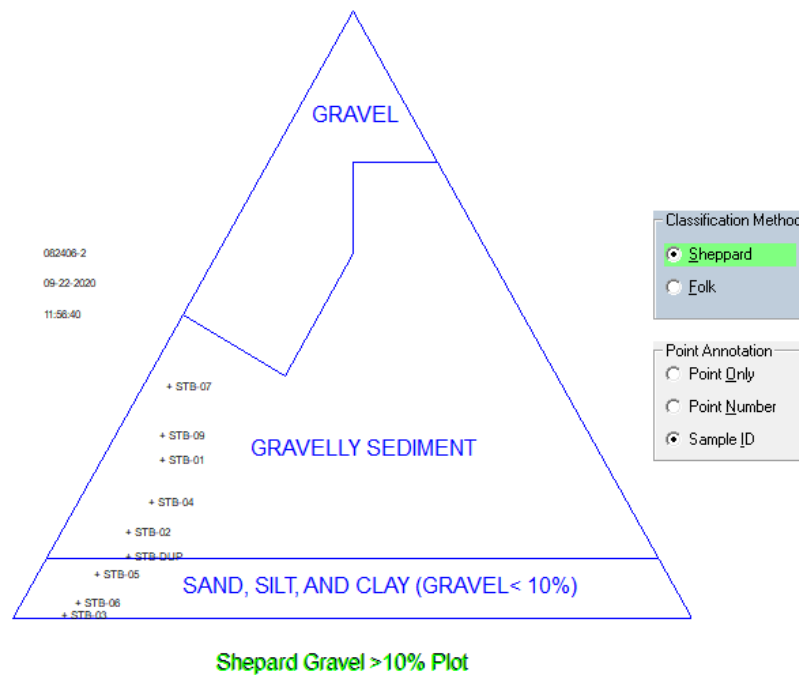


Figure 3.6: Ternary diagram displaying the Shepard Gravel Plot for sediment samples analysed from the South Turning Basin area.

Note that the grain-size distribution presented in this report does not constitute a geotechnical investigation of the Project Area. These results are not intended to characterize the geological make-up of the Project Area.

3.9 QA/QC Results

QA/QC sampling consisted of the collection and analysis of one blind field duplicate during the sediment sampling program, including:

- Sediment sample STP-DUP, collected at the same location of STB-03, was submitted for analysis of PHCs, metals, PCBs, PAHs, SAR, conductivity and TOC.

QA/QC analytical results are presented in Appendix C, including Tables C.9 (PHCs), C.10 (Metals), C.11 (PAHs), C.12 (SAR), and C.13 (TOC), where the duplicate information is presented along with the original sample data for comparison. The purpose of the blind duplicate was to determine the integrity of the samples.

The relative percent difference (RPD) between a sample and its duplicate is expressed as an absolute value in the tables, and was calculated using the following formula:

$$\text{RPD} = 100\% \times [(A - B) / ((A + B) / 2)]$$

Where, A = Original concentration

B = Duplicate concentration

RPD calculations are only considered applicable when one concentration is greater than five times the laboratory Reportable Detection Limits (RDLs). When one (or both) values are less than the RDL, the RPD is not calculated.

In reviewing the RPD calculations for the soil samples as related to blind duplicate samples, it has been observed that the duplicate results generally agree closely with their corresponding samples. Acceptable limits for RPD (i.e., high vs. low degree of correlation) are based on the Bureau Veritas Analytical Laboratories National QA/QC Interpretation Guide. The general alert criteria for soil is 60%. These are recommended alert criteria but results outside these limits may be deemed acceptable on a case by case basis. All calculated RPDs were within 60%. RPD calculations are only applicable when both concentrations are greater than five times the laboratory RDL. Based on the review of field duplicates, the overall laboratory and field data quality is considered acceptable.

Bureau Veritas has an extensive QA/QC program that includes a Quality Assurance Report with all analyses (see Appendix D), which provides Percent Recoveries and QC Limits on Matrix Spikes, Spiked Blanks, Method Blanks and Lab Duplicates. Several laboratory blank samples were analyzed with the sample sets to assess the quality of the laboratory results with respect to the presence/absence of instrument cross contamination at the laboratory. Surrogate recoveries were also reviewed for samples to evaluate the effectiveness and accuracy of the method on a sample-specific basis. Based on the review of QA reports, laboratory duplicates, blanks and surrogate recoveries, all laboratory QA/QC standards were within acceptable limits.

The analytical results of the sediment samples collected from the Port Aux Basques Harbour indicated the following guideline exceedances:

Table 4.1: Summarized Exceedances for Selected Parameters and Guidelines

Parameter / Guideline	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	STB-07	STB-09	STB-DUP
CCME Soil Quality Guidelines – Agricultural and/or Residential Parkland Land Uses^a															
BTEX/TPH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	●	●	●	-	●	●	-	-	●	●	-	-	●	-	-
PAHs	●	●	●	●	●	●	●	●	●	●	●	●	●	-	●
PCBs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAR and Inorganics	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CCME Soil Quality Guidelines – Commercial and/or Industrial Land Uses^b															
BTEX/TPH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAHs	●	●	●	●	●	●	●	●	●	●	●	●	●	-	●
PCBs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAR and Inorganics	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CCME Canada Wide Standards^c															
BTEX/TPH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCME Sediment Quality Guidelines^d															
Metals	●	●	●	●	●	●	●	●	●	●	●	●	●	-	●
PAHs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PCBs	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-
CEPA Disposal at Sea Regulations															
Metals	●	●	●	-	-	●	-	-	-	-	-	-	-	-	-
PAHs	●	●	●	●	●	●	-	●	●	●	-	-	-	-	●
PCBs	●	●	●	●	●	-	●	-	●	-	-	-	-	-	-
Atlantic RBCA Tier I RBSLs^f															
BTEX/TPH	●	●	●	-	●	●	-	-	-	-	-	-	-	-	-
Atlantic RBCA Tier I ESLs^g															
BTEX/TPH	●	●	●	-	●	●	-	-	-	-	-	-	-	-	-
NL Leachate Disposal Criteria^h															
Leachable PAHs	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NL Dredged Materialsⁱ															
BTEX/TPH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

- a. CCME SQG, Agricultural, Residential/Parkland Land Uses, coarse grain soil (Updated to 2020).
- b. CCME SQG, Commercial and/or Industrial Land Uses, coarse grain soil (Updated to 2020).
- c. CCME CWS for Petroleum Hydrocarbons in Soil, Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (January 2008).
- d. CCME Sediment Quality Guidelines (SedQGs) for the Protection of Aquatic Life, Marine Aquatic Life, PELs and ISQG (Updated to 2020).
- e. CEPA Disposal at Sea (formerly the *Ocean Dumping Control Act*).
- f. Atlantic RBCA Tier I RBSLs for Soil for all land use types, non-potable and coarse-grained soil (September 2015).
- g. Atlantic RBCA Tier I ESLs for the Protection of Freshwater and Marine Aquatic Life, "typical" sediment (September 2015).
- h. NL Leachate Disposal Criteria = Newfoundland and Labrador Department of Environment, GD-PPD-26.1 - Leachable Toxic Waste, Testing and Disposal
- i. NL Dredged Materials Criteria = Newfoundland and Labrador Department of Environment and Conservation Protocol for the Management of Excavated Soils, Concrete, Rubble and Dredged Materials.

'●' = Exceedance of applicable guidelines

'-' = No exceedance of applicable guidelines

'n/a' = Not submitted for analysis

In the area of the Town Wharves Breakwater, exceedances of land-based soil disposal guidelines for agricultural and/or residential parkland land uses included various metals parameters (arsenic, boron, cadmium, chromium, copper, lead, molybdenum, nickel, selenium, tin and zinc), various PAH parameters (naphthalene, phenanthrene, pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(b/j)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene), SAR and EC. Exceedances of the guidelines for commercial and/or industrial land uses included various PAH parameters (naphthalene and phenanthrene), SAR and EC. Leachable PAHs were reported below the applicable NL leachate disposal criteria. Exceedances of the *in-situ* guidelines for the protection of marine aquatic life reported in the samples collected from the Town Wharves Breakwater area included PHCs (modified TPH), various metals parameters (arsenic, cadmium, chromium, copper, lead and zinc), various PAH parameters and total PCBs. In addition, concentrations of cadmium, total PAHs and PCBs were reported to exceed CEPA Disposal at Sea in the sediment samples collected from the Town Wharves Breakwater area.

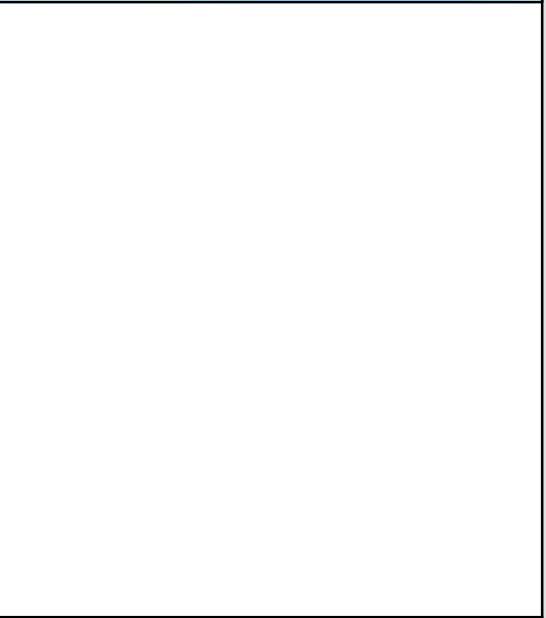
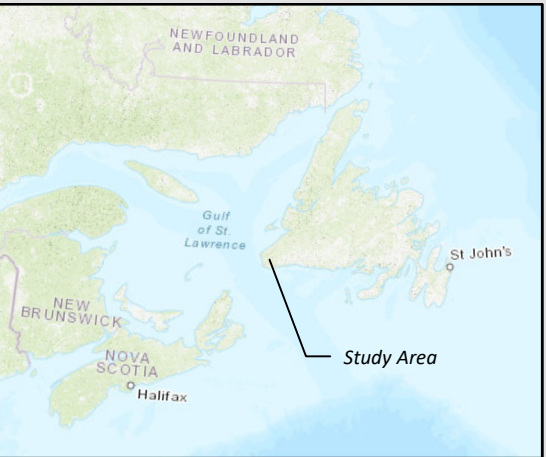
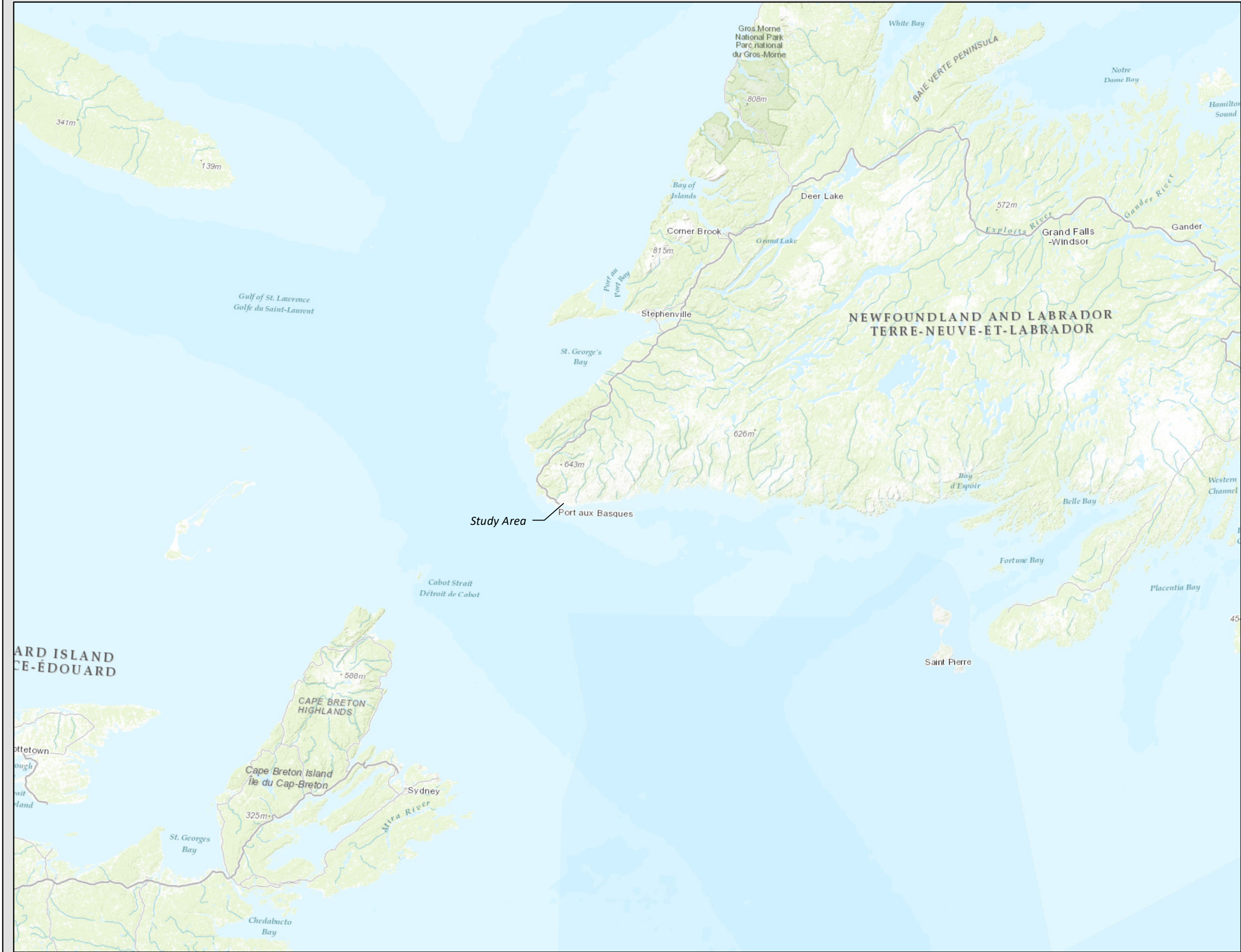
In the area of the South Turning Basin, exceedances of land-based soil disposal guidelines for agricultural and/or residential parkland land uses included various metals parameters (chromium, lead and nickel), various PAH parameters (naphthalene, phenanthrene, pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(b/j)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene), SAR and EC. Exceedances of the guidelines for commercial and/or industrial land uses included various PAH parameters (naphthalene and phenanthrene), SAR and EC. Exceedances of the *in-situ* guidelines for the protection of marine aquatic life reported in the samples collected from the South Turning Basin area various metals parameters (chromium, copper, and lead), various PAH parameters and total PCBs. In addition, concentrations of total PAHs and PCBs were reported to exceed CEPA Disposal at Sea in the sediment samples collected from the South Turning Basin area.

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- Atlantic PIRI. 2015. Atlantic Risk-Based Corrective Action (RBCA) for Petroleum Impacted Sites in Atlantic Canada, Version 3.0 User Guidance. Table 41 - Tier 1 Risk-Based Screening Levels (RBSLs) for Soil.
- Canadian Council of Ministers of the Environment (CCME). (2008). Canada-Wide Standards for Petroleum Hydrocarbons in Soil. Technical Supplement.
- CCME Canadian Council Ministers of Environment (CCME) Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Sediment Quality Guidelines (ISQG), Marine Probable Effects Levels (PELs)
- CCME Canadian Environmental Quality Guidelines Summary Table. Soil Quality. Available Online: <http://st-ts.ccme.ca/>. Accessed November 2019.
- CCME Canadian Soil Quality Guidelines for Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs): Environmental and Human Health Effects, 2008.
- Newfoundland and Labrador Department of Environment, GD-PPD-26.1 - Leachable Toxic Waste, Testing and Disposal (Revised November 2003).
- Newfoundland and Labrador Department of Environment and Conservation Protocol for the Management of Excavated Soils, Concrete Rubble and Dredged Materials, June 9, 2006 (Revised May 26, 2015).

APPENDIX A

Figures

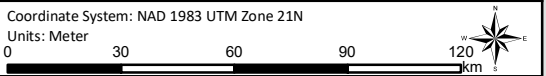


MARINE ATLANTIC INC.
*Navigation Improvement Project,
Port aux Basques, Newfoundland and Labrador*

Figure 1: Site Location Map

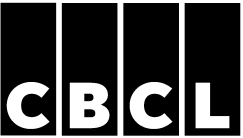
Drawn by: NH	Date: 2020-10-19
Checked:	CBCL Project #: 202479.05
Approved:	Scale @ 11" x 17" : 1:2,000,000

Notes:
Data Sources:
Northwest Atlantic Fisheries Organization, 2020





- Legend**
- Sediment Sample Locations (CBCL July, 2020)
 - Town Wharf Breakwater
 - Proposed Navigation Channel
 - Proposed Dredging Extents



MARINE ATLANTIC INC.
Navigation Improvement Project
Port aux Basques, Newfoundland and Labrador

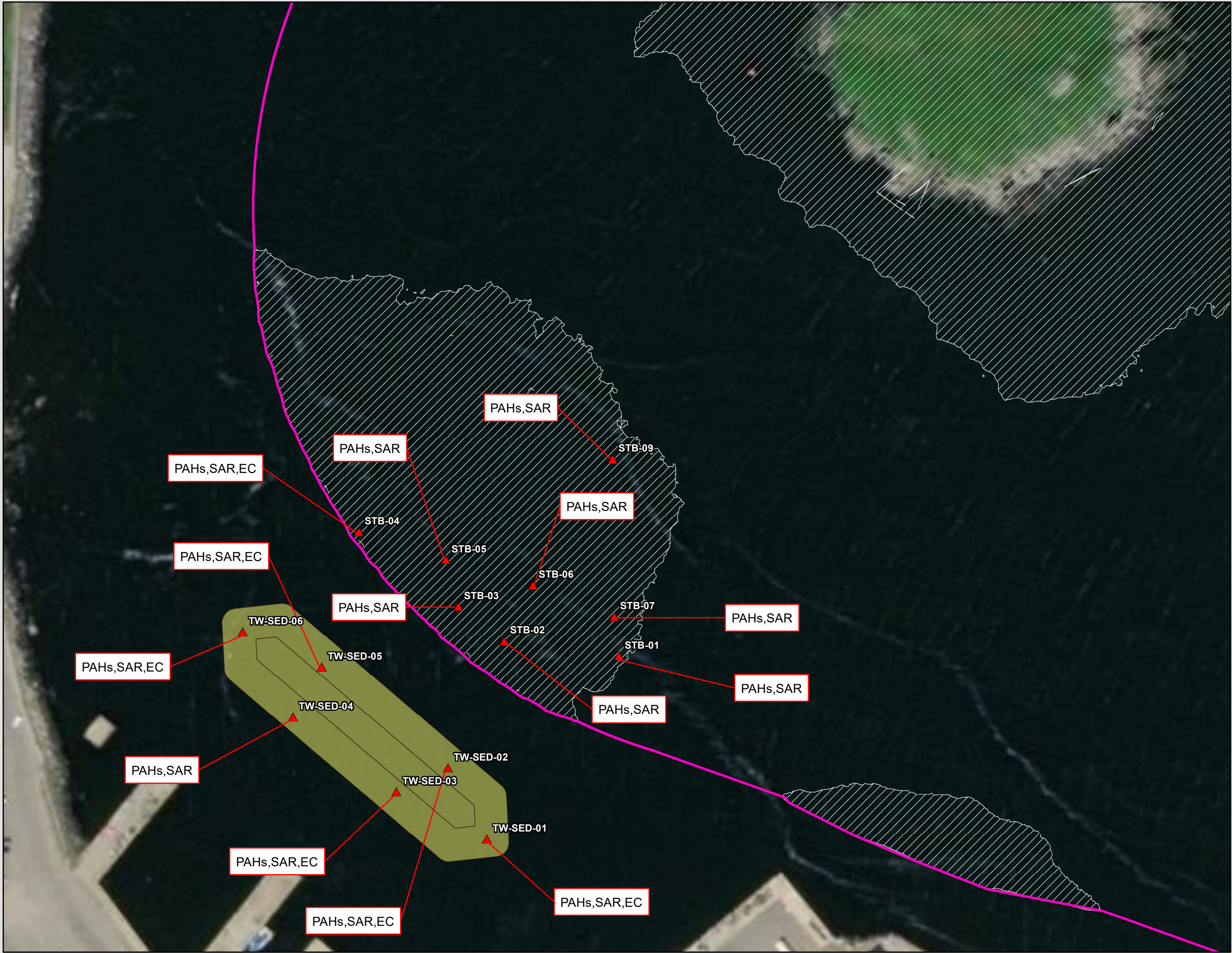
Figure 2: 2020 Sediment Sampling Program Locations

Drawn by: RM	Date: 2020-08-28
Checked:	CBCL Project #: 202479.05
Approved:	Scale @ 11" x 17" : 1:1,150

Notes:

Coordinate System: NAD 1983 UTM Zone 21N
Units: Meter
0 10 20 30 40
m





Legend

- Sediment Sample Location Exceeds Guidelines
- Proposed Navigation Channel
- Town Wharf Breakwater
- Proposed Dredging Extents



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Navigation Improvement Project
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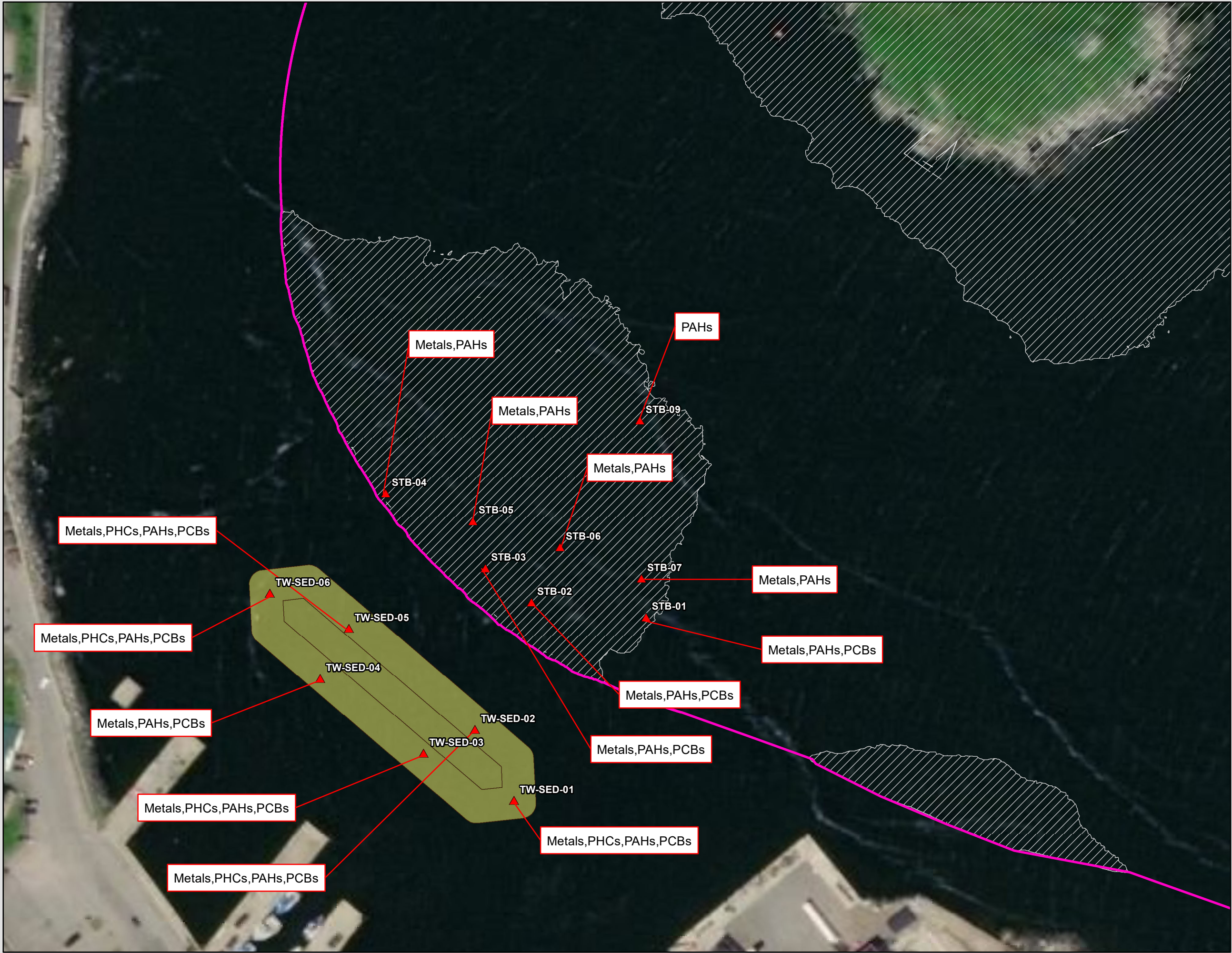
Figure 3: 2020 Sediment Sampling Program Locations and Exceedances of Land Based Disposal Guidelines (Commercial/Industrial)

Drawn by: NH	Date: 2020-10-19
Checked:	CBCL Project #: 202479.05
Approved:	Scale @ 11" x 17" : 1:1,250

Notes:
Polycyclic Aromatic Hydrocarbons (PAHs)
Sodium Absorption Ratio (SAR)
Electrical Conductivity (EC)

Coordinate System: NAD 1983 UTM Zone 21N
Units: Meter
0 10 20 30 40





- Legend**
- ▲ Sediment Sample Location Exceeds Guidelines
 - Proposed Navigation Channel
 - Town Wharf Breakwater
 - Proposed Dredging Extents



MARINE ATLANTIC INC.
Navigation Improvement Project
Port aux Basques, Newfoundland and Labrador

Figure 4: 2020 Sediment Sampling Program Locations and Exceedances of In-Situ Marine and/or DAS Guidelines

Drawn by: NH	Date: 2020-10-19
Checked:	CBCL Project #: 202479.05
Approved:	Scale @ 11" x 17" : 1:1,250

Notes:

Petroleum Hydrocarbons (PHCs)

Polycyclic Aromatic Hydrocarbons (PAHs)

Polychlorinated Biphenyl (PCBs)

Coordinate System: NAD 1983 UTM Zone 21N
Units: Meter
0 10 20 30 40



APPENDIX B

Photographs

Appendix B: Photo Log (July 2020)



Photo 1: STB-01



Photo 2: STB-01 (close up)



Photo 3: STB-02



Photo 4: STB-02 (close up)



Photo 5: STB-03



Photo 6: STB-03 (close up)

Appendix B: Photo Log



Photo 7: STB-04

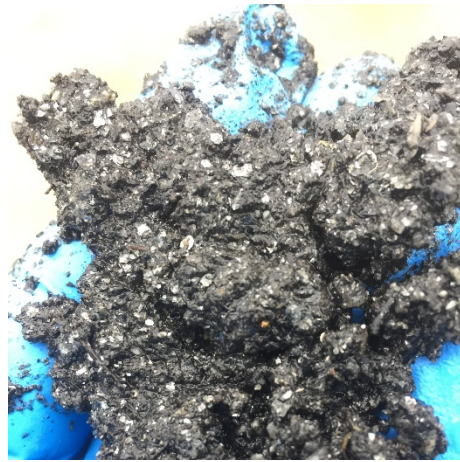


Photo 8: STB-04 (close up)



Photo 9: STB-05



Photo 10: STB-05 (close up)



Photo 11: STB-06



Photo 12: STB-06 (close up)

Appendix B: Photo Log



Photo 13: STB-07



Photo 14: STB-07 (close up)



Photo 15: STB-09

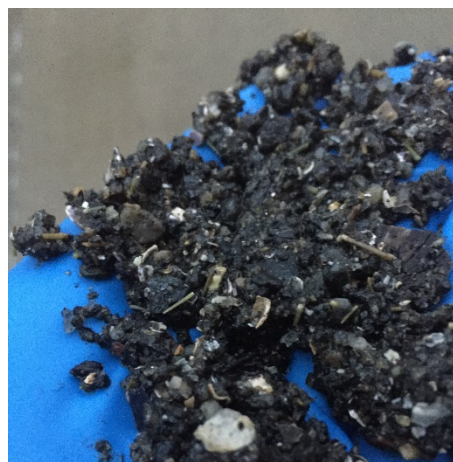


Photo 16: STB-09 (close up)



Photo 17: TW-SED-01



Photo 18: TW-SED-01 (close up)

Appendix B: Photo Log



Photo 19: TW-SED-02



Photo 20: TW-SED-02 (close up)



Photo 21: TW-SED-03



Photo 22: TW-SED-03 (close up)



Photo 23: TW-SED-04



Photo 24: TW-SED-04 (close up)

Appendix B: Photo Log



Photo 25: TW-SED-05

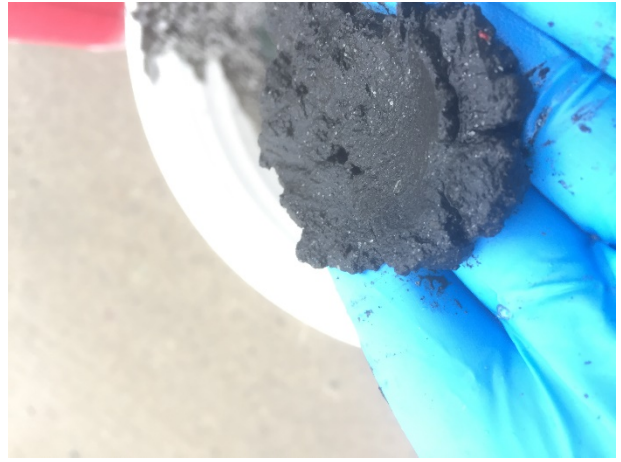


Photo 26: TW-SED-05 (close up)

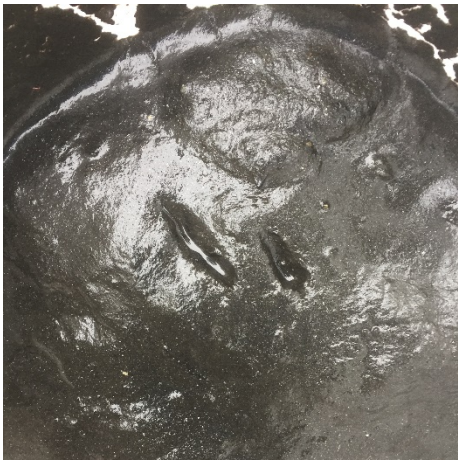


Photo 27: TW-SED-06



Photo 28: TW-SED-06 (close up)

APPENDIX C

Analytical Tables

Table C.1: Petroleum Hydrocarbons (PHCs) in Sediment (mg/kg)

Sample ID: Sampling date:	CCME SQGs ^a	CCME CWS ^b		NL MAE ^c	RBCA Tier I RBSLs ^d		RBCA Tier I ESLs ^e	Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations									
	Agricultural, Residential/ Commercial, Industrial	Agricultural, Residential/ Parkland	Commercial, Industrial	All Land Uses	Agricultural, Residential/ Parkland	Commercial, Industrial	Marine and Freshwater	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09	
								28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20
Petroleum Hydrocarbons																							
Benzene	0.030	-	-	-	0.099	2.5	1.2	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Toluene	0.37	-	-	-	77	10,000	1.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Ethylbenzene	0.082	-	-	-	30	10,000	1.2	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Total Xylenes	-	-	-	-	-	-	1.3	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
C6-C10 (less BTEX) [F1]	-	30	320	-	-	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
>C10-C16 Hydrocarbons [F2]	-	150	260	-	-	-	-	82	79	41	13	29	31	<10	<10	<10	<10	<10	<10	<10	<10	<10	
>C16-C21 Hydrocarbons	-	-	-	-	-	-	-	210	210	140	27	100	100	<10	<10	17	19	21	<10	<10	<10	<10	
>C21-<C32 Hydrocarbons	-	-	-	-	-	-	-	580	570	470	96	360	330	51	51	67	70	72	39	30	34	<15	
Modified TPH (Tier1) ^h	-	-	-	1000	74 (Gas) 270 (Fuel) 1,100 (Lube)	870 (Gas) 4,000 (Fuel) 10,000 (Lube)	15 (Gas) 25 (Fuel) 43 (Lube) 500 (Max)	880 ⁵ (318.2)	850 ⁵ (275.2)	650 ⁵ (262.3)	140	490 ⁵ (146.2)	460 ⁵ (154.8)	51	51	85	88	93	39	30	34	<15	
Fraction Organic Carbon (Foc) (g/g)	-	-	-	-	-	-	-	0.074	0.064	0.061	0.018	0.034	0.036	0.012	0.012	0.01	0.0083	0.021	0.0062	0.0059	0.015	0.015	
Reached Baseline at C32	-	-	-	-	-	-	-	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	
Resemblance	-	-	-	-	-	-	-	One product in fuel / lube oil fraction.	One product in fuel / lube range. Lube oil fraction.	Unidentified compound(s) in fuel / lube range. One product in fuel / lube range. Lube oil fraction.	Unidentified compound(s) in fuel / lube range. Lube oil fraction.	One product in fuel / lube range. Lube oil fraction.	One product in fuel / lube range. Lube oil fraction.	Possible lube oil fraction.	Possible lube oil fraction.	Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.	Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.	Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.	Possible lube oil fraction.	Possible lube oil fraction.	Unidentified compound(s) in lube oil range. Possible lube oil fraction.	NA	

Notes:

'-' = No guideline available or parameter not analyzed

<RDL in grey text

RDL = Reportable Detection Limit

a. CCME Soil Quality Guidelines (SQG), Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (Updated to 2020)

b. CCME Canada Wide Standards (CWS) for Petroleum Hydrocarbons in Soil, Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (January 2008)

c. Newfoundland and Labrador Department of Environment and Conservation Protocol for the Management of Excavated Soils, Concrete Rubble and Dredged Materials (June 9, 2006; revised May 26, 2015).

d. Atlantic Risk Based Corrective Action (RBCA) Tier I Risk Based Screening Levels (RBSLs) for Soil for all land use types, non-potable and coarse-grained soil (September 2015).

e. Atlantic Risk Based Corrective Action (RBCA) Tier I Sediment Ecological Screening Levels (ESLs) for the Protection of Freshwater and Marine Aquatic Life, "Typical" Sediment (September 2015).

f. The Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines (formerly the Ocean Dumping Control Act) were checked, but no guidelines exist for petroleum hydrocarbons.

g. CCME Sediment Quality Guidelines were checked, but no guidelines exist for petroleum hydrocarbons.

h. Adjusted Tier 1 Modified TPH guidelines (brackets) based on Foc concentrations. These adjusted Tier 1 TPH guidelines are consistent with the calculated RBCA Sediment Ecological Screening Levels for the Protection of Freshwater and Marine Aquatic Life, Table 4 Atlantic RBCA Version 3, July 2012, "Typical" sediment criteria. The screening levels change proportionally with the Foc compared to a base value of 0.01. For example, with Foc = 0.04, the Table 4 values increase by 4-fold.

Exceedance Identification:

Shaded = Exceedance of Guideline

1 - exceeds CCME SQGs

2 - exceeds CCME CWS Agricultural, Residential/Parkland

3 - exceeds CCME CWS Commercial, Industrial

4 - exceeds NL MAE

5 - exceeds RBCA Tier 1 RBSLs Agricultural, Residential/Parkland

6 - exceeds RBCA Tier 1 RBSLs Commercial, Industrial

Table C.2: Metals in Sediment (mg/kg)

Sample ID: Date:	CCME SQGs ^a				CEPA Disposal at Sea Regulations ^b	CCME Sediment Quality Guidelines (Marine) ^c		Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	Agricultural	Residential/ Parkland	Commercial	Industrial		ISQG	PEL	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Notes:
'-' = No guideline available or parameter not analyzed <RDL in grey text
RDL = Reportable Detection Limit

- a. CCME Soil Quality Guidelines (SQG), Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (Updated to 2020)
b. Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines (formerly the Ocean Dumping Control Act), (Current to March 12, 2019).
c. CCME Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Sediment Quality Guidelines (ISQG), Marine Probable Effects Levels (PELs)

Exceedance Identification:
Shaded = Exceedance of Guideline
1 - exceeds CCME SQGs Agricultural
2 - exceeds CCME SQGs Residential/Parkland
3 - exceeds CCME SQGs Commercial
4 - exceeds CCME SQGs Industrial
5 - exceeds CEPA Disposal at Sea
6 - exceeds CCME ISQG
7 - exceeds CCME PEL

Table C.3: Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment (mg/kg)

Sample ID: Date:	CCME SQGs ^a			CEPA Disposal at Sea Regulations ^b	CCME Sediment Quality Guidelines (Marine) ^c		PEFs (for B(a)P TPE calculations)	Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	Agricultural	Residential/ Parkland	Commercial, Industrial		TW-SED-01	TW-SED-02		TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
					ISQG	PEL		28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Ju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Notes:
'-' = No guideline available or parameter not analyzed <RDL in grey text
RDL = Reportable Detection Limit B[a]P PEF = Benzo(a)pyrene Potency Equivalent Factor.
B[a]P TPE = Benzo(a)pyrene Total Potency Equivalent concentration.
a. CCME Soil Quality Guidelines (SQG), Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (Updated to 2020)
b. Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines (formerly the Ocean Dumping Control Act), (Current to March 12, 2019).
c. CCME Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Sediment Quality Guidelines (ISQG), Marine Probable Effects Levels (PELs)
d. Total PAH calculation based on the sum of 16 individual PAH compounds (acenapthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, ideno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene)
e. Index of Additive Cancer Risk (IACR) = ([benzo(a)anthracene]/0.33 mg/kg) + ([benzo(a)pyrene]/0.37 mg/kg) + ([benzo(b+j+k)fluoranthene]/0.16 mg/kg) + ([benzo(g,h,i)perylene]/6.8 mg/kg) + ([chrysene]/2.1 mg/kg) + ([dibenzo(a,h)anthracene]/0.23 mg/kg) + ([indeno(1,2,3-c,d)pyrene]/2.7 mg/kg)
f The B(a)P TPE is calculated by multiplying the concentration of each PAH in the sample by its B(a)P PEF and summing the products as per CCME PAH Factsheet (2010). If the concentration is less than the RDL, 1/2 RDL is used in the B[a]P TPE calculations.
g. Elevated PAH RDL(s) due to matrix / co-extractive interference.
Exceedance Identification:
Shaded = Exceedance of Guideline
1 - exceeds CCME SQGs Agricultural
2 - exceeds CCME SQGs Residential/Parkland
3 - exceeds CCME SQGs Commercial, Industrial
4 - exceeds CEPA Disposal at Sea
5- exceeds CCME ISQG
6- exceeds CCME PEL

Table C.4: Leachable Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment (µg/L)

Sample ID Date	NL Leachate Disposal Criteria ^a	TW-SED-01
		28-Jul-20
Leachable PAHs		
Leachable 1-Methylnaphthalene	NGA	<0.50
Leachable 2-Methylnaphthalene	NGA	<0.50
Leachable Acenaphthene	NGA	<0.10
Leachable Acenaphthylene	NGA	<0.10
Leachable Anthracene	NGA	<0.10
Leachable Benzo(a)anthracene	NGA	<0.10
Leachable Benzo(a)pyrene	1	<0.10
Leachable Benzo(b)fluoranthene	NGA	<0.10
Leachable Benzo(b/j)fluoranthene	NGA	<0.20
Leachable Benzo(g,h,i)perylene	NGA	<0.10
Leachable Benzo(j)fluoranthene	NGA	<0.10
Leachable Benzo(k)fluoranthene	NGA	<0.10
Leachable Chrysene	NGA	<0.10
Leachable Dibenzo(a,h)anthracene	NGA	<0.10
Leachable Fluoranthene	NGA	<0.10
Leachable Fluorene	NGA	<0.10
Leachable Indeno(1,2,3-cd)pyrene	NGA	<0.10
Leachable Naphthalene	NGA	<2.0
Leachable Perylene	NGA	<0.10
Leachable Phenanthrene	NGA	<0.10
Leachable Pyrene	NGA	0.24

Notes:

NGA = No Guideline Available

RDL = Reportable Detection Limit

a. NL Leachate Disposal Criteria = Newfoundland and Labrador Department of Environment, GD-PPD-26.1 - Leachable Toxic Waste, Testing and Disposal, 2003.

Exceedance Identification:

Shaded = exceedance of NL Leachate Disposal Criteria

Table C.5: PCBs in Sediment (mg/kg)

Sample ID: Date:	CCME SQGs ^a				CEPA Disposal at Sea Regulations ^b	CCME Sediment Quality Guidelines (Marine) ^c		Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations								
	Agricultural	Residential/ Parkland	Commercial	Industrial		ISQG	PEL	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09
								28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20
TriCB-(17)+(18)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TriCB-(28)+(31)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
2'34'-TriCB-(33)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'55'-TetraCB-(52)	-	-	-	-	-	-	-	0.022	0.017	0.021	0.015	0.026	<0.010	0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'45'-TetraCB-(49)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'35'-TetraCB-(44)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
244'5'-TetraCB-(74)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
23'4'5'-TetraCB-(70)	-	-	-	-	-	-	-	0.013	<0.010	0.013	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'35'6'-PentaCB-(95)	-	-	-	-	-	-	-	0.032	0.025	0.025	0.022	0.030	<0.010	0.012	<0.010	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'455'-PentaCB-(101)	-	-	-	-	-	-	-	0.050	0.038	0.040	0.035	0.047	0.012	0.019	0.011	0.028	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'44'5'-PentaCB-(99)	-	-	-	-	-	-	-	0.015	0.011	0.012	0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'345'-PentaCB-(87)	-	-	-	-	-	-	-	0.023	0.015	0.015	0.015	0.021	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
233'4'6'-PentaCB-(110)	-	-	-	-	-	-	-	0.041	0.033	0.034	0.030	0.040	0.010	0.016	<0.010	0.024	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'4'-PentaCB-(82)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'355'6'-HexaCB-(151)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'34'5'6'-HexaCB-(149)	-	-	-	-	-	-	-	0.025	0.020	0.020	0.018	0.020	<0.010	0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
23'44'5'-PentaCB-(118)	-	-	-	-	-	-	-	0.031	0.024	0.026	0.023	0.031	<0.010	0.012	<0.010	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'44'55'-HexaCB-(153)	-	-	-	-	-	-	-	0.030	0.023	0.024	0.022	0.025	<0.010	0.011	<0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'46'-HexaCB-(132)	-	-	-	-	-	-	-	0.015	0.013	0.013	0.013	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
233'44'-PentaCB-(105)	-	-	-	-	-	-	-	0.013	<0.010	0.011	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
HexaCB-(138)+(158)	-	-	-	-	-	-	-	0.054	0.044	0.044	0.042	0.045	0.013	0.020	0.014	0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'34'55'6'-HeptaCB-(187)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'344'5'6'-HeptaCB-(183)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'-HexaCB-(128)	-	-	-	-	-	-	-	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'45'6'-HeptaCB-(177)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'6'-HeptaCB-(171)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
233'44'5'-HexaCB-(156)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'344'55'-HeptaCB-(180)	-	-	-	-	-	-	-	0.011	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
233'44'5'6'-HeptaCB-(191)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
33'44'55'-HexaCB-(169)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'5'-HeptaCB-(170)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'455'6'-OctaCB-(199)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'455'6'6'-NonaCB-(208)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'56'-OctaCB-(195)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'55'-OctaCB-(194)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
233'44'55'6'-OctaCB-(205)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
22'33'44'55'6'-NonaCB-(206)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
DecaCB-(209)	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorobiphenyls	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tetrachlorobiphenyls	-	-	-	-	-	-	-	0.035	0.017	0.034	0.015	0.053	<0.010	0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pentachlorobiphenyls	-	-	-	-	-	-	-	0.22	0.15	0.16	0.14	0.20	0.022	0.059	0.011	0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Hexachlorobiphenyls	-	-	-	-	-	-	-	0.13	0.099	0.10	0.095	0.10	0.013	0.041	0.014	0.058	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Heptachlorobiphenyls	-	-	-	-	-	-	-	0.011	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Notes:
'-' = No guideline available or parameter not analyzed
<RDL in grey text
RDL = Reportable Detection Limit
a. CCME Soil Quality Guidelines (SQG), Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (Updated to 2020)
b Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines (formerly the Ocean Dumping Control Act), (Current to March 12, 2019).
c. CCME Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Sediment Quality Guidelines (ISQG), Marine Probable Effects Levels (PELs)

Exceedance Identification:
Shaded = Exceedance of Guideline
1 - exceeds CCME SQGs Agricultural
2 - exceeds CCME SQGs Residential/Parkland
3 - exceeds CCME SQGs Commercial
4 - exceeds CCME SQGs Industrial
5 - exceeds CEPA Disposal at Sea
6 - exceeds CCME ISQG
7 - exceeds CCME PEL

Table C.6: Sodium Adsorption and Conductivity in Sediment

Sample ID: Date:	Units	CCME SQGs ^a		Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations								
				TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09
		Agricultural, Residential/ Parkland	Commercial, Industrial	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	29-Jul-20
Sodium Adsorption Ratio	N/A	5	12	46 ^{1,2}	45 ^{1,2}	44 ^{1,2}	26 ^{1,2}	36 ^{1,2}	40 ^{1,2}	24 ^{1,2}	27 ^{1,2}	26 ^{1,2}	25 ^{1,2}	29 ^{1,2}	21 ^{1,2}	21 ^{1,2}	23 ^{1,2}	23 ^{1,2}
Dissolved Calcium (Ca)	ug/L	-	-	320000	320000	320000	110000	150000	190000	73000	77000	67000	65000	94000	42000	46000	48000	62000
Dissolved Magnesium (Mg)	ug/L	-	-	750000	710000	710000	210000	340000	490000	140000	180000	160000	160000	210000	110000	100000	110000	140000
Dissolved Sodium (Na)	ug/L	-	-	6600000	6300000	6200000	2000000	3500000	4500000	1500000	1900000	1700000	1600000	2200000	1100000	1100000	1300000	1400000
Conductivity	µS/cm	2000	4000	15000 ^{1,2}	13000 ^{1,2}	14000 ^{1,2}	2100 ¹	9100 ^{1,2}	9000 ^{1,2}	3600 ¹	3400 ¹	3300 ¹	3600 ¹	4900 ^{1,2}	2500 ¹	2300 ¹	3300 ¹	2800 ¹

Notes:

'-' = No guideline available or parameter not analyzed

RDL = Reportable Detection Limit

<RDL in grey text

a. CCME Soil Quality Guidelines (SQG), Agricultural, Residential/Parkland, Commercial and Industrial Land Use, coarse grain soil (Updated to 2020)

b. The Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines (formerly the Ocean Dumping Control Act) were checked, but no guidelines exist for SAR and conductivity.

c. CCME Sediment Quality Guidelines were checked for SAR and conductivity but no data exist

Exceedance Identification:

Shaded = Exceedance of Guideline

1 - exceeds CCME SQGs Agricultural, Residential/Parkland

2 - exceeds CCME SQGs Commercial, Industrial

Table C.7: Total Organic Carbon in Sediment (mg/kg)

Sample ID	Town Wharves Breakwater - Sample Locations						South Turning Basin - Sample Locations								
	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-DUP	STB-04	STB-05	STB-06	STB-07	STB-09
	Date	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	29-Jul-20
Moisture (%)	61	62	61	31	50	50	29	27	31	27	42	26	24	19	22
Fraction Organic Carbon (Foc) (g/g)	0.074	0.064	0.061	0.018	0.034	0.036	0.012	0.012	0.01	0.0083	0.021	0.0062	0.0059	0.015	0.015
Total Organic Carbon (TOC) (mg/kg)	74000	64000	61000	18000	34000	36000	12000	12000	10000	8300	21000	6200	5900	15000	15000

Notes: 74000

'-' = No guideline available or parameter not analyzed

RDL = Reportable Detection Limit

- a. The CCME Soil Quality Guidelines (SQG) were checked, but no guidelines exist for TIC and TOC.
- b. The Canadian Environmental Protection Act (CEPA) Disposal at Sea Guidelines were checked, but not guidelines exist for TIC and TOC.
- c. The CCME Sediment Quality Guidelines (ISQGs and PELs) were checked but no guidelines exist for TOC.

Table C.8: Grain Size in Sediment (%)

Sample ID:	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	STB-07	STB-09
Date:	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	28-Jul-20	29-Jul-20
Parameters														
< -1 Phi (2 mm)	100	99	96 (2)	98	99 (2)	100 (2)	74	86	99	81	93	98	62	70 (2)
< 0 Phi (1 mm)	100 (1)	98	91	96 (2)	97 (2)	99	67	81	94	72	89	93	52	48 (2)
< +1 Phi (0.5 mm)	99 (1)	96	86	92	95	96	54	70	78	55	80	79	39	26 (2)
< +2 Phi (0.25 mm)	95	90	78	78	85	87	35	48	38	33	59	54	24	14 (2)
< +3 Phi (0.12 mm)	82	74	63	52	63	67	22	27	22	19	33	32	14	10
< +4 Phi (0.062 mm)	52	44	37	18	32	35	8.5	9.8	7.9	11	8.5	8.3	4.8	6.8
< +5 Phi (0.031 mm)	36	35	28	7.6	23	22	6.3	5.4	5.9	7.9	5.6	4.0	3.9	5.8
< +6 Phi (0.016 mm)	29	28	22	5.3	17	15	4.8	4.0	4.6	6.1	3.6	2.9	3.1	5.1
< +7 Phi (0.0078 mm)	21	21	18	4.3	13	12	3.9	3.1	3.6	5.3	2.8	2.4	2.5	3.9
< +8 Phi (0.0039 mm)	20	19	16	4.0	11	11	3.5	2.9	3.6	5.0	2.6	2.2	2.3	3.3
< +9 Phi (0.0020 mm)	17	17	15	3.7	10	9.2	3.0	2.7	3.4	4.9	2.6	2.1	2.2	2.5
Gravel	<0.10	1.4	4.0	1.6	1.2	<0.10	26	14	0.62	19	7.1	2.4	38	30
Sand	48	55	59	80	67	65	65	76	92	70	84	89	58	63
Silt	32	25	20	14	20	24	5.0	6.9	4.3	6.2	5.9	6.1	2.4	3.5
Clay	20	19	16	4.0	11	11	3.5	2.9	3.6	5.0	2.6	2.2	2.3	3.3

Table C.9: Sediment QA/QC - Petroleum Hydrocarbons

Parameter	Units	RDL	RDL x 5	STB-03	STB-DUP	RPD % Difference
Benzene	mg/kg	0.005	0.025	<0.025	<0.025	-
Toluene	mg/kg	0.1	0.5	<0.050	<0.050	-
Ethylbenzene	mg/kg	0.05	0.25	<0.025	<0.025	-
Xylenes	mg/kg	0.1	0.5	<0.050	<0.050	-
C6-C10 (less BTEX)	mg/kg	5	25	<2.5	<2.5	-
>C10-C16	mg/kg	10	50	<10	<10	-
>C16-C21	mg/kg	10	50	17	19	-
>C21-C32	mg/kg	15	75	67	70	-
Modified TPH	mg/kg	15	75	85	88	3.5

Notes:

1. RDL - Reported Detection Limit
2. RPD calculations are only applicable when one concentration is greater than 5 times the laboratory RDL.
3. " - " = Not calculated due to parameter(s) equal to <RDL; or <5 times RDL

Table C.10: Sediment QA/QC - Metals

Parameter	Units	RDL	RDL x 5	STB-03	STB-DUP	RPD % Difference
Aluminum (Al)	mg/kg	10	50	1.66	1.93	15.0
Antimony (Sb)	mg/kg	2.0	10	<2.0	<2.0	-
Arsenic (As)	mg/kg	2.0	10	2.6	2.6	-
Barium (Ba)	mg/kg	5.0	25	180	150	18.2
Beryllium (Be)	mg/kg	2.0	10	<2.0	<2.0	-
Bismuth (Bi)	mg/kg	2.0	10	<2.0	<2.0	-
Boron (B)	mg/kg	50	250	<50	<50	-
Cadmium (Cd)	mg/kg	0.30	1.5	<0.30	<0.30	-
Chromium (Cr)	mg/kg	2.0	10	68	62	9.2
Cobalt (Co)	mg/kg	1.0	5	14	12	15.4
Copper (Cu)	mg/kg	2.0	10	26	21	21.3
Iron (Fe)	mg/kg	50	250	28000	25000	11.3
Lead (Pb)	mg/kg	0.50	2.5	15	12	22.2
Lithium (Li)	mg/kg	2.0	10	18	16	11.8
Manganese (Mn)	mg/kg	2.0	10	250	220	12.8
Mercury (Hg)	mg/kg	0.10	0.5	0.036	0.013	-
Molybdenum (Mo)	mg/kg	2.0	10	<2.0	<2.0	-
Nickel (Ni)	mg/kg	2.0	10	47	42	11.2
Rubidium (Rb)	mg/kg	2.0	10	52	45	14.4
Selenium (Se)	mg/kg	1.0	5	<0.50	<0.50	-
Silver (Ag)	mg/kg	0.50	2.5	<0.50	<0.50	-
Strontium (Sr)	mg/kg	5.0	25	33	29	12.9
Thallium (Tl)	mg/kg	0.10	0.5	0.32	0.28	-
Tin (Sn)	mg/kg	2.0	10	2	1.7	16.2
Uranium (U)	mg/kg	0.10	0.5	0.87	0.83	4.7
Vanadium (V)	mg/kg	2.0	10	60	51	16.2
Zinc (Zn)	mg/kg	5.0	25	74	68	8.5

Notes:

1. RDL - Reported Detection Limit
2. RPD calculations are only applicable when one concentration is greater than 5 times the laboratory RDL.
3. " - " = Not calculated due to parameter(s) equal to <RDL; or <5 times RDL

Table C.11: Sediment QA/QC - Polycyclic Aromatic Hydrocarbons

Parameter	Units	RDL	RDL x 5	STB-03	STB-DUP	RPD % Difference
1-Methylnaphthalene	mg/kg	0.010	0.05	1.66	1.93	15.0
2-Methylnaphthalene	mg/kg	0.010	0.05	0.021	0.028	28.6
Acenaphthene	mg/kg	0.010	0.05	0.033	0.02	49.1
Acenaphthylene	mg/kg	0.010	0.05	0.029	0.028	3.5
Anthracene	mg/kg	0.010	0.05	0.12	0.17	34.5
Benzo(a)anthracene	mg/kg	0.010	0.05	0.35	0.32	9.0
Benzo(a)pyrene	mg/kg	0.010	0.05	0.25	0.21	17.4
Benzo(b)fluoranthene	mg/kg	0.010	0.05	0.28	0.24	15.4
Benzo(b/j)fluoranthene	mg/kg	0.020	0.1	0.41	0.36	13.0
Benzo(g,h,i)perylene	mg/kg	0.010	0.05	0.15	0.11	30.8
Benzo(j)fluoranthene	mg/kg	0.010	0.05	0.14	0.11	24.0
Benzo(k)fluoranthene	mg/kg	0.010	0.05	0.15	0.13	14.3
Chrysene	mg/kg	0.010	0.05	0.44	0.36	20.0
Dibenz(a,h)anthracene	mg/kg	0.010	0.05	<0.050	<0.030	-
Fluoranthene	mg/kg	0.010	0.05	0.53	0.4	28.0
Fluorene	mg/kg	0.010	0.05	0.067	0.1	39.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.010	0.05	0.12	0.093	25.4
Naphthalene	mg/kg	0.010	0.05	0.025	0.036	-
Perylene	mg/kg	0.010	0.05	0.067	0.064	4.6
Phenanthrene	mg/kg	0.010	0.05	0.46	0.46	0.0
Pyrene	mg/kg	0.010	0.05	0.39	0.32	19.7

Notes:

1. RDL - Reported Detection Limit
2. RPD calculations are only applicable when one concentration is greater than 5 times the laboratory RDL.
3. " - " = Not calculated due to parameter(s) equal to <RDL; or <5 times RDL

Table C.12: Sediment QA/QC - Sodium Adsorption and Conductivity

Parameter	Units	RDL	RDL x 5	STB-03	STB-DUP	RPD % Difference
Sodium Adsorption Ratio	N/A	N/A	N/A	26	25	3.9
Conductivity	uS/cm	1	5	3300	3600	8.7

Notes:

- 1. RDL - Reported Detection Limit
- 2. RPD calculations are only applicable when one concentration is greater than 5 times the laboratory RDL.
- 3. " - " = Not calculated due to parameter(s) equal to <RDL; or <5 times RDL

Table C.13: Sediment QA/QC - Total Organic Carbon

Parameter	Units	STB-03	STB-DUP	RPD % Difference
Total Organic Carbon (TOC) (mg/kg)	mg/kg	1.66	1.93	15.0

Notes:

APPENDIX D

Laboratory Certificates of Analysis



Your Project #: 202479.05

Attention: Lorna Campbell

CBCL Limited
Sydney-Standing Offer
164 Charlotte St
Sydney, NS
CANADA B1P 6J7

Report Date: 2020/08/27

Report #: R6308967

Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J4069

Received: 2020/07/31, 13:20

Sample Matrix: Sediment
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Benzo(b/j)fluoranthene Sum (leachates) (1)	1	N/A	2020/08/27	N/A	Auto Calc.
Benzo(b/j)fluoranthene Sum (soil) (1)	10	N/A	2020/08/11	N/A	Auto Calc.
Benzo(b/j)fluoranthene Sum (soil) (1)	5	N/A	2020/08/12	N/A	Auto Calc.
Conductance - soil (1)	14	2020/08/13	2020/08/17	ATL SOP 00004	SM 23 2510B m
Conductance - soil (1)	1	2020/08/13	2020/08/19	ATL SOP 00004	SM 23 2510B m
TEH in Soil (PIRI) (1, 3)	15	2020/08/10	2020/08/10	ATL SOP 00111	Atl. RBCA v3.1 m
Fraction Organic Carbon in Soil (1)	15	N/A	2020/08/13	ATL SOP 00044	LECO203601224 1991m
Mercury (CVAA) (1)	15	2020/08/13	2020/08/17	ATL SOP 00026	EPA 245.5 m
SAR - ICP Metals (1:2) (1, 4)	15	N/A	2020/08/19	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS (1)	7	2020/08/12	2020/08/12	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS (1)	8	2020/08/12	2020/08/13	ATL SOP 00058	EPA 6020B R2 m
Total PCB - Individual Congeners (2, 5)	15	2020/08/11	2020/08/14	STL SOP-00133	MA. 400-BPC 1.0 R5 m
Moisture (1)	15	N/A	2020/08/10	ATL SOP 00001	OMOE Handbook 1983 m
PAH in Leachate by GC/MS (SIM) (1)	1	2020/08/26	2020/08/27	ATL SOP 00103	EPA 8270E R6 m
PAH Compounds by GCMS (SIM) (1, 3)	3	2020/08/10	2020/08/10	ATL SOP 00102	EPA 8270E R6 m
PAH Compounds by GCMS (SIM) (1, 3)	7	2020/08/10	2020/08/11	ATL SOP 00102	EPA 8270E R6 m
PAH Compounds by GCMS (SIM) (1, 3)	5	2020/08/11	2020/08/11	ATL SOP 00102	EPA 8270E R6 m
Particle size in solids (pipette&sieve) (1, 6)	15	N/A	2020/08/19	ATL SOP 00012	MSAMS'78/WREP-125R3m
Sodium Adsorption Ratio in soil (1:2) (1, 7)	15	N/A	2020/08/19	ATL SOP 00050	Carter2e15.4.4/CCMEm
TCLP Inorganic extraction - pH (1)	1	N/A	2020/08/26	ATL SOP 00035	EPA 1311 m
TCLP Inorganic extraction - Weight (1)	1	N/A	2020/08/26	ATL SOP 00035	EPA 1311 m
Total Organic Carbon in Soil (1)	15	2020/08/13	2020/08/13	ATL SOP 00044	LECO203601224 1991 m
ModTPH (T1) Calc. for Soil (1)	15	N/A	2020/08/11	N/A	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (1, 8)	15	N/A	2020/08/07	ATL SOP 00119	Atl. RBCA v3.1 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All



Your Project #: 202479.05

Attention: Lorna Campbell

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Sydney-Standing Offer
164 Charlotte St
Sydney, NS
CANADA B1P 6J7

Report Date: 2020/08/27

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Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J4069

Received: 2020/07/31, 13:20

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Bedford

(2) This test was performed by BVLabs Montreal via Sydney

(3) Soils are reported on a dry weight basis unless otherwise specified.

(4) Sample filtered in laboratory prior to analysis for dissolved metals.

(5) Please note that the results have been corrected for the surrogate recoveries.

Un-rounded results are used in the total "PCB" calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

(6) Note: Graphical representation of larger fractions (PHI-4, PHI -3 and PHI -2) not applicable unless these optional parameters are specifically requested.

(7) Sodium Adsorption Ratio is not accredited.

(8) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Natalie MacAskill, Key Account Specialist

Email: Natalie.MacAskill@bvlabs.com

Phone# (902)567-1255 Ext:17

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU
VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RBCA HYDROCARBONS IN SOIL (FIELD PRES.)

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	RDL	QC Batch
Inorganics								
Moisture	%	61	62	61	31	50	1.0	6876310
Petroleum Hydrocarbons								
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	6876309
Toluene	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6876309
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	6876309
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6876309
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	2.5	6876309
>C10-C16 Hydrocarbons	mg/kg	82	79	41	13	29	10	6880390
>C16-C21 Hydrocarbons	mg/kg	210	210	140	27	100	10	6880390
>C21-<C32 Hydrocarbons	mg/kg	580	570	470	96	360	15	6880390
Modified TPH (Tier1)	mg/kg	880	850	650	140	490	15	6865637
Reached Baseline at C32	mg/kg	No	No	Yes	Yes	Yes	N/A	6880390
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (2)	COMMENT (3)	COMMENT (1)	N/A	6880390
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	96	98	94	97	94		6880390
n-Dotriacontane - Extractable	%	111	109	109	120	111		6880390
Isobutylbenzene - Volatile	%	111	109	116	107	122		6876309
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) One product in fuel / lube range. Lube oil fraction. (2) Unidentified compound(s) in fuel / lube range. One product in fuel / lube range. Lube oil fraction. (3) Unidentified compound(s) in fuel / lube range. Lube oil fraction.								



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BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RBCA HYDROCARBONS IN SOIL (FIELD PRES.)

BV Labs ID		NGK122	NGK123	NGK124	NGK125	NGK126		
Sampling Date		2020/07/28 16:10	2020/07/28 16:20	2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00		
	UNITS	TW-SED-06	STB-01	STB-02	STB-03	STB-04	RDL	QC Batch
Inorganics								
Moisture	%	50	29	27	31	42	1.0	6876310
Petroleum Hydrocarbons								
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	6876309
Toluene	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6876309
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	6876309
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6876309
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	2.5	6876309
>C10-C16 Hydrocarbons	mg/kg	31	<10	<10	<10	<10	10	6880390
>C16-C21 Hydrocarbons	mg/kg	100	<10	<10	17	21	10	6880390
>C21-<C32 Hydrocarbons	mg/kg	330	51	51	67	72	15	6880390
Modified TPH (Tier1)	mg/kg	460	51	51	85	93	15	6865637
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	6880390
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	COMMENT (2)	COMMENT (3)	COMMENT (3)	N/A	6880390
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	103	92	96	98	93		6880390
n-Dotriacontane - Extractable	%	119	113	118	124	114		6880390
Isobutylbenzene - Volatile	%	112	127	114	111	127		6876309
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) One product in fuel / lube range. Lube oil fraction. (2) Possible lube oil fraction. (3) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.								

**RBCA HYDROCARBONS IN SOIL (FIELD PRES.)**

BV Labs ID		NGK127	NGK128	NGK129		NGK130		
Sampling Date		2020/07/28 17:15	2020/07/28 17:30	2020/07/28 17:45		2020/07/29 05:45		
	UNITS	STB-05	STB-06	STB-07	QC Batch	STB-09	RDL	QC Batch
Inorganics								
Moisture	%	26	24	19	6876310	22	1.0	6876310
Petroleum Hydrocarbons								
Benzene	mg/kg	<0.025	<0.025	<0.025	6876309	<0.025	0.025	6876451
Toluene	mg/kg	<0.050	<0.050	<0.050	6876309	<0.050	0.050	6876451
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	6876309	<0.025	0.025	6876451
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	6876309	<0.050	0.050	6876451
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	<2.5	6876309	<2.5	2.5	6876451
>C10-C16 Hydrocarbons	mg/kg	<10	<10	<10	6880390	<10	10	6880390
>C16-C21 Hydrocarbons	mg/kg	<10	<10	<10	6880390	<10	10	6880390
>C21-<C32 Hydrocarbons	mg/kg	39	30	34	6880390	<15	15	6880390
Modified TPH (Tier1)	mg/kg	39	30	34	6865637	<15	15	6865637
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	6880390	NA	N/A	6880390
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (1)	COMMENT (2)	6880390	NA	N/A	6880390
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	97	95	96	6880390	93		6880390
n-Dotriacontane - Extractable	%	122	117	117	6880390	115		6880390
Isobutylbenzene - Volatile	%	110	103	98	6876309	117		6876451
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Possible lube oil fraction. (2) Unidentified compound(s) in lube oil range. Possible lube oil fraction.								

**RBCA HYDROCARBONS IN SOIL (FIELD PRES.)**

BV Labs ID		NGL975		
Sampling Date		2020/07/28 16:50		
	UNITS	STB-DUP	RDL	QC Batch
Inorganics				
Moisture	%	27	1.0	6876310
Petroleum Hydrocarbons				
Benzene	mg/kg	<0.025	0.025	6876967
Toluene	mg/kg	<0.050	0.050	6876967
Ethylbenzene	mg/kg	<0.025	0.025	6876967
Total Xylenes	mg/kg	<0.050	0.050	6876967
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	6876967
>C10-C16 Hydrocarbons	mg/kg	<10	10	6880390
>C16-C21 Hydrocarbons	mg/kg	19	10	6880390
>C21-<C32 Hydrocarbons	mg/kg	70	15	6880390
Modified TPH (Tier1)	mg/kg	88	15	6865637
Reached Baseline at C32	mg/kg	Yes	N/A	6880390
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	6880390
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	97		6880390
n-Dotriacontane - Extractable	%	123		6880390
Isobutylbenzene - Volatile	%	94		6876967
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.				

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VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

ATL. SODIUM ADSORPTION RATIO IN S (1:2)

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121	NGK122		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00	2020/07/28 16:10		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	RDL	QC Batch
Inorganics									
Sodium Adsorption Ratio	N/A	46	45	44	26	36	40	N/A	6869548
Metals									
Dissolved Calcium (Ca)	ug/L	320000	320000	320000	110000	150000	190000	1000	6895663
Dissolved Magnesium (Mg)	ug/L	750000	710000	710000	210000	340000	490000	1000	6895663
Dissolved Sodium (Na)	ug/L	6600000	6300000	6200000	2000000	3500000	4500000	1000	6895663
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									

BV Labs ID		NGK123	NGK124	NGK125	NGK126	NGK127	NGK128		
Sampling Date		2020/07/28 16:20	2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00	2020/07/28 17:15	2020/07/28 17:30		
	UNITS	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	RDL	QC Batch
Inorganics									
Sodium Adsorption Ratio	N/A	24	27	26	29	21	21	N/A	6869548
Metals									
Dissolved Calcium (Ca)	ug/L	73000	77000	67000	94000	42000	46000	1000	6895663
Dissolved Magnesium (Mg)	ug/L	140000	180000	160000	210000	110000	100000	1000	6895663
Dissolved Sodium (Na)	ug/L	1500000	1900000	1700000	2200000	1100000	1100000	1000	6895663
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									

BV Labs ID		NGK129	NGK130	NGL975		
Sampling Date		2020/07/28 17:45	2020/07/29 05:45	2020/07/28 16:50		
	UNITS	STB-07	STB-09	STB-DUP	RDL	QC Batch
Inorganics						
Sodium Adsorption Ratio	N/A	23	23	25	N/A	6869548
Metals						
Dissolved Calcium (Ca)	ug/L	48000	62000	65000	1000	6895663
Dissolved Magnesium (Mg)	ug/L	110000	140000	160000	1000	6895663
Dissolved Sodium (Na)	ug/L	1300000	1400000	1600000	1000	6895663
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
N/A = Not Applicable						



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VERITAS

BV Labs Job #: C0J4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

ATLANTIC TCLP LEACHATE (SEDIMENT)

BV Labs ID		NGJ868	
Sampling Date		2020/07/28 15:15	
	UNITS	TW-SED-01	QC Batch
Inorganics			
Sample Weight (as received)	g	100	6910201
Initial pH	N/A	5.0	6910204
Final pH	N/A	5.1	6910204
QC Batch = Quality Control Batch			

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VERITAS

BV Labs Job #: C0J4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121	NGK122		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00	2020/07/28 16:10		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	RDL	QC Batch
Inorganics									
Conductivity	uS/cm	15000	13000	14000	2100	9100	9000	1.0	6892756
Fraction of Organic Carbon	g/g	0.074	0.064	0.061	0.018	0.034	0.036	0.00050	6865993
Organic Carbon (TOC)	g/kg	74	64	61	18	34	36	0.50	6887114
< -1 Phi (2 mm)	%	100	99	96 (1)	98	99 (1)	100 (1)	0.10	6880157
< 0 Phi (1 mm)	%	100 (2)	98	91	96 (1)	97 (1)	99	0.10	6880157
< +1 Phi (0.5 mm)	%	99 (2)	96	86	92	95	96	0.10	6880157
< +2 Phi (0.25 mm)	%	95	90	78	78	85	87	0.10	6880157
< +3 Phi (0.12 mm)	%	82	74	63	52	63	67	0.10	6880157
< +4 Phi (0.062 mm)	%	52	44	37	18	32	35	0.10	6880157
< +5 Phi (0.031 mm)	%	36	35	28	7.6	23	22	0.10	6880157
< +6 Phi (0.016 mm)	%	29	28	22	5.3	17	15	0.10	6880157
< +7 Phi (0.0078 mm)	%	21	21	18	4.3	13	12	0.10	6880157
< +8 Phi (0.0039 mm)	%	20	19	16	4.0	11	11	0.10	6880157
< +9 Phi (0.0020 mm)	%	17	17	15	3.7	10	9.2	0.10	6880157
Gravel	%	<0.10	1.4	4.0	1.6	1.2	<0.10	0.10	6880157
Sand	%	48	55	59	80	67	65	0.10	6880157
Silt	%	32	25	20	14	20	24	0.10	6880157
Clay	%	20	19	16	4.0	11	11	0.10	6880157
PCBs									
TriCB-(17)+(18)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
TriCB-(28)+(31)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
2'34'-TriCB-(33)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'55'-TetraCB-(52)	mg/kg	0.022	0.017	0.021	0.015	0.026	<0.010	0.010	6896211
22'45'-TetraCB-(49)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'35'-TetraCB-(44)	mg/kg	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	0.010	6896211
244'5'-TetraCB-(74)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
23'4'5'-TetraCB-(70)	mg/kg	0.013	<0.010	0.013	<0.010	0.016	<0.010	0.010	6896211
22'35'6'-PentaCB-(95)	mg/kg	0.032	0.025	0.025	0.022	0.030	<0.010	0.010	6896211
22'455'-PentaCB-(101)	mg/kg	0.050	0.038	0.040	0.035	0.047	0.012	0.010	6896211
22'44'5'-PentaCB-(99)	mg/kg	0.015	0.011	0.012	0.010	0.015	<0.010	0.010	6896211
22'345'-PentaCB-(87)	mg/kg	0.023	0.015	0.015	0.015	0.021	<0.010	0.010	6896211
233'4'6'-PentaCB-(110)	mg/kg	0.041	0.033	0.034	0.030	0.040	0.010	0.010	6896211
22'33'4'-PentaCB-(82)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'355'6'-HexaCB-(151)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'34'5'6'-HexaCB-(149)	mg/kg	0.025	0.020	0.020	0.018	0.020	<0.010	0.010	6896211
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
(1) PSA sample observation comment: Fraction contained shells									
(2) PSA sample observation comment: Fraction contained unknown matter									

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VERITAS

BV Labs Job #: C0J4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121	NGK122		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00	2020/07/28 16:10		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	RDL	QC Batch
23'44'5-PentaCB-(118)	mg/kg	0.031	0.024	0.026	0.023	0.031	<0.010	0.010	6896211
22'44'55'-HexaCB-(153)	mg/kg	0.030	0.023	0.024	0.022	0.025	<0.010	0.010	6896211
22'33'46'-HexaCB-(132)	mg/kg	0.015	0.013	0.013	0.013	0.013	<0.010	0.010	6896211
233'44'-PentaCB-(105)	mg/kg	0.013	<0.010	0.011	<0.010	0.012	<0.010	0.010	6896211
HexaCB-(138)+(158)	mg/kg	0.054	0.044	0.044	0.042	0.045	0.013	0.010	6896211
22'34'55'6-HeptaCB-(187)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'344'5'6-HeptaCB-(183)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'-HexaCB-(128)	mg/kg	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'45'6'-HeptaCB-(177)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'6-HeptaCB-(171)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'5-HexaCB-(156)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'344'55'-HeptaCB-(180)	mg/kg	0.011	<0.010	0.011	<0.010	<0.010	<0.010	0.010	6896211
233'44'5'6-HeptaCB-(191)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
33'44'55'-HexaCB-(169)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'5-HeptaCB-(170)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'455'6'-OctaCB-(199)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'455'66'-NonaCB-(208)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'56-OctaCB-(195)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'55'-OctaCB-(194)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'55'6-OctaCB-(205)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'55'6-NonaCB-(206)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
DecaCB-(209)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Trichlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Tetrachlorobiphenyls	mg/kg	0.035	0.017	0.034	0.015	0.053	<0.010	0.010	6896211
Pentachlorobiphenyls	mg/kg	0.22	0.15	0.16	0.14	0.20	0.022	0.010	6896211
Hexachlorobiphenyls	mg/kg	0.13	0.099	0.10	0.095	0.10	0.013	0.010	6896211
Heptachlorobiphenyls	mg/kg	0.011	<0.010	0.011	<0.010	<0.010	<0.010	0.010	6896211
Octachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Nonachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Decachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Total PCB	mg/kg	0.40	0.26	0.31	0.25	0.35	0.035	0.010	6896211
Surrogate Recovery (%)									
2,3,3',4,6-Pentachlorobiphenyl	%	98	96	103	101	98	102		6896211
2',3,5-Trichlorobiphenyl	%	85	80	81	79	79	77		6896211
22'33'44'566'-Nonachlorobiphenyl	%	75	69	72	73	72	73		6896211
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

BUREAU
VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGK123	NGK124	NGK125	NGK126	NGK127	NGK128		
Sampling Date		2020/07/28 16:20	2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00	2020/07/28 17:15	2020/07/28 17:30		
	UNITS	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	RDL	QC Batch
Inorganics									
Conductivity	uS/cm	3600	3400	3300	4900	2500	2300	1.0	6892756
Fraction of Organic Carbon	g/g	0.012	0.012	0.010	0.021	0.0062	0.0059	0.00050	6865993
Organic Carbon (TOC)	g/kg	12	12	10	21	6.2	5.9	0.50	6887114
< -1 Phi (2 mm)	%	74	86	99	81	93	98	0.10	6880157
< 0 Phi (1 mm)	%	67	81	94	72	89	93	0.10	6880157
< +1 Phi (0.5 mm)	%	54	70	78	55	80	79	0.10	6880157
< +2 Phi (0.25 mm)	%	35	48	38	33	59	54	0.10	6880157
< +3 Phi (0.12 mm)	%	22	27	22	19	33	32	0.10	6880157
< +4 Phi (0.062 mm)	%	8.5	9.8	7.9	11	8.5	8.3	0.10	6880157
< +5 Phi (0.031 mm)	%	6.3	5.4	5.9	7.9	5.6	4.0	0.10	6880157
< +6 Phi (0.016 mm)	%	4.8	4.0	4.6	6.1	3.6	2.9	0.10	6880157
< +7 Phi (0.0078 mm)	%	3.9	3.1	3.6	5.3	2.8	2.4	0.10	6880157
< +8 Phi (0.0039 mm)	%	3.5	2.9	3.6	5.0	2.6	2.2	0.10	6880157
< +9 Phi (0.0020 mm)	%	3.0	2.7	3.4	4.9	2.6	2.1	0.10	6880157
Gravel	%	26	14	0.62	19	7.1	2.4	0.10	6880157
Sand	%	65	76	92	70	84	89	0.10	6880157
Silt	%	5.0	6.9	4.3	6.2	5.9	6.1	0.10	6880157
Clay	%	3.5	2.9	3.6	5.0	2.6	2.2	0.10	6880157
PCBs									
TriCB-(17)+(18)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
TriCB-(28)+(31)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
2'34'-TriCB-(33)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'55'-TetraCB-(52)	mg/kg	0.010	<0.010	0.012	<0.010	<0.010	<0.010	0.010	6896211
22'45'-TetraCB-(49)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'35'-TetraCB-(44)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
244'5'-TetraCB-(74)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
23'4'5'-TetraCB-(70)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'35'6'-PentaCB-(95)	mg/kg	0.012	<0.010	0.018	<0.010	<0.010	<0.010	0.010	6896211
22'455'-PentaCB-(101)	mg/kg	0.019	0.011	0.028	<0.010	<0.010	<0.010	0.010	6896211
22'44'5'-PentaCB-(99)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'345'-PentaCB-(87)	mg/kg	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	0.010	6896211
233'4'6'-PentaCB-(110)	mg/kg	0.016	<0.010	0.024	<0.010	<0.010	<0.010	0.010	6896211
22'33'4'-PentaCB-(82)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'355'6'-HexaCB-(151)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'34'5'6'-HexaCB-(149)	mg/kg	0.010	<0.010	0.013	<0.010	<0.010	<0.010	0.010	6896211
23'44'5'-PentaCB-(118)	mg/kg	0.012	<0.010	0.021	<0.010	<0.010	<0.010	0.010	6896211
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

BUREAU
VERITAS

BV Labs Job #: C0J4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGK123	NGK124	NGK125	NGK126	NGK127	NGK128		
Sampling Date		2020/07/28 16:20	2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00	2020/07/28 17:15	2020/07/28 17:30		
	UNITS	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	RDL	QC Batch
22'44'55'-HexaCB-(153)	mg/kg	0.011	<0.010	0.015	<0.010	<0.010	<0.010	0.010	6896211
22'33'46'-HexaCB-(132)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'-PentaCB-(105)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
HexaCB-(138)+(158)	mg/kg	0.020	0.014	0.030	<0.010	<0.010	<0.010	0.010	6896211
22'34'55'6'-HeptaCB-(187)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'344'5'6'-HeptaCB-(183)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'-HexaCB-(128)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'45'6'-HeptaCB-(177)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'6'-HeptaCB-(171)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'5'-HexaCB-(156)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'344'55'-HeptaCB-(180)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'5'6'-HeptaCB-(191)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
33'44'55'-HexaCB-(169)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'5'-HeptaCB-(170)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'455'6'-OctaCB-(199)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'455'66'-NonaCB-(208)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'56'-OctaCB-(195)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'55'-OctaCB-(194)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
233'44'55'6'-OctaCB-(205)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
22'33'44'55'6'-NonaCB-(206)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
DecaCB-(209)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Trichlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Tetrachlorobiphenyls	mg/kg	0.010	<0.010	0.012	<0.010	<0.010	<0.010	0.010	6896211
Pentachlorobiphenyls	mg/kg	0.059	0.011	0.10	<0.010	<0.010	<0.010	0.010	6896211
Hexachlorobiphenyls	mg/kg	0.041	0.014	0.058	<0.010	<0.010	<0.010	0.010	6896211
Heptachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Octachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Nonachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Decachlorobiphenyls	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6896211
Total PCB	mg/kg	0.11	0.025	0.17	<0.010	<0.010	<0.010	0.010	6896211
Surrogate Recovery (%)									
2,3,3',4,6-Pentachlorobiphenyl	%	104	105	91	92	115	96		6896211
2',3,5-Trichlorobiphenyl	%	78	75	92	97	78	92		6896211
22'33'44'566'-Nonachlorobiphenyl	%	73	78	77	75	77	75		6896211
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

BUREAU
VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGK129		NGK130	NGL975		
Sampling Date		2020/07/28 17:45		2020/07/29 05:45	2020/07/28 16:50		
	UNITS	STB-07	QC Batch	STB-09	STB-DUP	RDL	QC Batch
Inorganics							
Conductivity	uS/cm	3300	6897483	2800	3600	1.0	6892756
Fraction of Organic Carbon	g/g	0.015	6865993	0.015	0.0083	0.00050	6865993
Organic Carbon (TOC)	g/kg	15	6887114	15	8.3	0.50	6887114
< -1 Phi (2 mm)	%	62	6880157	70 (1)	90	0.10	6880157
< 0 Phi (1 mm)	%	52	6880157	48 (1)	84	0.10	6880157
< +1 Phi (0.5 mm)	%	39	6880157	26 (1)	74	0.10	6880157
< +2 Phi (0.25 mm)	%	24	6880157	14 (1)	55	0.10	6880157
< +3 Phi (0.12 mm)	%	14	6880157	10	34	0.10	6880157
< +4 Phi (0.062 mm)	%	4.8	6880157	6.8	12	0.10	6880157
< +5 Phi (0.031 mm)	%	3.9	6880157	5.8	6.7	0.10	6880157
< +6 Phi (0.016 mm)	%	3.1	6880157	5.1	4.3	0.10	6880157
< +7 Phi (0.0078 mm)	%	2.5	6880157	3.9	3.4	0.10	6880157
< +8 Phi (0.0039 mm)	%	2.3	6880157	3.3	3.1	0.10	6880157
< +9 Phi (0.0020 mm)	%	2.2	6880157	2.5	3.0	0.10	6880157
Gravel	%	38	6880157	30	9.9	0.10	6880157
Sand	%	58	6880157	63	78	0.10	6880157
Silt	%	2.4	6880157	3.5	8.8	0.10	6880157
Clay	%	2.3	6880157	3.3	3.1	0.10	6880157
PCBs							
TriCB-(17)+(18)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
TriCB-(28)+(31)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
2'34'-TriCB-(33)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'55'-TetraCB-(52)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'45'-TetraCB-(49)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'35'-TetraCB-(44)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
244'5'-TetraCB-(74)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
23'4'5'-TetraCB-(70)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'35'6'-PentaCB-(95)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'455'-PentaCB-(101)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'44'5'-PentaCB-(99)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'345'-PentaCB-(87)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
233'4'6'-PentaCB-(110)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'4'-PentaCB-(82)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'355'6'-HexaCB-(151)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'34'5'6'-HexaCB-(149)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
(1) PSA sample observation comment: Fraction contained shells							



RESULTS OF ANALYSES OF SEDIMENT

BV Labs ID		NGK129		NGK130	NGL975		
Sampling Date		2020/07/28 17:45		2020/07/29 05:45	2020/07/28 16:50		
	UNITS	STB-07	QC Batch	STB-09	STB-DUP	RDL	QC Batch
23'44'5-PentaCB-(118)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'44'55'-HexaCB-(153)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'46'-HexaCB-(132)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
233'44'-PentaCB-(105)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
HexaCB-(138)+(158)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'34'55'6-HeptaCB-(187)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'344'5'6-HeptaCB-(183)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'-HexaCB-(128)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'45'6'-HeptaCB-(177)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'6-HeptaCB-(171)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
233'44'5-HexaCB-(156)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'344'55'-HeptaCB-(180)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
233'44'5'6-HeptaCB-(191)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
33'44'55'-HexaCB-(169)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'5-HeptaCB-(170)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'455'6'-OctaCB-(199)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'455'66'-NonaCB-(208)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'56-OctaCB-(195)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'55'-OctaCB-(194)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
233'44'55'6-OctaCB-(205)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
22'33'44'55'6-NonaCB-(206)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
DecaCB-(209)	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Trichlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Tetrachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Pentachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Hexachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Heptachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Octachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Nonachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Decachlorobiphenyls	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Total PCB	mg/kg	<0.010	6896211	<0.010	<0.010	0.010	6896211
Surrogate Recovery (%)							
2,3,3',4,6-Pentachlorobiphenyl	%	89	6896211	88	90		6896211
2',3,5-Trichlorobiphenyl	%	85	6896211	77	94		6896211
22'33'44'566'-Nonachlorobiphenyl	%	74	6896211	73	75		6896211
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

**MERCURY BY COLD VAPOUR AA (SEDIMENT)**

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121	NGK122	NGK123		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00	2020/07/28 16:10	2020/07/28 16:20		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	STB-01	RDL	QC Batch
Metals										
Mercury (Hg)	mg/kg	0.093	0.058	0.043	0.014	0.067	0.046	0.016	0.010	6887077
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

BV Labs ID		NGK124	NGK125	NGK126	NGK127	NGK128	NGK129	NGK130		
Sampling Date		2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00	2020/07/28 17:15	2020/07/28 17:30	2020/07/28 17:45	2020/07/29 05:45		
	UNITS	STB-02	STB-03	STB-04	STB-05	STB-06	STB-07	STB-09	RDL	QC Batch
Metals										
Mercury (Hg)	mg/kg	0.011	0.036	0.012	0.011	0.012	0.016	<0.010	0.010	6887077
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

BV Labs ID		NGL975		
Sampling Date		2020/07/28 16:50		
	UNITS	STB-DUP	RDL	QC Batch
Metals				
Mercury (Hg)	mg/kg	0.013	0.010	6887077
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

BV Labs ID		NGJ868	NGK118	NGK119	NGK120	NGK121	NGK122		
Sampling Date		2020/07/28 15:15	2020/07/28 15:30	2020/07/28 15:40	2020/07/28 15:50	2020/07/28 16:00	2020/07/28 16:10		
	UNITS	TW-SED-01	TW-SED-02	TW-SED-03	TW-SED-04	TW-SED-05	TW-SED-06	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	14000	15000	14000	12000	15000	16000	10	6884760
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Arsenic (As)	mg/kg	9.7	9.1	10	3.3	6.6	7.0	2.0	6884760
Acid Extractable Barium (Ba)	mg/kg	130	140	130	120	140	150	5.0	6884760
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Boron (B)	mg/kg	66	58	56	<50	<50	<50	50	6884760
Acid Extractable Cadmium (Cd)	mg/kg	1.3	1.2	0.92	0.30	0.48	0.65	0.30	6884760
Acid Extractable Chromium (Cr)	mg/kg	60	67	61	53	63	64	2.0	6884760
Acid Extractable Cobalt (Co)	mg/kg	10	12	11	9.7	12	12	1.0	6884760
Acid Extractable Copper (Cu)	mg/kg	91	67	60	26	60	58	2.0	6884760
Acid Extractable Iron (Fe)	mg/kg	28000	28000	26000	21000	27000	28000	50	6884760
Acid Extractable Lead (Pb)	mg/kg	73	57	51	20	45	40	0.50	6884760
Acid Extractable Lithium (Li)	mg/kg	19	20	18	16	18	20	2.0	6884760
Acid Extractable Manganese (Mn)	mg/kg	230	240	220	210	240	250	2.0	6884760
Acid Extractable Molybdenum (Mo)	mg/kg	12	9.0	7.5	<2.0	6.0	4.9	2.0	6884760
Acid Extractable Nickel (Ni)	mg/kg	42	48	42	35	43	45	2.0	6884760
Acid Extractable Rubidium (Rb)	mg/kg	34	41	35	34	41	45	2.0	6884760
Acid Extractable Selenium (Se)	mg/kg	1.8	1.5	1.3	<0.50	0.95	0.91	0.50	6884760
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6884760
Acid Extractable Strontium (Sr)	mg/kg	110	110	110	66	60	59	5.0	6884760
Acid Extractable Thallium (Tl)	mg/kg	0.36	0.39	0.30	0.25	0.31	0.34	0.10	6884760
Acid Extractable Tin (Sn)	mg/kg	17	10	9.7	2.6	7.4	7.7	1.0	6884760
Acid Extractable Uranium (U)	mg/kg	4.3	3.2	2.9	1.1	2.4	1.9	0.10	6884760
Acid Extractable Vanadium (V)	mg/kg	65	63	59	44	63	61	2.0	6884760
Acid Extractable Zinc (Zn)	mg/kg	150	130	170	83	110	110	5.0	6884760
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

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VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

BV Labs ID		NGK123	NGK124	NGK125	NGK126	NGK127	NGK128		
Sampling Date		2020/07/28 16:20	2020/07/28 16:30	2020/07/28 16:50	2020/07/28 17:00	2020/07/28 17:15	2020/07/28 17:30		
	UNITS	STB-01	STB-02	STB-03	STB-04	STB-05	STB-06	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	11000	13000	17000	21000	15000	13000	10	6884760
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Arsenic (As)	mg/kg	2.8	2.9	2.6	2.9	<2.0	<2.0	2.0	6884760
Acid Extractable Barium (Ba)	mg/kg	110	130	180	210	160	170	5.0	6884760
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	6884760
Acid Extractable Cadmium (Cd)	mg/kg	0.31	<0.30	<0.30	0.45	<0.30	<0.30	0.30	6884760
Acid Extractable Chromium (Cr)	mg/kg	47	53	68	85	61	53	2.0	6884760
Acid Extractable Cobalt (Co)	mg/kg	9.5	11	14	17	13	11	1.0	6884760
Acid Extractable Copper (Cu)	mg/kg	20	24	26	44	28	19	2.0	6884760
Acid Extractable Iron (Fe)	mg/kg	19000	23000	28000	34000	25000	21000	50	6884760
Acid Extractable Lead (Pb)	mg/kg	11	17	15	16	9.0	9.2	0.50	6884760
Acid Extractable Lithium (Li)	mg/kg	14	15	18	21	17	14	2.0	6884760
Acid Extractable Manganese (Mn)	mg/kg	180	200	250	300	220	180	2.0	6884760
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Nickel (Ni)	mg/kg	35	37	47	58	43	39	2.0	6884760
Acid Extractable Rubidium (Rb)	mg/kg	30	39	52	73	49	41	2.0	6884760
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6884760
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	1.7	<0.50	0.50	6884760
Acid Extractable Strontium (Sr)	mg/kg	57	33	33	52	18	35	5.0	6884760
Acid Extractable Thallium (Tl)	mg/kg	0.20	0.25	0.32	0.46	0.29	0.25	0.10	6884760
Acid Extractable Tin (Sn)	mg/kg	1.6	1.7	2.0	2.9	1.5	1.4	1.0	6884760
Acid Extractable Uranium (U)	mg/kg	0.85	0.86	0.87	0.79	0.62	0.55	0.10	6884760
Acid Extractable Vanadium (V)	mg/kg	42	46	60	67	52	46	2.0	6884760
Acid Extractable Zinc (Zn)	mg/kg	56	60	74	100	62	49	5.0	6884760
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

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VERITAS

BV Labs Job #: C0J4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

BV Labs ID		NGK129	NGK130	NGL975		
Sampling Date		2020/07/28 17:45	2020/07/29 05:45	2020/07/28 16:50		
	UNITS	STB-07	STB-09	STB-DUP	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	13000	8100	15000	10	6884760
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Arsenic (As)	mg/kg	2.3	<2.0	2.6	2.0	6884760
Acid Extractable Barium (Ba)	mg/kg	170	81	150	5.0	6884760
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	6884760
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	6884760
Acid Extractable Chromium (Cr)	mg/kg	58	31	62	2.0	6884760
Acid Extractable Cobalt (Co)	mg/kg	11	5.8	12	1.0	6884760
Acid Extractable Copper (Cu)	mg/kg	21	8.1	21	2.0	6884760
Acid Extractable Iron (Fe)	mg/kg	22000	13000	25000	50	6884760
Acid Extractable Lead (Pb)	mg/kg	77	4.0	12	0.50	6884760
Acid Extractable Lithium (Li)	mg/kg	14	9.7	16	2.0	6884760
Acid Extractable Manganese (Mn)	mg/kg	190	110	220	2.0	6884760
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	2.0	6884760
Acid Extractable Nickel (Ni)	mg/kg	41	25	42	2.0	6884760
Acid Extractable Rubidium (Rb)	mg/kg	40	21	45	2.0	6884760
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	0.50	6884760
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	6884760
Acid Extractable Strontium (Sr)	mg/kg	77	230	29	5.0	6884760
Acid Extractable Thallium (Tl)	mg/kg	0.27	0.17	0.28	0.10	6884760
Acid Extractable Tin (Sn)	mg/kg	1.6	<1.0	1.7	1.0	6884760
Acid Extractable Uranium (U)	mg/kg	0.71	0.61	0.83	0.10	6884760
Acid Extractable Vanadium (V)	mg/kg	48	28	51	2.0	6884760
Acid Extractable Zinc (Zn)	mg/kg	57	29	68	5.0	6884760
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		NGJ868			NGK118		NGK119		NGK120		
Sampling Date		2020/07/28 15:15			2020/07/28 15:30		2020/07/28 15:40		2020/07/28 15:50		
	UNITS	TW-SED-01	RDL	QC Batch	TW-SED-02	RDL	TW-SED-03	RDL	TW-SED-04	RDL	QC Batch
Polyaromatic Hydrocarbons											
Leachable 1-Methylnaphthalene	ug/L	<0.50	0.50	6910149							
Leachable 2-Methylnaphthalene	ug/L	<0.50	0.50	6910149							
Leachable Acenaphthene	ug/L	<0.10	0.10	6910149							
Leachable Acenaphthylene	ug/L	<0.10	0.10	6910149							
Leachable Anthracene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(a)anthracene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(a)pyrene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(b)fluoranthene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(b,j)fluoranthene	ug/L	<0.20	0.20	6897327							
Leachable Benzo(g,h,i)perylene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(j)fluoranthene	ug/L	<0.10	0.10	6910149							
Leachable Benzo(k)fluoranthene	ug/L	<0.10	0.10	6910149							
Leachable Chrysene	ug/L	<0.10	0.10	6910149							
Leachable Dibenzo(a,h)anthracene	ug/L	<0.10	0.10	6910149							
Leachable Fluoranthene	ug/L	<0.10	0.10	6910149							
Leachable Fluorene	ug/L	<0.10	0.10	6910149							
Leachable Indeno(1,2,3-cd)pyrene	ug/L	<0.10	0.10	6910149							
Leachable Naphthalene	ug/L	<2.0	2.0	6910149							
Leachable Perylene	ug/L	<0.10	0.10	6910149							
Leachable Phenanthrene	ug/L	<0.10	0.10	6910149							
Leachable Pyrene	ug/L	0.24	0.10	6910149							
1-Methylnaphthalene	mg/kg	0.17	0.010	6882536	0.053	0.010	0.062	0.010	0.059	0.010	6880693
2-Methylnaphthalene	mg/kg	0.17	0.010	6882536	0.087	0.010	0.085	0.010	0.061	0.010	6880693
Acenaphthene	mg/kg	0.52	0.010	6882536	0.074	0.010	0.12	0.010	0.060	0.010	6880693
Acenaphthylene	mg/kg	0.30	0.010	6882536	0.17	0.010	0.15	0.010	0.071	0.010	6880693
Anthracene	mg/kg	1.2	0.010	6882536	0.70	0.010	0.64	0.010	0.21	0.010	6880693
Benzo(a)anthracene	mg/kg	2.3	0.010	6882536	1.8	0.010	2.1	0.010	0.45	0.010	6880693
Benzo(a)pyrene	mg/kg	1.9	0.010	6882536	1.5	0.010	1.3	0.010	0.39	0.010	6880693
Benzo(b)fluoranthene	mg/kg	2.1	0.010	6882536	1.8	0.010	1.6	0.010	0.45	0.010	6880693
Benzo(b,j)fluoranthene	mg/kg	3.1	0.020	6866303	2.5	0.020	2.4	0.020	0.68	0.020	6866303
Benzo(g,h,i)perylene	mg/kg	1.0	0.010	6882536	0.69	0.010	0.68	0.010	0.24	0.010	6880693
Benzo(j)fluoranthene	mg/kg	1.0	0.010	6882536	0.77	0.010	0.78	0.010	0.22	0.010	6880693
Benzo(k)fluoranthene	mg/kg	1.1	0.010	6882536	0.80	0.010	0.86	0.010	0.22	0.010	6880693
Chrysene	mg/kg	2.2	0.010	6882536	2.3	0.010	2.3	0.010	0.51	0.010	6880693
Dibenzo(a,h)anthracene	mg/kg	<0.33 (1)	0.33	6882536	<0.20 (1)	0.20	<0.19 (1)	0.19	<0.090 (1)	0.090	6880693
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.											



SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		NGJ868			NGK118		NGK119		NGK120		
Sampling Date		2020/07/28 15:15			2020/07/28 15:30		2020/07/28 15:40		2020/07/28 15:50		
	UNITS	TW-SED-01	RDL	QC Batch	TW-SED-02	RDL	TW-SED-03	RDL	TW-SED-04	RDL	QC Batch
Fluoranthene	mg/kg	3.7	0.010	6882536	1.4	0.010	2.8	0.010	1.1	0.010	6880693
Fluorene	mg/kg	0.71	0.010	6882536	0.22	0.010	0.30	0.010	0.14	0.010	6880693
Indeno(1,2,3-cd)pyrene	mg/kg	0.95	0.010	6882536	0.61	0.010	0.61	0.010	0.21	0.010	6880693
Naphthalene	mg/kg	0.24	0.010	6882536	0.13	0.010	0.18	0.010	0.079	0.010	6880693
Perylene	mg/kg	0.51	0.010	6882536	0.44	0.010	0.39	0.010	0.10	0.010	6880693
Phenanthrene	mg/kg	3.3	0.010	6882536	1.1	0.010	1.5	0.010	0.85	0.010	6880693
Pyrene	mg/kg	4.3	0.010	6882536	2.8	0.010	2.4	0.010	0.82	0.010	6880693
Surrogate Recovery (%)											
Leachable D10-Anthracene	%	94		6910149							
Leachable D14-Terphenyl	%	77		6910149							
Leachable D8-Acenaphthylene	%	85		6910149							
D10-Anthracene	%	104		6882536	98		97		98		6880693
D14-Terphenyl (FS)	%	103		6882536	106		105		101		6880693
D8-Acenaphthylene	%	102		6882536	98		97		98		6880693
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											

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VERITAS

BV Labs Job #: COJ4069

Report Date: 2020/08/27

CBCL Limited

Client Project #: 202479.05

SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		NGK121		NGK122		NGK123		NGK124		
Sampling Date		2020/07/28 16:00		2020/07/28 16:10		2020/07/28 16:20		2020/07/28 16:30		
	UNITS	TW-SED-05	RDL	TW-SED-06	RDL	STB-01	RDL	STB-02	RDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	mg/kg	0.032	0.010	0.027	0.010	<0.010	0.010	<0.010	0.010	6880693
2-Methylnaphthalene	mg/kg	0.038	0.010	0.034	0.010	<0.010	0.010	0.018	0.010	6880693
Acenaphthene	mg/kg	0.039	0.010	0.069	0.010	<0.010	0.010	0.031	0.010	6880693
Acenaphthylene	mg/kg	0.076	0.010	0.083	0.010	<0.010	0.010	0.029	0.010	6880693
Anthracene	mg/kg	0.21	0.010	0.30	0.010	0.041	0.010	0.12	0.010	6880693
Benzo(a)anthracene	mg/kg	0.82	0.010	1.0	0.010	0.11	0.010	0.38	0.010	6880693
Benzo(a)pyrene	mg/kg	0.65	0.010	0.75	0.010	0.12	0.010	0.24	0.010	6880693
Benzo(b)fluoranthene	mg/kg	0.78	0.010	0.90	0.010	0.15	0.010	0.26	0.010	6880693
Benzo(b,j)fluoranthene	mg/kg	1.1	0.020	1.3	0.020	0.21	0.020	0.39	0.020	6866303
Benzo(g,h,i)perylene	mg/kg	0.37	0.010	0.39	0.010	0.079	0.010	0.13	0.010	6880693
Benzo(j)fluoranthene	mg/kg	0.36	0.010	0.41	0.010	0.069	0.010	0.13	0.010	6880693
Benzo(k)fluoranthene	mg/kg	0.39	0.010	0.45	0.010	0.065	0.010	0.14	0.010	6880693
Chrysene	mg/kg	0.92	0.010	1.1	0.010	0.13	0.010	0.39	0.010	6880693
Dibenzo(a,h)anthracene	mg/kg	<0.11 (1)	0.11	<0.12 (1)	0.12	<0.030 (1)	0.030	<0.040 (1)	0.040	6880693
Fluoranthene	mg/kg	0.72	0.010	0.99	0.010	0.20	0.010	0.40	0.010	6880693
Fluorene	mg/kg	0.10	0.010	0.13	0.010	0.018	0.010	0.050	0.010	6880693
Indeno(1,2,3-cd)pyrene	mg/kg	0.34	0.010	0.36	0.010	0.066	0.010	0.11	0.010	6880693
Naphthalene	mg/kg	0.051	0.010	0.061	0.010	0.015	0.010	0.023	0.010	6880693
Perylene	mg/kg	0.18	0.010	0.21	0.010	0.043	0.010	0.073	0.010	6880693
Phenanthrene	mg/kg	0.60	0.010	0.81	0.010	0.13	0.010	0.30	0.010	6880693
Pyrene	mg/kg	0.98	0.010	1.0	0.010	0.20	0.010	0.32	0.010	6880693
Surrogate Recovery (%)										
D10-Anthracene	%	103		104		98		102		6880693
D14-Terphenyl (FS)	%	107		109		102		105		6880693
D8-Acenaphthylene	%	101		103		100		105		6880693
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.										



SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		NGK125		NGK126		NGK127			NGK128		
Sampling Date		2020/07/28 16:50		2020/07/28 17:00		2020/07/28 17:15			2020/07/28 17:30		
	UNITS	STB-03	RDL	STB-04	RDL	STB-05	RDL	QC Batch	STB-06	RDL	QC Batch
Polyaromatic Hydrocarbons											
1-Methylnaphthalene	mg/kg	0.021	0.010	<0.010	0.010	0.015	0.010	6880693	0.024	0.010	6882536
2-Methylnaphthalene	mg/kg	0.021	0.010	0.026	0.010	<0.010	0.010	6880693	0.038	0.010	6882536
Acenaphthene	mg/kg	0.033	0.010	0.029	0.010	0.017	0.010	6880693	0.036	0.010	6882536
Acenaphthylene	mg/kg	0.029	0.010	0.022	0.010	<0.010	0.010	6880693	<0.010	0.010	6882536
Anthracene	mg/kg	0.12	0.010	0.095	0.010	0.040	0.010	6880693	0.052	0.010	6882536
Benzo(a)anthracene	mg/kg	0.35	0.010	0.26	0.010	0.086	0.010	6880693	0.12	0.010	6882536
Benzo(a)pyrene	mg/kg	0.25	0.010	0.26	0.010	0.081	0.010	6880693	0.13	0.010	6882536
Benzo(b)fluoranthene	mg/kg	0.28	0.010	0.29	0.010	0.086	0.010	6880693	0.13	0.010	6882536
Benzo(b,j)fluoranthene	mg/kg	0.41	0.020	0.42	0.020	0.13	0.020	6866303	0.19	0.020	6866303
Benzo(g,h,i)perylene	mg/kg	0.15	0.010	0.15	0.010	0.053	0.010	6880693	0.082	0.010	6882536
Benzo(j)fluoranthene	mg/kg	0.14	0.010	0.14	0.010	0.044	0.010	6880693	0.064	0.010	6882536
Benzo(k)fluoranthene	mg/kg	0.15	0.010	0.14	0.010	0.051	0.010	6880693	0.072	0.010	6882536
Chrysene	mg/kg	0.44	0.010	0.25	0.010	0.11	0.010	6880693	0.14	0.010	6882536
Dibenzo(a,h)anthracene	mg/kg	<0.050 (1)	0.050	<0.060 (1)	0.060	<0.010	0.010	6880693	<0.030 (1)	0.030	6882536
Fluoranthene	mg/kg	0.53	0.010	0.50	0.010	0.25	0.010	6880693	0.32	0.010	6882536
Fluorene	mg/kg	0.067	0.010	0.056	0.010	0.027	0.010	6880693	0.050	0.010	6882536
Indeno(1,2,3-cd)pyrene	mg/kg	0.12	0.010	0.13	0.010	0.045	0.010	6880693	0.069	0.010	6882536
Naphthalene	mg/kg	0.025	0.010	0.026	0.010	0.016	0.010	6880693	0.10	0.010	6882536
Perylene	mg/kg	0.067	0.010	0.075	0.010	0.037	0.010	6880693	0.035	0.010	6882536
Phenanthrene	mg/kg	0.46	0.010	0.24	0.010	0.15	0.010	6880693	0.31	0.010	6882536
Pyrene	mg/kg	0.39	0.010	0.34	0.010	0.22	0.010	6880693	0.24	0.010	6882536
Surrogate Recovery (%)											
D10-Anthracene	%	104		104		104		6880693	114		6882536
D14-Terphenyl (FS)	%	106		108		105		6880693	108		6882536
D8-Acenaphthylene	%	104		107		106		6880693	111		6882536
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.											

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SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)

BV Labs ID		NGK129		NGK130		NGL975		
Sampling Date		2020/07/28 17:45		2020/07/29 05:45		2020/07/28 16:50		
	UNITS	STB-07	RDL	STB-09	RDL	STB-DUP	RDL	QC Batch
Polyaromatic Hydrocarbons								
1-Methylnaphthalene	mg/kg	<0.010	0.010	<0.010	0.010	0.020	0.010	6882536
2-Methylnaphthalene	mg/kg	0.022	0.010	<0.010	0.010	0.028	0.010	6882536
Acenaphthene	mg/kg	0.017	0.010	<0.010	0.010	0.020	0.010	6882536
Acenaphthylene	mg/kg	0.015	0.010	<0.010	0.010	0.028	0.010	6882536
Anthracene	mg/kg	0.048	0.010	<0.010	0.010	0.17	0.010	6882536
Benzo(a)anthracene	mg/kg	0.14	0.010	0.030	0.010	0.32	0.010	6882536
Benzo(a)pyrene	mg/kg	0.12	0.010	0.029	0.010	0.21	0.010	6882536
Benzo(b)fluoranthene	mg/kg	0.13	0.010	0.034	0.010	0.24	0.010	6882536
Benzo(b,j)fluoranthene	mg/kg	0.19	0.020	0.054	0.020	0.36	0.020	6866303
Benzo(g,h,i)perylene	mg/kg	0.078	0.010	<0.010	0.010	0.11	0.010	6882536
Benzo(j)fluoranthene	mg/kg	0.061	0.010	0.020	0.010	0.11	0.010	6882536
Benzo(k)fluoranthene	mg/kg	0.069	0.010	<0.010	0.010	0.13	0.010	6882536
Chrysene	mg/kg	0.15	0.010	0.025	0.010	0.36	0.010	6882536
Dibenzo(a,h)anthracene	mg/kg	<0.030 (1)	0.030	<0.010	0.010	<0.030 (1)	0.030	6882536
Fluoranthene	mg/kg	0.24	0.010	0.039	0.010	0.40	0.010	6882536
Fluorene	mg/kg	0.019	0.010	<0.010	0.010	0.10	0.010	6882536
Indeno(1,2,3-cd)pyrene	mg/kg	0.060	0.010	<0.010	0.010	0.093	0.010	6882536
Naphthalene	mg/kg	0.017	0.010	<0.010	0.010	0.036	0.010	6882536
Perylene	mg/kg	0.033	0.010	<0.010	0.010	0.064	0.010	6882536
Phenanthrene	mg/kg	0.14	0.010	0.019	0.010	0.46	0.010	6882536
Pyrene	mg/kg	0.19	0.010	0.026	0.010	0.32	0.010	6882536
Surrogate Recovery (%)								
D10-Anthracene	%	109		109		108		6882536
D14-Terphenyl (FS)	%	105		108		104		6882536
D8-Acenaphthylene	%	107		109		107		6882536
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.								



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GENERAL COMMENTS

TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6876309	SHL	Matrix Spike	Isobutylbenzene - Volatile	2020/08/07		102	%	60 - 130
			Benzene	2020/08/07		94	%	60 - 130
			Toluene	2020/08/07		88	%	60 - 130
			Ethylbenzene	2020/08/07		89	%	60 - 130
			Total Xylenes	2020/08/07		96	%	60 - 130
6876309	SHL	Spiked Blank	Isobutylbenzene - Volatile	2020/08/07		101	%	60 - 130
			Benzene	2020/08/07		94	%	60 - 140
			Toluene	2020/08/07		90	%	60 - 140
			Ethylbenzene	2020/08/07		86	%	60 - 140
			Total Xylenes	2020/08/07		95	%	60 - 140
6876309	SHL	Method Blank	Isobutylbenzene - Volatile	2020/08/07		100	%	60 - 130
			Benzene	2020/08/07	<0.025		mg/kg	
			Toluene	2020/08/07	<0.050		mg/kg	
			Ethylbenzene	2020/08/07	<0.025		mg/kg	
			Total Xylenes	2020/08/07	<0.050		mg/kg	
6876309	SHL	RPD	C6 - C10 (less BTEX)	2020/08/07	<2.5		mg/kg	
			Benzene	2020/08/07	NC		%	50
			Toluene	2020/08/07	NC		%	50
			Ethylbenzene	2020/08/07	NC		%	50
			Total Xylenes	2020/08/07	NC		%	50
6876310	KBB	RPD [NGJ868-01]	Moisture	2020/08/10	0.49		%	25
6876310	KBB	RPD	Moisture	2020/08/10	11		%	25
6876451	YXU	Matrix Spike	Isobutylbenzene - Volatile	2020/08/07		106	%	60 - 130
			Benzene	2020/08/07		84	%	60 - 130
			Toluene	2020/08/07		82	%	60 - 130
			Ethylbenzene	2020/08/07		82	%	60 - 130
			Total Xylenes	2020/08/07		94	%	60 - 130
6876451	YXU	Spiked Blank	Isobutylbenzene - Volatile	2020/08/07		98	%	60 - 130
			Benzene	2020/08/07		103	%	60 - 140
			Toluene	2020/08/07		103	%	60 - 140
			Ethylbenzene	2020/08/07		101	%	60 - 140
			Total Xylenes	2020/08/07		115	%	60 - 140
6876451	YXU	Method Blank	Isobutylbenzene - Volatile	2020/08/07		100	%	60 - 130
			Benzene	2020/08/07	<0.025		mg/kg	
			Toluene	2020/08/07	<0.050		mg/kg	
			Ethylbenzene	2020/08/07	<0.025		mg/kg	
			Total Xylenes	2020/08/07	<0.050		mg/kg	
6876451	YXU	RPD	C6 - C10 (less BTEX)	2020/08/07	<2.5		mg/kg	
			Benzene	2020/08/07	NC		%	50
			Toluene	2020/08/07	NC		%	50
			Ethylbenzene	2020/08/07	NC		%	50
			Total Xylenes	2020/08/07	NC		%	50
6876967	SHL	Matrix Spike [NGL975-02]	Isobutylbenzene - Volatile	2020/08/07		93	%	60 - 130
			Benzene	2020/08/07		100	%	60 - 130
			Toluene	2020/08/07		98	%	60 - 130
			Ethylbenzene	2020/08/07		101	%	60 - 130
			Total Xylenes	2020/08/07		108	%	60 - 130
6876967	SHL	Spiked Blank	Isobutylbenzene - Volatile	2020/08/07		96	%	60 - 130
			Benzene	2020/08/07		95	%	60 - 140
			Toluene	2020/08/07		97	%	60 - 140
			Ethylbenzene	2020/08/07		96	%	60 - 140
			Total Xylenes	2020/08/07		105	%	60 - 140
6876967	SHL	Method Blank	Isobutylbenzene - Volatile	2020/08/07		95	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6876967	SHL	RPD [NGL975-02]	Benzene	2020/08/07	<0.025		mg/kg	
			Toluene	2020/08/07	<0.050		mg/kg	
			Ethylbenzene	2020/08/07	<0.025		mg/kg	
			Total Xylenes	2020/08/07	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2020/08/07	<2.5		mg/kg	
			Benzene	2020/08/07	NC		%	50
			Toluene	2020/08/07	NC		%	50
			Ethylbenzene	2020/08/07	NC		%	50
			Total Xylenes	2020/08/07	NC		%	50
			C6 - C10 (less BTEX)	2020/08/07	NC		%	50
6880157	TPE	RPD [NGK118-01]	Gravel	2020/08/19	34		%	35
			Sand	2020/08/19	0.45		%	35
			Silt	2020/08/19	8.5		%	35
			Clay	2020/08/19	8.7		%	35
6880390	MSK	Matrix Spike [NGK122-01]	Isobutylbenzene - Extractable	2020/08/10		98	%	60 - 130
			n-Dotriacontane - Extractable	2020/08/10		109	%	60 - 130
			>C10-C16 Hydrocarbons	2020/08/10		106	%	30 - 130
			>C16-C21 Hydrocarbons	2020/08/10		96	%	30 - 130
			>C21-<C32 Hydrocarbons	2020/08/10		NC	%	30 - 130
6880390	MSK	Spiked Blank	Isobutylbenzene - Extractable	2020/08/10		71	%	60 - 130
			n-Dotriacontane - Extractable	2020/08/10		115	%	60 - 130
			>C10-C16 Hydrocarbons	2020/08/10		98	%	60 - 130
			>C16-C21 Hydrocarbons	2020/08/10		89	%	60 - 130
			>C21-<C32 Hydrocarbons	2020/08/10		112	%	60 - 130
6880390	MSK	Method Blank	Isobutylbenzene - Extractable	2020/08/10		70	%	60 - 130
			n-Dotriacontane - Extractable	2020/08/10		114	%	60 - 130
			>C10-C16 Hydrocarbons	2020/08/10	<10		mg/kg	
			>C16-C21 Hydrocarbons	2020/08/10	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2020/08/10	<15		mg/kg	
6880390	MSK	RPD [NGK122-01]	>C10-C16 Hydrocarbons	2020/08/10	3.6		%	50
			>C16-C21 Hydrocarbons	2020/08/10	3.9		%	50
			>C21-<C32 Hydrocarbons	2020/08/10	3.3		%	50
6880693	RST	Matrix Spike	D10-Anthracene	2020/08/10		102	%	50 - 130
			D14-Terphenyl (FS)	2020/08/10		106	%	50 - 130
			D8-Acenaphthylene	2020/08/10		100	%	50 - 130
			1-Methylnaphthalene	2020/08/10		87	%	50 - 130
			2-Methylnaphthalene	2020/08/10		90	%	50 - 130
			Acenaphthene	2020/08/10		101	%	50 - 130
			Acenaphthylene	2020/08/10		95	%	50 - 130
			Anthracene	2020/08/10		92	%	50 - 130
			Benzo(a)anthracene	2020/08/10		92	%	50 - 130
			Benzo(a)pyrene	2020/08/10		90	%	50 - 130
			Benzo(b)fluoranthene	2020/08/10		100	%	50 - 130
			Benzo(g,h,i)perylene	2020/08/10		91	%	50 - 130
			Benzo(j)fluoranthene	2020/08/10		91	%	50 - 130
			Benzo(k)fluoranthene	2020/08/10		97	%	50 - 130
			Chrysene	2020/08/10		92	%	50 - 130
			Dibenzo(a,h)anthracene	2020/08/10		98	%	50 - 130
			Fluoranthene	2020/08/10		95	%	50 - 130
			Fluorene	2020/08/10		104	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/08/10		91	%	50 - 130
			Naphthalene	2020/08/10		124	%	50 - 130
			Perylene	2020/08/10		85	%	50 - 130
			Phenanthrene	2020/08/10		100	%	50 - 130
			Pyrene	2020/08/10		89	%	50 - 130



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6880693	RST	Spiked Blank	D10-Anthracene	2020/08/10		108	%	50 - 130
			D14-Terphenyl (FS)	2020/08/10		106	%	50 - 130
			D8-Acenaphthylene	2020/08/10		106	%	50 - 130
			1-Methylnaphthalene	2020/08/10		87	%	50 - 130
			2-Methylnaphthalene	2020/08/10		95	%	50 - 130
			Acenaphthene	2020/08/10		103	%	50 - 130
			Acenaphthylene	2020/08/10		101	%	50 - 130
			Anthracene	2020/08/10		89	%	50 - 130
			Benzo(a)anthracene	2020/08/10		95	%	50 - 130
			Benzo(a)pyrene	2020/08/10		94	%	50 - 130
			Benzo(b)fluoranthene	2020/08/10		104	%	50 - 130
			Benzo(g,h,i)perylene	2020/08/10		105	%	50 - 130
			Benzo(j)fluoranthene	2020/08/10		92	%	50 - 130
			Benzo(k)fluoranthene	2020/08/10		94	%	50 - 130
			Chrysene	2020/08/10		94	%	50 - 130
			Dibenzo(a,h)anthracene	2020/08/10		103	%	50 - 130
			Fluoranthene	2020/08/10		98	%	50 - 130
			Fluorene	2020/08/10		104	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/08/10		99	%	50 - 130
			Naphthalene	2020/08/10		124	%	50 - 130
			Perylene	2020/08/10		91	%	50 - 130
			Phenanthrene	2020/08/10		104	%	50 - 130
			Pyrene	2020/08/10		93	%	50 - 130
6880693	RST	Method Blank	D10-Anthracene	2020/08/10		107	%	50 - 130
			D14-Terphenyl (FS)	2020/08/10		108	%	50 - 130
			D8-Acenaphthylene	2020/08/10		104	%	50 - 130
			1-Methylnaphthalene	2020/08/10	<0.010		mg/kg	
			2-Methylnaphthalene	2020/08/10	<0.010		mg/kg	
			Acenaphthene	2020/08/10	<0.010		mg/kg	
			Acenaphthylene	2020/08/10	<0.010		mg/kg	
			Anthracene	2020/08/10	<0.010		mg/kg	
			Benzo(a)anthracene	2020/08/10	<0.010		mg/kg	
			Benzo(a)pyrene	2020/08/10	<0.010		mg/kg	
			Benzo(b)fluoranthene	2020/08/10	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2020/08/10	<0.010		mg/kg	
			Benzo(j)fluoranthene	2020/08/10	<0.010		mg/kg	
			Benzo(k)fluoranthene	2020/08/10	<0.010		mg/kg	
			Chrysene	2020/08/10	<0.010		mg/kg	
			Dibenzo(a,h)anthracene	2020/08/10	<0.010		mg/kg	
			Fluoranthene	2020/08/10	<0.010		mg/kg	
			Fluorene	2020/08/10	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/08/10	<0.010		mg/kg	
			Naphthalene	2020/08/10	<0.010		mg/kg	
			Perylene	2020/08/10	<0.010		mg/kg	
			Phenanthrene	2020/08/10	<0.010		mg/kg	
			Pyrene	2020/08/10	<0.010		mg/kg	
6880693	RST	RPD	1-Methylnaphthalene	2020/08/10	NC		%	50
			2-Methylnaphthalene	2020/08/10	NC		%	50
			Acenaphthene	2020/08/10	NC		%	50
			Acenaphthylene	2020/08/10	NC		%	50
			Anthracene	2020/08/10	NC		%	50
			Benzo(a)anthracene	2020/08/10	NC		%	50
			Benzo(a)pyrene	2020/08/10	NC		%	50
			Benzo(b)fluoranthene	2020/08/10	NC		%	50
			Benzo(g,h,i)perylene	2020/08/10	NC		%	50



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6882536	RST	Matrix Spike	Benzo(j)fluoranthene	2020/08/10	NC		%	50
			Benzo(k)fluoranthene	2020/08/10	NC		%	50
			Chrysene	2020/08/10	NC		%	50
			Dibenzo(a,h)anthracene	2020/08/10	NC		%	50
			Fluoranthene	2020/08/10	NC		%	50
			Fluorene	2020/08/10	NC		%	50
			Indeno(1,2,3-cd)pyrene	2020/08/10	NC		%	50
			Naphthalene	2020/08/10	NC		%	50
			Perylene	2020/08/10	NC		%	50
			Phenanthrene	2020/08/10	NC		%	50
			Pyrene	2020/08/10	NC		%	50
			D10-Anthracene	2020/08/11		106	%	50 - 130
			D14-Terphenyl (FS)	2020/08/11		104	%	50 - 130
			D8-Acenaphthylene	2020/08/11		102	%	50 - 130
			1-Methylnaphthalene	2020/08/11		87	%	50 - 130
			2-Methylnaphthalene	2020/08/11		90	%	50 - 130
			Acenaphthene	2020/08/11		101	%	50 - 130
			Acenaphthylene	2020/08/11		100	%	50 - 130
			Anthracene	2020/08/11		91	%	50 - 130
			Benzo(a)anthracene	2020/08/11		93	%	50 - 130
			Benzo(a)pyrene	2020/08/11		86	%	50 - 130
			Benzo(b)fluoranthene	2020/08/11		96	%	50 - 130
			Benzo(g,h,i)perylene	2020/08/11		88	%	50 - 130
			Benzo(j)fluoranthene	2020/08/11		86	%	50 - 130
			Benzo(k)fluoranthene	2020/08/11		88	%	50 - 130
			Chrysene	2020/08/11		92	%	50 - 130
			Dibenzo(a,h)anthracene	2020/08/11		92	%	50 - 130
			Fluoranthene	2020/08/11		97	%	50 - 130
			Fluorene	2020/08/11		103	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/08/11		87	%	50 - 130
			Naphthalene	2020/08/11		128	%	50 - 130
			Perylene	2020/08/11		83	%	50 - 130
			Phenanthrene	2020/08/11		104	%	50 - 130
			Pyrene	2020/08/11		90	%	50 - 130
6882536	RST	Spiked Blank	D10-Anthracene	2020/08/11		117	%	50 - 130
			D14-Terphenyl (FS)	2020/08/11		114	%	50 - 130
			D8-Acenaphthylene	2020/08/11		111	%	50 - 130
			1-Methylnaphthalene	2020/08/11		96	%	50 - 130
			2-Methylnaphthalene	2020/08/11		100	%	50 - 130
			Acenaphthene	2020/08/11		112	%	50 - 130
			Acenaphthylene	2020/08/11		111	%	50 - 130
			Anthracene	2020/08/11		102	%	50 - 130
			Benzo(a)anthracene	2020/08/11		106	%	50 - 130
			Benzo(a)pyrene	2020/08/11		102	%	50 - 130
			Benzo(b)fluoranthene	2020/08/11		113	%	50 - 130
			Benzo(g,h,i)perylene	2020/08/11		110	%	50 - 130
			Benzo(j)fluoranthene	2020/08/11		102	%	50 - 130
			Benzo(k)fluoranthene	2020/08/11		104	%	50 - 130
			Chrysene	2020/08/11		104	%	50 - 130
			Dibenzo(a,h)anthracene	2020/08/11		108	%	50 - 130
			Fluoranthene	2020/08/11		111	%	50 - 130
			Fluorene	2020/08/11		115	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/08/11		105	%	50 - 130
			Naphthalene	2020/08/11		129	%	50 - 130
			Perylene	2020/08/11		100	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6882536	RST	Method Blank	Phenanthrene	2020/08/11		114	%	50 - 130
			Pyrene	2020/08/11		102	%	50 - 130
			D10-Anthracene	2020/08/11		117	%	50 - 130
			D14-Terphenyl (FS)	2020/08/11		113	%	50 - 130
			D8-Acenaphthylene	2020/08/11		112	%	50 - 130
			1-Methylnaphthalene	2020/08/11	<0.010		mg/kg	
			2-Methylnaphthalene	2020/08/11	<0.010		mg/kg	
			Acenaphthene	2020/08/11	<0.010		mg/kg	
			Acenaphthylene	2020/08/11	<0.010		mg/kg	
			Anthracene	2020/08/11	<0.010		mg/kg	
			Benzo(a)anthracene	2020/08/11	<0.010		mg/kg	
			Benzo(a)pyrene	2020/08/11	<0.010		mg/kg	
			Benzo(b)fluoranthene	2020/08/11	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2020/08/11	<0.010		mg/kg	
			Benzo(j)fluoranthene	2020/08/11	<0.010		mg/kg	
			Benzo(k)fluoranthene	2020/08/11	<0.010		mg/kg	
			Chrysene	2020/08/11	<0.010		mg/kg	
			Dibenzo(a,h)anthracene	2020/08/11	<0.010		mg/kg	
			Fluoranthene	2020/08/11	<0.010		mg/kg	
			Fluorene	2020/08/11	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/08/11	<0.010		mg/kg	
			Naphthalene	2020/08/11	<0.010		mg/kg	
			Perylene	2020/08/11	<0.010		mg/kg	
6882536	RST	RPD	Phenanthrene	2020/08/11	<0.010		mg/kg	
			Pyrene	2020/08/11	<0.010		mg/kg	
			1-Methylnaphthalene	2020/08/11	NC		%	50
			2-Methylnaphthalene	2020/08/11	NC		%	50
			Acenaphthene	2020/08/11	NC		%	50
			Acenaphthylene	2020/08/11	NC		%	50
			Anthracene	2020/08/11	NC		%	50
			Benzo(a)anthracene	2020/08/11	NC		%	50
			Benzo(a)pyrene	2020/08/11	NC		%	50
			Benzo(b)fluoranthene	2020/08/11	NC		%	50
			Benzo(g,h,i)perylene	2020/08/11	NC		%	50
			Benzo(j)fluoranthene	2020/08/11	NC		%	50
			Benzo(k)fluoranthene	2020/08/11	NC		%	50
			Chrysene	2020/08/11	NC		%	50
			Dibenzo(a,h)anthracene	2020/08/11	NC		%	50
			Fluoranthene	2020/08/11	9.8		%	50
			Fluorene	2020/08/11	NC		%	50
			Indeno(1,2,3-cd)pyrene	2020/08/11	NC		%	50
			Naphthalene	2020/08/11	NC		%	50
			Perylene	2020/08/11	NC		%	50
			Phenanthrene	2020/08/11	NC		%	50
			Pyrene	2020/08/11	NC		%	50
6884760	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2020/08/13		90	%	75 - 125
			Acid Extractable Arsenic (As)	2020/08/13		96	%	75 - 125
			Acid Extractable Barium (Ba)	2020/08/13		100	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/08/13		100	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/08/13		103	%	75 - 125
			Acid Extractable Boron (B)	2020/08/13		82	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/08/13		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/08/13		95	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/08/13		96	%	75 - 125
			Acid Extractable Copper (Cu)	2020/08/13		99	%	75 - 125

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6884760	BAN	Spiked Blank	Acid Extractable Lead (Pb)	2020/08/13		97	%	75 - 125
			Acid Extractable Lithium (Li)	2020/08/13		106	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/08/13		NC	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/08/13		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/08/13		99	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/08/13		96	%	75 - 125
			Acid Extractable Selenium (Se)	2020/08/13		97	%	75 - 125
			Acid Extractable Silver (Ag)	2020/08/13		101	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/08/13		103	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/08/13		99	%	75 - 125
			Acid Extractable Tin (Sn)	2020/08/13		100	%	75 - 125
			Acid Extractable Uranium (U)	2020/08/13		101	%	75 - 125
			Acid Extractable Vanadium (V)	2020/08/13		94	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/08/13		101	%	75 - 125
			Acid Extractable Antimony (Sb)	2020/08/12		104	%	75 - 125
			Acid Extractable Arsenic (As)	2020/08/12		101	%	75 - 125
			Acid Extractable Barium (Ba)	2020/08/12		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/08/12		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/08/12		100	%	75 - 125
			Acid Extractable Boron (B)	2020/08/12		97	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/08/12		96	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/08/12		100	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/08/12		98	%	75 - 125
			Acid Extractable Copper (Cu)	2020/08/12		101	%	75 - 125
			Acid Extractable Lead (Pb)	2020/08/12		99	%	75 - 125
			Acid Extractable Lithium (Li)	2020/08/12		105	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/08/12		102	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/08/12		99	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/08/12		103	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/08/12		100	%	75 - 125
			Acid Extractable Selenium (Se)	2020/08/12		101	%	75 - 125
			Acid Extractable Silver (Ag)	2020/08/12		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/08/12		103	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/08/12		101	%	75 - 125
			Acid Extractable Tin (Sn)	2020/08/12		101	%	75 - 125
			Acid Extractable Uranium (U)	2020/08/12		101	%	75 - 125
			Acid Extractable Vanadium (V)	2020/08/12		101	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/08/12		102	%	75 - 125
6884760	BAN	Method Blank	Acid Extractable Aluminum (Al)	2020/08/12	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2020/08/12	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Boron (B)	2020/08/12	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2020/08/12	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2020/08/12	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2020/08/12	<50		mg/kg	
			Acid Extractable Lead (Pb)	2020/08/12	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Molybdenum (Mo)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2020/08/12	<2.0		mg/kg	

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6884760	BAN	RPD	Acid Extractable Rubidium (Rb)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2020/08/12	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2020/08/12	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2020/08/12	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2020/08/12	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2020/08/12	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/08/12	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/08/12	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/08/12	<5.0		mg/kg	
			Acid Extractable Aluminum (Al)	2020/08/13	6.8		%	35
			Acid Extractable Antimony (Sb)	2020/08/13	NC		%	35
			Acid Extractable Arsenic (As)	2020/08/13	13		%	35
			Acid Extractable Barium (Ba)	2020/08/13	2.2		%	35
			Acid Extractable Beryllium (Be)	2020/08/13	NC		%	35
			Acid Extractable Bismuth (Bi)	2020/08/13	NC		%	35
			Acid Extractable Boron (B)	2020/08/13	NC		%	35
			Acid Extractable Cadmium (Cd)	2020/08/13	NC		%	35
			Acid Extractable Chromium (Cr)	2020/08/13	6.7		%	35
			Acid Extractable Cobalt (Co)	2020/08/13	11		%	35
			Acid Extractable Copper (Cu)	2020/08/13	14		%	35
			Acid Extractable Iron (Fe)	2020/08/13	6.9		%	35
			Acid Extractable Lead (Pb)	2020/08/13	7.2		%	35
			Acid Extractable Lithium (Li)	2020/08/13	1.3		%	35
			Acid Extractable Manganese (Mn)	2020/08/13	3.0		%	35
			Acid Extractable Molybdenum (Mo)	2020/08/13	NC		%	35
			Acid Extractable Nickel (Ni)	2020/08/13	0.41		%	35
			Acid Extractable Rubidium (Rb)	2020/08/13	0.91		%	35
			Acid Extractable Selenium (Se)	2020/08/13	12		%	35
			Acid Extractable Silver (Ag)	2020/08/13	NC		%	35
			Acid Extractable Strontium (Sr)	2020/08/13	NC		%	35
			Acid Extractable Thallium (Tl)	2020/08/13	4.5		%	35
			Acid Extractable Tin (Sn)	2020/08/13	0.051		%	35
			Acid Extractable Uranium (U)	2020/08/13	10		%	35
			Acid Extractable Vanadium (V)	2020/08/13	3.8		%	35
			Acid Extractable Zinc (Zn)	2020/08/13	5.5		%	35
6887077	NHU	Matrix Spike [NGK125-01]	Mercury (Hg)	2020/08/17		78	%	75 - 125
6887077	NHU	QC Standard	Mercury (Hg)	2020/08/17		68	%	50 - 150
6887077	NHU	Spiked Blank	Mercury (Hg)	2020/08/17		100	%	80 - 120
6887077	NHU	Method Blank	Mercury (Hg)	2020/08/17	<0.010		mg/kg	
6887077	NHU	RPD [NGK125-01]	Mercury (Hg)	2020/08/17	NC		%	30
6887114	BBD	QC Standard	Organic Carbon (TOC)	2020/08/13		105	%	75 - 125
6887114	BBD	Method Blank	Organic Carbon (TOC)	2020/08/13	<0.50		g/kg	
6887114	BBD	RPD	Organic Carbon (TOC)	2020/08/13	8.8		%	35
6892756	SSI	RPD [NGK125-01]	Conductivity	2020/08/17	2.7		%	20
6895663	MLB	Matrix Spike [NGK124-01]	Dissolved Calcium (Ca)	2020/08/19		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2020/08/19		NC	%	80 - 120
			Dissolved Sodium (Na)	2020/08/19		NC	%	80 - 120
			Dissolved Calcium (Ca)	2020/08/19		97	%	80 - 120
			Dissolved Magnesium (Mg)	2020/08/19		100	%	80 - 120
6895663	MLB	Spiked Blank	Dissolved Sodium (Na)	2020/08/19		95	%	80 - 120
			Dissolved Calcium (Ca)	2020/08/19	290, RDL=100 (1)		ug/L	
			Dissolved Magnesium (Mg)	2020/08/19	<100		ug/L	
			Dissolved Sodium (Na)	2020/08/19	<100		ug/L	
			Dissolved Calcium (Ca)	2020/08/19	31		%	35
6895663	MLB	RPD [NGK124-01]	Dissolved Calcium (Ca)	2020/08/19	31		%	35

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6896211	CT2	Spiked Blank	Dissolved Magnesium (Mg)	2020/08/19	28		%	35
			Dissolved Sodium (Na)	2020/08/19	24		%	35
			2,3,3',4,6-Pentachlorobiphenyl	2020/08/12		85	%	60 - 130
			2',3,5-Trichlorobiphenyl	2020/08/12		78	%	60 - 130
			22'33'44'566'-Nonachlorobiphenyl	2020/08/12		68	%	60 - 130
			TriCB-(17)+(18)	2020/08/12		102	%	60 - 130
			TriCB-(28)+(31)	2020/08/12		105	%	60 - 130
			2'34-TriCB-(33)	2020/08/12		99	%	60 - 130
			22'55'-TetraCB-(52)	2020/08/12		98	%	60 - 130
			22'45'-TetraCB-(49)	2020/08/12		127	%	60 - 130
			22'35'-TetraCB-(44)	2020/08/12		103	%	60 - 130
			244'5-TetraCB-(74)	2020/08/12		99	%	60 - 130
			23'4'5-TetraCB-(70)	2020/08/12		97	%	60 - 130
			22'35'6-PentaCB-(95)	2020/08/12		99	%	60 - 130
			22'455'-PentaCB-(101)	2020/08/12		98	%	60 - 130
			22'44'5-PentaCB-(99)	2020/08/12		97	%	60 - 130
			22'345'-PentaCB-(87)	2020/08/12		95	%	60 - 130
			233'4'6-PentaCB-(110)	2020/08/12		94	%	60 - 130
			22'33'4-PentaCB-(82)	2020/08/12		78	%	60 - 130
			22'355'6-HexaCB-(151)	2020/08/12		104	%	60 - 130
			22'34'5'6-HexaCB-(149)	2020/08/12		93	%	60 - 130
			23'44'5-PentaCB-(118)	2020/08/12		100	%	60 - 130
			22'44'55'-HexaCB-(153)	2020/08/12		101	%	60 - 130
			22'33'46'-HexaCB-(132)	2020/08/12		99	%	60 - 130
			233'44'-PentaCB-(105)	2020/08/12		93	%	60 - 130
			HexaCB-(138)+(158)	2020/08/12		114	%	60 - 130
			22'34'55'6-HeptaCB-(187)	2020/08/12		126	%	60 - 130
			22'344'5'6-HeptaCB-(183)	2020/08/12		128	%	60 - 130
			22'33'44'-HexaCB-(128)	2020/08/12		94	%	60 - 130
			22'33'45'6'-HeptaCB-(177)	2020/08/12		90	%	60 - 130
			22'33'44'6-HeptaCB-(171)	2020/08/12		120	%	60 - 130
			233'44'5-HexaCB-(156)	2020/08/12		96	%	60 - 130
			22'344'55'-HeptaCB-(180)	2020/08/12		139 (2)	%	60 - 130
			233'44'5'6-HeptaCB-(191)	2020/08/12		118	%	60 - 130
			33'44'55'-HexaCB-(169)	2020/08/12		107	%	60 - 130
			22'33'44'5-HeptaCB-(170)	2020/08/12		121	%	60 - 130
			22'33'455'6'-OctaCB-(199)	2020/08/12		121	%	60 - 130
			22'33'455'66'-NonaCB-(208)	2020/08/12		122	%	60 - 130
			22'33'44'56-OctaCB-(195)	2020/08/12		121	%	60 - 130
			22'33'44'55'-OctaCB-(194)	2020/08/12		131 (2)	%	60 - 130
			233'44'55'6-OctaCB-(205)	2020/08/12		130	%	60 - 130
			22'33'44'55'6-NonaCB-(206)	2020/08/12		122	%	60 - 130
			DecaCB-(209)	2020/08/12		106	%	60 - 130
			Total PCB	2020/08/12		108	%	60 - 130
6896211	CT2	Method Blank	2,3,3',4,6-Pentachlorobiphenyl	2020/08/12		87	%	60 - 130
			2',3,5-Trichlorobiphenyl	2020/08/12		84	%	60 - 130
			22'33'44'566'-Nonachlorobiphenyl	2020/08/12		76	%	60 - 130
			TriCB-(17)+(18)	2020/08/12	<0.010		mg/kg	
			TriCB-(28)+(31)	2020/08/12	<0.010		mg/kg	
			2'34-TriCB-(33)	2020/08/12	<0.010		mg/kg	
			22'55'-TetraCB-(52)	2020/08/12	<0.010		mg/kg	
			22'45'-TetraCB-(49)	2020/08/12	<0.010		mg/kg	
			22'35'-TetraCB-(44)	2020/08/12	<0.010		mg/kg	
			244'5-TetraCB-(74)	2020/08/12	<0.010		mg/kg	
			23'4'5-TetraCB-(70)	2020/08/12	<0.010		mg/kg	

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6896211	CT2	RPD [NGL975-03]	22'35'6-PentaCB-(95)	2020/08/12	<0.010		mg/kg	
			22'455'-PentaCB-(101)	2020/08/12	<0.010		mg/kg	
			22'44'5-PentaCB-(99)	2020/08/12	<0.010		mg/kg	
			22'345'-PentaCB-(87)	2020/08/12	<0.010		mg/kg	
			233'4'6-PentaCB-(110)	2020/08/12	<0.010		mg/kg	
			22'33'4-PentaCB-(82)	2020/08/12	<0.010		mg/kg	
			22'355'6-HexaCB-(151)	2020/08/12	<0.010		mg/kg	
			22'34'5'6-HexaCB-(149)	2020/08/12	<0.010		mg/kg	
			23'44'5-PentaCB-(118)	2020/08/12	<0.010		mg/kg	
			22'44'55'-HexaCB-(153)	2020/08/12	<0.010		mg/kg	
			22'33'46'-HexaCB-(132)	2020/08/12	<0.010		mg/kg	
			233'44'-PentaCB-(105)	2020/08/12	<0.010		mg/kg	
			HexaCB-(138)+(158)	2020/08/12	<0.010		mg/kg	
			22'34'55'6-HeptaCB-(187)	2020/08/12	<0.010		mg/kg	
			22'344'5'6-HeptaCB-(183)	2020/08/12	<0.010		mg/kg	
			22'33'44'-HexaCB-(128)	2020/08/12	<0.010		mg/kg	
			22'33'45'6'-HeptaCB-(177)	2020/08/12	<0.010		mg/kg	
			22'33'44'6-HeptaCB-(171)	2020/08/12	<0.010		mg/kg	
			233'44'5-HexaCB-(156)	2020/08/12	<0.010		mg/kg	
			22'344'55'-HeptaCB-(180)	2020/08/12	<0.010		mg/kg	
			233'44'5'6-HeptaCB-(191)	2020/08/12	<0.010		mg/kg	
			33'44'55'-HexaCB-(169)	2020/08/12	<0.010		mg/kg	
			22'33'44'5-HeptaCB-(170)	2020/08/12	<0.010		mg/kg	
			22'33'455'6'-OctaCB-(199)	2020/08/12	<0.010		mg/kg	
			22'33'455'66'-NonaCB-(208)	2020/08/12	<0.010		mg/kg	
			22'33'44'56-OctaCB-(195)	2020/08/12	<0.010		mg/kg	
			22'33'44'55'-OctaCB-(194)	2020/08/12	<0.010		mg/kg	
			233'44'55'6-OctaCB-(205)	2020/08/12	<0.010		mg/kg	
			22'33'44'55'6-NonaCB-(206)	2020/08/12	<0.010		mg/kg	
			DecaCB-(209)	2020/08/12	<0.010		mg/kg	
			Trichlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Tetrachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Pentachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Hexachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Heptachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Octachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Nonachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Decachlorobiphenyls	2020/08/12	<0.010		mg/kg	
			Total PCB	2020/08/12	<0.010		mg/kg	
			TriCB-(17)+(18)	2020/08/14	NC		%	N/A
			TriCB-(28)+(31)	2020/08/14	NC		%	N/A
			2'34-TriCB-(33)	2020/08/14	NC		%	N/A
			22'55'-TetraCB-(52)	2020/08/14	NC		%	N/A
			22'45'-TetraCB-(49)	2020/08/14	NC		%	N/A
			22'35'-TetraCB-(44)	2020/08/14	NC		%	N/A
			244'5-TetraCB-(74)	2020/08/14	NC		%	N/A
			23'4'5-TetraCB-(70)	2020/08/14	NC		%	N/A
			22'35'6-PentaCB-(95)	2020/08/14	NC		%	N/A
			22'455'-PentaCB-(101)	2020/08/14	NC		%	N/A
			22'44'5-PentaCB-(99)	2020/08/14	NC		%	N/A
			22'345'-PentaCB-(87)	2020/08/14	NC		%	N/A
			233'4'6-PentaCB-(110)	2020/08/14	NC		%	N/A
			22'33'4-PentaCB-(82)	2020/08/14	NC		%	N/A
			22'355'6-HexaCB-(151)	2020/08/14	NC		%	N/A
			22'34'5'6-HexaCB-(149)	2020/08/14	NC		%	N/A



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			23'44'5-PentaCB-(118)	2020/08/14	NC		%	N/A
			22'44'55'-HexaCB-(153)	2020/08/14	NC		%	N/A
			22'33'46'-HexaCB-(132)	2020/08/14	NC		%	N/A
			233'44'-PentaCB-(105)	2020/08/14	NC		%	N/A
			HexaCB-(138)+(158)	2020/08/14	NC		%	N/A
			22'34'55'6-HeptaCB-(187)	2020/08/14	NC		%	N/A
			22'344'5'6-HeptaCB-(183)	2020/08/14	NC		%	N/A
			22'33'44'-HexaCB-(128)	2020/08/14	NC		%	N/A
			22'33'45'6'-HeptaCB-(177)	2020/08/14	NC		%	N/A
			22'33'44'6-HeptaCB-(171)	2020/08/14	NC		%	N/A
			233'44'5-HexaCB-(156)	2020/08/14	NC		%	N/A
			22'344'55'-HeptaCB-(180)	2020/08/14	NC		%	N/A
			233'44'5'6-HeptaCB-(191)	2020/08/14	NC		%	N/A
			33'44'55'-HexaCB-(169)	2020/08/14	NC		%	N/A
			22'33'44'5-HeptaCB-(170)	2020/08/14	NC		%	N/A
			22'33'455'6'-OctaCB-(199)	2020/08/14	NC		%	N/A
			22'33'455'66'-NonaCB-(208)	2020/08/14	NC		%	N/A
			22'33'44'56-OctaCB-(195)	2020/08/14	NC		%	N/A
			22'33'44'55'-OctaCB-(194)	2020/08/14	NC		%	N/A
			233'44'55'6-OctaCB-(205)	2020/08/14	NC		%	N/A
			22'33'44'55'6-NonaCB-(206)	2020/08/14	NC		%	N/A
			DecaCB-(209)	2020/08/14	NC		%	N/A
			Trichlorobiphenyls	2020/08/14	NC		%	30
			Tetrachlorobiphenyls	2020/08/14	NC		%	30
			Pentachlorobiphenyls	2020/08/14	152 (2)		%	30
			Hexachlorobiphenyls	2020/08/14	132 (2)		%	30
			Heptachlorobiphenyls	2020/08/14	NC		%	30
			Octachlorobiphenyls	2020/08/14	NC		%	30
			Nonachlorobiphenyls	2020/08/14	NC		%	30
			Decachlorobiphenyls	2020/08/14	NC		%	30
			Total PCB	2020/08/14	170 (2)		%	30
6897483	SSI	RPD	Conductivity	2020/08/19	1.4		%	20
6910149	LGE	Leachate Blank	Leachable 1-Methylnaphthalene	2020/08/27	<0.50		ug/L	
			Leachable 2-Methylnaphthalene	2020/08/27	<0.50		ug/L	
			Leachable Acenaphthene	2020/08/27	<0.10		ug/L	
			Leachable Acenaphthylene	2020/08/27	<0.10		ug/L	
			Leachable Anthracene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(a)anthracene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(a)pyrene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(b)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(g,h,i)perylene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(j)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(k)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Chrysene	2020/08/27	<0.10		ug/L	
			Leachable D10-Anthracene	2020/08/27		90	%	50 - 130
			Leachable D14-Terphenyl	2020/08/27		87	%	50 - 130
			Leachable D8-Acenaphthylene	2020/08/27		93	%	50 - 130
			Leachable Dibenzo(a,h)anthracene	2020/08/27	<0.10		ug/L	
			Leachable Fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Fluorene	2020/08/27	<0.10		ug/L	
			Leachable Indeno(1,2,3-cd)pyrene	2020/08/27	<0.10		ug/L	
			Leachable Naphthalene	2020/08/27	<2.0		ug/L	
			Leachable Perylene	2020/08/27	<0.10		ug/L	
			Leachable Phenanthrene	2020/08/27	<0.10		ug/L	
			Leachable Pyrene	2020/08/27	<0.10		ug/L	



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6910149	LGE	Spiked Blank	Leachable 1-Methylnaphthalene	2020/08/27		87	%	50 - 130
			Leachable 2-Methylnaphthalene	2020/08/27		87	%	50 - 130
			Leachable Acenaphthene	2020/08/27		99	%	50 - 130
			Leachable Acenaphthylene	2020/08/27		102	%	50 - 130
			Leachable Anthracene	2020/08/27		108	%	50 - 130
			Leachable Benzo(a)anthracene	2020/08/27		118	%	50 - 130
			Leachable Benzo(a)pyrene	2020/08/27		89	%	50 - 130
			Leachable Benzo(b)fluoranthene	2020/08/27		101	%	50 - 130
			Leachable Benzo(g,h,i)perylene	2020/08/27		87	%	50 - 130
			Leachable Benzo(j)fluoranthene	2020/08/27		104	%	50 - 130
			Leachable Benzo(k)fluoranthene	2020/08/27		106	%	50 - 130
			Leachable Chrysene	2020/08/27		117	%	50 - 130
			Leachable D10-Anthracene	2020/08/27		109	%	50 - 130
			Leachable D14-Terphenyl	2020/08/27		94	%	50 - 130
			Leachable D8-Acenaphthylene	2020/08/27		104	%	50 - 130
			Leachable Dibenzo(a,h)anthracene	2020/08/27		69	%	50 - 130
			Leachable Fluoranthene	2020/08/27		120	%	50 - 130
			Leachable Fluorene	2020/08/27		95	%	50 - 130
			Leachable Indeno(1,2,3-cd)pyrene	2020/08/27		77	%	50 - 130
			Leachable Naphthalene	2020/08/27		88	%	50 - 130
			Leachable Perylene	2020/08/27		90	%	50 - 130
			Leachable Phenanthrene	2020/08/27		117	%	50 - 130
			Leachable Pyrene	2020/08/27		121	%	50 - 130
6910149	LGE	Method Blank	Leachable 1-Methylnaphthalene	2020/08/27	<0.50		ug/L	
			Leachable 2-Methylnaphthalene	2020/08/27	<0.50		ug/L	
			Leachable Acenaphthene	2020/08/27	<0.10		ug/L	
			Leachable Acenaphthylene	2020/08/27	<0.10		ug/L	
			Leachable Anthracene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(a)anthracene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(a)pyrene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(b)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(g,h,i)perylene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(j)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Benzo(k)fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Chrysene	2020/08/27	<0.10		ug/L	
			Leachable D10-Anthracene	2020/08/27		101	%	50 - 130
			Leachable D14-Terphenyl	2020/08/27		93	%	50 - 130
			Leachable D8-Acenaphthylene	2020/08/27		97	%	50 - 130
			Leachable Dibenzo(a,h)anthracene	2020/08/27	<0.10		ug/L	
			Leachable Fluoranthene	2020/08/27	<0.10		ug/L	
			Leachable Fluorene	2020/08/27	<0.10		ug/L	
			Leachable Indeno(1,2,3-cd)pyrene	2020/08/27	<0.10		ug/L	
			Leachable Naphthalene	2020/08/27	<2.0		ug/L	
			Leachable Perylene	2020/08/27	<0.10		ug/L	
			Leachable Phenanthrene	2020/08/27	<0.10		ug/L	
			Leachable Pyrene	2020/08/27	<0.10		ug/L	
6910149	LGE	RPD [NGJ868-01]	Leachable 1-Methylnaphthalene	2020/08/27	NC		%	40
			Leachable 2-Methylnaphthalene	2020/08/27	NC		%	40
			Leachable Acenaphthene	2020/08/27	NC		%	40
			Leachable Acenaphthylene	2020/08/27	NC		%	40
			Leachable Anthracene	2020/08/27	NC		%	40
			Leachable Benzo(a)anthracene	2020/08/27	NC		%	40
			Leachable Benzo(a)pyrene	2020/08/27	NC		%	40
			Leachable Benzo(b)fluoranthene	2020/08/27	NC		%	40
			Leachable Benzo(g,h,i)perylene	2020/08/27	NC		%	40

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Leachable Benzo(j)fluoranthene	2020/08/27	NC		%	40
			Leachable Benzo(k)fluoranthene	2020/08/27	NC		%	40
			Leachable Chrysene	2020/08/27	NC		%	40
			Leachable Dibenzo(a,h)anthracene	2020/08/27	NC		%	40
			Leachable Fluoranthene	2020/08/27	NC		%	40
			Leachable Fluorene	2020/08/27	NC		%	40
			Leachable Indeno(1,2,3-cd)pyrene	2020/08/27	NC		%	40
			Leachable Naphthalene	2020/08/27	NC		%	40
			Leachable Perylene	2020/08/27	NC		%	40
			Leachable Phenanthrene	2020/08/27	NC		%	40
			Leachable Pyrene	2020/08/27	9.7		%	40
6910201	EPU	Method Blank	Sample Weight (as received)	2020/08/26	NA		g	

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Low level lab contamination.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Alan Stewart, Organics Manager, Bedford

Eric Dearman, Scientific Specialist

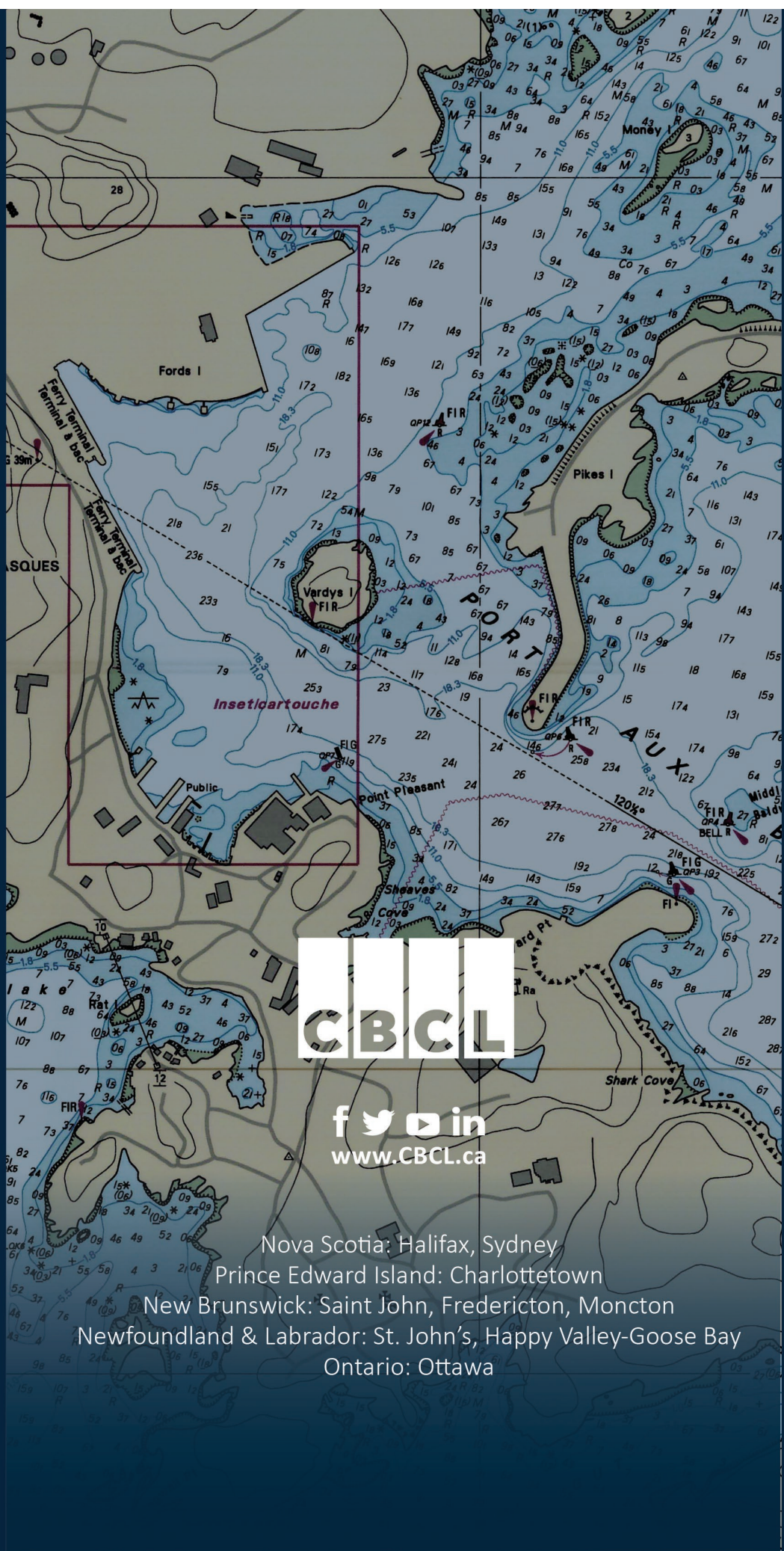
Gina Thompson, Inorganics General Chemistry Supervisor

Rosemarie MacDonald, Scientific Specialist (Organics)



Tien Nguyen Thi, Quality Assurance Coordinator

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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