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Baseline Environmental Testing Program to Support the Proposed Construction of a Canadian Surface Combatant (CSC) Land-Based Test Facility (LBFT), Hartlen Point, Eastern Passage, Nova Scotia

Final Report

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Executive Summary

In February 2021, SNC-Lavalin Inc. (SNCL) was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to carry out a baseline environmental testing program to support the proposed construction of a Canadian Surface Combatant (CSC) Land-Based Test Facility (LBTF) at Hartlen Point, Eastern Passage, Nova Scotia (NS).

The program had three (3) primary Objectives:

1. Assess current “baseline” environmental conditions at the site prior to the design, construction, and operation of a LBTF;
2. Identify any soil and groundwater management considerations in support of design of the LBTF; and
3. Identify any site/land use restrictions to support planning decisions in relation to the proposed change in land use and construction of the LBTF.

Provided below are summary discussions on the three primary objectives.

Baseline Environmental Conditions at the site prior to the design, construction, and operation of a LBTF.

› Assessment of Previous Investigations

The federal contaminated sites program has been undertaken at Canadian Forces Base (CFB) Shearwater and adjacent federal lands. Considerable work has been completed with the identification of potential contaminated sites and subsequent investigations and quantifications. These previous investigations have been reviewed in the context of any associations with the lands proposed for the LBTF.

Previous work identified Site 50 (Former Beacon, Emergency Explosives Demolition Area and Artillery Firing Range): Metals and polycyclic aromatic hydrocarbon (PAH) impacts were identified as potential contaminants associated with these activities. The explosive ordinance disposal (EOD) area was interpreted to have been eroded into the shoreline and use of the artillery firing range was identified to have been short lived and replaced by concrete gun emplacements along the western side of the golf course; and Site 51 (Building HP151 - Crash Guard Tactical Air Navigation (TACAN) Building: an existing petroleum Aboveground Storage Tank (AST) and potential Underground Storage Tank (UST) were identified as potential sources of contaminants. Test pitting was completed by Maritime Groundwater Inc. (MGI) in 1997 at Site 51 to investigate potential petroleum impacts related to a former AST. Based upon visual inspection of soil within the test pit it was concluded that the site was assessed, and no further action was recommended.

Test pitting, monitoring well (MW) installation and hand auger sampling were carried out at several locations within the general area of the proposed LBTF site, including the documented small arms range in the general vicinity. The results of soil recovered in 2001 and submitted for metals and hydrocarbons analytical results were reported to be below the applicable respective 1999 Canadian Council of Ministers of Environment (CCME) Commercial and Atlantic Risk-Based Corrective Action (RBCA) Tier I Guidelines for soil.

A Natural Resource Management Plan (NRMP) for the Hartlen Point area property over a 5-year span. Their work included a compilation of known natural resources data for the property, additional inventory to fill gaps within the study timeframe, recommended natural resource management or mitigation measures and determination of relevant sustainability and biodiversity indicators. Water quality analysis for all surface water samples show elevated levels of chemical – physical parameters consistent with the use of pesticides, fertilizers or herbicides which could be used for maintenance of the greens at the nearby golf course. It is noted that golf course runoff does not discharge through the proposed LBTF property, however it is proximal to the north and western boundaries.

Regarding geotechnical investigation, a 2020 study provided recommendations for the proposed development of a Land Based Training Facility (LBTF) at Hartlen Point. This work was based upon ten test pits at various locations to characterize the conditions throughout the Site and is directly relevant to constructability conclusions. Recommendations confirmed suitability of soils for on-site use including excavation and fill placement, excavation slopes, groundwater control and foundation design and soil parameters to be considered in the LBTF design.

A recent 2020 study: Final Concept Report – Irving Shipbuilding Inc. – Land Based Test Facility provided details and recommendation specific to the development of the LBTF and would be relevant to several of the Objectives of the Subject Report. Including: Geotechnical assessment should consider potential for pyritic slate to be present. Impacted material (metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile organic compounds) may be present in area of CS5550 southeast of proposed building (fenced area); further review is recommended, and potential assessment to quantify impacted material and manage either through off-site disposal or onsite in accordance with Royal Canadian Navy Maritime Forces Atlantic Formation (MARLANT) Safety and Environmental Management System (SEMS) Directive #E2.

› Results of Current Investigations

In response to the 2020 study: Final Concept Report – Irving Shipbuilding Inc. – Land Based Test Capability recommendation; a Hartlen Point property reconnaissance was completed on March 8, 2021. It included reconnaissance of the Site to confirm the locations of several activities of potential concern that were noted from the desktop information review and documented current land uses.

The borehole and monitoring well location plans were designed to assess areas of potential environmental concern identified within the previous reports provided by DCC and to provide baseline environmental soil and groundwater testing within and near the construction footprint of the proposed LBTF development. The investigation would also log soil type and strata, as well as groundwater elevations and note any other physical conditions that may be useful to support the design and construction of the future land-based training mock-up facility for the Canadian frigate's facility. Each borehole and groundwater monitoring well was positioned to determine the presence of metals, Petroleum Hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and Perfluoroalkyl Substances (PFAS) in soil and groundwater within the areas investigated.

The drilling program was carried out between March 15 and 22, 2021. The program consisted of six (6) boreholes (S5551-21BH01 to S5551-21BH06 inclusive) and six (6) monitoring wells (S5551-21MW01 to S5551-21MW06 inclusive) drilled to depths between 2.9 metres (m) and 9.1 metres below ground surface (mgs) with a track mounted continuous flight auger rig using solid stem augers.

The concentrations of PHCs, VOCs, PAHs and PFAS in soil were reported by the laboratory to be below method detection limits for all parameters tested except for the PAH Perylene, for which a concentration of 0.05 mg/kg (equal to the RDL for Perylene) was measured in sample S5551-21MW03-21SS-06 and 0.06 mg/kg in sample S5551-21BH06-08.

The metals in soil results were below either the applicable Guideline or the method detection limit for most of the parameters tested. The only exceptions were Arsenic in soil sample S5551-21BH05-07 (14 milligrams per kilogram (mg/kg)) and S5551-21BH05-08 (14 mg/kg), sample S5551-21BH06-08 (14 mg/kg) and duplicate sample S5551-21BH06-09 (15 mg/kg) which were reported by the laboratory to slightly exceed the applicable CCME guideline of 12 mg/kg, however they are below the MARLANT guideline for arsenic of 36 mg/kg. Iron was identified by the laboratory to exceed the applicable guideline in all samples except for S5551-21BH03-01. These data are consistent with metals and PHC soil analytical results reported by Neill and Gunter (2002). The presence of elevated levels of arsenic and iron in soil and groundwater within this region is not uncommon (Dillon, 2011; NSE, 2015) and is likely related to the presence dissolution of sulfide minerals frequently associated with bedrock and constituents within overburden originating from the Halifax Formation strata.

The PHC, VOC, PAH and PFAS in groundwater results were reported by the laboratory to be below method detection limit for all parameters tested except for the RDL for Benzene and Ethylbenzene. The metals in groundwater results were reported by the laboratory to be below the applicable Guideline, CCME Canadian Environmental Quality Guidelines (CEQGs) - Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, updated 2015) or the method detection limit for most of the parameters tested. The only exceptions were Arsenic in groundwater recovered from S5551-21MW05-21GW-01 (14 µg/L), and S5551-21MW06-21GW-01 (46 µg/L) and Iron in groundwater from S5551-21MW06-21GW-01 (671 µg/L).

Both Arsenic and Iron in soils are listed on the Nova Scotia Department of Environment Contaminated sites Guidance Document as Substances Potentially considered Background Occurrences (Guidance Document - Table 5). Similarly, both Arsenic and Iron in groundwater exceed the same reference guidelines.

Pyritic slate was not observed. Bedrock elevations were not encountered at the 10 mbgs well completion horizon. No other contaminants of concern were identified.

SNCL has prepared a Preliminary Conceptual Site Model (CSM), presented through an exposure pathway analysis and resultant CSM figure presented in Appendix D. The CSM includes information related to the Site geologic and hydrogeologic setting, identifies the contaminants of potential concern (COPCs), identified human and ecological receptors of concern (ROCs) and identifies associated potential risks to human health and the environment under current and future land uses. No adverse effects were identified for human health or the environment in the CSM from residual contamination at the Site.

Soil and Groundwater Management Considerations in Support of Design of the LBTF

Soils – Arsenic, and Iron concentrations in soils exceed one or both reference guidelines, CCME CSQG's and the Province of Nova Scotia Tier 1 remediation guidelines. In both cases the guidelines incorporate both human health and ecological considerations. As such, and in accordance with the Contaminated Sites Instruction (CSI.004.001) for Soil Management, the disturbance, removal, and /or re-use of these soils must be undertaken in accordance with a prescribed Management Plan. This plan will apply site-specific standards and requirements based on the proposed re-use and potential risks. Based on the concentrations, extensive on-site re-use of these soils will be possible with the application of prescribed procedures and controls based on the application. Off-site use would require provincial notification and application of the Nova Scotia Contaminated Site Regulations.

The physical characteristics of the soil would not generally restrict on-site re-use. Grain size, drainage and erosion characteristics would need to be evaluated and matched to the suitable re-use options (i.e., backfill, cover material, landscaping features etc.). Given the finer grain sizes, minimizing dust generation will be an important consideration in any Soil Management Plan.

Groundwater – Arsenic and Iron in groundwater concentrations exceed the CCME Canadian Environmental Quality Guidelines (CEQGs) – Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, Updated in 2015). It is understood the proposed LBTF will be connected to municipal services. Non-potable assessment criteria would be relevant. Observations (adjacent wetlands, and coastal slopes and elevations) support a conclusion the site is a groundwater discharge zone. The groundwater is currently interacting with surficial ecology and therefore any proposed de-watering would not likely present a change in existing conditions. The borehole investigation noted some siltation in the water columns suggesting construction earthwork activities, include temporary dewatering, may require siltation controls (e.g., sedimentation pond or equivalent).

Localized groundwater was identified in several wells within the upper 2 m of the soil profile. Assuming a typical depth of soil disturbance supporting the proposed LBTF of 5 mbgs, groundwater management will be a requirement design consideration, as well as during proposed construction activities. Artesian conditions were encountered in one monitoring well. Further investigation may be required, depending upon the facility design parameters, to assess perched and artesian groundwater at the Site as these conditions may influence geotechnical design parameters.

Site/Land Use Restrictions to Support Planning Decisions in Relation to the Proposed Change in Land Use and Construction of the LBTF

The exact location of the former Emergency Explosives Demolition (EOD) area and small arms ranges remains unclear. As a result, the presence of potential related contaminants in soil or groundwater or other EOD related safety concerns will need to be highlighted in construction related planning information and Specifications.

The site is located at the end of a public road with residential development terminating at a public golf course and federal lands. Seasonal and construction period traffic considerations should be considered. Seasonal load restrictions on this road classification would also be applicable.

The Final Concept Report – Irving Shipbuilding Inc. – Land Based Test Facility Report noted several potential land/use restrictions related to plant Species of Conservation Concern, as well as additional items not part of this scope of Work, these are reference here for information.

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1. Introduction

SNC-Lavalin (SNCL) was retained by the Department of National Defence (DND) and Defence Construction Canada (DCC) for a Baseline Environmental Testing Program (BETP) to support the proposed construction of a Canadian Surface Combatant (CSC) Land-Based Test Facility (LBTF) at Hartlen Point in Eastern Passage, Nova Scotia (NS).

The BETP is required to determine the current/baseline environmental existing conditions prior to design/construction of the LBTF. Other requirements for the BETP are soil and groundwater management requirements during LBTF construction activities and any site/land use restrictions posed by contaminants present at the Site that could impact human health or the environment. The results of the BETP may be used to determine if the construction of the LBTF and/or DND's related operations have negatively impacted the environment at the Site.

The LBTF would be constructed on DND-owned land at Hartlen Point, in Eastern Passage, Nova Scotia. The proposed project Site is bordered by a golf course to the North, Canadian Coast Guard (CCG) and Defence Research and Development Canada (DRDC) communication facilities to the West and the Halifax Harbour to the South and East. The project Site is also located in the vicinity of two previously identified contaminated sites (Sites 5550 and 5551).

2. Objectives

The BETP involved the collection of environmental information on the Site to achieve the following objectives:

- › Assess current baseline environmental conditions at the Site prior to the design, construction, and operation of the LBTF;
- › Identify soil and groundwater management considerations in support of design of the LBTF; and
- › Identify site/land use restrictions to support planning decisions in relation to the proposed change in land use and construction of the LBTF.

3. Scope of Work

The following subsections outline the scope of work carried out by SNCL to fulfill the objectives outlined in Section 2.

3.1 Documentation Review

SNCL completed a thorough review of existing reports, plans and information provided by DCC/DND related to the Site. Document review was completed to:

- › Develop a comprehensive understanding of past and present site issues, including potential sources of contamination, and to identify data gaps; and
- › Make comparisons with previously collected data to current regulatory requirements.

A summary of findings and recommendations from the document review are included in Section 5 of this report.

3.2 Site Reconnaissance

Following document review, site reconnaissance was carried out to:

- › Compare current site conditions to those described in historical documentation, noting changes/discrepancies including anomalies, and immediate hazardous and surface contamination; and
- › Evaluate site access and select proposed sampling locations.

3.3 Work Plan Development

SNCL developed a work plan under the information provided in Section 5.3 (Work Plan) of the Statement of Work in the development of this proposal. After completion of the document review and site visit, SNCL discussed with DCC/DND proposed changes to the work plan prior to commencing the updated activities as defined in Section 5.4. SNCL's work plan included all information and requirements included in Section 5.4.1 of the Statement of Work (SOW). The revised Work Plan included details on the rationale for the field program, including media to be sampled, locations, sampling methods, backup collection method(s) if the first method cannot be used due to unforeseen circumstances, analytical methods, detection limits, number, and type of quality control (QC) samples (field blanks, trip blanks, blind duplicates, regulatory framework for result comparison, anticipated schedule and updated associated costs.

Through our unexploded ordnance (UXO) Sub-consultant, the UXO Specialist developed a UXO workplan, outlining the approach and specifications of the UXO team under requirements B-GL-381-003/TS-000 Range Clearance and Unexploded Explosive Ordnance (UXO) Activities Manual (interim version April 2011).

3.4 Field Program

SNCL conducted the field program following the current version of MARLANT Standard Operating Procedures (Rev. 7.0, May 2018). During the field program, SNCL:

- › Collected a suitable amount of soil material at the depths noted in the SOW for specific analytical and grain size analysis.
- › Collected groundwater samples in accordance with project workplan;
- › Surveyed wells and boreholes located in the UTM zone number and the easting and northing planar coordinates. Completed an elevation survey of newly installed monitoring wells;
- › Collected sufficient geological and hydrogeological information to characterize subsurface characteristics;
- › Prepared detailed borehole/monitoring well logs that identify characteristics and stratigraphy of the soil, headspace vapour readings, water level and which samples were submitted for specific analysis;
- › Complete field reports for each groundwater sampling location including static water levels, well depth and volume measurements, and purge volumes. SNCL field staff collected groundwater sample in laboratory supplied bottles; and
- › Through our UXO Sub-consultant, provided clearance of proposed well sites, a sweep of access lanes and work site areas. Work was undertaken following the requirements BGL-381-003/TS-000 Range Clearance and Unexploded Explosive Ordnance (UXO) Activities Manual (interim version April 2011).

3.5 Data Presentation and Reporting

Details of the Baseline Environmental Testing Program has been presented within this formal report. The report includes an executive summary, introduction, a summary of relevant historical information from the Documentation Review, a detailed description of the methods employed, and results obtained, regulatory criteria selection justification, presentation of analytical results including current and historical with comparison to appropriate guidelines, interpretation of findings, assumptions, with the last section a discussion and findings presented in accordance with the SOW.

Appendices include photographs documenting site features and field collection methods; recorded GPS coordinates for all sampling points as well as all natural and anthropogenic site features; bore hole logs documenting soil type, visual observations, headspace OVM readings, and equipment used; copies of all laboratory Certificates of Analyses.

Digital imagery was used as backdrop for drawings and sampling points and site features to clearly displayed spatially. Laboratory data has been summarized in tables including the most applicable environmental quality criteria and/or standards. Where onsite screening methods were used, these results were presented alongside tabulated laboratory data. Laboratory detection limits have been reported for each analysis.

Interpretation includes a Conceptual Site Model (CSM) for the site. Descriptions of soil stratigraphy and characteristics from ground surface to bedrock; depth to bedrock; geology; hydrogeology; depth to water table; surficial drainage patterns; location of onsite infrastructure and probable source(s).

4. Site Description

4.1 Site Location

The Hartlen Point property is located near the Halifax/Dartmouth Metropolitan area within Halifax Regional Municipality. The property is within the community of Eastern Passage and is approximately 7 kilometres (km) East of 12 Wing Shearwater. The property occupies approximately 177 hectares of largely undeveloped land on a small point (Hartlen Point) at the mouth of Halifax Harbour.

As discussed in the Statement of Work (SOW) the proposed Site is in the vicinity of two previously identified contaminated sites (Sites 5550 and 5551).



Figure 4-1: Proposed Construction Site in Hartlen Point, Eastern Passage, NS.

Site 5550 is a former marine beacon, emergency explosive demolition area and small arms firing range, located southeast of Shore Road and the Hartlen Point Golf Course and along the southeastern shoreline, see Figure 4-1.

The original marine beacon site was abandoned when the current building HP151 became operational in 1964, the concrete foundations remain on-site. It is suggested that the former building may have been heated by coal during its era of operation.

The emergency explosives demolition area was also used as a demolition training area in the 1940s and continued to be used as an explosives area until the 1980s. A site investigation was undertaken in 2000 to determine if demolition remains were visible and to sample on-shore and near-shore beach sediments for explosive compounds (OCL, 2000). Explosive parameters (nitro-aromatics) were not reported above laboratory detection limits. No evidence of environmental impact from explosive components was reported.

A former artillery range was initially identified at the Hartlen Point property; however, a later investigation conducted in 2002 concluded that the area was likely a small arms firing range. The investigation was carried out to assess metals and/or petroleum hydrocarbons presence in soil in the general area of the former small arms firing range. Petroleum hydrocarbons were not detected, and metals parameters were identified at levels below the applicable guidelines at the time (CCME 1999; commercial land use).

Site 5551 is occupied by building HP151 and located near the north-west corner of the Site, see Figure 4-1.

Previous environmental concerns associated with the Hartlen Point property are related to fuel storage. A test pit (TP-1) was excavated on the northeast side of building HP151 during a site investigation in 1997 (MGI, 1997). Test Pit TP1 was reported to have been excavated in the vicinity of a pipe protruding from the ground suggesting the possible presence of an underground storage tank (UST). Based on a visual inspection, no UST or subsurface impacts were identified. No samples were submitted for analysis.

4.2 Potential Contaminant Sources

Table 4-1 identifies the area of potential concern (APEC) and the contaminants of potential concern (COPCs) identified during the review of historical reports for Hartlen Point provided by DCC. The SNCL sampling program was developed based on this review.

Table 4-1: Areas and Contaminants of Potential Environmental Concern

Site	Area of Potential Environmental Concern	Contaminants of Potential Environmental Concern
Site 5550	Former Marine Beacon, Emergency Explosives Demolition (EOD) Area and Artillery Firing Range (later investigation concluded that the area was likely a small arms firing range).	Soil: metals, petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, and xylene (BTEX) F1-F4 (PHCs), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), explosive compounds Groundwater: Metals, PHCs, PAHs, VOCs
Site 5551	Building HP551 – existing Aboveground Storage Tank (AST) and potential UST	Soil: PHCs Groundwater: PHCs
Assumed location of former small arms range	Along the eastern side of the Site.	Soil: Metals, PHCs

4.3 Current and Future Land Use

The Site is mostly undeveloped containing shrubs and sparse trees. The only building is Building HP151 located at the Northwest corner of the Site. The proposed future land use includes structure that will be designed to accommodate a land-based training mock-up for the future Canadian frigates (Stantec, 2020). Current and expected future land use at the Site is commercial.

4.4 Surrounding Land Use

The Site is located on a relatively small point at the east entrance to Halifax Harbour, bordered by the Atlantic Ocean to the south and east. The site is bounded by the Eastern Passage-Cow Bay Land-use Classification UR (Urban Rural to the west, and RA (Rural Area to the north). Halifax Regional Municipality Planning Services Environmental Constraint Mapping identifies no local constraints. The surrounding area land-use restrictions are governed by the Halifax Regional Municipality (HRM) Land-Use By-Law, Schedule A. The surrounding area is located within the Municipal Stormwater Service Boundary. Immediately surrounding land use consists of a golf course to the north. The remainder of the area is largely undeveloped consisting of antenna facilities (including a tactical air navigation (TACAN) system – aircraft landing beacon), a gravel helicopter landing pad and a CCG communications tower on the western side of the Site.

4.5 Climatic Information (Temperature, Precipitation)

The Hartlen Point property's exposure to the high energy coastal system makes it vulnerable to constant erosion, hence the continual addition of large size cobbles to the shoreline and redistribution of finer sediments and the development of characteristic eroded bluffs rather than the small rocky beaches are common along the shorelines within the Harbour. Hartlen Point is located within Watershed Division 1EJ-

2SD. The majority of site runoff eventually reaches the Atlantic Ocean at the mouth of Eastern Passage or at Cow Bay (Vaughan Engineering C. Ltd., 1993 pg. 5-14).

4.6 Topography

The Site is generally located in a glacial drumlin field consisting of relatively low elevation rolling hills. Elevations at the Site are reported to range between 0 metres (m) along the shoreline in the south and east to 18 m in the north. A steep bluff is located along the shoreline to the south and topography gently slopes toward the shoreline along the eastern side of the Site.

4.7 Surface Vegetation

Vegetation across the Site was observed to consist of tightly intergrown alders and spruce and fir trees. Grassy areas were identified near the southeast, south, and western margins of the Site.

4.8 Regional and Local Geology

The Hartlen Point property is reportedly underlain by Cambrian to Ordovician age bedrock identified as the Halifax Formation (Donahoe et al., 1989). The bedrock consists of black to rust-brown slate with thin beds and lenses of minor black metasiltstone. It is typically overlain by Quaternary age deposits of glacial till. The overburden stratigraphy over much of the Site was observed to consist of a dense low permeability sandy clay till. Provincial records from water wells completed within approximately 1 km of the Site indicate that overburden thickness may be between approximately 21 to 31 metres below ground surface (mbgs).

4.9 Regional and Local Hydrogeology

Given the thickness of low permeability glacial till within the region it is unlikely the overburden would be exploited as a productive groundwater resource. Groundwater within the region is expected to follow topographic and/or bedrock contours. As a result, groundwater is assumed to flow toward Halifax Harbour or Cow Bay. The nearest resident (Shore Road (900 m) and Sandpiper Drive (850 m) are supplied by municipal water services (ref. Halifax Water Service Boundary Mapping (<https://hwc.maps.arcgis.com>))

Four (4) water wells are identified on the Nova Scotia Department of Natural Resources water well logs database (<https://www.novascotia.ca/nse/groundwater/welldatabase.asp>.) to be in the vicinity of the site. All four are located on the Hartlen Point Golf Course property. The four wells were installed in 1988 and 1989 to depths ranging from 200' to 300' (feet). No water usage records were available on the database.

4.10 Surface Water Bodies

The Hartlen Point property is bordered by the Atlantic Ocean to the south and east. Localized wetlands were reported to exist north and west of the site; however, none were observed within the areas investigated a part of this study.

5. Summary of Findings

In preparation of the BETP, SNCL conducted a detailed review of historical reports for the Hartlen Point property, as provided by DCC, Table 5-1 provides a summary of the historical reports.

Table 5-1: Summary of Historical Reports for Hartlen Point

Year	Document No.	Scope	Summary of Findings/Recommendations
1996	MARL SE Report 10b Historical Environmental Review 12 Wing Shearwater, Nova Scotia	A historical Review was completed by mgl for several sites located within the 12 Wing Shearwater main base, Hartlen Point, Osbourne Head and East Chezzetcook. The purpose of the work was to identify potentially contaminated sites within the Hartlen Point property based on historical activities and to prioritize the sites for additional environmental site investigation.	<p>With respect to Hartlen Point, a total of 17 potentially contaminated sites were reviewed throughout the Golf Course and Site areas. Of these, a total 14 were identified as potentially contaminated. Within the Hartlen Point property only 2 potentially contaminated sites were identified:</p> <ul style="list-style-type: none"> - Site 5550 (formerly identified as Site 50) (Former Beacon, Emergency Explosives Demolition Area and Artillery Firing Range): Metals and PAH impacts were identified as potential contaminants associated with these activities. The EOD area was interpreted to have been eroded into the shoreline and use of the artillery firing range was identified to have been short lived and replaced by concrete gun emplacements along the western side of the golf course. - Site 5551 (formerly identified as Site 51) (Building HP151 - Crash Guard TACAN Building): an existing petroleum AST and potential UST were identified as potential sources of contaminants. <p>These sites were scored moderate to low priority, respectively, for additional site assessment work.</p>
2000	MARL SE Report 367 Additional Site Investigations at 4 Sites: Hartlen Point and Osbourne Head, CFB Halifax, Nova Scotia	<p>OCL undertook investigations at 2 Sites (Site 5550 (formerly identified as Site 50) and 55) previously identified at Hartlen Point and 3 Sites (Site 57, 61 and 63) at Osbourne Head. Of these Site 5550 is the only one relevant to this study.</p> <p>The investigation consisted of confirmation of site usage, site inspection to assess the physical state of the former demolition area and collection of on-shore and near-shore samples to evaluate the potential presence of explosive compounds.</p>	<p>The Site was reported to have been used as a demolition site for more than twenty-six (26) years as Emergency Demolition site for ordnance.</p> <p>There was no reported evidence of former ordnance disposal either on, or near, the shore. Sediment samples were recovered from the beach and below the water line and analyzed for residual explosive compounds. All parameters were reported to be below the laboratory method detection limit (MDL). No evidence of environmental impact as a result of residual EOD activities was reported.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> - No further contaminant delineation required. - A Base Order should be issued to officially discontinue EOD activities and ensure no further impact or potential impact on local wildlife or sensitive ecological habitats.
2002	MARL SE Report 466 FS/PQRA At 4 Sites	Neill and Gunter (Nova Scotia) Limited conducted a Field Survey and Preliminary Qualitative Risk Assessment (FS/PQRA), at four (4) sites on the	<p>This FS/PQRA of the former small arms range at the Hartlen Point property offered the following conclusions:</p> <ul style="list-style-type: none"> - Metals are present within the first metre of soil at our sampling locations. No metal concentrations were found to be above 1999 CCME Commercial guideline values.

	Former DND Coastal Installation at Hartlen Point	<p>Hartlen Point property between December 14, 2001 and January 18, 2002. The former small arms range was the only site relevant to this study.</p> <p>The FS/PQRA at the Former Small Arms Range consisted of drilling nine hand augers to determine the possibility of metals and/or petroleum hydrocarbon contamination across the site.</p>	<ul style="list-style-type: none"> - Petroleum hydrocarbons, benzene, toluene, ethyl-benzene, and xylene (BTEX) concentrations yielded non-detectable results at all submitted sample locations. - The site is considered a low priority. Based on the National Classification System, the site score is 31. Based on the score, the site is a Class N; Action Not Likely Required. <p>Based on these conclusions the FS/PQRA recommended that:</p> <ul style="list-style-type: none"> - No further action is recommended for this site. - Based on the laboratory results of this FS/PQRA they were led to believe this site could be considered “Green”, unless any further investigation provides evidence to the contrary.
2018	HX090005 Natural Resource Management Plan Hartlen Point, Maritime Forces Atlantic	WSP completed a Natural Resource Management Plan (NRMP) for the Hartlen Point property over a 5-year span. Their work included a compilation of known natural resources data for the property, additional inventory to fill gaps within the study timeframe, recommended natural resource management or mitigation measures and determination of relevant sustainability and biodiversity indicators.	<p>Recommendations of their findings include habitat management options but do not pertain to contaminants site management.</p> <p>Water quality analysis for all surface water samples show elevated levels of chemical – physical parameters consistent with the use of pesticides, fertilizers or herbicides which could be used for maintenance of the greens at the nearby golf course.</p>
2020	Geotechnical Letter Report – Proposed Development, Hartlen Point, Shearwater, Nova Scotia File: 133431906	<p>The scope of this work was reported by Stantec to provide recommendations for the proposed development of a Land Based Training Facility (LBTF) at Hartlen Point.</p> <p>The recommendations were based upon ten test pits at various locations to characterize the conditions throughout the Site.</p>	Recommendations included excavation and fill placement, excavation slopes, groundwater control and foundation design and soil parameters to be considered in the LBTF design.
2020	Final Concept Report – Irving Shipbuilding Inc. – Land Based Test Facility	<p>The purpose of the study was reported by Stantec to develop the preferred architectural option, and the supporting engineering option.</p> <p>The scope was outlines as follows:</p>	<ul style="list-style-type: none"> - Complete a supplemental wetland delineation and wetland functional assessment to map and document the functions of wetlands in the project area. - Complete a supplemental botanical survey to determine the presence of plant Species of Conservation Concern (SOCC) (3 potential species identified in NRMP) in the project area.

- Part 1 includes the project development phase:
 - o Pre-Design
 - o Statement of Construction Requirements (SOCR)
 - o Concept Design (including Construction Cost Estimate)
- Part 2 – Detailed Design:
 - o Design Development
 - o Construction Documents
- Part 3 – Implementation Phase:
 - o Construction
 - o Post Construction
- Review the lists of birds compiled during previous breeding bird surveys and determine if species previously found in or near the project area whose populations were once considered to be secure are now listed as SOCC or species at risk and complete an up-to-date breeding survey completed, if necessary.
- Relocate the Osprey nest pole once the Osprey nesting season is over.
- Assess stability and potential for coastal erosion and climate change effects.
- Complete an archeological review and develop a contingency plan for potential to encounter archeological/historical resources.
- Complete an assessment for potential for unexploded ordnance (UXO) to be present and what impact that will have on site development.
- Geotechnical assessment should consider potential for pyritic slate to be present.
- Impacted material (metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile organic compounds) may be present in area of CS5550 southeast of proposed building (fenced area); further review is recommended, and potential assessment to quantify impacted material and manage either through off-site disposal or onsite in accordance with MARLANT SEMS Directive #E2.
- Review Indigenous Community Engagement requirements with MARLANT and/or DND Indigenous Affairs Secretariat in consideration of the Aboriginal Consultation and Accommodation: Updated Guidelines for Federal Officials to Fulfill the Legal Duty to Consult.
- Mitigative measures for concept design include:
 - o design considerations to limit migratory bird strikes.
 - o disturbance of natural habitat to be avoided or planned accordingly.
 - o Erosion and sediment control to protect watercourses/habitat. Timing/planning work on or near watercourses with Department of Fisheries and Oceans (DFO).
- In accordance with MARLANT SEMS Directive #E3, consultation with relevant federal, provincial and/or municipal departments will be completed by MARLANT staff during the Environmental Effects Determination (EED) process. Permitting can be expected with Transport Canada for the helipad, and relevant federal departments for any radiofrequency permitting or proprietary emitters associated with the operations (e.g., Coast Guard and Spectrum Management (through Innovation, Science and Technology Development Canada may be applicable). Interaction with Halifax Regional Municipality (HRM), NS Power and Halifax Water will be completed for utility connection and design. Aboveground storage tanks will be federally regulated. Interaction with provincial and federal departments may occur if wetland will be altered or impacted.
- Directive #E3 is based on the requirements of CEAA, 2012 which was repealed. Directive #E3 has not been updated to reflect the Impact Assessment Act (IAA) of 2019. Under the new IAA, factors to be considered in the planning and permitting of this project include the following:
 - o the requirement to post a notice of intent on the website for public comment before making a determination (section 86(1)). Note the area is popular with local birders and is highly visible so public interest and comment is expected.

- the requirement to post a notice of determination outlining mitigation and consideration of the comments received (section 86(2))

The Practitioners Guide to the Impact Assessment Act is in draft form; there may be changes in the approach DND or other federal departments use in their planning, assessment and permitting processes.

2020

Summary of
Environmental
Considerations
Proposed Canadian
Surface Combatant
Land Based Test
Facility, Hartlen Point,
Eastern Passage, Nova
Scotia

The DCC report consists of a preliminary review of environmental considerations associated with the proposed LBTF site. Issues related to contaminated sites, wildlife/vegetation including species at risk, wetlands, and surface water were reviewed.

- Although the locations of the former artillery range, small arms range and EOD area at Site 5550 (formerly identified as Site 50) remain unclear, it was concluded that the site was assessed, and no further action was required.
- Test pitting reportedly completed by mgl in 1997 at Site 5551 (formerly identified as Site 51) to investigate potential petroleum impacts related to a former AST. Based upon visual inspection of soil within the test pit it was concluded that the site was assessed, and no further action was recommended.
- Soil sampling for petroleum hydrocarbon, polycyclic aromatic hydrocarbon, inorganic metals, and volatile organic compounds should be considered during project planning to confirm disposal options for surplus excavated/unsuitable soil during construction.
- Appropriate measures must also be implemented if stockpiling pyritic slate to limit the potential for acid bearing water leaching into the ground and/or stormwater systems or entering freshwater aquatic habitat.
- Any disturbance of natural habitat should consider potential impacts to SAR species.
- Schedule vegetation clearing activities for the fall or winter to avoid nesting periods.
- Disturbance of soil and rock onsite should be conducted in a manner that will protect the identified aquatic resources. Standard sediment and erosion protocols should be implemented.
- Avoid working in watercourses to the extent possible; follow the hierarchy of avoid, mitigation and compensation if it is unavoidable.
- If archaeological/historical artifact(s) are encountered at the Hartlen Point property, activities must be suspended and the appropriate authorities contacted (e.g., Naval Museum of Halifax, Nova Scotia Department of Communities, Culture & Heritage). Resources should be evaluated by a professional archaeologist.
- Based on the history of the area, it is recommended that a UXO risk assessment/survey be conducted at the Hartlen Point property prior to construction.
- It is recommended that requirements for public and Aboriginal consultation be considered at the planning stage of any project.
- With respect to radio frequency (RF), consultation will be required with DRDC, Coast Guard and Naval Electronic Systems Test Range Atlantic (NESTRA) Range to evaluate the RF radiated once it is known with which RF and Laser system the LBTF will be fitted. An RF license will be required from the Spectrum Office (Ottawa) for the LBTF.

6. Preliminary Conceptual Site Model (CSM)

SNCL has prepared a Preliminary Conceptual Site Model (CSM), presented through an exposure pathway analysis and resultant CSM figure presented in Appendix D. The CSM includes information related to the Site geologic and hydrogeologic setting, identifies the contaminants of potential concern (COPCs), identified human and ecological receptors of concern (ROCs) and identifies associated potential risks to human health and the environment under current and future land uses. No adverse effects were identified for human health or the environment in the CSM from residual contamination at the Site.

7. Regulatory Framework

Provincial and Federal guidelines (where applicable) have been used to evaluate the environmental quality of the soil and groundwater samples collected within the area of investigation. The site-specific information presented in Table 7-1 was used to select regulatory criteria for comparison to soil and groundwater quality within the area of investigation.

Table 7-1: Site Specific Information for Determining Applicable Regulatory Guidelines

Land Use	- The Hartlen Point property is Commercial in nature. It is owned by the Department of National Defence and was developed as a coastal defence site.
Future Land Use	- Federal Facility / Commercial.
Potable Water Supply	- Non-potable.
Soil Texture	- Fine grained – Based on site observations and grain size analysis of several samples, surface soil at the Site has been identified as fine grained (refer to Appendix B for analytical results).
Overburden	- Most soil observed at the Site was described in the field to consist of fine grained glacial till composed of silt with some sand, gravel, and clay.
Closest Water Body	- The Hartlen Point property is bordered by the Atlantic Ocean to the south and east.

7.1 Federal Guidelines

Soil

Based on the site-specific information in Table 7-1, analytical results for soil samples collected within the area of investigation were compared with the following federal guidelines for the assessment of metals, TPH, PAHs, VOCs and PFAS:

- › Canadian Council of Ministers of the Environment (CCME), 1999 as updated, Canadian Environmental Quality Guidelines (CEQG), Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for Commercial Land Use, Fine Grained Soils.
- › CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil: Scientific Rationale, Supporting Technical Document, commercial land use, fine grained soil (CCME, 2008).

- › MARLANT Surface Soil Screening Criteria (SSC) for metals and PAHs, March 2015, for restricted commercial, based on proposed use of the Site.
- › Health Canada (HC) Summary Table: Health Canada Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS), Soil Screening Values (SSV), commercial land use, (HC, 2019). The Health Canada guidelines include SSV protective of human health for 11 PFAS parameters and a calculated (PFOS + PFOA) index calculated as the sum of the ratios of measured PFOS and PFOA concentrations to their respective SSV.
- › Interim Advice to Federal Custodian Departments for the Management of Federal Contaminated Sites Containing Perfluorooctane Sulfonate (PFOS) and other Per- and Polyfluoroalkyl Substances (PFAS), April 2018 (Version 1.4.1). Federal Environmental Quality Guidelines (FEQGs) for PFOS in soil for various ecological exposure pathways (Appendix I, Table 2).
- › Contaminated Sites Instruction (CSI.004.001) Soil Management 2020. PFAS guidelines included within this document were also used to screen laboratory analytical data. However, given the CCME guidelines are more extensive, the CCME guidelines have been referenced in addition to these with the appropriate analytical summary tables.

It is noted that for the protection of Environmental Health from non-carcinogenic effects of PAHs, the soil quality guideline for environmental health (SQGE) was used for each PAH compound, where available. In the absence of a SQGE, the protection of freshwater life guideline (SQGFL) was used followed by the interim soil quality criteria (CCME 1991) when available. For the PAH parameter Chrysene, the soil and food ingestion guideline were used as this was the only listed guideline available for this parameter.

There is no single final CCME Soil Quality Guideline for any of the PAHs that will protect both human and environmental health. To ensure that both human and ecological receptors are protected, the user must:

- › Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with soil contaminated with carcinogenic PAHs;
- › Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected from carcinogenic PAHs; and
- › Consider all relevant guidelines to protect ecological receptors from non-carcinogenic effects for the land use in question.

Groundwater

Based on the site-specific information above, analytical results for groundwater samples were compared with the following Federal guidelines for the assessment of Metals, TPH, PAHs, VOCs and PFAS:

- › Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites (Metals, TPH, PAHs and VOCs).
- › CCME Canadian Environmental Quality Guidelines (CEQGs) - Water Quality Guidelines for the Protection of Freshwater Aquatic Life (1999 as updated) (Metals, TPH and PAHs).
- › Health Canada Drinking Water Screening Values for other PFAS (April 2019) (PFAS).
- › Health Canada Guideline for Canadian drinking water quality - maximum acceptable concentrations (MACs) for PFOS and PFOA (April 2019) (PFAS).

- › Interim Advice to Federal Custodian Departments for the Management of Federal Contaminated Sites Containing Perfluorooctane Sulfonate (PFOS) and other Per-and Polyfluoroalkyl Substances (PFAS), April 2018 (Version 1.4.1). Federal Environmental Quality Guidelines (FEQGs) for PFOS in groundwater for various ecological exposure pathways.

It should be noted that, although groundwater at the Site is non-potable, the HC DWSVs/DWQGs were conservatively used to screen groundwater collected at the Site and assess potential for risk to construction workers, DND maintenance workers and site visitor receptors as there are no human health guidelines specifically for dermal contact pathways.

7.2 Provincial Guidelines

Soil

Based on the site-specific information in Table 7-1, analytical results for soil samples collected from the Site were compared with the following Provincial guidelines listed below:

- › Atlantic Risk Based Corrective Action for Petroleum Impacted Sites in Atlantic Canada (Version 3, updated January 2015) - Tier 1 Risk Based Screening Levels for Soil (Commercial, fine-grained, and Non-potable water criteria);
- › Provincial Atlantic Risk Based Corrective Action for Petroleum Impacted Sites in Atlantic Canada (Version 3, updated January 2015) - Commercial Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact, and
- › Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained),

Groundwater

Analytical results for groundwater samples were compared with the following Provincial guidelines for TPH/BTEX:

- › Atlantic RBCA Tier I Risk Based Screening Levels for Groundwater (July 2012, revised January 2015).

8. Methodology

8.1 Site Reconnaissance

The site reconnaissance was completed on March 8, 2021. It included observations of the Site to confirm the locations of several activities of potential concern, activities noted from the desktop information review and documented current land uses. The Site was surveyed on foot. Physical evidence of many of the reported former features was not observed during the visit. The location of the concrete pad which supported the former AST at HP151 was observed. A concrete pad, former foundation (undermined along the bluff) and concrete support wire anchors and guy wire anchors were observed near the bluff along the south side of the Site.

8.2 Utility Locates

Underground utility and UXO clearance were provided by MacIsaac Drilling, All Clear UXO and DND. Clearance took place at each of the proposed borehole or monitoring well locations at the Hartlen Point property on March 8 and 10, 2021. Potential underground services and UXOs were cleared within a 3 m radius of the proposed sampling location. Due to the reported potential to encounter UXO, all drill access pathways were cleared for UXO presence.

8.3 Borehole and Monitoring Well Installation

The borehole and monitoring well location plans were designed to assess areas of potential environmental concern identified within the previous reports provided by DCC and to provide baseline environmental soil and groundwater testing within and near the construction footprint of the proposed LBTF development. Each borehole and groundwater monitoring well was positioned to determine the presence of metals, PHCs, PAHs, VOCs and PFAS in soil and groundwater within the areas investigated.

The drilling program was carried out between March 15 and 22, 2021. The program consisted of six (6) boreholes (S5551-21BH01 to S5551-21BH06 inclusive) and six (6) monitoring wells (S5551-21MW01 to S5551-21MW06 inclusive) drilled to depths between 2.9 m and 9.1 mbgs with a track mounted continuous flight auger rig using solid stem augers.

Boreholes were backfilled with a mixture of bentonite and drill cuttings. Monitoring wells were completed as Polyvinyl chloride (PVC) plastic wells constructed with 0.05 m diameter PVC casing and slotted screen. Silica sand was installed across the monitoring well intake screen. A 0.6 m bentonite seal was installed in each of the monitoring wells approximately 0.3 m above the bentonite seal to prevent infiltration of surface water. The remainder of the monitoring well was backfilled with a mixture of bentonite, drill cuttings and silica sand to surface. Access to each monitoring well was sealed with a lockable PVC J-Plug. As the well locations are not directly accessible to the public, and will be removed during site development, the PVC casing stickups were unprotected in all monitoring wells except S5551-21MW01 (located near Building HP151), at which a lockable steel protective casing was installed. Each monitoring well was subsequently surveyed, and coordinates located in the UTM zone number and the easting and northing planar coordinate pair in that zone. Locks were subsequently installed on all well J-plugs.

Care was taken not to allow the monitoring well construction materials to lay on the ground. A new pair of nitrile gloves were used during each monitoring well installation.

The locations of these boreholes and monitoring wells are illustrated on the attached Figures 2 and 3 (Appendix A) in relation to the historic and proposed site features and boundaries. Borehole and monitoring well logs are illustrated in Appendix C.

8.3.1 Assessment Rationale

A total of six (6) boreholes and six (6) groundwater monitoring wells were completed during the Site Assessment. The holes were located to investigate onsite soil conditions, potential impacts from historical operations identified during the document review and proposed future site infrastructure as well as to permit the recovery of representative soil and groundwater samples for laboratory analyses. The rationale for borehole locations and monitoring wells for the site investigation is presented in Table 8-1 below.

Table 8-1: Rationale for and Location of Boreholes and Monitoring Wells

Monitoring Wells	Target Area
S5551-21MW01	Site 5551 (formerly identified as Site 51) - reported former AST at Building HP151
S5551-21MW02	Site 5550 (formerly identified as Site 50) - former Small Arms Range
S5551-21MW03	Baseline conditions near proposed office trailers
S5551-21MW04	Baseline conditions at proposed parking lot
S5551-21MW05	Baseline conditions beneath proposed building footprint
S5551-21MW06	Baseline conditions near east side of the Site and former gun emplacements
Boreholes	Target Area
S5551-21BH01	Baseline conditions at proposed generator and fuel tank location

S5551-21BH02	Baseline conditions near proposed office trailers
S5551-21BH03	Baseline conditions beneath proposed building footprint, near proposed sewage lift station and cooling towers 1 and 2
S5551-21BH04	Baseline conditions near north corner of the Site, former gun emplacements
S5551-21BH05	Baseline conditions beneath proposed building footprint
S5551-21BH06	Baseline conditions near east side of the Site and former gun emplacements

8.4 Drilling and Soil and Sampling Program

Soil and groundwater sampling were carried out at each applicable location. The program included the advancement of twelve (12) boreholes, six (6) of which were completed as groundwater monitoring wells. The locations of each borehole and monitoring well are identified on Figures 2 and 3, Appendix A.

Soil Sampling

Drilling activities were completed by Logan Drilling of Stewiacke, NS and soil collection and soil preparation for analytical testing was completed by the project team during drilling activities at each borehole. Soil samples were recovered for selected PHCs, VOC, PAH, Metals, PFAS and grain size laboratory analyses.

Soil samples were typically collected at 0.6 m continuous depth intervals throughout the advancement of each borehole using 0.05 m diameter split spoon sampler. Although it was planned that the first sample from each borehole was to be recovered between 0 to 0.15 m depth, the lack of sample volume due to poor recovery, required these samples to be recovered between 0 to 0.3 m depth. In some instances, the full 0.6 m surface sample interval was required to fill the necessary laboratory containers. In some cases, slight deviation from MARLANT SOP field procedures were required to ensure sample integrity, specifically sampling was adjusted to avoid inclusion of surficial organic material.

A new pair of nitrile gloves was used to handle and recover each sample. Samples were logged in the field for depth, composition, moisture, plasticity, consistency, color, and additional comments were provided where necessary. Where possible, standard penetration test (SPT) values were recorded for each 0.15 m of spoon penetration. Additional grab samples were recovered directly from the augers if deemed necessary in the field.

To provide an indication of potential impacts related to the former operation, storage and handling of petroleum at the Site, soil samples recovered during the drilling program were field screened for soil vapours using ambient temperature headspace (ATH) technique. A portion of the soil sample was placed into appropriate clean laboratory supplied sample containers together with appropriate preservative if required. The remainder of the soil was placed into a laboratory supplied clean bag for ATH screening.

The ATH measurements were recorded with a handheld Minirae 3000 Photoionization Detector (PID) portable hydrocarbon vapour detector calibrated to hexane. The ATH technique involved half filling and sealing a plastic bag with soil and allowing the vapours to accumulate for approximately fifteen to twenty minutes prior to analyzing the headspace. Accumulated vapours were measured in parts per million total organic vapours (ppm). After completion of sampling and ATH measurements, all samples were stored in a cooler with ice until transportation to the laboratory.

Given the potential for contamination of samples recovered for PFAS analysis, precautions were employed throughout the sampling program in accordance with MARLANT SOP 16. The split spoons were cleaned prior to commencing the drilling program and after each sample was recovered. A clean pair of nitrile gloves was worn during each step of the decontamination process to reduce cross-contamination. Drilling water was not required as all holes were installed by auger, not a rotary drill. The sampling equipment was cleaned between each borehole location and after each split spoon. While wearing a new pair of nitrile gloves, field equipment was decontaminated according to the process outlined below:

- › The equipment was rinsed with Liquinox;
- › rinsed with laboratory-supplied PFAS free water;
- › rinsed with methanol; and finally
- › rinsed again with laboratory-supplied PFAS free water.

The field protocols and QA/QC procedures utilized by SNCL were in accordance with MARLANT SOPs and standard industry protocols, with the exception of field data naming conventions related to SOP 13, which were not required in the SOW; and slight deviations were required to ensure sample integrity, specifically sampling of the 0-0.6 mbgs layer was adjusted to avoid inclusion of surficial organic material.

Table 8-2: Borehole and Monitoring Well Location and Soil Sampling Information

Borehole/ Monitoring Well ID	Location	Analyses	Depth (mbgs)	Sample ID	Sample Depth (mbgs)
S5551- 21BH01	4940201 N 25583749 E	Metals, PAHs, PFAS	4.9	S5551-21BH01-01	0-0.6
				S5551-21BH01-02	0.6-1.2
				S5551-21BH01-03	1.2-1.8
		PHCs, VOCs		S5551-21BH01-04	1.8-2.4
				S5551-21BH01-05	2.4-3.1
				S5551-21BH01-06	3.1-3.7
				S5551-21BH01-07	3.7-4.3
		Metals, PFAS		S5551-21BH01-08	4.3-4.9
		Metals, PAHs, PFAS		S5551-21BH01-09 (DUP of S5551-21BH01-01)	0-0.6
S5551- 21BH02	4940281 N 25583695 E	Metals, PAHs	4.9	S5551-21BH02-01	0-0.6
				S5551-21BH02-02	0.6-1.2
				S5551-21BH02-03	1.2-1.8
				S5551-21BH02-04	1.8-2.4
		PHCs, VOCs		S5551-21BH02-05	2.4-3.1
				S5551-21BH02-06	3.1-3.7
				S5551-21BH02-07	3.7-4.3
		Metals, PAH		S5551-21BH02-08	4.3-4.9
		Metals, PAHs, PFAS		S5551-21BH03-01	0-0.6
S5551- 21BH03	4940253 N 25583773 E		4.2	S5551-21BH03-02	0.6-1.2
		PHCs, VOCs		S5551-21BH03-03	1.2-1.8
				S5551-21BH03-04	1.8-2.4
				S5551-21BH03-05	2.4-3.1

Borehole/ Monitoring Well ID	Location	Analyses	Depth (mbgs)	Sample ID	Sample Depth (mbgs)
S5551- 21BH04	4940350 N 25583799 E		2.9	S5551-21BH03-06	3.1-3.7
		Metals, PAHs, PFAS		S5551-21BH03-07	3.7-4.3
		Metals, PAHs, PFAS		S5551-21BH04-01	0-0.6
				S5551-21BH04-02	0.6-1.2
				S5551-21BH04-03	1.2-1.8
				S5551-21BH04-04	1.8-2.4
		Metals, PHCs, VOCs		S5551-21BH04-05	2.4-3.1
		Metals, PHCs, VOCs, PFAS		S5551-21BH04-08 (DUP of S5551-21BH04-05)	2.4-3.1
		Metals, PAHs		S5551-21BH04-09 (DUP of S5551-21BH04-01)	0-0.6
		Metals, PAHs, PFAS		S5551-21BH05-01	0-0.6
S5551- 21BH05	4940150 N 25583832 E		6.1	S5551-21MW05-02	0.6-1.2
				S5551-21BH05-03	1.2-1.8
				S5551-21BH05-04	1.8-2.4
				S5551-21BH05-05	2.4-3.1
				S5551-21BH05-06	3.1-3.7
		Metals, PHCs, PAHs, VOCs		S5551-21BH05-07	3.7-4.3
		Metals, PAHs,		S5551-21BH05-08	4.3-4.9
S5551- 21BH06	4940146 N 25583950 E	Metals, PAHs	4.9	S5551-21BH06-01	0-0.6
				S5551-21BH06-02	0.6-1.2
				S5551-21BH06-03	1.2-1.8
				S5551-21BH06-04	1.8-2.4
				S5551-21BH06-05	2.4-3.1
		PHCs, VOCs		S5551-21BH06-06	3.1-3.7
				S5551-21BH06-07	3.7-4.3
		Metals, PAHs		S5551-21BH06-08	4.3-4.9
		Metals, PAHs		S5551-21BH06-09 (DUP of S5551-BH06-08)	4.3-4.9
S5551- 21MW01	4940138 N 25583671 E	Metals, PAHs	9.1	S5551-21MW01-21SS-01	0-0.6
		PHCs, VOCs		S5551-21MW01-21SS-02	0.6-1.2
				S5551-21MW01-21SS-03	1.2-1.8
				S5551-21MW01-21SS-04	1.8-2.4

Borehole/ Monitoring Well ID	Location	Analyses	Depth (mbgs)	Sample ID	Sample Depth (mbgs)
S5551- 21MW02	4939998 N 25583823 E		6.4	S5551-21MW01-21SS-05	2.4-3.1
				S5551-21MW01-21SS-06	3.1-3.7
				S5551-21MW01-21SS-07	3.7-4.3
		Metals, PAHs		S5551-21MW01-21SS-08	4.3-4.9
		Metals, PAHs, PFAS		S5551-21MW02-21SS-01	0-0.6
				S5551-21MW02-21SS-02	0.6-1.2
		PHCs, VOCs		S5551-21MW02-21SS-03	1.2-1.8
				S5551-21MW02-21SS-04	1.8-2.4
				S5551-21MW02-21SS-05	2.4-3.1
				S5551-21MW02-21SS-06	3.1-3.7
				S5551-21MW02-21SS-07	3.7-4.3
		Metals, PFAS		S5551-21MW02-21SS-08	4.3-4.9
S5551- 21MW03	4940230 N 25583668 E	Metals, PAHs	4.9	S5551-21MW03-21SS-01	0-0.6
				S5551-21MW03-21SS-02	0.6-1.2
				S5551-21MW03-21SS-03	1.2-1.8
				S5551-21MW03-21SS-04	1.8-2.4
				S5551-21MW03-21SS-05	2.4-3.1
		Metals, PHCs, PAHs, VOCs		S5551-21MW03-21SS-06	3.1-3.7
				S5551-21MW03-21SS-07	3.7-4.3
				S5551-21MW03-21SS-08	4.3-4.9
S5551- 21MW04	4940088 N 25583761 E	Metals, PAHs	4.9	S5551-21MW04-21SS-01	0-0.6
				S5551-21MW04-21SS-02	0.6-1.2
				S5551-21MW04-21SS-03	1.2-1.8
				S5551-21MW04-21SS-04	1.8-2.4
		PHCs, VOCs		S5551-21MW04-21SS-05	2.4-3.1
				S5551-21MW04-21SS-06	3.1-3.7
				S5551-21MW04-21SS-07	3.7-4.3
		Metals, PAHs		S5551-21MW04-21SS-08	4.3-4.9
S5551- 21MW05	4940208 N 25583832 E	Metals, PAHs, PFAS	4.3	S5551-21MW05-21SS-01	0-0.6
				S5551-21MW05-21SS-02	0.6-1.2
				S5551-21MW05-21SS-03	1.2-1.8
		PHCs, VOCs		S5551-21MW05-21SS-04	1.8-2.4
				S5551-21MW05-21SS-05	2.4-3.1

Borehole/ Monitoring Well ID	Location	Analyses	Depth (mbgs)	Sample ID	Sample Depth (mbgs)
S5551- 21MW06	4940262 N 25583891 E		8.2	S5551-21MW05-21SS-06	3.1-3.7
		Metals, PAHs		S5551-21MW05-21SS-07	3.7-4.3
		Metals, PAHs, PFAS		S5551-21MW06-21SS-01	0-0.6
				S5551-21MW06-21SS-02	0.6-1.2
		PHCs, VOCs		S5551-21MW06-21SS-03	1.2-1.8
				S5551-21MW06-21SS-04	1.8-2.4
				S5551-21MW06-21SS-05	2.4-3.1
				S5551-21MW06-21SS-06	3.1-3.7
				S5551-21MW06-21SS-07	3.7-4.3
		Metals		S5551-21MW06-21SS-08	4.3-4.9
		Metals, PFAS		S5551-21MW06-21SS-09 (DUP of S5551-21MW06-21SS-01)	0-0.6
		PFAS		S5551-21MW06-21 Grab-01	7.9-8.2

Groundwater Monitoring and Sampling Program

The groundwater monitoring program included the following activities (in order):

- › April 13, 2021: measurement of water levels and developing monitoring wells;
- › April 22, 2021: measurement of water levels and purging monitoring wells;
- › April 23, 2021: measurement of water levels and sampling of monitoring wells for laboratory analysis.

Monitoring Well Development

Monitoring well development was carried out in accordance with MARLANT SOP 15 (Monitoring Well Development). Given the fine-grained nature of the overburden and apparent low permeability, well development was carried out 22 days (April 13, 2021) after completion of all monitoring well installations. The procedure is briefly summarized below:

- › Prior to development, static water level was measured in the monitoring well and the absence of Non-Aqueous Phase Liquids (NAPL) was verified.
- › Using a clean pair of nitrile gloves, a dedicated Teflon free High-Density Polyethylene (HDPE) bailer was carefully lowered down the well until it entered the water column then subsequently removed and emptied into a 5-gallon pail.
- › Well development was undertaken until either 5 well volumes were removed, or the well was bailed consistently dry.
 - S5551-21MW01 was dry. No groundwater entered the well.
 - S5551-21MW02, -21MW03, -21MW04 and -21MW05 were bailed dry without recovering more than 2 well volumes and waiting for recovery of the wells to at least within 80% of static water level was estimated in the field to be impractical.

- DCC was contacted to discuss the findings and it was determined that wells which provided sufficient water volume after purging would be sampled (confirmed in email correspondence with Jaime Darrow, April 20, 2021).

- › Groundwater collected in the pail was discarded away and down gradient from each monitoring well.

Groundwater level measurements were carried out using an oil/water interface probe (Solinst Model 122). Gauging was conducted by lowering the clean probe down into each well until a tone was obtained indicating a liquid had been contacted. The depth at which a tone was first sounded was then carefully noted to the nearest millimeter. The groundwater volume was calculated based on the casing diameter and the height of water in each monitoring well.

As discussed in Section 8.4.1 above, decontamination procedures employed during this process are summarized as follows:

A clean pair of nitrile gloves was worn during each step of the decontamination process to reduce cross-contamination. The sampling equipment was cleaned between each borehole location and after each split spoon. While wearing a new pair of nitrile gloves, field equipment was decontaminated according to the process outlined below:

- › The equipment was rinsed with Liquinox;
- › rinsed with laboratory-supplied PFAS free water;
- › rinsed with methanol; and finally
- › rinsed again with laboratory-supplied PFAS free water.

Groundwater Purging

Prior to recovery of groundwater samples, the monitoring wells were purged manually on April 22, 2021 using a dedicated HDPE bailer. A maximum of three (3) times the dry volume from each well was removed during the purging process.

The procedure is briefly summarized below:

- › Prior to development, static water level was measured in the monitoring well and the absence of Non-Aqueous Phase Liquids (NAPL) was verified.
- › Using a clean pair of nitrile gloves, a dedicated Teflon free HDPE bailer was carefully lowered down the well until it entered the water column then subsequently removed and emptied into appropriate laboratory supplied sample containers.
- › Well development was undertaken until either 3 well volumes were removed, or the well was bailed consistently dry.
 - S5551-21MW01 was dry. No groundwater entered the well.
 - S5551-21MW02, -21MW03, -21MW04 and -21MW05 were bailed dry without recovering more than 2 well volumes and waiting for recovery of the wells to at least within 80% of static water level was estimated in the field to be impractical.
 - DCC was contacted to discuss the findings and it was determined that wells which provided sufficient water volume after purging would be sampled.
- › Groundwater collected in the pail was discarded away and down gradient from each monitoring well.

Groundwater level measurements were carried out using an oil/water interface probe (Solinst Model 122). Gauging was conducted by lowering the clean probe down into each well until a tone was obtained indicating a liquid had been contacted. The depth at which a tone was first sounded was then carefully

noted to the nearest millimeter. The groundwater volume was calculated based on the casing diameter and the height of water in each monitoring well.

As discussed in Sections 8.4.1 and 8.4.4 above decontamination the procedure employed during this process is summarized as follows:

A clean pair of nitrile gloves was worn during each step of the decontamination process to reduce cross-contamination. The sampling equipment was cleaned between each monitoring well location and after each split spoon. While wearing a new pair of nitrile gloves, field equipment was decontaminated according to the process outlined below:

- › The equipment was rinsed with Liquinox;
- › rinsed with laboratory-supplied PFAS free water;
- › rinsed with methanol; and finally
- › rinsed again with laboratory supplied PFAS free water.

Groundwater Sampling

Groundwater samples were recovered on April 23, 2021 from S5551-21MW03, -21MW05, and -21MW06. Insufficient groundwater volume had been recovered in S5551-21MW01, -21MW02 and -21MW04. No groundwater was observed in S5551-21MW01. Static water levels were measured in each of the monitoring wells prior to sample recovery.

The procedure is briefly summarized below:

- › Prior to development, static water level was measured in the monitoring well and the absence of Non-Aqueous Phase Liquids (NAPL) was verified.
- › Using a clean pair of nitrile gloves, a dedicated Teflon free HDPE bailer was used to carefully lower down the well until it entered the water column then subsequently removed and emptied into appropriate laboratory supplied sample containers. Inline 40-micron filters were employed to filter groundwater samples for metals analysis.
- › Where possible the MARLANT SOP field protocols were followed. There were cases where surface soil contained organic material (humus etc.) sampling was adjusted to avoid inclusion of organic material which would have skewed the analytical results.

Groundwater level measurements were carried out using an oil/water interface probe (Solinst Model 122). Gauging was conducted by lowering the clean probe down into each well until a tone was obtained indicating a liquid had been contacted. The depth at which a tone was first sounded was then carefully noted to the nearest millimeter. Groundwater levels were measured on April 13/21 (shown on Borehole logs), again on April 23/21 prior to bailing and on April 23/21 prior to sampling. The groundwater volume was calculated based on the casing diameter and the height of water in each monitoring well.

As discussed in Sections 8.4.1, 8.4.4 and 8.4.5 above, the decontamination procedure employed during this process is summarized as follows:

A clean pair of nitrile gloves was worn during each step of the decontamination process to reduce cross-contamination. The sampling equipment was cleaned between each borehole location and after each split spoon. While wearing a new pair of nitrile gloves, field equipment was decontaminated according to the process outlined below:

- › The equipment was rinsed with Liquinox;
- › rinsed with laboratory-supplied PFAS free water;
- › rinsed with methanol; and finally

- › rinsed again with laboratory supplied PFAS free water.

A new pair of Nitrile gloves was used for each well and equipment was cleaned as outlined above before and after completing the sampling at each of the wells.

The groundwater samples were packed with ice and stored in an insulated cooler while on-site and during transport to AGAT Laboratory in Dartmouth, NS together with appropriate chain of custody documentation. The field protocols and QA/QC procedures utilized by SNCL during site monitoring were in accordance with MARLANT SOPs and standard industry protocols. Table 8-3 below provides location and analysis information of the groundwater sampling conducted as part of the investigation.

Table 8-3: Monitoring Well Location and Groundwater Sampling Information

Monitoring Well	Location (NAD 83 UTM)	GW Depth (mbgs) Apr 13/21	GW Depth (mbgs) Apr 22/21	GW Depth (mbgs) Apr 23/21	Well Depth (mbgs)	Analyses (Apr 23/21)	Sample ID (Apr 23/21)
S5551-21MW01	4940138 N 25583671 E	– (Dry)	– (Dry)	– (Dry)	9.1	–	–
S5551-21MW02	4939998 N 25583823 E	6.16	6.10	6.105	6.4	–	–
S5551-21MW03	4940230 N 25583668 E	0.25	0.45	0.45	4.9	Metals, PHCs, PAHs, VOCs, PFAS	S5551-21MW03-21GW-01
S5551-21MW04	4940088 N 25583761 E	2.80	3.91	3.91	4.9	–	–
S5551-21MW05	4940208 N 25583832 E	2.4	2.4	2.40	4.3	Metals, PHCs, PAHs, VOCs	S5551-21MW05-21GW-01
S5551-21MW06	4940262 N 25583891 E	TOC –Top of Casing (Artesian)	TOC (Artesian)	TOC (Artesian)	8.2	Metals, PHCs, PAHs, VOCs, PFAS	S5551-21MW06-21GW-01, S5551-21MW07-21GW-01 (DUP of S5551-21MW06-21GW-01)

8.5 Quality Assurance / Quality Control (QA/QC)

QA/QC for the sampling program consisted of the collection of three trip blanks, collecting four field blanks, four equipment blanks and six duplicate samples. These were sent to AGAT Laboratory in Dartmouth, Nova Scotia for analytical testing.

QA/QC procedures followed protocols outlined in MARLANT SOP 2 (Decontamination of Equipment), 5 (Groundwater Purging and Sampling), 16 (PFAS Sampling Methodology & Best Practices).

To ensure accuracy and precision of samples collected, Quality Assurance was maintained by:

- › Use of MARLANT SOPs.
- › Use of Laboratory supplied sterile sample containers and Laboratory preservatives.
- › Decontamination of all sampling equipment between wells and other sample locations.
- › New pair of nitrile gloves during the collection of each sample.
- › Dedicated inline disposable filters for each sample that requires filtering.
- › Control of external contaminant sources when sampling such as; running motors, location of sampling equipment, wind direction, and container handling.

The Quality Control Protocol was evaluated the reproducibility, accuracy and level of contamination introduced by field procedures, including:

- › One (1) in ten (10) Field Duplicates collected for each round of sampling.
- › Four (4) Equipment Blank submitted during sampling events.
- › Four (4) Field Blank submitted daily during sampling events.
- › Three (3) Trip Blank submitted daily during sampling events.
- › Laboratory receiving samples followed their own internal QA/QC program and a copy of the results were included with each certificate of analysis.

QA/QC procedures for sample shipping are outlined below:

- › Collected samples and associated blanks are to be placed in coolers with ice and transported to the analytical laboratory as soon as possible after collection.
- › Fill out chain of custody (COC) and verify the sample matches the COC. Pack samples well enough to prevent breakage.
- › Place completed COC for all samples within the cooler in a zip lock bag and place in the cooler for transport to the laboratory.

8.6 Laboratory Analysis

At least two (2) representative soil samples were selected from each borehole and monitoring well for laboratory analysis. Each of the samples was submitted to AGAT Laboratory in Dartmouth, NS for quantification of selected Metals, PHC, PAH, VOC, PFAS and grain size.

Each of the parameters selected for analysis from each sample location are summarized in Table 8-2 above.

Groundwater samples recovered from S5551-21MW03, -21MW05 and -21MW06 were submitted for Metals, PHC, PAH, VOC, PFAS analyses. The samples were submitted to AGAT Laboratory in Dartmouth, NS. AGAT's laboratory is certified with the Canadian Association for Laboratory Accreditation (CALA).

Each of the parameters selected for analysis from each sample location are summarized in Table 8-3 above. The Laboratory Analytical Reports are provided in Appendix B.

9. Results

9.1 Geology / Stratigraphy

Soil conditions were observed to consist primarily of approximately 0.03 m to 0.15 m of root mat and humus topsoil, composed of organic rich silty sand and silt, with some sand over poorly sorted glacial till composed of sandy silt with some pebbles, cobbles, and boulders with varying proportions of clay extending to the maximum depth of investigation (approx. 9 mbgs). Sandy interlayers typically less than 0.01 m were observed in S5551-21BH02, -21BH03, -21MW03, and -21MW04. A thicker sandy interlayer up to 0.15 m thickness was observed in S5551-21MW05. Each of these features was logged in the field to occur between approximately 1.5 and 2 mbgs.

Auger refusal was encountered in S5551-21BH04, -21MW01, -21MW02, and -21MW06 at depths between approximately 2.9 and 9 mbgs. Given the possible thickness of glacial till, and cobbles within this area, it is unclear if bedrock was encountered while completing these test holes.

The subsurface soil stratigraphy encountered at each test hole location is summarized in detail on the borehole and monitoring well logs included in Appendix C.

9.2 Potentiometric Conditions

The results of groundwater level monitoring carried out on 13 April, 22 April, and 23 April 2021 are summarized in Table 8-3. Groundwater levels were measured on those dates ranging from 0.25 m below ground surface (mbgs) in S5551-21MW03 to 6.16 mbgs in S5551-21MW02. Groundwater was overflowing the top of casing in S5551-21MW06. Groundwater was not observed in S5551-21MW01 at the time of these site visits.

No light non aqueous phase liquid (LNAPL) was identified in any of the monitoring wells.

Given the absence of groundwater in S5551-21MW01 and the observed localized occurrence of thin coarser grained sandy interlayers in the glacial till between approximately 1.5 and 2 mbgs, it is apparent the presence of perched groundwater conditions exists within the near surface soil at the Site. As a result, the groundwater level measurements may not be considered representative of the presence of a true saturated groundwater horizon within near-surface overburden stratigraphy. If encountered during excavation activity, localized groundwater flow within this horizon could be expected to follow local topography.

The apparent presence of artesian conditions was identified in only one monitoring well (S5551-21MW06). Based upon the limited field observations, this phenomenon could be interpreted to represent the presence of groundwater over bedrock beneath the low permeability glacial till overburden. Groundwater flow may be expected to follow bedrock and topographic contours and at this lower elevation may be tidally influenced.

9.3 Field Observations

No measurable soil vapours were recorded in any of the soil samples recovered as part of this investigations. In addition, no visual or olfactory signs of potential contamination was observed.

9.4 Soil Laboratory Analytical Results

Soil samples were recovered from each of the recently completed boreholes and monitoring wells (S5551-21BH01 through -21BH06 and S5551-21MW01 through -21MW06) and submitted to the laboratory for selected Metals, PHC, PAH, VOC, PFAS and grain size analysis. The results of the laboratory analyses are summarized in Tables 1 to 5 (Appendix B). Copies of the laboratory certificates are included in Appendix F. Results from MARLANT SE Report 466 were compared with current guidelines and results are provided in Tables 6 and 7 (Appendix B).

The concentrations of PHCs, VOCs, PAHs and PFAS were reported by the laboratory to be below method detection limits for all parameters tested except for the PAH Perylene, for which a concentration of 0.05 mg/kg (equal to the RDL for Perylene) was measured in sample S5551-21MW03-21SS-06 and 0.06 mg/kg in sample S5551-21BH06-08. It should be noted that these results are far below the MARLANT SSC Guideline of 16,000 mg/kg.

The metals in soil results were below either the applicable Guideline or the method detection limit for most of the parameters tested. The only exceptions were Arsenic in soil sample S5551-21BH05-07 (14 milligrams per kilogram (mg/kg)) and S5551-21BH05-08 (14 mg/kg), sample S5551-21BH06-08 (14 mg/kg) and duplicate sample S5551-21BH06-09 (15 mg/kg) were reported by the laboratory to slightly exceed the applicable CCME guideline of 12 mg/kg, however they are below the MARLANT SSC guideline for arsenic of 36 mg/kg. S5551-21BH06-09 is a duplicate of sample S5551-21BH06-08. Iron was identified by the laboratory to exceed the applicable guideline in all samples except for S5551-21BH03-01.

These data are consistent with metals soil analytical results reported by Neill and Gunter in 2002. The analytical results from soil samples obtained from Hand Auger test holes reportedly recovered from within the former small arms range were reported to be either below the laboratory method detection limits or the applicable regulatory guidelines.

Soil grain size conditions were observed to consist of approximately 0.03 m to 0.15 m of root mat underlain by a humus topsoil, composed of organic rich silty sand and silt with some sand over poorly sorted glacial till composed of sandy silt with some pebbles, cobbles and boulders with varying proportions of clay extending to the maximum depth of investigation (approx. 9 mbgs).

9.5 Groundwater Laboratory Analytical Results

Groundwater samples were recovered from three of the completed monitoring wells (S5551-21MW03, -21MW05 and -21MW06) and submitted to the laboratory for Dissolved Metals, PHC, PAH, VOC and PFAS analysis. S5551-21MW07-21GW-01 was a field duplicate of S5551-21MW06-21GW-01 and was submitted for complementary laboratory analysis. The results of the laboratory analyses are summarized in Tables 8 to 12 (Appendix B). Copies of the detailed laboratory analytical reports are included in Appendix F.

The PHC, VOC, PAH and PFAS results were reported by the laboratory to be below method detection limit for all the parameters tested. The metals results were below the applicable CCME Canadian Environmental Quality Guidelines (CEQGs) - Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, updated 2015) and the method detection limit for most of the parameters tested. The only exceptions were Arsenic in groundwater recorded from S5551-21MW05-21GW-01 (14 µg/L), S5551-21MW06-21GW-01 (46 µg/L) and Iron in groundwater from S5551-21MW06-21GW-01 (671 µg/L).

9.6 QA/QC

Ten percent of all the samples submitted to AGAT laboratory were blind duplicates for each parameter of each media tested. Laboratory QC standard samples were analyzed with the samples and their duplicates to assess the reliability of the analysis. The QC results are reported on the Certificates of Analysis included in Appendix F.

To reduce the risk of cross contamination during sampling and drilling, a field QA/QC program was followed which included the following measures:

- › Disposable latex gloves were used to collect each sample and discarded following collection of each sample;
- › Sampling instruments and equipment were thoroughly cleaned prior to and between sampling locations;
- › Laboratory supplied jars and bottles were used to store water and soil samples; and
- › Samples were stored in a cooler with ice during storage and transported to the laboratory with the appropriate Chain of Custody documentation for tracking purposes.

AGAT Laboratory employs quality assurance professionals whose mandate is to monitor the operations for the company and to ensure compliance with the best documented practices. The Quality Assurance System covers all areas including sample collection, sample transportation, sample analysis and data reporting. Major components and features of the Quality Assurance System include:

- › Chain of Custody and sample integrity inspection;
- › Strict documentation control and files;
- › A detailed training program which trains personnel to prepare and analyze samples according to Standard Operating Procedures;
- › All analytical methods are based on accepted (e.g., Ministry of Environment (MOE), United States Environmental Protection Agency (US EPA), American Society for Testing and Materials (ASTM)) procedures and are fully validated prior to use;
- › Precision is monitored by performing replicated analysis of samples within each batch;
- › Preventative maintenance procedures are clearly defined and written for each instrument and support equipment;
- › Maintenance activities are documented on standard forms within the equipment logbook;
- › Matrix effects in organic analysis are assessed with surrogate fortification of each sample;
- › All analytical procedures are subjected to various quality checks which include, linearity of calibration, accuracy of calibration, precision of analysis system and interference to the analysis systems;
- › Hard copy reports displaying all the required data are generated for each instrument;
- › A Continuous Improvement System is in place, which includes third party audits, internal audits, investigation procedures, nonconformance reporting, document change request forms; improvement suggestions) and corrective and preventative actions; and
- › AGAT Analytical Laboratory is accredited for CALA.

9.6.1 Laboratory Surrogate Recoveries

All the surrogate recoveries for soil analytical results have been reviewed to evaluate the effectiveness and accuracy of the method on a sample-specific basis. A summary of the reported surrogate recovery data for each media and analytical suite is provided in Table 9-1 below.

Table 9-1: Laboratory QC - Surrogate Recovery Summary

Media	Parameter	Acceptable Recovery	Surrogate Recovery
Soil	PHC	50%-140%	96%-106%
	PAH	50%-140%	68%-92%
	VOC	60%-140%	91%-98%
	PFAS	30%-140%	31%-106%

Water	PHC	70%-130%	85%-121%
	PAH	50%-140%	70%-94%
	VOC	60%-140%	91%-100%
	PFAS	60%-140%	30% -140%

Soil

Assessment of the analysis of the laboratory blanks, replicates and the QC standards shows relatively good correlation. The surrogate recoveries for several PFAS compounds were reported to be below the minimum acceptable recovery limit of 30%, namely Perfluooctane Sulfonamide (PFOSA) from soil samples S5551-21MW02-21SS-08, S5551-21BH05-01 and S5551-21BH03-07, and Perfluorododecanoic Acid and Perfluorotetradecanoic Acid from sample S5551-21MW02-21SS-08. The laboratory reported that acceptable surrogate recoveries for more than 90% of the compounds were met, and the quality criteria for analysis were met.

QA violations for the PAH compound Bromomethane and the VOC compounds Trichlorofluoro-methane, Chloroform and 1,2-Dibromoethane were reported for sample S5551-21BH01-06. Similar violations for metals Barium and Boron were also reported for S5551-21BH01-01. The laboratory indicated that according to their method protocol, these represented less than 10% of the reported data for each analysis and are within acceptable limits.

It should be noted that some surrogate recoveries for samples S5551-21BH01-01, S5551-21BH01-08, S5551-21BH01-09, S5551-21BH04-01, S5551-21BH04-08, S5551-21MW06-21SS-01, S5551-21MW06-21SS-09, S5551-21MW06-21Grab-01, S5551-21MW02-21SS-01 and S5551-21MW02-21SS-08 were reported to be outside acceptance limits and the analytical results were corrected based on the surrogate percent recoveries. As a result, Surrogate recovery was low bias, therefore were biased high due to surrogate correction. Given that the analytical results for these samples were reported to be below the laboratory method detection limit, it is not considered significantly detrimental for the purpose of this study if the results are potentially biased high.

Groundwater

Assessment of the analysis of the laboratory blanks, replicates and the QC standards shows relatively good correlation. The surrogate recoveries for PFAS compounds Perfluoro dodecanoic Acid-13C7, Perfluoro dodecanoic Acid-13C2, and N-Ethylperfluorosulfonamideacetic from groundwater samples S5551-21MW06 was reported to be below the minimum acceptable recovery limit of 30%, the laboratory reported that acceptable surrogate recoveries for more than 90% of the compounds were met and the quality criteria for analysis was met. QA violations for the PAH compound Dibenzo (ah) anthracene, Quinoline, the VOC compounds Chloromethane, Bromomethane, cis-1,3-Dichloropropene and trans-1,3-Dichloropropene, and the PFAS compound N-Ethylperfluorosulfonamideacetic were reported for sample S5551-21MW03. The laboratory indicated that according to their method protocol, these represented less than 10% of the reported data for each analysis and are within acceptable limits.

It should be noted that some surrogate recoveries for groundwater samples S5551-21MW06-21GW-01 was reported to be outside acceptance limits and the analytical results were corrected based on the surrogate percent recoveries. As a result, Surrogate recovery was low bias, therefore were biased high due to surrogate correction. Given that the analytical results for these samples were reported to be below the laboratory method detection limit, it is not considered significantly detrimental for the purpose of this study if the results are potentially biased high.

9.6.2 Field QA Duplicates

All duplicates were chosen at random and represent ten percent of all samples collected to verify the accuracy of the analyses performed on the specific analytes. This is expressed as a relative percentage difference (RPD) between the two samples collected. It is noted that RPD criteria only apply when analytes are present at greater than 5 times the reporting limit. No deficiencies were noted. Duplicate results are provided in Appendix F – Laboratory Certificates. The results have not been repeatedly presented in Appendix B – Analytical Results.

10. Discussion and Findings

10.1 Contaminants of Potential Concern (COPCs), Contaminant Source and Location and Potential Receptors for the Site

The concentrations of PHCs, VOCs, PAHs and PFAS were reported by the laboratory to be below method detection limits for all parameters tested except for the PAH Perylene, for which a concentration of 0.05 mg/kg (equal to the RDL for Perylene) was measured in sample S5551-21MW03-21SS-06 and 0.06 mg/kg in sample S5551-21BH06-08. It should be noted that these results are far below the MARLANT SSC Guideline of 16,000 mg/kg.

The metals in soil results were below either the applicable Guideline or the method detection limit for most of the parameters tested. The only exceptions were Arsenic in soil sample S5551-21BH05-07 (14 mg/kg) and S5551-21BH05-08 (14 mg/kg), sample S5551-21BH06-08 (14 mg/kg) and duplicate sample S5551-21BH06-09 (15 mg/kg) which were reported by the laboratory to slightly exceed the applicable CCME guideline of 12 mg/kg, however analytical results are below the MARLANT SSC guideline for arsenic of 36 mg/kg. S5551-21BH06-09 is a duplicate of sample S5551-21BH06-08. Iron was identified by the laboratory to exceed the applicable guideline in all samples except for S5551-21BH03-01. These data are consistent with metals and PHC soil analytical results reported by Neill and Gunter (2002). The presence of elevated levels of arsenic and iron in soil and groundwater within this region is generally recognized (Dillon, 2011; NSE, 2015) and is often related to the presence of sulfide minerals frequently associated with bedrock and constituents within overburden originating from the Halifax Formation strata. Metal soil concentrations have been discussed further in Appendix D with reference to background levels.

All residual contamination in groundwater at the Site included arsenic and iron in groundwater. Groundwater is not used for potable or domestic use at the Site, and there are no domestic wells located either down or cross-gradient from the Site, as groundwater flows to the east towards Cow Bay, while the nearest water well is located 750 m north. Groundwater at the Site has been observed at average depths ranging from 0.25 to 6.16 mbgs across the entire property. The PHC, VOC, PAH and PFAS in groundwater results were reported by the laboratory to be below method detection limit for all the parameters tested. The metals in groundwater results were reported by the laboratory to be below the applicable Guideline, CCME Canadian Environmental Quality Guidelines (CEQGs) or Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, updated 2015) or the method detection limit for most of the parameters tested. The only exceptions were Arsenic in groundwater recovered from S5551-21MW05-21GW-01 (14 µg/L), S5551-21MW06-21GW-01 (46 µg/L) and Iron in groundwater from S5551-21MW06-21GW-01 (671 µg/L). Metal concentrations in groundwater have been discussed further in Appendix D with reference to background levels.

10.2 Observable Contaminant Trends

The investigation did not identify any contaminant trends that would require follow-up. The results were consistent with previous historic investigations, contaminants are primarily typical of background concentration for this region. The slight PAH exceedance would also be considered unremarkable given the location and proximity to historic marine related infrastructure.

10.3 Local Geological and Hydrogeological Conditions at the Site, Groundwater Flow Patterns, and Transport Mechanisms

The glacial till overburden at the Site is considered to exhibit low permeability, with thin sandy interlayers identified at a few test hole locations. Where possible, groundwater monitoring wells were preferentially constructed in locations at which sandy interlayers were identified and the potential to capture groundwater was most likely. Based upon the data recovered as part of this study, there appears to be localized perched groundwater at the Site observed at horizontal depths between approximately 1.5 and 2 mbgs. It should be noted that given their apparent irregular and discontinuous presence, they may be found to occur at other depths and locations.

Artesian groundwater conditions were identified in S5551-21MW06 located near the shoreline on the eastern side of the Site. The monitoring well was completed at approximately 8 mbgs and could not be advanced further due to auger refusal. Although no sandy seams were observed while drilling, it may be likely that groundwater elevations over bedrock are confined by the low permeability glacial till. The area exhibits typical, near shore, groundwater discharge.

10.4 Discuss any Potential Risk to the Environment or Human Health, and Requirements for Further Investigation or Delineation

The identified presence of localized groundwater within the upper 2 m of the soil profile, and assuming a maximum depth of soil disturbance for the LBTF of 5 mbgs, it is likely that groundwater management will be required during proposed construction activities, however groundwater quality is not considered a risk to human health or the environment as it currently interacts with the ecology through this Region.

10.5 Soil and Groundwater Management Requirements (related to the Planned Design Activities and Future Construction and Operation of a LBTF)

Soil

Arsenic and Iron concentrations in soils exceed one or both reference guidelines, CCME CSQG's and the Province of Nova Scotia Tier 1 remediation guidelines. In both cases the guidelines incorporate both human health and ecological considerations. As such, and in accordance with the Contaminated Sites Instruction (CSI.004.001) for Soil Management, the disturbance removal and /or re-use of these soils must be undertaken in accordance with a prescribed Management Plan. This plan will apply site-specific standards and requirements based on the proposed re-use and potential risks. Based on the concentrations, extensive on-site re-use of these soils will be possible with the application of prescribed procedures and controls based on the application; examples of required procedures would include dust controls, appropriate Personal Protective Equipment, and engineering mitigations such as use of soils beneath asphalt, gravel, or suitable landscaping geotextiles. Given the finer grain sizes in soil, minimizing dust generation will be an important consideration in any Soil Management Plan.

The physical characteristics of the soil would not generally restrict on-site re-use. Grain size, drainage and erosion characteristics would need to be evaluated, and matched to the proposed re-use options (i.e., backfill, cover material, landscaping features etc.).

Groundwater

Arsenic and Iron in groundwater concentration exceeded the CCME Canadian Environmental Quality Guidelines (CEQGs) - Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, updated 2015). It is understood the proposed LBTF will be connected to municipal services. Non-potable assessment criteria would be relevant. Observations (adjacent wetlands, and coastal slopes and elevations) support a conclusion the site is a groundwater discharge zone. The groundwater is currently

interacting with surficial ecology and therefore any proposed de-watering would not likely present a change in existing conditions. Based on the metal concentrations in groundwater in relation to regional background concentrations, worker interactions with groundwaters would not be restricted (see Appendix D). The borehole investigations noted some siltation in the water columns suggesting construction activities involving de-watering may require siltation controls (e.g., sedimentation pond or equivalent).

10.6 Other Considerations Related to the Handling and Onsite and/or Offsite Disposal of the Site's Soil/Groundwater During Construction Activities

On-site use of soils will be possible following the provisions of a Soil Management Plan. Off-site use of soils would require provincial notification and application of the Nova Scotia Contaminated Site Regulations.

On-site use of groundwater would not be restricted (non-potable applications). Localized de-watering to receiving environmental would not be restricted. Groundwater was identified in several wells within the upper 2 m of the soil profile, assuming a maximum depth of soil disturbance for the proposed LBTF of 5 mbgs, it is likely that groundwater management will be a requirement during proposed construction activities. Artesian conditions were encountered in one monitoring well located near the shore. Further investigation would be required assess perched and artesian groundwater at the Site as these conditions may influence geotechnical design parameters.

10.7 Site/Land Use Restrictions to Support Planning Decisions in Relation to the Proposed Change in Land Use and Construction of the LBTF

The exact location of the former Emergency Explosives Demolition (EOD) area and small arms ranges remains undefined, as a result, the presence of potential related contaminants in soil or groundwater or other EOD related safety concerns will need to be highlighted in construction related planning information and Specifications.

The site is located at the end of a public road with residential development terminating at a public golf course and federal lands. Seasonal and construction period traffic planning should be considered. Seasonal load restrictions on this road classification would also be applicable.

The Final Concept Report – Irving Shipbuilding Inc. – Land Based Test Facility Report noted several potential land/use restrictions related to plant Species of Conservation Concern. This report (Stantec, June 3, 2020) is noted in the Reference Section 11.

10.8 Further Assessment

Soil and groundwater contaminants have been identified and delineated. Artesian groundwater flow conditions were encountered in one monitoring well. These conditions may influence geotechnical and hydrogeologic design parameters, depending upon the proposed design. Artesian conditions may also affect construction methodology related to de-watering and drainage. The nature and scope of additional investigations would be influenced by the facility design requirements.

11. References

Table 11-1: References

Ref. No.	Date	Source	Item #
1	1999 as updated	Canadian Council of Ministers of the Environment	Canadian Council of Ministers of the Environment (CCME), Canadian Soil Quality Guidelines (CSQG) Soil Quality Guidelines for the Protection of Environmental and Human Health, Commercial, Fine Grained, and non-potable water guidelines.
2	Revised 2008	Canadian Council of Ministers of the Environment	CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil - Tier 1 Levels for Surface Soil (Commercial, fine-grained soil criteria).
3	2012 (revised January 2015)	Atlantic Risk Based Corrective Action – Version 3	Atlantic Risk Based Corrective Action for Petroleum Impacted Sites in Atlantic Canada - Table 4a: Tier 1 Risk Based Screening Levels for Soil (Commercial, fine-grained, and Non-potable water criteria)
4	2012 (revised January 2015)	Atlantic Risk Based Corrective Action – Version 3	Atlantic Risk Based Corrective Action for Petroleum Impacted Sites in Atlantic Canada - Commercial Table 1a: Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact
5	2019	Health Canada	Health Canada Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS), Soil Screening Values (SSV), commercial land use.
6	1999 (revised in 2015)	Canadian Council of Ministers of the Environment	Canadian Environmental Quality Guidelines (CEQGs) - Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (1999, updated 2015)
7	November 2012	Government of Canada	Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, commercial land use, fine grain soil
8	2012 (revised January 2015)	Atlantic Risk Based Corrective Action – Version 3	Atlantic RBCA Tier I Risk Based Screening Levels for Groundwater.
9	April 2019	Health Canada	Health Canada Drinking Water Screening Values for other PFAS.
10	April 2019	Health Canada	Health Canada Guideline for Canadian drinking water quality - maximum acceptable concentrations (MACs) for PFOS and PFOA.
11	April 6, 2021	AGAT Laboratory	Certificate of Analysis – AGAT Work Order Number 21X723447
12	April 8, 2021	AGAT Laboratory	Certificate of Analysis – AGAT Work Order Number 21X723545

Ref. No.	Date	Source	Item #
13	April 30, 2021	AGAT Laboratory	Certificate of Analysis – AGAT Work Order Number 21X725158
14	May 13, 2021	AGAT Laboratory	Certificate of Analysis – AGAT Work Order Number 21X737616
15	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 2 Decontamination of Equipment
16	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 5 Groundwater Purging and Sampling.
17	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 8 Surface Soil Sampling.
18	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 10 Soil Jar Vapour Headspace Screening.
19	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 12 Chain of Custody.
20	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 13 Data Transfer and Recording.
21	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 15 – Monitoring Well Development.
22	May 2018	MARLANT Safety and Environment	MARLANT Standard Operating Procedure No. 16 – PFAS Sampling Methodology and Best Practices.
23	June 1996	MGI Limited	Historical Environmental Review, 12 Wing Shearwater, Nova Scotia
24	April 1997	MGI Limited	Environmental Investigation, Former DND Coastal Defence Installation, Hartlen Point, NS, Project SW069864.
25	March 8, 2002	Neill and Gunter (Nova Scotia) Limited	FS/PQRA At 4 Sites Former DND Coastal Installation at Hartlen Point, Dartmouth, Nova Scotia, NGNS Job No. 16844, Rev. 1.
26	March 2011	Dillon Consulting Limited (Dillon)	Review of Environment Canada's Background Soil Database (2004-2009) Version No.1, Prepared for Public Works and Government Services Canada
27	August 2015	Nova Scotia Environment (NSE)	Nova Scotia Groundwater Observation Well Network
28	March, 2018	WSP	Natural Resource Management Plan, Hartlen Point, Maritime Forces Atlantic (MARLANT)
29	2020	OCL	Additional Site Investigations at 4 Sites: Hartlen Point and Osborne Head, CFB Halifax, Nova Scotia, Project No. HX00022
30	June 3, 2020	Stantec	Final Concept Report, Irving Shipbuilding Inc. – Land Based Test Capability.
31	July 9, 2020	Stantec	Geotechnical Letter Report – Proposed Development, Hartlen Point, Shearwater, Nova Scotia
32	2020	Unauthored	Summary of Environmental Considerations, Proposed Canadian Surface Combatant Land Based Test Facility, Hartlen Point, Eastern Passage, Nova

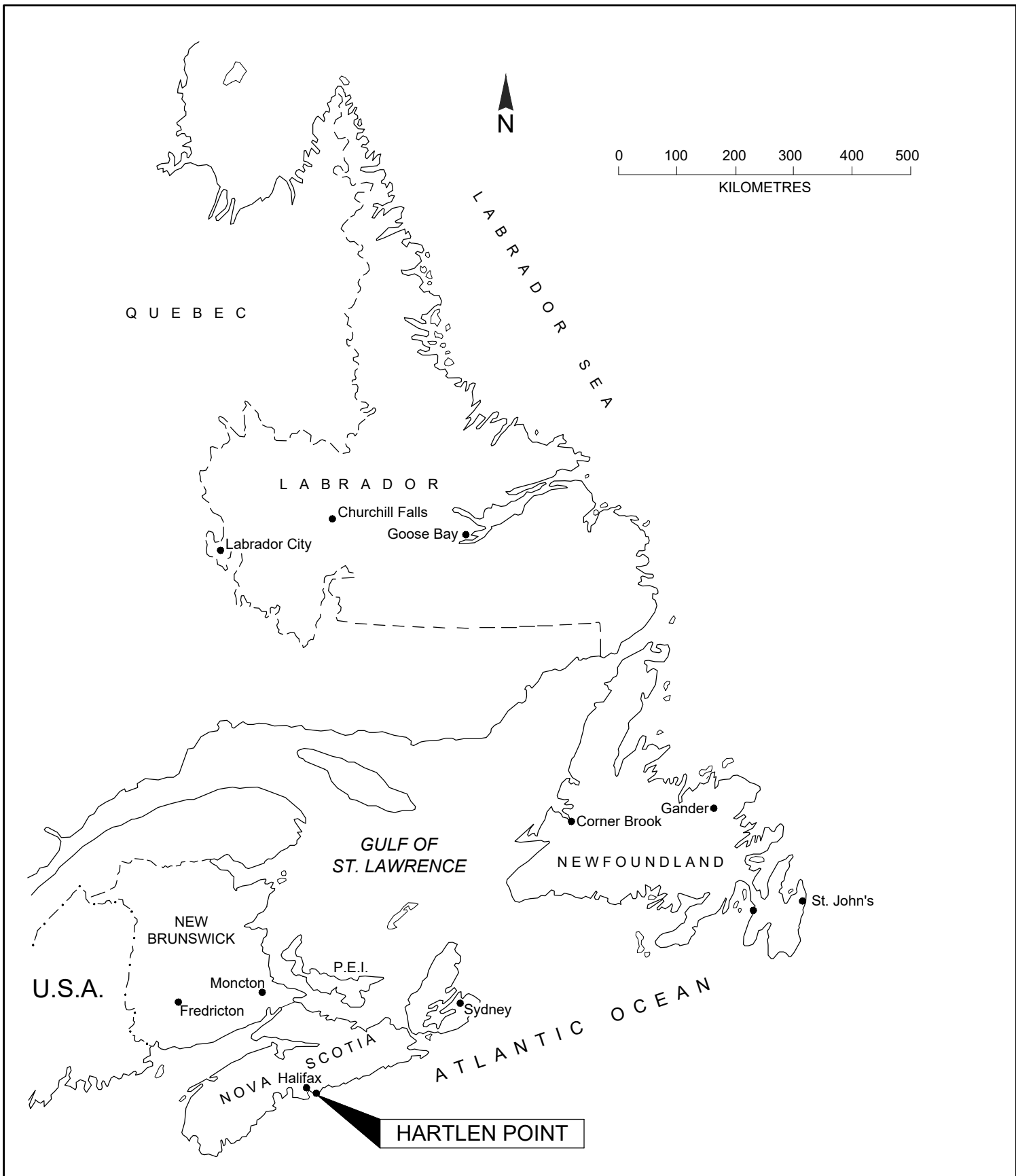
Ref. No.	Date	Source	Item #
			Scotia
29	July 9, 2020	Stantec	Geotechnical Letter Report – Proposed Development, Hartlen Point, Shearwater, Nova Scotia
30	2020	Unauthored	Summary of Environmental Considerations, Proposed Canadian Surface Combatant Land Based Test Facility, Hartlen Point, Eastern Passage, Nova Scotia

Appendix A

Figures



REFERENCE FILES: REFERENCE-FILE-LINE-1



CLIENT: DEFENCE CONSTRUCTION CANADA		<div></div> <div>SNC • LAVALIN</div> <div>1090 TOPSAIL RD., MOUNT PEARL, NL, A1N 5E7</div> <div>TEL: (709) 368-0118 FAX: (709) 368-3541</div>					
PROJECT: PROPOSED LAND BASED TEST FACILITY (LBTF) HARTLEN POINT, NS			C04	ISSUED FOR REPORT	S.V.	A.P.	22/04/08
DRAWING TITLE: FIGURE 1 LOCATION PLAN			REV.	REVISIONS	BY	APP.	DATE
			DRAWN:	J.B.	APPROVED:	DATE:	21/05/21
			CLIENT PROJ. NO.		SNC PROJ. NO. 680449		
			DWG. TYPE PD	DRAWING NO. EN101		REV. C04	



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C04	ISSUED FOR REPORT	S.V.	A.P.	22/04/08
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REV.	REVISIONS	CHECKED BY	APP BY	DATE
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27 BECLIN RD., MOUNT PEARL, NL, A1N 5G4

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CLIENT
**DEFENCE
CONSTRUCTION
CANADA**

PROJECT
**PROPOSED LAND BASED TEST
FACILITY (LBTF)
HARTLEN POINT, NS**

TITLE
**FIGURE 2
SITE PLAN**

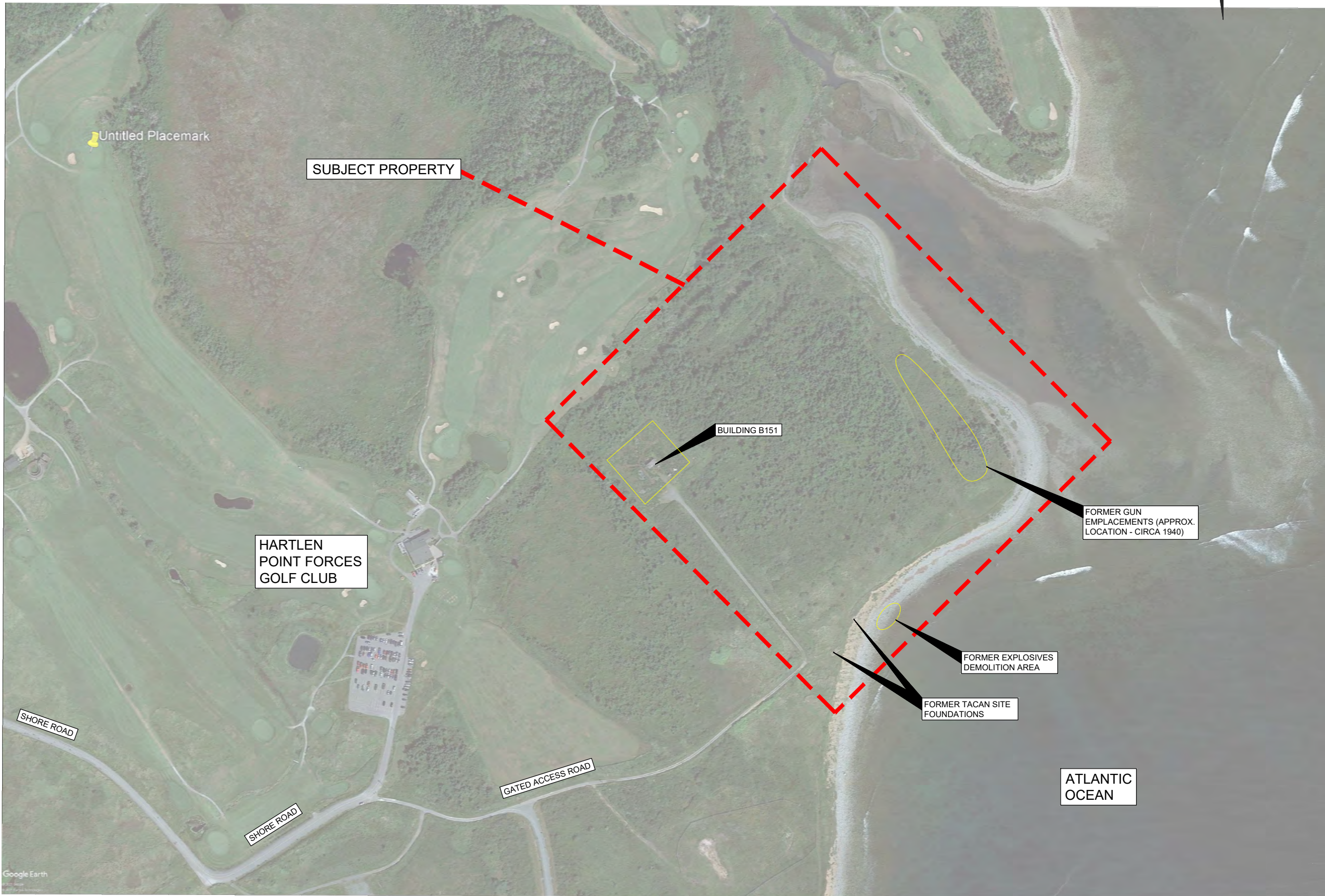
DESIGNED BY	K.T.	CHECKED BY		DATE	21/05/21
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DRAWN BY	K.Y. & J.B.	APPROVED BY		DATE	21/05/21
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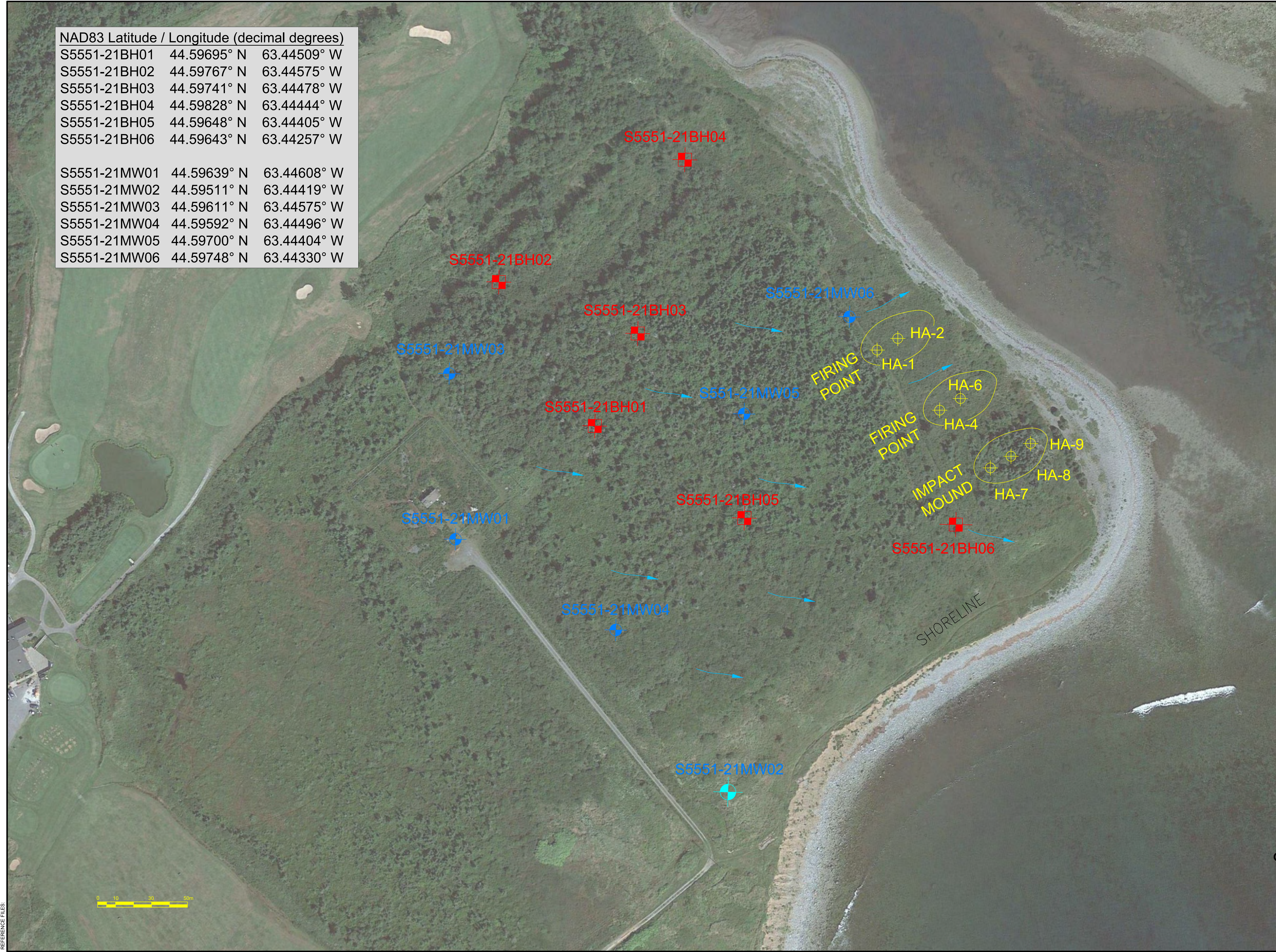
SCALE	SNC LAVALIN PROJ. No.	680499
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AS SHOWN	CLIENT PROJ. No.	IE036102-76648
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DWG. TYPE	DRAWING No.	REV
PD	EN102	C04



REFERENCE FILES:



NAD83 Latitude / Longitude (decimal degrees)

S5551-21BH01	44.59695° N	63.44509° W
S5551-21BH02	44.59767° N	63.44575° W
S5551-21BH03	44.59741° N	63.44478° W
S5551-21BH04	44.59828° N	63.44444° W
S5551-21BH05	44.59648° N	63.44405° W
S5551-21BH06	44.59643° N	63.44257° W

S5551-21MW01	44.59639° N	63.44608° W
S5551-21MW02	44.59511° N	63.44419° W
S5551-21MW03	44.59611° N	63.44575° W
S5551-21MW04	44.59592° N	63.44496° W
S5551-21MW05	44.59700° N	63.44404° W
S5551-21MW06	44.59748° N	63.44330° W

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LEGEND

S5551-21MW04



S5551-21BH03



HA-3



NOTE:
ASSUMED LOCATIONS BASED ON
INFORMATION PROVIDED IN MARLENT SE
REPORT 466 (NEILL AND GUNTER (NOVA
SCOTIA) LIMITED, 2002)

C04	ISSUED FOR REPORT	S.V.	A.P.	22/04/08
REV.	REVISIONS	CHECKED BY	APP BY	DATE

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CLIENT
DEFENCE CONSTRUCTION CANADA

PROJECT
PROPOSED LAND BASED TEST FACILITY (LBTF) HARTLEN POINT, NS

TITLE
FIGURE 3 SAMPLING LOCATIONS AND GROUNDWATER FLOW DIRECTION

DESIGNED BY	K.T.	CHECKED BY	DATE	21/05/21
DRAWN BY	K.Y. & J.B.	APPROVED BY	DATE	21/05/21
SCALE	AS SHOWN	SNC LAVALIN PROJ. No.	680449	
		CLIENT PROJ. No.	IE036102-76648	
DWG. TYPE	PD	DRAWING No.	EN103	REV. C04

REFERENCE FILES:

Original Sheet Size: ANSI D (22"x34")



GROUNDWATER EXCEEDANCES		
LOCATION	ARSENIC (µg/L)	IRON (µg/L)
S5551-21MW05	14	< Guideline
S5551-21MW06	46	671
S5551-21MW07 (dup of 21MW06)	47	642


SOIL EXCEEDANCES	
LOCATION	ARSENIC (mg/kg)
S5551-21BH05-07	14
S5551-21BH05-08	14
S5551-21BH06-08	14
S5551-21BH06-09	15

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LEGEND


S5551-21MW04


 MONITORING WELL LOCATION

S5551-21BH03

 BOREHOLE LOCATION

HA-3


 HAND AUGER LOCATION

 GROUNDWATER FLOW DIRECTION

NOTE:
ASSUMED LOCATIONS BASED ON
INFORMATION PROVIDED IN MARLENT SE
REPORT 466 (NEILL AND GUNTER (NOVA
SCOTIA) LIMITED, 2002)


C04	ISSUED FOR REPORT	S.V.	A.P.	22/04/08
REV.	REVISIONS	CHECKED BY	APP BY	DATE

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CLIENT

**DEFENCE
CONSTRUCTION
CANADA**

PROJECT

**PROPOSED LAND BASED TEST
FACILITY (LBTF)
HARTLEN POINT, NS**

TITLE

**FIGURE 4
EXTENT OF SOIL AND
GROUNDWATER IMPACTS**

DESIGNED BY	K.T.	CHECKED BY	DATE	21/05/21
DRAWN BY	K.Y. & J.B.	APPROVED BY	DATE	21/05/21
SCALE	SNC LAVALIN PROJ. No. 680449			
	AS SHOWN CLIENT PROJ. No. IE036102-76648			
DWG. TYPE	DRAWING No. EN104			REV. C04

Appendix B

Analytical Results



Table 1: Available Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	Site Specific	S5551-21BH01			S5551-21BH02		S5551-21BH03	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21BH01-01	S5551-21BH01-09	S5551-21BH01-08	S5551-21BH02-01	S5551-21BH02-08	S5551-21BH03-01	S5551-21BH03-07
Sample Date (yyyy mm dd)						03/22/2021	Duplicate	03/22/2021	03/17/2021	03/17/2021	03/16/2021	03/16/2021
Depth Interval (m)						0.0 - 0.6	0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	3.7 - 4.3
Parameter	Unit	RDL				Analytical Results						Analytical Results
Aluminum	mg/kg	10	n/a	15,400	n/a	10,800	10,900	14,700	14,500	14,100	6,300	14,900
Antimony	mg/kg	1	40	7.5	420	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg	1	12	31	36	8	8	10	10	8	5	8
Barium	mg/kg	5	2,000	10,000	n/a	12	13	77	50	75	11	76
Beryllium	mg/kg	2	8	110	n/a	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg	2	n/a	4300	n/a	<2	<2	5	5	7	<2	7
Cadmium	mg/kg	0.3	22	49	5,400	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg	2	87	630	5,900	14	15	22	21	22	8	20
Cobalt	mg/kg	1	300	22	n/a	5	5	12	12	12	4	12
Copper	mg/kg	2	91	4000	620,000	6	6	19	22	20	4	19
Iron	mg/kg	50	n/a	11,000	n/a	23,100	23,100	23,100	23,100	23,100	10,600	23,100
Lead	mg/kg	0.5	260	260	8,700	8.8	8.0	9.0	7.6	7.9	5.1	7.2
Lithium	mg/kg	5	n/a	n/a	n/a	15	19	30	30	37	13	36
Manganese	mg/kg	2	n/a	360	n/a	188	176	711	555	707	183	620
Molybdenum	mg/kg	2	40	110	37,000	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg	2	89	310	32,000	10	12	28	23	26	7	28
Selenium	mg/kg	1	2.9	125	n/a	<1	<1	<1	<1	<1	<1	<1
Silver	mg/kg	0.5	40	77	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg	5	n/a	9,400	n/a	<5	<5	20	8	24	<5	23
Thallium	mg/kg	0.1	1	1	100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg	2	300	9,400	420,000	3	3	3	2	3	<2	3
Uranium	mg/kg	0.1	33	33	n/a	0.3	0.3	0.4	0.5	0.5	0.3	0.5
Vanadium	mg/kg	2	130	39	59000	28.0	24.0	24.0	24.0	23.0	16	23.0
Zinc	mg/kg	5	410	16,000	>999999	24	26	60	54	58	18	66

Notes:

Analysis performed at AGAT Halifax

All terms defined within the body of SNC-Lavalin's report.

Results are based on the dry weight of the sample

< Denotes concentration less than indicated detection limit.

n/a Denotes no applicable standard/guideline.

RDL - Reported Detection Limit

>999,999 indicates that the calculated SSC was greater than 1,000,000 ppm, indicating that adverse health effects are not anticipated due to chronic exposure to soil under the defined exposure scenarios

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)

² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.

Table 1: Available Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	Site Specific	S5551-21BH04				S5551-21BH05		
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC2 ³	S5551-21BH04-01	S5551-21BH04-09	S5551-21BH04-05	S5551-21BH04-08	S5551-21BH05-01	S5551-21BH05-07	S5551-21BH05-08
Sample Date (yyyy mm dd)						03/22/2021	Duplicate	03/22/2021	Duplicate	03/16/2021	03/16/2021	03/16/2021
Depth Interval (m)						0.0 - 0.6	0.0 - 0.6	2.4 - 3.1	2.4 - 3.1	0.0 - 0.6	3.7 - 4.3	4.3 - 4.9
Parameter	Unit	RDL								Analytical Results		
Aluminum	mg/kg	10	n/a	15,400	n/a	14,500	13,700	13,600	14,900	14,000	14,900	12,900
Antimony	mg/kg	1	40	7.5	420	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg	1	12	31	36	9	7	9	9	10	14	14
Barium	mg/kg	5	2,000	10,000	n/a	25	23	80	66	18	92	80
Beryllium	mg/kg	2	8	110	n/a	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg	2	n/a	4300	n/a	3	2	6	7	3	4	4
Cadmium	mg/kg	0.3	22	49	5,400	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg	2	87	630	5,900	19	19	20	22	19	18	18
Cobalt	mg/kg	1	300	22	n/a	12	12	12	12	7	11	10
Copper	mg/kg	2	91	4000	620,000	17	15	19	26	8	18	17
Iron	mg/kg	50	n/a	11,000	n/a	22,900	21,800	21,200	24,300	23,100	23,100	23,100
Lead	mg/kg	0.5	260	260	8,700	8.2	7.9	7.4	186	8.9	7.7	7.2
Lithium	mg/kg	5	n/a	n/a	n/a	26	25	32	31	31	36	32
Manganese	mg/kg	2	n/a	360	n/a	599	594	644	714	243	615	522
Molybdenum	mg/kg	2	40	110	37,000	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg	2	89	310	32,000	21	20	27	28	16	22	20
Selenium	mg/kg	1	2.9	125	n/a	<1	<1	<1	<1	<1	<1	<1
Silver	mg/kg	0.5	40	77	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg	5	n/a	9,400	n/a	5	5	20	22	<5	16	15
Thallium	mg/kg	0.1	1	1	100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg	2	300	9,400	420,000	3	3	3	3	3	3	3
Uranium	mg/kg	0.1	33	33	n/a	0.4	0.4	0.4	0.4	0.4	1.2	0.8
Vanadium	mg/kg	2	130	39	59000	21.0	20.0	22.0	24.0	26.0	19.0	19.0
Zinc	mg/kg	5	410	16,000	>999999	49	45	61	58	41	53	50

Notes:

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>999,999 indicates that the calculated SSC was greater than 1,000,000 ppm, indicating that adverse health effects are not anticipated due to chronic exposure to soil under the defined exposure scenarios

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

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² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.

Table 1: Available Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	Site Specific	S5551-21BH06			S5551-21MW01		S5551-21MW02	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC2 ³	S5551-21BH06-01	S5551-21BH06-08	S5551-21BH06-09	S5551-21MW01-21SS-01	S5551-21MW01-21SS-08	S5551-21MW02-21SS-01	S5551-21MW02-21SS-08
Sample Date (yyyy mm dd)						03/18/2021	03/17/2021	Duplicate	03/17/2021	03/17/2021	03/22/2021	03/22/2021
Depth Interval (m)						0.0 - 0.6	4.3 - 4.9	4.3 - 4.9	0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	4.3 - 4.9
Parameter	Unit	RDL				Analytical Results						
Aluminum	mg/kg	10	n/a	15,400	n/a	10,800	11,700	13,600	12,700	13,900	9,990	14,300
Antimony	mg/kg	1	40	7.5	420	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg	1	12	31	36	7	14	15	6	7	8	7
Barium	mg/kg	5	2,000	10,000	n/a	50	65	74	20	80	24	71
Beryllium	mg/kg	2	8	110	n/a	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg	2	n/a	4300	n/a	4	4	4	3	7	3	5
Cadmium	mg/kg	0.3	22	49	5,400	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg	2	87	630	5,900	16	20	25	16	19	16	22
Cobalt	mg/kg	1	300	22	n/a	7	11	11	6	12	5	15
Copper	mg/kg	2	91	4000	620,000	13	15	18	11	17	9	20
Iron	mg/kg	50	n/a	11,000	n/a	23,100	23,100	23,100	17,500	21,900	15,300	23,500
Lead	mg/kg	0.5	260	260	8,700	5.3	8.4	9.6	6.2	7.5	11.0	6.9
Lithium	mg/kg	5	n/a	n/a	n/a	25	30	35	27	33	16	31
Manganese	mg/kg	2	n/a	360	n/a	410	524	573	240	611	215	630
Molybdenum	mg/kg	2	40	110	37,000	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg	2	89	310	32,000	19	19	22	13	24	13	31
Selenium	mg/kg	1	2.9	125	n/a	<1	<1	<1	<1	<1	<1	<1
Silver	mg/kg	0.5	40	77	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg	5	n/a	9,400	n/a	15	13	17	<5	22	14	21
Thallium	mg/kg	0.1	1	1	100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg	2	300	9,400	420,000	3	3	3	3	3	3	3
Uranium	mg/kg	0.1	33	33	n/a	0.5	0.6	0.7	0.4	0.4	0.4	0.6
Vanadium	mg/kg	2	130	39	59000	18.0	16.0	20.0	18	21.0	19.0	24.0
Zinc	mg/kg	5	410	16,000	>999999	39	45	51	33	55	31	66

Notes:

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SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

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² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.

Table 1: Available Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	Site Specific	S5551-21MW03		S5551-21MW05		S5551-21MW04	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC2 ³	S5551-21MW03-21SS-01	S5551-21MW03-21SS-06	S5551-21MW05-21SS-01	S5551-21MW05-21SS-07	S5551-21MW04-21SS-01	S5551-21MW04-21SS-08
Sample Date (yyyy mm dd)						03/15/2021	03/15/2021	03/15/2021	03/15/2021	03/17/2021	03/17/2021
Depth Interval (m)						0.0 - 0.6	3.1 - 3.7	0.0 - 0.6	3.7 - 4.3	0.0 - 0.6	4.3 - 4.9
Parameter	Unit	RDL	Analytical Results						Analytical Results		
Aluminum	mg/kg	10	n/a	15,400	n/a	10,700	14,800	11,500	12,700	12,600	15,300
Antimony	mg/kg	1	40	7.5	420	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg	1	12	31	36	8	7	8	7	9	9
Barium	mg/kg	5	2,000	10,000	n/a	11	70	11	71	23	79
Beryllium	mg/kg	2	8	110	n/a	<2	<2	<2	<2	<2	<2
Boron	mg/kg	2	n/a	4300	n/a	4	7	3	6	3	7
Cadmium	mg/kg	0.3	22	49	5,400	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg	2	87	630	5,900	12	20	14	19	15	26
Cobalt	mg/kg	1	300	22	n/a	4	12	5	11	12	12
Copper	mg/kg	2	91	4000	620,000	6	18	5	18	14	42
Iron	mg/kg	50	n/a	11,000	n/a	20,600	23,300	22,900	20,700	19,600	25,300
Lead	mg/kg	0.5	260	260	8,700	8.6	14.7	6.1	6.4	8.9	7.4
Lithium	mg/kg	5	n/a	n/a	n/a	19	36	24	31	24	37
Manganese	mg/kg	2	n/a	360	n/a	150	657	210	627	668	760
Molybdenum	mg/kg	2	40	110	37,000	<2	<2	<2	<2	<2	<2
Nickel	mg/kg	2	89	310	32,000	10	24	19	23	15	35
Selenium	mg/kg	1	2.9	125	n/a	<1	<1	<1	<1	<1	<1
Silver	mg/kg	0.5	40	77	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg	5	n/a	9,400	n/a	<5	21	<5	20	<5	20
Thallium	mg/kg	0.1	1	1	100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg	2	300	9,400	420,000	2	4	3	3	2	3
Uranium	mg/kg	0.1	33	33	n/a	0.3	0.4	0.3	0.4	0.3	0.4
Vanadium	mg/kg	2	130	39	59000	29.0	21.0	24.0	20.0	17	23
Zinc	mg/kg	5	410	16,000	>999999	23	57	28	55	35	60

Notes:

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SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

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² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.

Table 1: Available Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	Site Specific	S5551-21MW06		
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21MW06-21SS-01	S5551-21MW06-21SS-09	S5551-21MW06-21SS-08
Sample Date (yyyy mm dd)						03/22/2021	Duplicate	03/22/2021
Depth Interval (m)						0.0 - 0.6	0.0 - 0.6	4.3 - 4.9
Parameter	Unit	RDL						
Aluminum	mg/kg	10	n/a	15,400	n/a	13,400	12,400	14,900
Antimony	mg/kg	1	40	7.5	420	<1	<1	<1
Arsenic	mg/kg	1	12	31	36	8	9	9
Barium	mg/kg	5	2,000	10,000	n/a	19	18	73
Beryllium	mg/kg	2	8	110	n/a	<2	<2	<2
Boron	mg/kg	2	n/a	4300	n/a	3	3	6
Cadmium	mg/kg	0.3	22	49	5,400	<0.3	<0.3	<0.3
Chromium	mg/kg	2	87	630	5,900	19	18	57
Cobalt	mg/kg	1	300	22	n/a	5	5	13
Copper	mg/kg	2	91	4000	620,000	7	7	24
Iron	mg/kg	50	n/a	11,000	n/a	27,800	23,600	23,600
Lead	mg/kg	0.5	260	260	8,700	7.3	7.7	7.3
Lithium	mg/kg	5	n/a	n/a	n/a	22	19	32
Manganese	mg/kg	2	n/a	360	n/a	168	170	674
Molybdenum	mg/kg	2	40	110	37,000	<2	<2	6
Nickel	mg/kg	2	89	310	32,000	15	13	38
Selenium	mg/kg	1	2.9	125	n/a	<1	<1	<1
Silver	mg/kg	0.5	40	77	n/a	<0.5	<0.5	<0.5
Strontium	mg/kg	5	n/a	9,400	n/a	<5	<5	26
Thallium	mg/kg	0.1	1	1	100	<0.1	<0.1	<0.1
Tin	mg/kg	2	300	9,400	420,000	3	3	3
Uranium	mg/kg	0.1	33	33	n/a	0.3	0.3	0.5
Vanadium	mg/kg	2	130	39	59000	29	28	23
Zinc	mg/kg	5	410	16,000	>999999	32	29	62

Notes:

Analysis performed at AGAT Halifax

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² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.

Table 2: Petroleum Hydrocarbons in Soil

Sample Location			Federal Guidelines	Provincial Standards		S5551-21BH01	S5551-21BH02	S5551-21BH03	S5551-21BH04		S5551-21BH05	S5551-21BH06
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	RBCA Tier I NP FG ³	S5551-21BH01-04	S5551-21BH02-05	S5551-21BH03-03	S5551-21BH04-05	S5551-21BH04-08	S5551-21BH05-07	S5551-21BH06-06
Sample Date (mm/dd/yyyy)						03/22/2021	03/17/2021	03/16/2021	03/22/2021	Duplicate	03/16/2021	03/18/2021
Depth Interval (m)						1.8 - 2.4	2.4 - 3.1	1.2 - 1.8	2.4 - 3.1	2.4 - 3.1	3.7 - 4.3	3.1 - 3.7
Parameter	Unit	RDL				Analytical Results						
Volatiles												
Benzene	µg/g	0.02	0.0068	6.9	33.0	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.08	0.08	1,400	10,000	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	0.05	0.018	3,100	10,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total) ⁴	µg/g	0.05	2.4	1,800	10,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons (PHC) ⁷												
C6 - C10 (F1) ⁶	µg/g	10	320	n/a	n/a	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX) ⁴	µg/g	10	n/a	n/a	n/a	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 (F2)	µg/g	10	260	n/a	n/a	<10	<10	<10	<10	<10	<10	<10
>C16 - C34 (F3)	µg/g	50	2,500	n/a	n/a	<50	<50	<50	<50	<50	<50	<50
>C34 - C50 (F4)	µg/g	50	6,600	n/a	n/a	<50	<50	<50	<50	<50	<50	<50
Modified TPH ⁵	µg/g	50	n/a	n/a	10,000	<50	<50	<50	<50	<50	<50	<50

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RDL - Reported Detection Limit

TPH Denotes total petroleum parameters.

UNDERLINE	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
OUTLINE	Concentration greater than the RBCA Tier I

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)

² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

³ Provincial Atlantic Risk Based Corrective Action for Petroleum Impacted Sites In Atlantic Canada (RBCA) (Version 3, updated September 2015) - Table 4a Tier 1 Risk based Screening Levels for Soil (Commercial, fine-grained and Non-potable water criteria)

⁴ Xylenes (Total) and C6-C10 (F1 minus BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

⁵ Sum of C6-C10 (F1 minus BTEX), >C10-C16 (F2), and >C16-C34 (F3).

⁶ The C6-C10 fraction is calculated using toluene response factor.

⁷ The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Table 2: Petroleum Hydrocarbons in Soil

Sample Location			Federal Guidelines	Provincial Standards		S5551-21MW01	S5551-21MW03	S5551-21MW02	S5551-21MW04	S5551-21MW05	S5551-21MW06
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	RBCA Tier I EQS NP FG ³	S5551-21MW01-21SS-02	S5551-21MW03-21SS-06	S5551-21MW02-21SS-03	S5551-21MW04-21SS-05	S5551-21MW05-21SS-04	S5551-21MW06-21SS-03
Sample Date (mm/dd/yyyy)						03/17/2021	03/15/2021	03/22/2021	03/17/2021	03/15/2021	03/22/2021
Depth Interval (m)						0.6 - 1.2	3.1 - 3.7	1.2 - 1.8	2.4 - 3.1	1.8 - 2.4	1.2 - 1.8
Parameter	Unit	RDL				Analytical Results					
Volatiles											
Benzene	µg/g	0.02	0.0068	6.9	33.0	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.08	0.08	1,400	10,000	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	0.05	0.018	3,100	10,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total) ⁴	µg/g	0.05	2.4	1,800	10,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons (PHC) ⁷											
C6 - C10 (F1) ⁶	µg/g	10	320	n/a	n/a	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX) ⁴	µg/g	10	n/a	n/a	n/a	<10	<10	<10	<10	<10	<10
>C10 - C16 (F2)	µg/g	10	260	n/a	n/a	<10	<10	<10	<10	<10	<10
>C16 - C34 (F3)	µg/g	50	2,500	n/a	n/a	<50	<50	<50	<50	<50	<50
>C34 - C50 (F4)	µg/g	50	6,600	n/a	n/a	<50	<50	<50	<50	<50	<50
Modified TPH ⁵	µg/g	50	n/a	n/a	10,000	<50	<50	<50	<50	<50	<50

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⁴ Xylenes (Total) and C6-C10 (F1 minus BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

⁵ Sum of C6-C10 (F1 minus BTEX), >C10-C16 (F2), and >C16-C34 (F3).

⁶ The C6-C10 fraction is calculated using toluene response factor.

⁷ The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Table 3: Polycyclic Aromatic Hydrocarbons in Soil

Sample Location			Federal Guideline	Provincial Standards	Site Specific	S5551-21BH01		S5551-21BH02		S5551-21BH03	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21BH01-01	S5551-21BH01-09	S5551-21BH02-01	S5551-21BH02-08	S5551-21BH03-01	S5551-21BH03-07
Sample Date (mm/dd/yyyy)						03/22/2021	Duplicate	03/17/2021	03/17/2021	03/16/2021	03/16/2021
Depth Interval (m)						0.0 - 0.6	0.0 - 0.6	0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	3.7 - 4.3
Parameter	Unit	RDL	Analytical Results								
Benzo(a)Pyrene Total Potency Equivalents	mg/kg	-	16	5.3	16	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141
Carcinogenic PAH	mg/kg	-	IACR <1	n/a	n/a	0.347	0.347	0.347	0.347	0.347	0.347
Benzo(a)anthracene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01	72	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene ⁴	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	10	n/a	n/a	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Indeno(1,2,3)pyrene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	mg/kg	0.05	n/a	72	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg	0.01	n/a	72	2,100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	n/a	8,000	32,000	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.004	n/a	66	32,000	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.03	32	37,000	160,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(e)pyrene	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	mg/kg	0.05	180	5,300	21,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.01	n/a	4,100	21,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01	0.013	370	11,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05	n/a	n/a	16,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg	0.03	0.046	n/a	21,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg	0.05	100	3,200	16,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.
⁴ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 3: Polycyclic Aromatic Hydrocarbons in Soil

Sample Location			Federal Guideline	Provincial Standards	Site Specific	S5551-21BH04		S5551-21BH05		
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21BH04-01	S5551-21BH04-09	S5551-21BH05-01	S5551-21BH05-07	S5551-21BH05-08
Sample Date (mm/dd/yyyy)						03/22/2021	Duplicate	03/16/2021	03/16/2021	03/16/2021
Depth Interval (m)						0.0 - 0.6	0.0 - 0.6	0.0 - 0.6	3.7 - 4.3	4.3 - 4.9
Parameter	Unit	RDL	Analytical Results							
Benzo(a)Pyrene Total Potency Equivalents	mg/kg	-	16	5.3	16	0.0141	0.0141	0.0141	0.0141	0.0141
Carcinogenic PAH	mg/kg	-	IACR <1	n/a	n/a	0.347	0.347	0.347	0.347	0.347
Benzo(a)anthracene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01	72	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene ⁴	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	10	n/a	n/a	<0.006	<0.006	<0.006	<0.006	<0.006
Indeno(1,2,3)pyrene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	mg/kg	0.05	n/a	72	n/a	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg	0.01	n/a	72	2,100	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	n/a	8,000	32,000	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.004	n/a	66	32,000	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.03	32	37,000	160,000	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(e)pyrene	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	mg/kg	0.05	180	5,300	21,000	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.01	n/a	4,100	21,000	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01	0.013	370	11,000	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05	n/a	n/a	16,000	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg	0.03	0.046	n/a	21,000	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg	0.05	100	3,200	16,000	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.
⁴ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 3: Polycyclic Aromatic Hydrocarbons in Soil

Sample Location			Federal Guideline	Provincial Standards	Site Specific	S5551-21BH06			S5551-21MW01		S5551-21MW02
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21BH06-01	S5551-21BH06-08	S5551-21BH06-09	S5551-21MW01-21SS-01	S5551-21MW01-21SS-08	S5551-21MW02-21SS-01
Sample Date (mm/dd/yyyy)						03/18/2021	03/17/2021	Duplicate	03/17/2021	03/22/2021	
Depth Interval (m)						0.0 - 0.6	4.3 - 4.9	4.3 - 4.9	0.0 - 0.6	4.3 - 4.9	
Parameter	Unit	RDL				Analytical Results					Analytical Results
Benzo(a)Pyrene Total Potency Equivalents	mg/kg	-	16	5.3	16	0.0141	0.0141	0.0141	0.0141	0.0141	0.014
Carcinogenic PAH	mg/kg	-	IACR <1	n/a	n/a	0.347	0.347	0.347	0.347	0.347	0.347
Benzo(a)anthracene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01	72	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene ⁴	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	10	n/a	n/a	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Indeno(1,2,3)pyrene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	mg/kg	0.05	n/a	72	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg	0.01	n/a	72	2,100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	n/a	8,000	32,000	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.004	n/a	66	32,000	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.03	32	37,000	160,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(e)pyrene	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	mg/kg	0.05	180	5,300	21,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.01	n/a	4,100	21,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01	0.013	370	11,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05	n/a	n/a	16,000	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg	0.03	0.046	n/a	21,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg	0.05	100	3,200	16,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
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n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.
⁴ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 3: Polycyclic Aromatic Hydrocarbons in Soil

Sample Location			Federal Guideline	Provincial Standards	Site Specific	S5551-21MW03		S5551-21MW04		S5551-21MW05	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	MARLANT SSC ³	S5551-21MW03-21SS-01	S5551-21MW03-21SS-06	S5551-21MW04-21SS-01	S5551-21MW04-21SS-08	S5551-21MW05-21SS-01	S5551-21MW05-21SS-07
Sample Date (mm/dd/yyyy)						03/15/2021	03/15/2021	03/17/2021	03/17/2021	03/15/2021	03/15/2021
Depth Interval (m)						0.0 - 0.6	3.1 - 3.7	0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	3.7 - 4.3
Parameter	Unit	RDL									
Benzo(a)Pyrene Total Potency Equivalents	mg/kg	-	16	5.3	16	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141
Carcinogenic PAH	mg/kg	-	IACR <1	n/a	n/a	0.347	0.347	0.347	0.347	0.347	0.347
Benzo(a)anthracene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01	72	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene ⁴	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	10	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	10	n/a	n/a	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Indeno(1,2,3)pyrene	mg/kg	0.01	10	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	mg/kg	0.05	n/a	72	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg	0.01	n/a	72	2,100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	n/a	8,000	32,000	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.004	n/a	66	32,000	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.03	32	37,000	160,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(e)pyrene	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	mg/kg	0.05	180	5,300	21,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.01	n/a	4,100	21,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01	0.013	370	11,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05	n/a	n/a	16,000	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg	0.03	0.046	n/a	21,000	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg	0.05	100	3,200	16,000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
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n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.
⁴ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 3: Polycyclic Aromatic Hydrocarbons in Soil

Sample Location			Federal Guideline	Provincial Standards	Site Specific	S5551-21MW06
Sample ID						S5551-21MW06-21SS-01
Sample Date (mm/dd/yyyy)						03/22/2021
Depth Interval (m)						0.0 - 0.6
Analytical Results						
Benzo(a)Pyrene Total Potency Equivalents	mg/kg	-	16	5.3	16	0.0141
Carcinogenic PAH	mg/kg	-	IACR <1	n/a	n/a	0.347
Benzo(a)anthracene	mg/kg	0.01	10	n/a	n/a	<0.01
Benzo(a)pyrene	mg/kg	0.01	72	n/a	n/a	<0.01
Benzo(b)fluoranthene ⁴	mg/kg	0.05	10	n/a	n/a	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	10	n/a	n/a	<0.05
Benzo(ghi)perylene	mg/kg	0.01	n/a	n/a	n/a	<0.01
Chrysene	mg/kg	0.01	n/a	n/a	n/a	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	10	n/a	n/a	<0.006
Indeno(1,2,3)pyrene	mg/kg	0.01	10	n/a	n/a	<0.01
1-Methylnaphthalene	mg/kg	0.05	n/a	72	n/a	<0.05
2-Methylnaphthalene	mg/kg	0.01	n/a	72	2,100	<0.01
Acenaphthene	mg/kg	0.00671	n/a	8,000	32,000	<0.00671
Acenaphthylene	mg/kg	0.004	n/a	66	32,000	<0.004
Acridine	mg/kg	0.05	n/a	n/a	n/a	<0.05
Anthracene	mg/kg	0.03	32	37,000	160,000	<0.03
Benzo(e)pyrene	mg/kg	0.05	n/a	n/a	n/a	<0.05
Fluoranthene	mg/kg	0.05	180	5,300	21,000	<0.05
Fluorene	mg/kg	0.01	n/a	4,100	21,000	<0.01
Naphthalene	mg/kg	0.01	0.013	370	11,000	<0.01
Perylene	mg/kg	0.05	n/a	n/a	16,000	<0.05
Phenanthrene	mg/kg	0.03	0.046	n/a	21,000	<0.03
Pyrene	mg/kg	0.05	100	3,200	16,000	<0.05
Quinoline	mg/kg	0.05	n/a	n/a	n/a	<0.05

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
RED	Concentration greater than MARLANT SSCs

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ MARLANT Surface Soil Screening Criteria (MARLANT SSC), March 2015.
⁴ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 4: Volatile Organic Compounds in Soil

Sample Location			Federal Guideline	Provincial Standards	S5551-21BH01	S5551-21BH02	S5551-21BH03	S5551-21BH04		S5551-21BH05	S5551-21BH06	S5551-21MW01
Sample ID			CCME CSQG ¹	NS Tier I EQS ²	S5551-21BH01-04	S5551-21BH02-05	S5551-21BH03-03	S5551-21BH04-05	S5551-21BH04-08	S5551-21BH05-07	S5551-21BH06-06	S5551-21MW01-21SS-02
Sample Date (mm/dd/yyyy)					03/22/2021	03/17/2021	03/16/2021	03/22/2021	Duplicate	03/16/2021	03/18/2021	03/17/2021
Depth Interval (m)					1.8 - 2.4	2.4 - 3.1	1.2 - 1.8	2.4 - 3.1	2.4 - 3.1	3.7 - 4.3	3.1 - 3.7	0.6 - 1.2
Parameter	Unit	RDL	Analytical Results									
Chloromethane	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
Vinyl Chloride	µg/kg	20	n/a	n/a	<20	<20	<20	<20	<20	<20	<20	<20
Bromomethane	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50	<50	<50	<50
Chloroethane	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
Trichlorofluoromethane (FREON 11)	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
Acetone	µg/kg	500	n/a	n/a	<500	<500	<500	<500	<500	<500	<500	<500
1,1-Dichloroethylene	µg/kg	50	n/a	6,600	<50	<50	<50	<50	<50	<50	<50	<50
Methylene Chloride (Dichloromethane)	µg/kg	100	50,000	110,000	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,2-Dichloroethylene	µg/kg	80	n/a	4,100	<80	<80	<80	<80	<80	<80	<80	<80
1,1-Dichloroethane	µg/kg	100	50,000	39,000	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,2-Dichloroethylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
Chloroform	µg/kg	50	n/a	1,500	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	µg/kg	100	50,000	n/a	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1-Trichloroethane	µg/kg	30	50,000	42,000	<30	<30	<30	<30	<30	<30	<30	<30
Carbon Tetrachloride	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50	<50	<50	<50
Benzene	µg/kg	6.8	6.8	6,900	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
1,2-Dichloropropane	µg/kg	50	50,000	680	<50	<50	<50	<50	<50	<50	<50	<50
Trichloroethylene	µg/kg	10	n/a	140	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	µg/kg	100	n/a	130,000	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,3-Dichloropropene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,3-Dichloropropene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
1,1,2-Trichloroethane	µg/kg	30	50,000	1,100	<30	<30	<30	<30	<30	<30	<30	<30
Toluene	µg/kg	80	80	1,400,000	<80	<80	<80	<80	<80	<80	<80	<80
2-Hexanone	µg/kg	500	n/a	n/a	<500	<500	<500	<500	<500	<500	<500	<500
Dibromochloromethane	µg/kg	100	n/a	76,000	<100	<100	<100	<100	<100	<100	<100	<100
1,2-Dibromoethane	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50	<50	<50	<50
Tetrachloroethylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1,2-Tetrachloroethane	µg/kg	100	50,000	1,100	<100	<100	<100	<100	<100	<100	<100	<100
Chlorobenzene	µg/kg	50	n/a	2,700	<50	<50	<50	<50	<50	<50	<50	<50
Ethylbenzene	µg/kg	18	18	3,100,000	<18	<18	<18	<18	<18	<18	<18	<18
m,p-Xylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
Bromoform	µg/kg	100	n/a	17,000	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/kg	100	50,000	170,000	<100	<100	<100	<100	<100	<100	<100	<100
1,1,2,2-Tetrachloroethane	µg/kg	50	n/a	940	<50	<50	<50	<50	<50	<50	<50	<50
o-Xylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	µg/kg	50	10,000	420,000	<50	<50	<50	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	µg/kg	50	10,000	100,000	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	µg/kg	50	10,000	1,700,000	<50	<50	<50	<50	<50	<50	<50	<50

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

Table 4: Volatile Organic Compounds in Soil

Sample Location			Federal Guideline	Provincial Standards	S5551-21MW02	S5551-21MW03	S5551-21MW04	S5551-21MW05	S5551-21MW06
Sample ID			CCME CSQG ¹	NS Tier I EQS ²	S5551-21MW02-21SS-03	S5551-21MW03-21SS-06	S5551-21MW04-21SS-05	S5551-21MW05-21SS-04	S5551-21MW06-21SS-03
Sample Date (mm/dd/yyyy)					03/22/2021	03/15/2021	03/17/2021	03/15/2021	03/22/2021
Depth Interval (m)					1.2 - 1.8	3.1 - 3.7	2.4 - 3.1	1.8 - 2.4	1.2 - 1.8
Parameter	Unit	RDL	Analytical Results						
Chloromethane	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
Vinyl Chloride	µg/kg	20	n/a	n/a	<20	<20	<20	<20	<20
Bromomethane	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50
Chloroethane	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
Trichlorofluoromethane (FREON 11)	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
Acetone	µg/kg	500	n/a	n/a	<500	<500	<500	<500	<500
1,1-Dichloroethylene	µg/kg	50	n/a	6,600	<50	<50	<50	<50	<50
Methylene Chloride (Dichloromethane)	µg/kg	100	50,000	110,000	<100	<100	<100	<100	<100
trans-1,2-Dichloroethylene	µg/kg	80	n/a	4,100	<80	<80	<80	<80	<80
1,1-Dichloroethane	µg/kg	100	50,000	39,000	<100	<100	<100	<100	<100
cis-1,2-Dichloroethylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
Chloroform	µg/kg	50	n/a	1,500	<50	<50	<50	<50	<50
1,2-Dichloroethane	µg/kg	100	50,000	n/a	<100	<100	<100	<100	<100
1,1,1-Trichloroethane	µg/kg	30	50,000	42,000	<30	<30	<30	<30	<30
Carbon Tetrachloride	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50
Benzene	µg/kg	6.8	6.8	6,900	<6.8	<6.8	<6.8	<6.8	<6.8
1,2-Dichloropropane	µg/kg	50	50,000	680	<50	<50	<50	<50	<50
Trichloroethylene	µg/kg	10	n/a	140	<10	<10	<10	<10	<10
Bromodichloromethane	µg/kg	100	n/a	130,000	<100	<100	<100	<100	<100
cis-1,3-Dichloropropene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
trans-1,3-Dichloropropene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
1,1,2-Trichloroethane	µg/kg	30	50,000	1,100	<30	<30	<30	<30	<30
Toluene	µg/kg	80	80	1,400,000	<80	<80	<80	<80	<80
2-Hexanone	µg/kg	500	n/a	n/a	<500	<500	<500	<500	<500
Dibromochloromethane	µg/kg	100	n/a	76,000	<100	<100	<100	<100	<100
1,2-Dibromoethane	µg/kg	50	n/a	n/a	<50	<50	<50	<50	<50
Tetrachloroethylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
1,1,1,2-Tetrachloroethane	µg/kg	100	50,000	1,100	<100	<100	<100	<100	<100
Chlorobenzene	µg/kg	50	n/a	2,700	<50	<50	<50	<50	<50
Ethylbenzene	µg/kg	18	18	3,100,000	<18	<18	<18	<18	<18
m,p-Xylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
Bromoform	µg/kg	100	n/a	17,000	<100	<100	<100	<100	<100
Styrene	µg/kg	100	50,000	170,000	<100	<100	<100	<100	<100
1,1,2,2-Tetrachloroethane	µg/kg	50	n/a	940	<50	<50	<50	<50	<50
o-Xylene	µg/kg	100	n/a	n/a	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	µg/kg	50	10,000	420,000	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	µg/kg	50	10,000	100,000	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	µg/kg	50	10,000	1,700,000	<50	<50	<50	<50	<50

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the soil.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

Table 5: Perfluorinated Compounds in Soil

Sample Location			Federal Guidelines		S5551-21BH01		S5551-21BH01	S5551-21BH03		S5551-21BH04	
Sample ID			HC SSV Commercial ¹	CCME CEQG Commercial CG ²	S5551-21BH01-01	S5551-21BH01-08	S5551-21BH01-09	S5551-21BH03-01	S5551-21BH03-07	S5551-21BH04-01	S5551-21BH04-08
Sample Date (mm/dd/yyyy)					03/22/2021	03/22/2021	03/22/2021	03/16/2021	03/16/2021	03/22/2021	Duplicate
Depth Interval (m)					0.0 - 0.6	4.3 - 4.9	0.0 - 0.6	0.0 - 0.6	3.7 - 4.3	0.0 - 0.6	2.4 - 3.1
Parameter	Unit	RDL			Analytical Results						
Perfluorobutanoic Acid PFBA	µg/kg	1.0	173,000	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	µg/kg	1.0	1,050	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	µg/kg	1.0	130	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	µg/kg	1.0	92,000	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	µg/kg	1.0	3,500	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	µg/Kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	µg/kg	1.0	3,200	100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctane sulfonamide PFOSA	µg/Kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PFOS + PFOA Additivity Approach ³	None	-	1	n/a	NC	NC	NC	NC	NC	NC	NC
PFOS + PFOA Hazard Index ⁴	None	-	n/a	1	NC	NC	NC	NC	NC	NC	NC

Notes:
Analysis performed at AGAT Montreal
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.
NC Denotes Not Calculable.

<u>UNDERLINE</u>	Concentration greater than HC SSV Commercial
SHADED	Concentration greater than CCME CEQG Commercial CG Surface

¹ Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS), Soil Screening Values (SSV), Commercial land use (HC, May 2019)
² The PFAS fact sheet includes a single soil quality guideline for PFOS protective of ecological receptors; coarse grained.
³ The PFOS + PFOA Additivity Approach is calculated in accordance with the equation provided with the guideline (CCME, 2021)
⁴ The PFOS + PFOA Hazard Index is calculated in accordance with the equation provided in Health Canada Guideline (HC, May 2019)

Table 5: Perfluorinated Compounds in Soil

Sample Location			Federal Guidelines		S5551-21BH05	S5551-21MW02		S5551-21MW05	S5551-21MW06		
Sample ID			HC SSV Commercial ¹	CCME CEQG Commercial CG ²	S5551-21BH05-01	S5551-21MW02-21SS-01	S5551-21MW02-21SS-08	S5551-21MW05-21SS-01	S5551-21MW06-21SS-01	S5551-21MW06-21SS-09	
Sample Date (mm/dd/yyyy)					03/16/2021	03/22/2021	03/22/2021	03/15/2021	03/22/2021	Duplicate	
Depth Interval (m)					0.0 - 0.6	0.0 - 0.6	4.3 - 4.9		0.0 - 0.6	0.0 - 0.6	0.0 - 0.6
Parameter		Unit			RDL	Analytical Results					
Perfluorobutanoic Acid PFBA		µg/kg	1.0	173,000	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA		µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA		µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA		µg/kg	1.0	1,210	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA		µg/kg	1.0	1,050	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA		µg/kg	1.0	130	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS		µg/kg	1.0	92,000	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS		µg/kg	1.0	3,500	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS		µg/Kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS		µg/kg	1.0	3,200	100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctane sulfonamide PFOSA		µg/Kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA		µg/kg	1.0	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PFOS + PFOA Additivity Approach ³		None	-	1	n/a	NC	NC	NC	NC	NC	NC
PFOS + PFOA Hazard Index ⁴		None	-	n/a	1	NC	NC	NC	NC	NC	NC

Notes:
Analysis performed at AGAT Montreal
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
RDL Denotes reported detection limit.
NC Denotes Not Calculable.

<u>UNDERLINE</u>	Concentration greater than HC SSV Commercial
SHADED	Concentration greater than CCME CEQG Commercial CG Surface

¹ Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS), Soil Screening Values (SSV), Commercial land use (HC, May 2019)
² The PFAS fact sheet includes a single soil quality guideline for PFOS protective of ecological receptors; coarse grained.
³ The PFOS + PFOA Additivity Approach is calculated in accordance with the equation provided with the guideline (CCME, 2021)
⁴ The PFOS + PFOA Hazard Index is calculated in accordance with the equation provided in Health Canada Guideline (HC, May 2019)

Table 5: Perfluorinated Compounds in Soil

Sample Location			Federal Guidelines		S5551-21MW06
Sample ID			HC SSV Commercial ¹	CCME CEQG Commercial CG ²	S5551-21MW06-21Grab-01
Sample Date (mm/dd/yyyy)					03/22/2021
Depth Interval (m)					7.5
Parameter	Unit	RDL			Analytical Results
Perfluorobutanoic Acid PFBA	µg/kg	1.0	173,000	n/a	<1.0
Perfluoropentanoic Acid PFPeA	µg/kg	1.0	1,210	n/a	<1.0
Perfluorohexanoic Acid PFHxA	µg/kg	1.0	1,210	n/a	<1.0
Perfluoroheptanoic Acid PFHpA	µg/kg	1.0	1,210	n/a	<1.0
Perfluorooctanoic Acid PFOA	µg/kg	1.0	1,050	n/a	<1.0
Perfluorononanoic Acid PFNA	µg/kg	1.0	130	n/a	<1.0
Perfluorodecanoic Acid PFDA	µg/kg	1.0	n/a	n/a	<1.0
Perfluoroundecanoic Acid PFUnA	µg/kg	1.0	n/a	n/a	<1.0
Perfluorododecanoic Acid PFDoA	µg/kg	1.0	n/a	n/a	<1.0
Perfluorotridecanoic Acid PFTrDA	µg/kg	1.0	n/a	n/a	<1.0
Perfluorotetradecanoic Acid PFTeDA	µg/kg	1.0	n/a	n/a	<1.0
Perfluorobutanesulfonic Acid PFBS	µg/kg	1.0	92,000	n/a	<1.0
Perfluorohexasulfonic Acid PFHxS	µg/kg	1.0	3,500	n/a	<1.0
Perfluoroheptanesulfonate PFHpS	µg/Kg	1.0	n/a	n/a	<1.0
Perfluorooctasulfonic Acid PFOS	µg/kg	1.0	3,200	100	<1.0
Perfluorooctane sulfonamide PFOSA	µg/Kg	1.0	n/a	n/a	<1.0
Perfluorodecanesulfonic Acid PFDS	µg/kg	1.0	n/a	n/a	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	µg/kg	1.0	n/a	n/a	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	µg/kg	1.0	n/a	n/a	<1.0
PFOS + PFOA Additivity Approach ³	None	-	1	n/a	NC
PFOS + PFOA Hazard Index ⁴	None	-	n/a	1	NC

Notes:

Analysis performed at AGAT Montreal

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

RDL Denotes reported detection limit.

NC Denotes Not Calculable.

<u>UNDERLINE</u>	Concentration greater than HC SSV Commercial
SHADED	Concentration greater than CCME CEQG Commercial CG Surface

¹ Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS), Soil Screening Values (SSV), Commercial land use (HC, May 2019)

² The PFAS fact sheet includes a single soil quality guideline for PFOS protective of ecological receptors; coarse grained.

³ The PFOS + PFOA Additivity Approach is calculated in accordance with the equation provided with the guideline (CCME, 2021)

⁴ The PFOS + PFOA Hazard Index is calculated in accordance with the equation provided in Health Canada Guideline (HC, May 2019)

Table 6: Historical Report - Marlant SE Report 466 - 2002 - Metals in Soil

Sample Location			Federal Guidelines	Provincial Standards	HA-1	HA-2	HA-3		HA-4	HA-5	HA-6	HA-7	HA-8	HA-9	
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	HA-1	HA-2	HA-3		HA-4	HA-5	HA-6	HA-7	HA-8	HA-9	
Sample Date (yyyy)					2002	2002	2002	Duplicate	2002	2002	2002	2002	2002		
Depth Interval (m)					0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0	0.0 -1.0		
Parameter	Unit	RDL			Analytical Results										
Aluminum	mg/kg	4	n/a	15,400	8,440	5,630	5,000	4,300	16,100	9,990	10,200	7,970	9,230	13,800	
Antimony	mg/kg	0.1	40	7.5	0.2	< 0.1	< 0.1	< 0.1	0.1	0.7	0.2	0.2	0.2	0.2	
Arsenic	mg/kg	1	12	31	7	4	3	2	9	6	7	7	6	8	
Barium	mg/kg	1	2,000	10,000	36	15	28	30	147	44	35	26	49	62	
Beryllium	mg/kg	0.1	8	110	0.3	0.1	0.1	0.1	1.3	0.4	0.4	0.2	0.3	0.5	
Bismuth	mg/kg	5	n/a	n/a	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	
Boron	mg/kg	1	n/a	4300	3	2	2	2	6	4	4	4	4	5	
Cadmium	mg/kg	0.1	22	49	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Chromium	mg/kg	1	87	630	16	8	7	6	25	14	16	11	12	18	
Cobalt	mg/kg	0.1	300	22	7.6	2.5	2	1.9	14.9	6.4	6.7	3.1	5.4	10.2	
Copper	mg/kg	1	91	4000	16	3	2	2	21	8	12	13	9	12	
Iron	mg/kg	20	n/a	11,000	20,800	10,900	8,230	6,610	31,500	20,000	20,900	13,000	18,000	27,200	
Lead	mg/kg	0.5	260	260	21.1	6.6	7.4	9.7	12.4	10.9	17.9	15	19.3	12	
Magnesium	mg/kg	10	n/a	n/a	4,130	1,700	1,300	1,260	5,160	3,050	3,530	2,030	2,440	3,900	
Manganese	mg/kg	1	n/a	360	746	132	98	93	996	339	248	109	319	519	
Molybdenum	mg/kg	0.1	40	110	0.7	1.2	0.3	0.2	0.5	0.4	0.5	1.8	0.5	0.8	
Nickel	mg/kg	1	89	310	16	7	4	5	33	13	15	8	11	17	
Potassium	mg/kg	20	n/a	n/a	700	580	560	510	2,260	1,140	1,130	1,120	1,080	1,740	
Rubidium	mg/kg	0.1	n/a	n/a	8.3	7.7	11.5	10	19.8	12.4	12.5	13.8	13.6	14.8	
Selenium	mg/kg	1	2.9	125	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1	< 1	< 1	
Silver	mg/kg	0.1	40	77	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Sodium	mg/kg	50	n/a	n/a	60	< 50	60	50	130	90	90	120	110	100	
Strontium	mg/kg	1	n/a	9400	9	5	8	7	15	10	9	10	13	12	
Thallium	mg/kg	0.1	1	1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.1	0.1	< 0.1	
Tin	mg/kg	3.3	300	9400	4.2	2.9	3.2	3.1	3.4	3.3	3.4	3.1	3.3	3.3	
Uranium	mg/kg	0.1	33	33	0.5	0.4	0.4	0.4	0.9	0.6	0.6	0.4	0.6	0.6	
Vanadium	mg/kg	1	130	39	16	15	13	11	25	20	22	20	21	23	
Zinc	mg/kg	1	410	16000	100	18	14	18	64	32	52	30	40	45	

Notes:

Laboratory: RPC, Fredericton, NB

All terms defined within the body of SNC-Lavalin's report.

Results are based on the dry weight of the sample

< Denotes concentration less than indicated detection limit.

n/a Denotes no applicable standard/guideline.

RDL - Reported Detection Limit

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentrations greater than NS Tier I EQS Guideline criteria.

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)

² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)

Table 7: Historical Report - Marlant SE Report 466 - 2002 - PHCs in Soil

Sample Location			Federal Guidelines	Provincial Standards		HA-1	HA-4	HA-7
Sample ID			CCME CEQG SQG (CL FG) ¹	NS Tier I EQS ²	RBCA Tier I NP FG ³	HA-1	HA-4	HA-7
Sample Date (yyyy)						2002	2002	2002
Depth Interval (m)						0-1.0	0-1.0	0-1.0
Parameter	Unit	RDL				Analytical Results		
Volatiles								
Benzene	mg/kg	0.005	0.0068	6.9	33.0	ND	ND	ND
Toluene	mg/kg	0.05	0.08	1,400	10,000	ND	ND	ND
Ethylbenzene	mg/kg	0.005	0.018	3,100	10,000	ND	ND	ND
Xylenes	mg/kg	0.05	2.4	1,800	10,000	ND	ND	ND
Petroleum Hydrocarbons (PHC) ⁴								
Gas Range (C ₆ -C ₁₀)	mg/kg	2.5	n/a	n/a	n/a	ND	ND	ND
Fuel Range (C ₁₀ -C ₂₁)	mg/kg	25	n/a	n/a	n/a	ND	ND	ND
Lube Range (C ₂₁ -C ₃₂)	mg/kg	40	n/a	n/a	n/a	ND	ND	ND
Modified TPH (C ₆ -C ₃₂)	mg/kg	40	n/a	n/a	10,000	ND	ND	ND
Resemblance	n/a	n/a	n/a	n/a	n/a	-	-	-

Notes:
Laboratory: RPC, Fredericton, NB
All terms defined within the body of SNC-Lavalin's report.
Results are based on the dry weight of the sample
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard/guideline.
RDL - Reported Detection Limit

<u>UNDERLINE</u>	Concentration greater than CCME CEQG SQG CL FG Guidelines
SHADED	Concentration greater than the Nova Scotia (NS) Tier I EQS
OUTLINE	Concentration greater than the RBCA Tier I

¹ Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (CEQG). Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health, Commercial Land Use (CL), Fine-Grained (FG) Surface Soil (CCME, 1999, as updated)
² Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Soil (Commercial, fine grained)
³ Provincial Atlantic Risk Based Corrective Action for Petroleum Impacted Sites In Atlantic Canada (RBCA) (Version 4, updated July 2021) - Human Health (HH) Tier 1 Environmental Quality Standards (EQS) for Soil (Commercial, fine-grained and Non-potable water criteria)
⁴ Carbon Ranges have changed, these cannot be compared to the updated guidelines.

Table 8: Dissolved Metals in Groundwater

Sample Location			Federal Guideline			Provincial Standard	S5551-21MW03	S5551-21MW05	S5551-21MW06	
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	S5551-21MW03-21GW-01	S5551-21MW05-21GW-01	S5551-21MW06-21GW-01	S5551-21MW07-21GW-01
Sample Date (mm/dd/yyyy)							04/23/2021	04/23/2021	04/23/2021	Duplicate
Parameter	Unit	RDL					Analytical Results			
Dissolved Aluminum	µg/L	5	5 ⁵	5 ⁵	n/a	n/a	<5	<5	<5	<5
Dissolved Antimony	µg/L	2	n/a	2,000	6	n/a	<2	<2	<2	<2
Dissolved Arsenic	µg/L	2	5	5	10	n/a	4	14	46	47
Dissolved Barium	µg/L	5	n/a	2,900	2,000	n/a	363	151	123	123
Dissolved Beryllium	µg/L	2	n/a	5.3	n/a	n/a	<2	<2	<2	<2
Dissolved Bismuth	µg/L	2	n/a	n/a	n/a	n/a	<2	<2	<2	<2
Dissolved Boron	µg/L	5	1,500	1,500	5,000	n/a	23	48	34	34
Dissolved Cadmium	µg/L	0.09	0.09 ⁶	0.09 ⁶	7	n/a	<0.09	<0.09	<0.09	<0.09
Dissolved Chromium	µg/L	1	1 ⁷	8.9	50	n/a	5	4	4	3
Dissolved Cobalt	µg/L	1	n/a	n/a	n/a	n/a	<1	<1	<1	<1
Dissolved Copper	µg/L	2	2 ⁶	2 ⁶	2,000	n/a	<2	<2	<2	<2
Dissolved Iron	µg/L	50	300	300	n/a	n/a	<50	<50	671	642
Dissolved Lead	µg/L	0.5	1 ⁶	1 ⁶	5	n/a	<0.5	<0.5	<0.5	<0.5
Dissolved Manganese	µg/L	2	500 ⁸	n/a	120	n/a	277	470	242	267
Dissolved Molybdenum	µg/L	2	73	73	n/a	n/a	<2	18	7	7
Dissolved Nickel	µg/L	2	25 ⁶	25 ⁶	n/a	n/a	<2	4	<2	<2
Dissolved Selenium	µg/L	1	1	1	50	n/a	<1	<1	<1	<1
Dissolved Silver	µg/L	0.1	0.25	0.25	n/a	n/a	<0.1	<0.1	<0.1	<0.1
Dissolved Strontium	µg/L	5	n/a	n/a	n/a	n/a	330	291	223	240
Dissolved Thallium	µg/L	0.1	0.8	0.8	n/a	n/a	<0.1	<0.1	<0.1	<0.1
Dissolved Tin	µg/L	2	n/a	n/a	n/a	n/a	<2	<2	<2	<2
Dissolved Titanium	µg/L	2	n/a	100	n/a	n/a	<2	<2	<2	<2
Dissolved Uranium	µg/L	0.1	15 ⁹	15 ⁹	20	n/a	4.7	6.2	2.7	2.6
Dissolved Vanadium	µg/L	2	n/a	n/a	n/a	n/a	<2	<2	<2	<2
Dissolved Zinc	µg/L	5	30 ¹⁰	30	n/a	n/a	6	14	<5	<5

Notes:
Analysis performed at AGAT Halifax
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
Metals analysis completed on a filtered sample.
< Denotes concentration less than indicated detection limit.
n/a - Not Applicable

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Guideline is pH dependent. Applied pH 7.0 site wide.
⁶ Guideline is hardness dependent. Applied Hardness 50 mg/L site wide.
⁷ Individual guideline exist for Cr +3 and Cr +6. Reported value represents more stringent guideline.
⁸ Guideline is pH and hardness dependent. Applied pH 7.0 and Hardness 50 mg/L site wide.
⁹ Where guidelines are available for both long-term and short-term exposure scenarios, the more stringent has been applied.
¹⁰ Guideline is hardness, pH and DOC dependent. Guideline applies to dissolved concentrations.

Table 9: Petroleum Hydrocarbons in Groundwater

Sample Location			Federal Guideline			Provincial Standard		S5551-21MW03	S5551-21MW05	S5551-21MW06			
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	RBCA Tier I ⁵	S5551-21MW03-21GW-01	S5551-21MW05-21GW-01	S5551-21MW06-21GW-01	S5551-21MW07-21GW-01		
Sample Date (mm/dd/yyyy)								04/23/2021	04/23/2021	04/23/2021	Duplicate		
Parameter	Unit	RDL						Analytical Results					
Volatiles													
Benzene	mg/L	0.001	0.37	19	0.005	20	20	<0.001	<0.001	<0.001	<0.001		
Toluene	mg/L	0.001	0.09	150	0.14	20	20	<0.001	<0.001	<0.001	<0.001		
Ethylbenzene	mg/L	0.001	0.002	240	0.06	20	20	<0.001	<0.001	<0.001	<0.001		
Xylene (Total) ⁶	mg/L	0.001	n/a	74	0.09	20	20	<0.001	<0.001	<0.001	<0.001		
Petroleum Hydrocarbons													
C6-C10 (less BTEX)	mg/L	0.01	n/a	9.9	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01		
>C10-C16 Hydrocarbons (F2)	mg/L	0.05	n/a	3.1	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05		
>C16-C21 Hydrocarbons	mg/L	0.05	n/a	n/a	n/a	n/a	n/a	<0.05	<0.05	<0.05	<0.05		
>C21-C32 Hydrocarbons	mg/L	0.01	n/a	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01		
Modified TPH (Tier 1) ⁷	mg/L	0.05	n/a	n/a	n/a	20 ⁶	20 ⁶	<0.05	<0.05	<0.05	<0.05		
Sediment ⁸	n/a	n/a	n/a	n/a	n/a	n/a	n/a	TRACE	YES	TRACE	TRACE		
Resemblance Comment	n/a	n/a	n/a	n/a	n/a	n/a	n/a	NR	NR	NR	NR		
Return to Baseline at C32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES	YES		

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.
NR - No Resemblance

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS
SHADED	Concentration greater than the RBCA HH Tier I

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Provincial Atlantic Risk Based Corrective Action for Petroleum Impacted Sites In Atlantic Canada (RBCA) (Version 3, updated September 2015) - Table 4b Tier 1 Risk Based Screening Levels for Groundwater (Commercial, fine-grained and Non-potable water criteria)
⁶ Most stringent value applied; Modified TPH (Lube).
⁷ Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.
⁸ Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Table 10: Polycyclic Aromatic Hydrocarbons in Groundwater

Sample Location			Federal Guideline			Provincial Standard	S5551-21MW03	S5551-21MW05	S5551-21MW06	
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	S5551-21MW03-21GW-01	S5551-21MW05-21GW-01	S5551-21MW06-21GW-01	S5551-21MW07-21GW-01
Sample Date (mm/dd/yyyy)							04/23/2021	04/23/2021	04/23/2021	Duplicate
Parameter	Unit	RDL					Analytical Results			
Acenaphthene	µg/L	0.01	5.8	5.8	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	µg/L	0.01	n/a	46	n/a	17,000	<0.01	<0.01	<0.01	<0.01
Acridine	µg/L	0.01	4.4	0.05	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Anthracene	µg/L	0.012	0.012	0.012	n/a	n/a	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	µg/L	0.018	0.018	0.018	n/a	n/a	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	µg/L	0.010	0.015	0.017	0.04	n/a	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene ⁵	µg/L	0.01	n/a	0.48	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	µg/L	0.01	n/a	0.21	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Chrysene	µg/L	0.01	n/a	1.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	µg/L	0.01	n/a	0.28	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Fluoranthene	µg/L	0.01	0.04	0.04	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Fluorene	µg/L	0.01	3	3	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.01	n/a	0.23	n/a	n/a	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	µg/L	0.01	n/a	180	n/a	n/a	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	µg/L	0.01	n/a	180	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Naphthalene	µg/L	0.01	1.1	1.1	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Perylene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Phenanthrene	µg/L	0.01	0.4	0.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Pyrene	µg/L	0.01	0.025	0.025	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Quinoline	µg/L	0.01	3.4	3.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01
Sediment ⁶	n/a	n/a	n/a	n/a	n/a	n/a	TRACE	TRACE	NO	TRACE

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.
NR - No Resemblance

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS
SHADED	Concentration greater than the RBCA Tier I

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.
⁶ Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Table 11: Volatile Organic Compounds in Groundwater

Sample Location			Federal Guideline			Provincial Standard	S5551-21MW03	S5551-21MW05	S5551-21MW06	
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	S5551-21MW03-21GW-01	S5551-21MW05-21GW-01	S5551-21MW06-21GW-01	S5551-21MW07-21GW-01
Sample Date (mm/dd/yyyy)							04/23/2021	04/23/2021	04/23/2021	Duplicate
Parameter	Unit	RDL					Analytical Results			
Acetone	µg/L	10	n/a	13000	n/a	n/a	<10	<10	<10	<10
Benzene	µg/L	1	370	19000	5	n/a	<1	<1	<1	<1
Bromodichloromethane	µg/L	1	n/a	8500	n/a	n/a	<1	<1	<1	<1
Bromoform	µg/L	1	n/a	3700	n/a	130,000	<1	<1	<1	<1
Bromomethane	µg/L	0.89	n/a	230	n/a	230	<0.89	<0.89	<0.89	<0.89
Carbon Tetrachloride	µg/L	0.56	13.3	13	2	n/a	<0.56	<0.56	<0.56	<0.56
Chlorobenzene	µg/L	1	1.3	1.3	80	n/a	<1	<1	<1	<1
Chloroethane	µg/L	5	n/a	n/a	n/a	n/a	<5	<5	<5	<5
Chloroform	µg/L	1	1.8	1.8	n/a	n/a	<1	<1	<1	<1
Chloromethane	µg/L	1	n/a	n/a	n/a	n/a	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	0.7	0.7	0.7	200	n/a	<0.7	<0.7	<0.7	<0.7
1,3-Dichlorobenzene	µg/L	1	150	150	n/a	n/a	<1	<1	<1	<1
1,4-Dichlorobenzene	µg/L	1	26	26	5	32,000	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	1	n/a	44000	n/a	44,000	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	2	100	100	5	1200	<2	<2	<2	<2
1,1-Dichloroethylene	µg/L	0.6	n/a	4500	14	27,000	<0.6	<0.6	<0.6	<0.6
cis-1,2-Dichloroethylene	µg/L	2	n/a	230	n/a	23,000	<2	<2	<2	<2
trans-1,2-Dichloroethylene	µg/L	2	n/a	230	n/a	25,000	<2	<2	<2	<2
1,2-Dichloropropane	µg/L	0.7	n/a	2000	n/a	2000	<0.7	<0.7	<0.7	<0.7
cis-1,3-Dichloropropene	µg/L	0.5	n/a	310 ⁵	n/a	n/a	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L	0.5	n/a	310 ⁵	n/a	n/a	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	1	n/a	250000	n/a	250,000	<1	<1	<1	<1
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	0.2	n/a	12	n/a	n/a	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	µg/L	2	90	150000	140	n/a	<2	<2	<2	<2
Methylene Chloride (Dichloromethane)	µg/L	2	98.1	98	50	410,000	<2	<2	<2	<2
2-Hexanone	µg/L	10.0	n/a	n/a	n/a	n/a	<10.0	<10.0	<10.0	<10.0
Styrene	µg/L	1	72	72	n/a	160,000	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	µg/L	0.5	n/a	380	n/a	3800	<0.5	<0.5	<0.5	<0.5
1,1,1,2,2-Tetrachloroethane	µg/L	1	n/a	210	n/a	2100	<1	<1	<1	<1
Tetrachloroethylene	µg/L	2	110	110	10	5900	<2	<2	<2	<2
Toluene	µg/L	2	2	240000	60	n/a	<2	<2	<2	<2
1,1,1-Trichloroethane	µg/L	1	n/a	1100	n/a	95,000	<1	<1	<1	<1
1,1,2-Trichloroethane	µg/L	1	n/a	410	n/a	4100	<1	<1	<1	<1
Trichloroethylene	µg/L	1	21	270	5	540	<1	<1	<1	<1
Trichlorofluoromethane (FREON 11)	µg/L	5	n/a	n/a	n/a	n/a	<5	<5	<5	<5
m,p-Xylene	µg/L	4	n/a	n/a	n/a	n/a	<4	<4	<4	<4
o-Xylene	µg/L	1	n/a	n/a	n/a	n/a	<1	<1	<1	<1
Vinyl Chloride	µg/L	0.6	n/a	120	2	470	<0.6	<0.6	<0.6	<0.6

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Guideline for 1,3-Dichloropropene applied.

Table 12: Perfluorinated Compounds in Groundwater

Sample Location			Federal Guideline			Provincial Standard	S5551-21MW03	S5551-21MW06	
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	HC Drinking Water Screening Value ²	ECCC FEQG Surface Water ³	NS Tier I EQS ⁴	S5551-21MW03-21GW-01	S5551-21MW06-21GW-01	S5551-21MW07-21GW-01
Sample Date (mm/dd/yyyy)							04/23/2021	04/23/2021	Duplicate
Parameter	Unit	RDL					Analytical Results		
Perfluorobutanoic Acid PFBA	ng/L	1.0	n/a	30,000	n/a	n/a	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L	1.0	n/a	200 ⁵	n/a	n/a	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L	1.0	n/a	20	n/a	n/a	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L	1.0	n/a	15000	n/a	n/a	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L	1.0	n/a	600	n/a	n/a	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L	1.0	600	600 ⁵	6800	n/a	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0
PFOS/PFOA Index	None	-	n/a	1 ⁷	n/a	n/a	<1.0	<1.0	<1.0

Notes:
Analysis performed at AGAT Montréal (unless marked by *).
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit.
n/a - Not Applicable.
< Denotes concentration less than indicated detection limit.

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than Health Canada (HC) Drinking Water Screening Value
OUTLINE	Concentration greater than Guidelines for ECCC FEQG Surface Water
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated) for PFOS considering ecological receptors (fine grain soil).
² Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS) (HC, May 2019)
³ Federal Environmental Quality Guidelines (FEQG) for Perfluorooctane Sulfonate (PFOS), (ECCC, June 2018).
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Drinking Water Guideline (DWG)

Table 13: Petroleum Hydrocarbon in Groundwater - Blanks

Sample Location			Federal Guideline			Provincial Standard		Trip Blank			Equipment Blank	Field Blank						
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	RBCA Tier I ⁵	TB1	TB2	TB3	EB1	FB2	FB3	FB4				
Sample Date (mm/dd/yyyy)								03/15/2021	03/16/2021	03/17/2021	03/15/2021	03/16/2021	03/17/2021	03/18/2021				
Parameter	Unit	RDL						Analytical Results										
Volatiles																		
Benzene	µg/L	0.2	370	19,000	5	20,000	20,000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
Toluene	µg/L	0.2	90	150,000	140	20,000	20,000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
Ethylbenzene	µg/L	0.1	2	240,000	60	20,000	20,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Xylene (Total) ⁶	µg/L	0.2	n/a	74,000	90	20,000	20,000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
Petroleum Hydrocarbons ⁷																		
C6 - C10 (F1)	µg/L	63	n/a	n/a	n/a	n/a	n/a	<63	<63	<63	<63	<63	<63	<63				
C6-C10 (less BTEX) ⁶	µg/L	63	n/a	9,900	n/a	n/a	n/a	<63	<63	<63	<63	<63	<63	<63				
>C10-C16 Hydrocarbons (F2)	µg/L	49	n/a	3,100	n/a	n/a	n/a	<49	<49	<49	<49	<49	<49	<49				
C6 - C16 (F1 + F2)	µg/L	49	n/a	n/a	n/a	n/a	n/a	<49	<49	<49	<49	<49	<49	<49				
>C16 - C34 (F3)	µg/L	100	n/a	n/a	n/a	n/a	n/a	<100	<100	<100	<100	<100	<100	<100				
>C34 - C50 (F4)	µg/L	100	n/a	n/a	n/a	n/a	n/a	<100	<100	<100	<100	<100	<100	<100				
>C16 - C50 (F3 + F4)	µg/L	100	n/a	n/a	n/a	n/a	n/a	<100	<100	<100	<100	<100	<100	<100				

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.
NR - No Resemblance

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS
SHADED	Concentration greater than the RBCA Tier I

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Provincial Atlantic Risk Based Corrective Action for Petroleum Impacted Sites In Atlantic Canada (RBCA) (Version 3, updated September 2015) - Table 4b Tier 1 Risk Based Screening Levels for Groundwater (Commercial, fine-grained and Non-potable water criteria)
⁶ Modified TPH, Xylene(Total) and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.
⁷ Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Table 14: Polycyclic Aromatic Hydrocarbons in Groundwater - Blanks

Sample Location			Federal Guideline			Provincial Standard	Trip Blank			Equipment Blank	Field Blank			
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	TB1	TB2	TB3	EB1	FB1	FB2	FB3	FB4
Sample Date (mm/dd/yyyy)							03/15/2021	03/16/2021	03/17/2021	03/15/2021	03/15/2021	03/16/2021	03/17/2021	03/18/2021
Parameter	Unit	RDL					Analytical Results							
Acenaphthene	µg/L	0.01	5.8	5.8	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	µg/L	0.01	n/a	46	n/a	17,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	µg/L	0.01	4.4	0.05	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	µg/L	0.012	0.012	0.012	n/a	n/a	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	µg/L	0.018	0.018	0.018	n/a	n/a	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	µg/L	0.010	0.015	0.017	0.04	n/a	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene ⁵	µg/L	0.01	n/a	0.48	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	µg/L	0.01	n/a	0.21	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	µg/L	0.01	n/a	1.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	µg/L	0.01	n/a	0.28	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	µg/L	0.01	0.04	0.04	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	µg/L	0.01	3	3	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.01	n/a	0.23	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1-Methylnaphthalene	µg/L	0.01	n/a	180	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	µg/L	0.01	n/a	180	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	µg/L	0.01	1.1	1.1	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	µg/L	0.01	n/a	n/a	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	µg/L	0.01	0.4	0.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	µg/L	0.01	0.025	0.025	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	µg/L	0.01	3.4	3.4	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.
NR - No Resemblance

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Table 15: Volatile Organic Compounds in Groundwater Blanks

Sample Location			Federal Guideline			Provincial Standard	Trip Blank			Equipment Blank	Field Blank		
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	FIGQG Commercial / Industrial Land Use FG ²	Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ³	NS Tier I EQS ⁴	TB1	TB2	TB3	EB1	FB2	FB3	FB4
Sample Date (mm/dd/yyyy)							03/15/2021	03/16/2021	03/17/2021	03/15/2021	03/16/2021	03/17/2021	03/18/2021
Parameter	Unit	RDL					Analytical Results						
Acetone	µg/L	10	n/a	13000	n/a	n/a	<10	<10	<10	<10	<10	<10	<10
Benzene	µg/L	1	370	19000	5	n/a	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	1	n/a	8500	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
Bromoform	µg/L	1	n/a	3700	n/a	130,000	<1	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	0.89	n/a	230	n/a	230	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89
Carbon Tetrachloride	µg/L	0.56	13.3	13	2	n/a	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56
Chlorobenzene	µg/L	1	1.3	1.3	80	n/a	<1	<1	<1	<1	<1	<1	<1
Chloroethane	µg/L	5	n/a	n/a	n/a	n/a	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L	1	1.8	1.8	n/a	n/a	5	4	<1	<1	<1	<1	<1
Chloromethane	µg/L	1	n/a	n/a	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	0.7	0.7	0.7	200	n/a	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
1,3-Dichlorobenzene	µg/L	1	150	150	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	µg/L	1	26	26	5	32,000	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	1	n/a	44000	n/a	44,000	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	2	100	100	5	1200	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloroethylene	µg/L	0.6	n/a	4500	14	27,000	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
cis-1,2-Dichloroethylene	µg/L	2	n/a	230	n/a	23,000	<2	<2	<2	<2	<2	<2	<2
trans-1,2-Dichloroethylene	µg/L	2	n/a	230	n/a	25,000	<2	<2	<2	<2	<2	<2	<2
1,2-Dichloropropane	µg/L	0.7	n/a	2000	n/a	2000	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
cis-1,3-Dichloropropene	µg/L	0.5	n/a	310 ⁵	n/a	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L	0.5	n/a	310 ⁵	n/a	n/a	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	1	n/a	250000	n/a	250,000	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	0.2	n/a	12	n/a	n/a	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	µg/L	2	90	150000	140	n/a	<2	<2	<2	<2	<2	<2	<2
Methylene Chloride (Dichloromethane)	µg/L	2	98.1	98	50	410,000	<2	<2	<2	<2	<2	<2	<2
2-Hexanone	µg/L	10.0	n/a	n/a	n/a	n/a	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Styrene	µg/L	1	72	72	n/a	160,000	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	µg/L	0.5	n/a	380	n/a	3800	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1,2,2-Tetrachloroethane	µg/L	1	n/a	210	n/a	2100	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethylene	µg/L	2	110	110	10	5900	<2	<2	<2	<2	<2	<2	<2
Toluene	µg/L	2	2	240000	60	n/a	<2	<2	<2	<2	<2	<2	<2
1,1,1-Trichloroethane	µg/L	1	n/a	1100	n/a	95,000	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	µg/L	1	n/a	410	n/a	4100	<1	<1	<1	<1	<1	<1	<1
Trichloroethylene	µg/L	1	21	270	5	540	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane (FREON 11)	µg/L	5	n/a	n/a	n/a	n/a	<5	<5	<5	<5	<5	<5	<5
m,p-Xylene	µg/L	4	n/a	n/a	n/a	n/a	<4	<4	<4	<4	<4	<4	<4
o-Xylene	µg/L	1	n/a	n/a	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	µg/L	0.6	n/a	120	2	470	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6

Notes:
Analysis performed at AGAT Halifax.
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit
n/a - Not Applicable
< Denotes concentration less than indicated detection limit.

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than FIGQG Commercial / Industrial Land Use FG
OUTLINE	Concentration greater than Guidelines for Canadian Drinking Water Quality (GCDWQ) - MAC ONLY Guideline
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated)
² Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses, Fine-grained soil, marine life pathway excluded (FCSAP, 2016).
³ Pathways Included: Maximum Acceptable Concentrations,
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Guideline for 1,3-Dichloropropene applied.

Table 16: Perfluorinated Compounds in Groundwater - Blanks

Sample Location			Federal Guideline			Provincial Standard	Trip Blank			Equipment Blank			
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	HC Drinking Water Screening Value ²	ECCC FEQG Surface Water ³	NS Tier I EQS ⁴	TB1	TB2	TB3	EB1	EB2	EB3	EB4
Sample Date (mm/dd/yyyy)							03/15/2021	03/16/2021	03/17/2021	03/15/2021	03/16/2021	03/17/2021	03/18/2021
Parameter	Unit	RDL					Analytical Results						
Perfluorobutanoic Acid PFBA	ng/L	1.0	n/a	30,000	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L	1.0	n/a	200 ⁵	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L	1.0	n/a	20	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L	1.0	n/a	15000	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L	1.0	n/a	600	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L	1.0	600	600 ⁵	6800	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Analysis performed at AGAT Montréal (unless marked by *).
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit.
n/a - Not Applicable.
< Denotes concentration less than indicated detection limit.

UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
ITALIC	Concentration greater than Health Canada (HC) Drinking Water Screening Value
OUTLINE	Concentration greater than Guidelines for ECCC FEQG Surface Water
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated) for PFOS considering ecological receptors (fine grain soil).
² Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS) (HC, May 2019)
³ Federal Environmental Quality Guidelines (FEQG) for Perfluorooctane Sulfonate (PFOS), (ECCC, June 2018).
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Drinking Water Guideline (DWG)

Table 16: Perfluorinated Compounds in Groundwater - Blanks

Sample Location			Federal Guideline			Provincial Standard	Field Blank			
Sample ID			CCME CEQG Freshwater Aquatic Life ¹	HC Drinking Water Screening Value ²	ECCC FEQG Surface Water ³	NS Tier I EQS ⁴	FB1	FB2	FB3	FB4
Sample Date (mm/dd/yyyy)							03/15/2021	03/16/2021	03/17/2021	03/18/2021
Parameter	Unit	RDL					Analytical Results			
Perfluorobutanoic Acid PFBA	ng/L	1.0	n/a	30,000	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L	1.0	n/a	200	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L	1.0	n/a	200 ⁵	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L	1.0	n/a	20	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L	1.0	n/a	15000	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L	1.0	n/a	600	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L	1.0	600	600 ⁵	6800	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L	1.0	n/a	n/a	n/a	n/a	<1.0	<1.0	<1.0	<1.0

Notes:
Analysis performed at AGAT Montréal (unless marked by *).
All terms defined within the body of SNC-Lavalin's report.
RDL - Denotes Reported Detection Limit.
n/a - Not Applicable.
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UNDERLINE	Concentration greater than CCME CEQG Freshwater Aquatic Life
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OUTLINE	Concentration greater than Guidelines for ECCC FEQG Surface Water
SHADOW	Concentration greater than the Nova Scotia (NS) Tier I EQS

¹ Canadian Environmental Quality Guidelines (CEQG). Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME, 1999, as updated) for PFOS considering ecological receptors (fine grain soil).
² Health Canada (HC) Summary Table: Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS) (HC, May 2019)
³ Federal Environmental Quality Guidelines (FEQG) for Perfluorooctane Sulfonate (PFOS), (ECCC, June 2018).
⁴ Table 4B Nova Scotia Tier I Environmental Quality Standards for Contaminated Sites (April 2014) for Groundwater, non-potable, Commercial, fine grained.
⁵ Drinking Water Guideline (DWG)

Appendix C

Borehole and Monitoring Well Logs

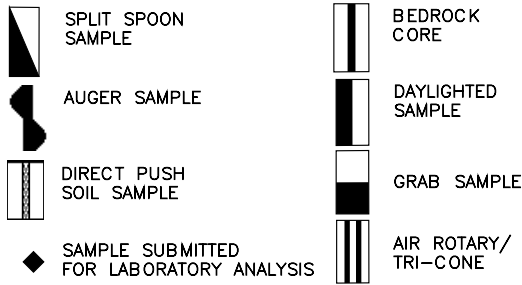




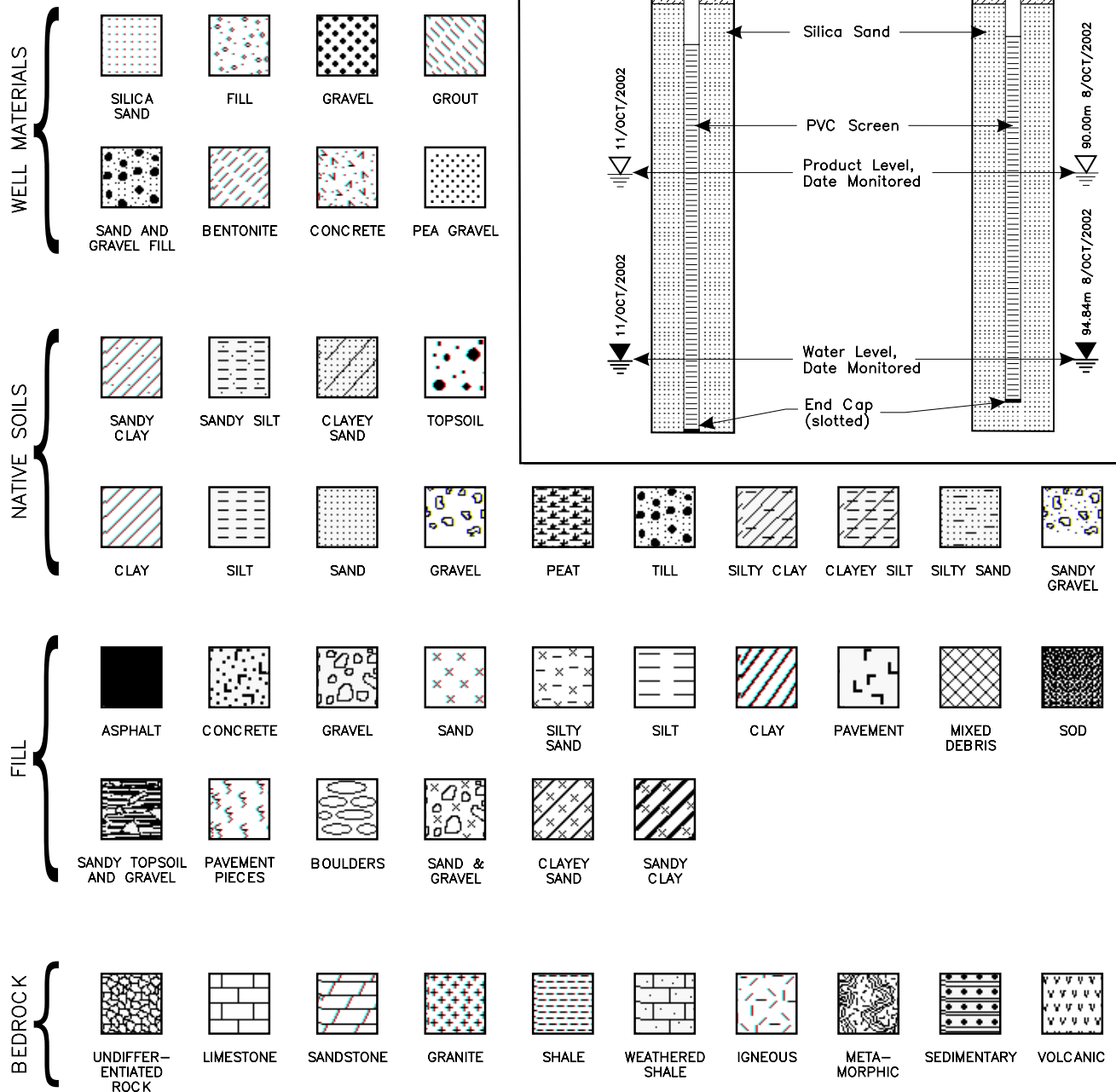
SNC • LAVALIN

BOREHOLE LOG LEGEND

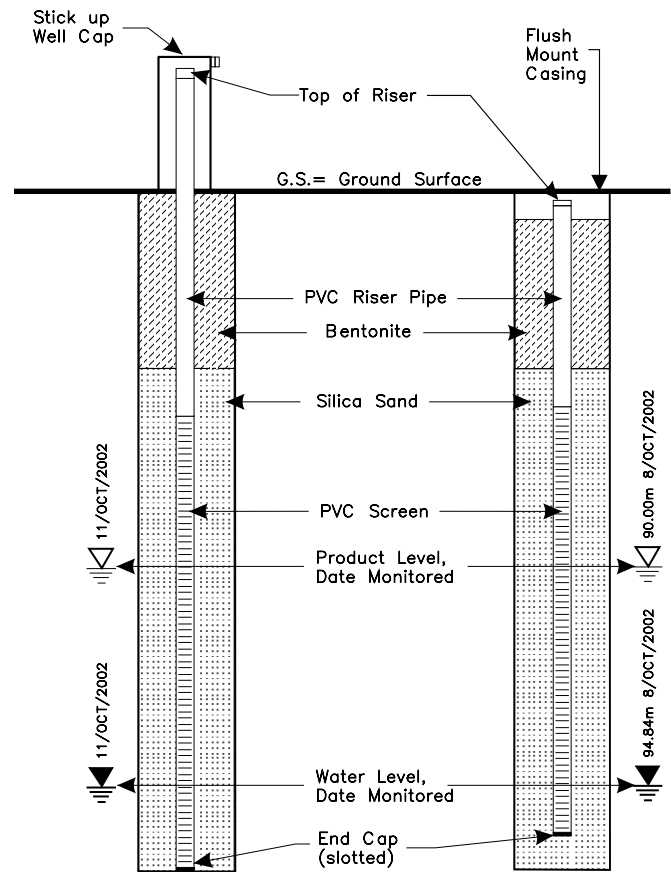
SAMPLING



GRAPHIC LOG



WELL INSTALLATION





Project No.: 680449

SLI Supervisor: SV

Drilling Company: Logan Drilling

Client: DCC

Drilling Method: Solid Stem Auger

Drilling Equipment: CME75-2

Location: Eastern Passage, NS

Borehole Diameter: 114 mm

OVM: Minirae 3000

Date Completed: March 22, 2021

Coordinates: 4940201 N 25583749 E

Site Datum: Canadian Hydrographic Service Monument

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	12.94
0	1	-01		0	63		HUMUS and ORGANICS	
1	2						SILT	
2	6						red-brown, moist, some sand, trace pebble	
3	7	-02		0	25			12.00
4	6							
5	7							
6	3	-03		0	100		PEBBLES	
7	4						wet	
8	7							
9	10							
10	3	-04		0	25		SILT	11.00
11	9						red-brown, dry, some sand and pebbles	
12	14							
13	14	-05		0	83			
14	15							10.00
15	14							
16	17	-06		0	83			
17	13							
18	14							
19	8	-07		0	92			9.00
20	10							
21	12							
22	16	-08		0	83		wet	
23	4							
24	8							
25	12							
26	15							
27							End of hole at 4.9 m bgs	8.00
28								
29								
30								
31								
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38								
39								
40								
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(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

SLI Supervisor: SV

Drilling Company: Logan Drilling

Client: DCC

Drilling Method: Solid Stem Auger

Drilling Equipment: CME75-2

Location: Eastern Passage, NS

Borehole Diameter: 114 mm

OVM: Minirae 3000

Date Completed: March 17, 2021

Coordinates: 4940281 N 25583695 E

Site Datum: Canadian Hydrographic Service Monument

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	11.54
0	1	-01		0	17		HUMUS and ORGANICS	
1	1						SILT	
1	1						red-brown, some sand, trace pebbles	
1	2						and clay	11.00
2								
3	4	-02		0	100			
3	4							
3	12							
3	8							
4								
5	6	-03		0	42			10.00
5	67							
5	10							
5	10							
6								
7	5	-04		0	75			
7	7							
7	14							
7	18							
8								
9	7	-05		0	100		SAND seam	9.00
9	8						wet	
9	12						SILT	
9	36						red-brown, some sand, trace pebbles	
10							and clay	
11	15	-06		0	83			8.00
11	14							
11	30							
11	50							
12								
13	6	-07		0	92			
13	8							
13	11							
13	14							
14								
15	4	-08		0	96			7.00
15	6							
15	10							
15	16							
16							End of hole at 4.9 m bgs	
17								
18								6.00
19								
20								

(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

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Drilling Method: Solid Stem Auger

Drilling Equipment: CME75-2

Location: Eastern Passage, NS

Borehole Diameter: 114 mm

OVM: Minirae 3000

Date Completed: March 16, 2021

Coordinates: 4940253 N 25583773 E

Site Datum: Canadian Hydrographic Service Monument

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	8.80
0	1	-01		0	58		HUMUS and ORGANICS	
1	3						SILT	
1	1						red-brown, some sand, trace pebbles	
1	6						and clay	
2								
3	3	-02		0	46			8.00
3	4							
3	4							
3	6							
4								
5	3	-03		0	100		SAND seam	
5	4						wet	7.00
5	5							
5	8							
6								
7	3	-04		0	100		SILT	
7	5						red-brown, some sand, trace	
7	6						pebbles and clay	
7	10							
8								
9	9	-05		0	100			6.00
9	10							
9	13							
9	15							
10								
11	5	-06		0	92			
11	11							
11	10							
11	16							
12								
13	5	-07		0	75			5.00
13	7							
13	12							
13	16							
14							End of hole at 4.2 m bgs	
15								4.00
16								
17								
18								
19								3.00
20								

(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

SLI Supervisor: SV

Drilling Company: Logan Drilling

Client: DCC

Drilling Method: Solid Stem Auger

Drilling Equipment: CME75-2

Location: Eastern Passage, NS

Borehole Diameter: 114 mm

OVM: Minirae 3000

Date Completed: March 22, 2021

Coordinates: 4940350 N 25583799 E

Site Datum: Canadian Hydrographic Service Monument

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 ft m 0							Ground Surface	3.00
1	1 1 3 4	-01		0	25		TOPSOIL and ORGANICS	
2							SILT	
3	3 20 33 6	-02		0	50		red-brown, moist, some sand, trace pebbles	2.00
4								
5	2 4 8 10	-03		0	83			
6								
7	4 9 20 23	-04		0	25			1.00
8								
9	10 9 12 50	-05		0	75		dry	
10							End of hole at 2.9 m bgs	0.00
11								
12								
13								-1.00
14								
15								
16								-2.00
17								
18								
19								
20								-3.00

(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 16, 2021

Site Datum: Hydrographic Service Monument

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Monitoring Well Diameter: 50 mm

Coordinates: 4940150 N 25583832 E

Drilling Company: Logan Drilling

Drilling Equipment: CME75-2

Well Casing: none

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000

DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft m								
-3								
-2								
-1								
0							Ground Surface	8.00
1	0 2 3 4	-01	◆	0	75		TOPSOIL and Organics	7.79
2							sandy SILT	
3	1 4 4 4	-02	◆	0	83		grey to red-brown, trace pebbles	7.00
4								
5	3 4 6 12	-03	◆	0	83			6.00
6								
7	9 5 8 9	-04	◆	0	100			5.00
8								
9	14 19 19 22	-05	◆	0	100			4.00
10								
11	9 12 50	-06	◆	0	50			3.00
12								
13	16 19 50	-07	◆	0	71		SILT	2.00
14							grey, dry, some sand, and pebbles	
15	48 28 46 50	-08	◆	0	100			
16								
17								
18	na	na		na	na			
19								
20								
21							End of Hole at 6.1 m bgs	

(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated HDPE Teflon free Bailer for sampling.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

SLI Supervisor: SV

Drilling Company: Logan Drilling

Client: DCC

Drilling Method: Solid Stem Auger

Drilling Equipment: CME75-2

Location: Eastern Passage, NS

Borehole Diameter: 114 mm

OVM: Minirae 3000

Date Completed: March 18, 2021

Coordinates: 4940146 N 25583950 E

Site Datum: Canadian Hydrographic Service Monument

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	4.20
0							TOPSOIL and ORGANICS	
1	push	-01		0	25		SILT red-brown, some sand, trace pebbles and clay	4.00
2								
3	1 2 2 4	-02		0	58			3.00
4								
5	1 2 4 6	-03		0	83			
6								
7	1 3 10 13	-04		0	75			2.00
8								
9	10 13 14 20	-05		0	83			
10								
11	7 7 19 20	-06		0	100		green grey	1.00
12								
13	15 19 20 30	-07		0	100			0.00
14								
15	7 11 17 18	-08		0	100			
16							End of hole at 4.9 m bgs	-1.00
17								
18								
19								
20								

(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin
 Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 17, 2021

Site Datum: Hydrographic Service Monument Coordinates: 4940138 N 25583671 E

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Monitoring Well Diameter: 50 mm

Drilling Company: Logan Drilling

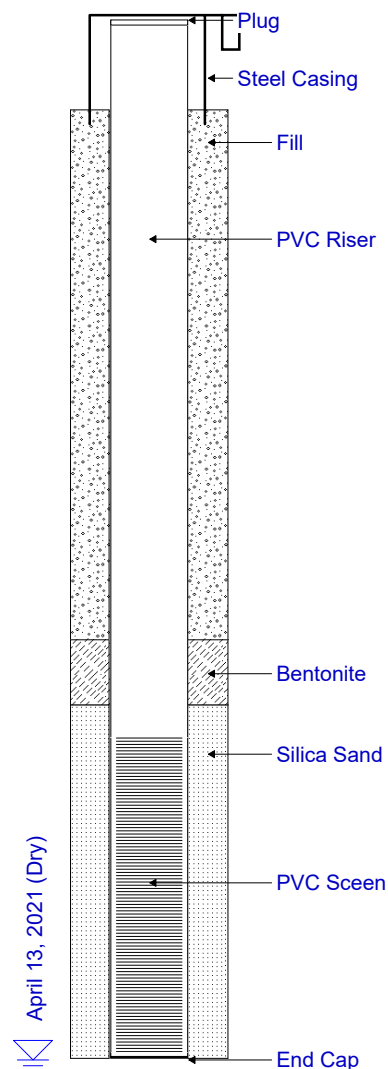
Drilling Equipment: CME75-2

Well Casing: Steel Stick-up

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000

DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
-3 ft -3 m								
-2								
-1								
0							Ground Surface	18.00
1	5	21SS-01		-	75		SAND and GRAVEL grey-brown, dry	17.66
2	3							
3	5	21SS-02		-	100		SILT red-brown, dry, some sand, trace pebbles	17.00
4	7							
5	4	21SS-03		-	25			
6	4							
7	8							
8	1	21SS-04		-	75		platy texture 2.1 to 3.3 m bgs	16.00
9	5							
10	8	21SS-05		-	100			15.00
11	12							
12	16							
13	17	21SS-06		-	25			14.00
14	7							
15	11	21SS-07		-	100			13.00
16	14							
17	17	21SS-08		-	100			12.00
18	6							
19	10							
20	14							
21	18							
22								
23	na	na		na	na			11.00
24								
25								10.00
26								
27								
28							SLATE pieces grey	9.00
29								
30								
31							Refusal at 9.1 m bgs	



(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated HDPE Teflon free Bailer for sampling.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 22, 2021

Site Datum: Canadian Hydrographic Service Monument

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Well Diameter: 50 mm

Coordinates: 4939998 N 25583823 E

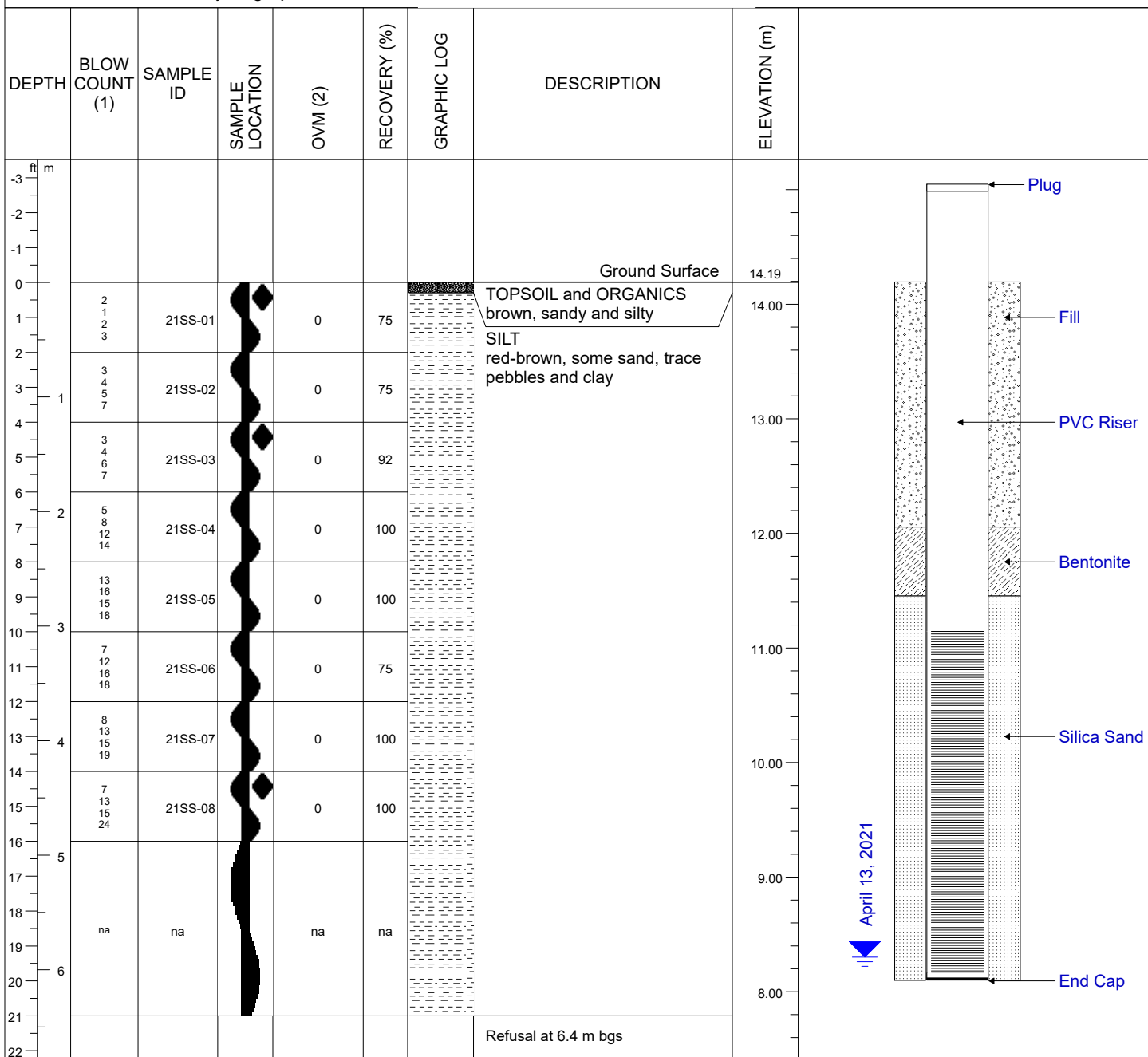
Drilling Company: Logan Drilling

Drilling Equipment: CME75-2

Well Casing: none

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000



(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated HDPE Teflon free Bailer for sampling.

◆ Sample submitted for laboratory analysis.



Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 15, 2021

Site Datum: Canadian Hydrographic Service Monument

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Monitoring Well Diameter: 50 mm

Coordinates: 4940230 N 25583668 E

Drilling Company: Logan Drilling

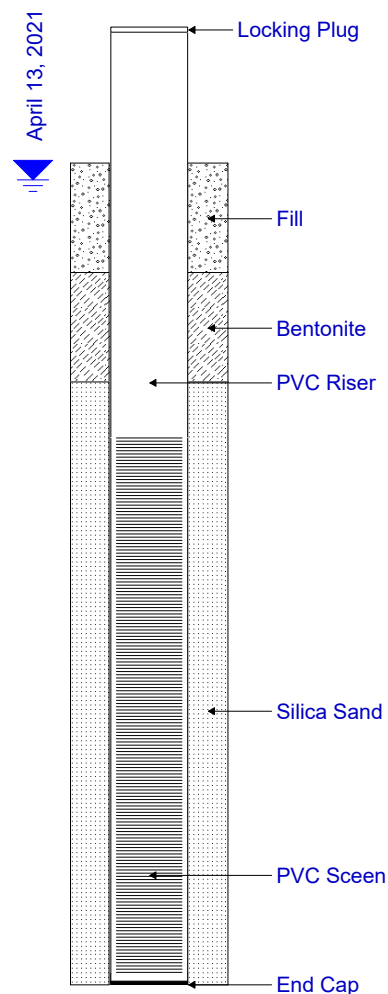
Drilling Equipment: CME75-2

Well Casing: none

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000

DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
-3 ft m								
-2								
-1								
0							Ground Surface	0.00
1	0 2 3 47	21SS-01		0	100		TOPSOIL and Organics SILT red-brown, some sand and pebbles, trace cobbles	
2								
3	56 10 6 8	21SS-02		0	25			-1.00
4								
5	1 3 5 6	21SS-03		0	100			
6								
7	7 8 11 14	21SS-04		0	100		SAND seam SILT red-brown, some sand and pebbles, trace cobbles and clay	-2.00
8								
9	7 10 11 16	21SS-05		0	96			
10								-3.00
11	13 21 27 26	21SS-06		0	83			
12								
13	8 13 15 8	21SS-07		0	100		sandy SILT some pebbles, wet from 3.7 to 4.3 m bgs	-4.00
14								
15	18 29 24 23	21SS-08		0	38			
16								
17							End of Hole at 4.9 m bgs	-5.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.



Sample submitted for laboratory analysis.

Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 17, 2021

Site Datum: Hydrographic Service Monument

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Monitoring Well Diameter: 50 mm

Coordinates: 4940088 N 25583761 E

Drilling Company: Logan Drilling

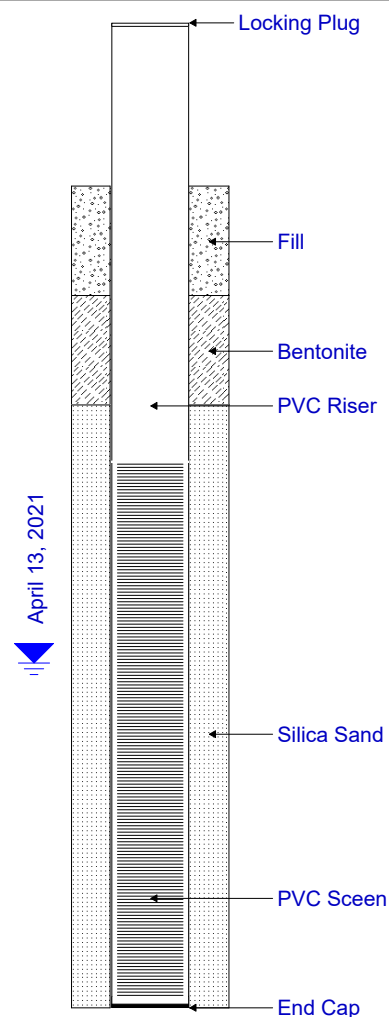
Drilling Equipment: CME75-2

Well Casing: none

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000

DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
-3 ft m								
-2								
-1								
0							Ground Surface	16.17
1	1 2 4 5	21SS-01		-	50		TOPSOIL and Organics SILT and SAND grey, moist, trace pebbles	16.00
2	4 6 6 7	21SS-02		-	83		SILT red-brown, some sand, trace pebbles and clay	15.00
3								
4								
5	3 4 5 7	21SS-03		-	100		SAND rusty-brown, wet, some silt	
6							SILT red-brown, some sand, trace pebbles and clay	
7	2 4 15 13	21SS-04		-	79			14.00
8								
9	8 12 15 19	21SS-05		-	100		fine SAND and SILT brown, dry	
10							SILT red-brown, some sand, trace pebbles and clay	
11	6 12 14 21	21SS-06		-	83			13.00
12								
13	11 20 23 37	21SS-07		-	25			12.00
14								
15	9 21 24 50	21SS-08		-	100			
16								
17							Refusal at 4.9 m bgs	11.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

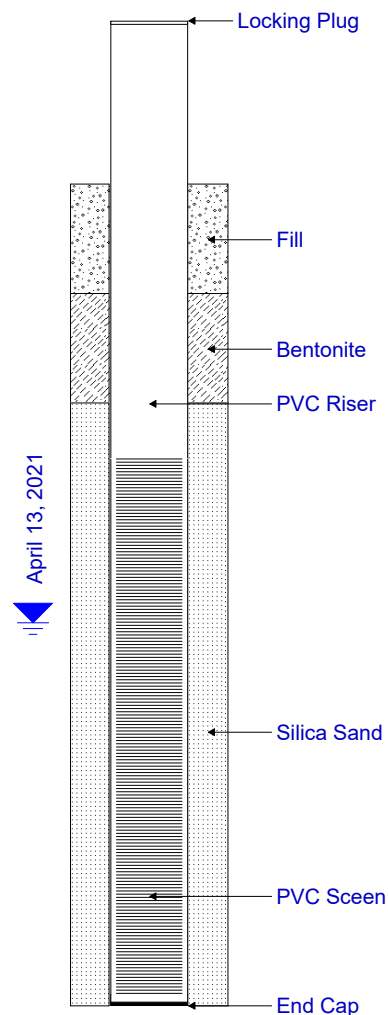
Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.



Sample submitted for laboratory analysis.

Project No.: 680449 Client: DCC Location: Eastern Passage, NS Date Completed: March 15, 2021 Site Datum: Hydrographic Service Monument	SLI Supervisor: SV Drilling Method: Solid Stem Auger Borehole Diameter: 114 mm Monitoring Well Diameter: 50 mm Coordinates: 4940208 N 25583832 E	Drilling Company: Logan Drilling Drilling Equipment: CME75-2 Well Casing: none Well Screen: Schedule 40, Slot 10 PVC OVM: Minirae 3000
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DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
-3 ft m								
-2								
-1								
0							Ground Surface	10.03
1	2 2 3 6	21SS-01		0	100		TOPSOIL and Organics sandy SILT grey to grey brown	10.00
2							SILT red-brown, dry, some sand, trace clay and pebbles	
3	7 6 7 10	21SS-02		0	100			9.00
4								
5	3 4 5 8	21SS-03		0	100			
6							moist	
7	6 7 9 14	21SS-04		0	100		SAND seam brown, wet, some silt, poorly sorted	8.00
8							SILT red-brown, dry, some sand, trace clay and pebbles	
9	12 15 18 24	21SS-05		0	100			7.00
10								
11	22 23 29 25	21SS-06		0	100		SAND brown, wet, some silt	
12							SILT red-brown, wet, some sand, trace clay and pebbles	
13	6 8 11 17	21SS-07		0	100			6.00
14								
15							End of Hole at 4.3 m bgs	
16								
17								5.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated HDPE Teflon free Bailer for sampling.

◆ Sample submitted for laboratory analysis.

Project No.: 680449

Client: DCC

Location: Eastern Passage, NS

Date Completed: March 22, 2021

Site Datum: Hydrographic Service Monument

SLI Supervisor: SV

Drilling Method: Solid Stem Auger

Borehole Diameter: 114 mm

Monitoring Well Diameter: 50 mm

Coordinates: 4940262 N 25583891 E

Drilling Company: Logan Drilling

Drilling Equipment: CME75-2

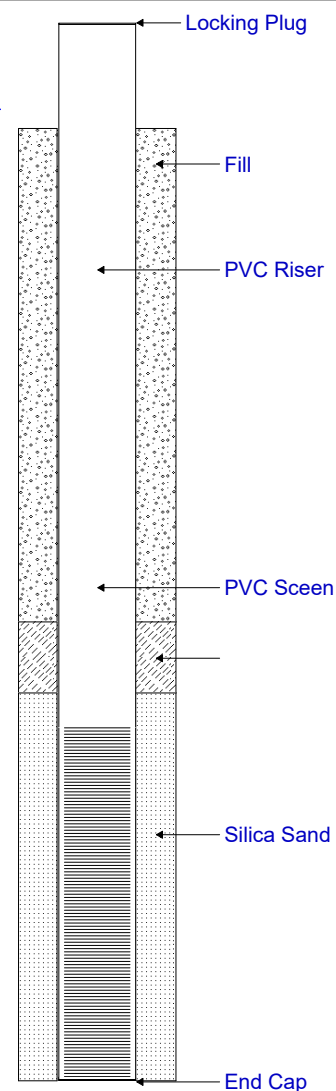
Well Casing: none

Well Screen: Schedule 40, Slot 10 PVC

OVM: Minirae 3000

DEPTH	BLOW COUNT (1)	SAMPLE ID	SAMPLE LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)	
-3 ft m									
-2									
-1									
0							Ground Surface	4.00	
1	1	21SS-01	◆	-	33		TOPSOIL and Organics	3.58	
2	3		◆				sandy SILT		
3	3	21SS-02	◆	-	83		grey	3.00	
4	4		◆				SILT		
5	7	21SS-03	◆	-	75		red-brown, some sand, trace pebbles and clay	2.00	
6	6		◆						
7	5	21SS-04	◆	-	83			1.00	
8	12		◆						
9	16	21SS-05	◆	-	67			0.00	
10	9		◆						
11	50	21SS-06	◆	-	83				
12	5		◆						
13	8	21SS-07	◆	-	88			0.00	
14	12		◆						
15	15	21SS-08	◆	-	75			-1.00	
16	11		◆						
17	18		◆						
18	14		◆						
19	15		◆						
20	6		◆						
21	9		◆						
22	13		◆						
23	16		◆						
24	na	na		na	na		moist	-3.00	
25									
26									
27									
28							Refusal at 8.2 m bgs	-4.00	

April 13, 2021 (Artesian)



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

Monitoring well equipped with dedicated HDPE Teflon free Bailer for sampling.

◆ Sample submitted for laboratory analysis.

Appendix D

Preliminary Conceptual Site Model



Appendix D

Conceptual Site Model

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The Hartlen Point Conceptual Site Model (CSM) provides information on the sources, types, and extent of the known contamination, as well as the release and transport mechanisms, possible subsurface migration pathways, and potential receptors and the routes of exposure to contamination. The physical characteristics of the Site and the results of the sampling programs have been presented in the main body of the report. The CSM includes screening for contaminants of potential concern COPCs, the identification of human and ecological receptors of concern (ROCs) and determination of associated potentially operable exposure pathways between ROCs and COPCs under the current commercial land (CL) use and the anticipated future condition of the Site. A summary of the outcomes of the CSM is provided in section 1.3 and in attached [Figure D-1](#).

1.1 Chemical Hazard Identification

The following sections discuss the identification of COPCs at the Site given the presence of residual soil and groundwater contamination. The identification of COPCs considers contaminant concentrations that exceed exposure pathway guidelines/standards (discussed below).

1.1.1 Soil COPC Screening

All residual contamination in soil at the Site, as summarized in Section 9.4 and 9.5 in the main report, were retained as preliminary COPCs. Preliminary COPCs in soil included arsenic and iron. A secondary screening was conducted to identify site-specific COPCs that would be retained for exposure assessment for both human and ecological receptors. The identification of COPC sample depth was not reported; therefore, all COPCs were assumed to be potentially present within the surficial soils at depths of ≤ 1.5 metres below ground surface (m bgs) and considered for direct contact exposure for both human health and ecological ROCs.

The identification of human and ecological ROCs (and potentially operable exposure pathways) is presented in Section 1.2 of this Appendix.

1.1.1.1 Secondary Screening Benchmarks

Secondary COPCs for the protection of human health and ecological receptors were identified by comparing maximum residual soil Contaminant concentrations with receptor/exposure pathway specific CCME guidelines, where available. Receptor/exposure pathway guidelines/standards from other Canadian jurisdictions (see below) were used to identify secondary COPCs for parameters with no CCME guidelines. Secondary groundwater COPCs were identified based on measured groundwater concentrations and therefore soil guidelines protective of soil leaching to groundwater used by aquatic life were not applied in the secondary screening. Vapour check values were not applied as no indoor/outdoor vapour contaminants were identified. The soil dataset on which COPC screening took place included all residual soil sampling locations (as shown Figure 3 in the main report).

The COPC screening benchmarks used in the HHERA were consistent with the CL guidelines applied in the main report, as well as assumptions for current and future use at the Site. As such, the screening benchmarks used to identify COPCs to human health and ecological receptors in soils at all depths investigated, were the following:

- › For the protection of human health exposure pathways, the following CCME SQG human health check values (SQG_{HH}) were used:



- Direct Contact – soil ingestion or soil dermal contact, whichever was the lowest (for identification of secondary COPCs for the protection of human health).
- › For the protection of ecological receptor exposure pathways, the following CCME SQG ecological check values (SQGE_{eco}) were used:
 - Direct Contact – soil contact, soil and food ingestion, whichever was the lowest (for the identification of COPCs for the protection of ecological receptors).

Preference was given to the CCME exposure pathway guidelines, where available. However, for parameters for which receptor/exposure pathway guidelines are not available from the CCME, the BC CSR exposure pathway benchmarks were used to identify secondary soil COPCs. Specifically, the BC ENV Contaminated Sites Regulation (CSR) (2019) Schedule 3.1 Part 1 CL Matrix Numerical Soil Standards (standards for human health protection – intake of contaminated soil and for environmental protection – toxicity to soil invertebrates and plants). Where CSR Schedule 3.1 Part 1 standards were not available, the Part 2 Generic Soil Standards specific to human health and ecological health were referenced. In accordance with Health Canada (2021) guidance, BC CSR soil matrix standards incorporated a factor of 0.2x (20%) of the toxicity reference value during their development, consistent with the CCME (2006) soil quality guideline derivation procedure. If no pathway or receptor specific guideline/standard was available, the non-potable soil Nova Scotia Tier 1 Environmental Quality Standard for CL was applied.

Where maximum concentrations exceeded both the regional background soil concentration (obtained from Dillon [2011]) and the relevant guideline/standard, the preliminary COPC was retained as a final COPC for further consideration in the CSM.

1.1.1.2 Results of the Secondary Soil COPC Screening

Table 1 below, presents the results of the secondary COPC screening at the Site for soil (assuming surface soil ≤1.5 m bgs).

Table 1: Secondary Soil COPC Screening (Surface Soil ≤1.5 m bgs)

Preliminary COPC	Maximum Soil Concentration Detected (mg/kg)	Location of Maximum Concentration	Background Soil Concentration (mg/kg)	Exposure Pathway Specific Benchmarks		Retained as a Final COPC for	
				Human Intake of Soil (µg/g)	Toxicity to Soil Invertebrates and Plants (µg/g)	Human Health?	Terrestrial Ecological?
Site							
Arsenic	15	S5551-21BH06-09 ^a	7.16	12 (31) ^b	26 ^b	Yes*	No
Iron	27,800	S5551-21MW06-21SS-01	25,739	150,000 ^c	11,000 ^d	No	Yes

Notes:

Regional background soil concentration for Central Uplands Soil Zone, 95% Student's-t UCL ($n=8$) (Dillon, 2011)

Bold Preliminary COPC concentration exceeds exposure pathway-specific benchmarks; identified as a COPC

CCME SQG Canadian Council of Ministers of the Environment Soil Quality Guidelines

^a Duplicate of S5551-21BH06-08

^b CCME SQG exposure pathway guideline for the protection of human health (direct soil ingestion + dermal contact; produce consumption) or ecological direct soil contact (land use specific); note that 12 mg/kg is the level for protection of incremental lifetime cancer risk 10^{-6} ; 31 mg/kg provides 10^{-5} protection (ECCC, 1999)

^c CSR Schedule 3.1 Part 2 or Part 3 Generic Numerical Soil Standards for the protection of human health or ecological health (land use specific)

^d Nova Scotia Tier 1 Environmental Quality Standard for soil, commercial land use, non-potable

* Conservatively carried forward for additional evaluation; guideline is protective of incremental lifetime cancer risk of 10^{-6}



1.1.2 Groundwater COPC Screening

All residual contamination in groundwater at the Site, were retained as preliminary groundwater COPCs, which included arsenic and iron in groundwater. A secondary screening was conducted to identify site-specific COPCs that would be retained for exposure assessment for both human and ecological receptors. Groundwater is not used for potable or domestic use (i.e., including bathing/showering, cooking, gardening, drinking, etc.) at the Site, and there are no domestic wells located either down or cross-gradient from the Site, as groundwater flows to the east towards Cow Bay, while the nearest water well is located 750 m north (see [Attachment 1](#)). Groundwater at the Site has been observed at average depths ranging from 0.25 to 6.16 m bgs across the entire property. Figure in the main report details the preliminary COPCs in groundwater at the Site, as identified in the main report.

1.1.2.1 Protection of Human Health

To identify COPCs for further evaluation in the CSM (i.e., dermal contact with groundwater), maximum concentrations of preliminary groundwater COPCs were compared to water quality guidelines protective of human health. Though considered highly conservative, drinking water guidelines were used for screening as listed below, in order of preference:

- › Health Canada, Canadian Drinking Water Guidelines; and
- › BC CSR Schedule 3.2, Generic Numerical Water Standards, for Drinking Water.

As groundwater is located at depths < 1.5 m bgs, dermal contact with groundwater is possible for both human receptors at-grade as well as those conducting subsurface work (further discussion of receptors and exposure pathways presented in Section 1.2). It is noted that for the purposes of evaluating dermal exposures for human receptors at-grade and/or in the event of subsurface activity (e.g., construction and/or maintenance work), screening against the drinking water (DW) guidelines/standards is a conservative approach; groundwater exposures under this scenario would be limited to the dermal absorption pathway (as incidental ingestion of groundwater during such activities is expected to be insignificant), and such exposures would be a small fraction of that for the ingestion of groundwater via the drinking water pathway.

To identify COPCs for the protection of human health, the groundwater data considered representative of current conditions has been screened against the HC DW or the BC CSR DW standards. Maximum concentrations were used for the screening of groundwater COPCs at the Site.

1.1.2.2 Protection of Ecological Receptors

To identify COPCs in groundwater for further evaluation for the protection of ecological receptors, maximum concentrations of preliminary groundwater COPCs were compared to groundwater quality guidelines for the protection of aquatic life (marine). It is understood that there is possible groundwater COPC discharges into the marine aquatic receiving environment to the east of the Site. Direct contact of plant roots with groundwater below the water table is only of concern for phreatophyte species (e.g., poplars, willows) which can draw water directly from the water table (CCME, 2015). The roots of non-phreatophytes (i.e., most plant species) do not penetrate the water table since they rely on oxygen in soil gas to support root respiration (CCME, 2015). Various processes can result in the movement of groundwater, potentially carrying contaminants, into the vadose zone (i.e., soil) where contaminants can encounter the roots of non-phreatophyte species.



Based on CCME (2015), the identification of soil COPCs was completed and was considered sufficient for the protection of terrestrial plants (and invertebrates).

The guidelines used to screen for ecological groundwater COPCs are listed below, in order of preference:

- › Federal Interim Groundwater Quality Guidelines (FIGWQG) Tier 2 CL (T2 CL);
- › CCME CEQG Aquatic Life (AW) Guidelines (applicable to porewater);
- › BC CSR Schedule 3.2, Generic Numerical Water Standards for Drinking Water.

Where maximum concentrations exceeded the regional background groundwater concentration range (obtained from NSE [2015]), as well as the relevant guideline/standard, the preliminary COPC was retained as a final COPC for further consideration in the CSM. If not guideline/standard was available for a parameter, it was conservatory carried forward if the maximum concentration exceeded background.

1.1.2.3 Results of the Groundwater COPC Screening

Results of the groundwater COPC screening is presented below in **Table 2**.

Table 2: Groundwater COPC Screening Results

Preliminary COPC	Maximum Representative Concentration (µg/L)	Location	Background Concentration Range (µg /L)	Exposure Pathway Specific Benchmarks		Retained as a Final COPC for	
				Human Dermal Contact (µg/L)	Aquatic Receiving Environment (µg/L)	Human Health?	Aquatic Receiving Environment?
Site							
Arsenic	47	S5551- 21MW07- 21GW-01 ^a	18 - 65.7	10 ^b	12.5 ^c	No	No
Iron	671	S5551- 21MW06- 21GW-01	51 - 734	6,500 ^d	n/a	No	No

Notes:

Regional background groundwater concentration range obtained from NSE (2015); values specific to Lawrencetown, Lewis Lake, Smileys Park and Rainbow Haven monitoring wells (n=4)

Bold Preliminary COPC concentration exceeds exposure pathway-specific benchmarks; identified as a COPC

COPC Contaminant of Potential Concern

n/a No guideline available

^a Duplicate of S5551-21MW06-21GW-01

^b Health Canada Drinking Water Guidelines

^c CCME Federal Interim Groundwater Quality Guidelines (Commercial land uses) for the protection of the marine aquatic receiving environment

^d Although a HC DWG is available for this parameter, the BC CSR Schedule 3.2 Part 3 Generic Numerical Groundwater Standards for the protection of drinking water was selected as the appropriate standard for protection of dermal contact as the HC DWG is based on an aesthetic objective only, while the BC CSR Standard is based on toxicity data and more recent science.

1.2 Summary of Final COPCs

Table 3 below provides a summary of the COPCs retained for assessment in each of the media types at the Site.

Table 3: Summary of Final COPCs by Media Type at the Site

Media Type	Human Health COPCs	Ecological Receptors COPCs
Site		
Soil (≤ 1.5 m bgs)	Arsenic*	Iron
Subsurface Soil (> 1.5 m bgs)	—	—
Groundwater	No COPCs	No COPCs

Notes:

COPC Contaminant of potential concern

— No COPCs identified in this media type

* Screening criteria is protective of 1×10^{-6} level of incremental lifetime cancer risk (ILCR); no associated exceedances of ILCR of 1×10^{-6} for arsenic (ECCC, 1999)

1.3 Human and Ecological Receptor Selection and Exposure Pathway Identification

In this section, human and ecological ROCs are identified along with potential exposure pathways to secondary COPCs identified in soil and groundwater at the Site.

1.3.1 Human Receptor and Exposure Pathway Identification

Potential receptors groups considered for evaluation were based on assumed current/future uses at the Site and are consistent with CCME (2016) and Health Canada (2021) guidance and included the following:

- › Commercial receptors (maintenance/construction workers);
- › Visitors;
- › Recreational receptors;
- › Off-Site Receptors (toddler and adults) in surrounding areas; and
- › Future Drinking Well Users.

The Site is currently occupied by approximately 177 hectares of largely undeveloped land on a small point (Hartlen Point) at the mouth of Halifax Harbour. The proposed future land use includes structure that will be designed to accommodate a land-based training mock-up for the future Canadian frigate; the building is anticipated to incorporate office/planning/meeting areas, warehousing, technical workshops, training areas, operations areas, and laydown area, and site infrastructure is anticipated to include paved vehicle parking, trailer space and security fencing (Stantec, 2020; Government of Canada, 2021). Road access and municipal service extensions are expected to be required.

Current commercial receptors, including workers, are not expected to frequent the Site regularly. The only building on-Site is the HP151 Crash Guard Tactical Air Navigation building. As the Site is just outside the Eastern Passage community, and active recreational trails are nearby, recreational receptors were also considered as ROCs given the proximity of the Site to the beach and trail network that may result in recreational receptor presence at the Site, although presence would likely be infrequent and limited to the shoreline.



It is assumed that commercial receptors and visitors at the Site will only be adults, while recreational receptors may be of any age. At-grade human ROCs are exposed to surface media (soil/groundwater) to a depth of ≤ 1.5 m bgs per CCME (2006)¹ guidance and for the protection of human health for potential human ROCs at-grade, COPCs were assumed to be present in surface soil (≤ 1.5 m bgs). Depth to groundwater at the Site has been measured at (≤ 1.5 m bgs); therefore, there is potential for ROCs to contact surficial groundwater. Indirect exposure pathway to soil COPCs, via the incidental consumption of plant tissue (i.e., berries) was not retained as a potential exposure pathway based on the likely limited presence of human ROCs at the Site.

Off-Site human receptors (all age groups) were also identified as potential ROCs; however, they were not quantitatively evaluated in the HHERA given that outdoor air COPCs were not identified and the nearest off-Site building (at the Hartlen Point Force Golf Club) is > 30 m to the west. While it is acknowledged that soil impacts, may not be entirely delineated, and may extend off-Site, the Site is bordered by the beach and ocean and direct contact exposures to off-Site soils (containing COPCs originating from the Site) are not likely. Despite no operable direct contact pathways for off-Site receptors, direct contact exposures to on-Site ROCs are assumed to be protective of off-Site ROC exposures.

Arsenic was identified as a COPC in soil for protection of direct contact for human health. The maximum concentration of 15 mg/kg is approximately two times greater than the regional background concentration of 7.16 mg/kg (Dillion, 2011). However, the total number of exceedances in soil at the Site was limited to three sampling locations of 25, with an average and 90th percentile concentration of 8.9 and 12.4 mg/kg, respectively. Additional statistical analysis indicated that the 95% UCLM, calculated using US EPA ProUCL Version 5.1 (with further input from Helsel [2012]), at the Site for arsenic is 9.7 mg/kg (95% Student's-t UCL, see [Attachment 2](#)). The descriptive statistics for the soil arsenic concentrations throughout the Site indicate that concentrations generally do not exceed the CCME SQG. The soil exceedances are limited to three sampling locations in the center of the Site within a forested area. Also of note in the supporting technical information for arsenic (ECCC, 1999) documents the levels of protection used in derivation of the CCME SQG with reference to the accepted incremental lifetime cancer risk (ILCR). The screening reference criteria of 12 mg/kg is protective of a 1×10^{-6} or one in a million ILCR. The generally acceptable level of ILCR used for the protection of federal lands in Canada is within 1 to 10 in a million. As such, the applicable SQG for 1×10^{-5} is 31 mg/kg. In comparison with this range the maximum arsenic concentration measured in soils at the Site is less than the screening level guideline.

Based on the low likelihood of human ROC presence at the Site for both commercial works, visitors and recreational receptors and the localised nature of the arsenic soil exceedances exposure to human ROCs via soil direct contact is anticipated to be negligible. The concentration distribution in soil throughout the Site, as demonstrated using descriptive statistics, further supports that if a human ROC were present at the Site, it is unlikely that they would come into contact with arsenic soil concentrations that exceed the CCME SQG.

As future land use will require disturbance of in-situ materials, these materials may require management plan to minimize exposure to construction workers. However as stated,

¹ Which defines surface soil to be the uppermost ≤ 1.5 m layer.



concentrations of arsenic at the Site are generally below CCME SQGs. It is also expected that any subsurface exposures during construction/utility work would be sub-chronic (< 90 days) in nature (i.e., subsurface work of chronic duration at the Site is considered unlikely). As a result, risks to human ROCs from arsenic soil exposure at the Site under both current as well as future land use are not anticipated. Impacted material at the Site will be managed onsite in accordance with MARLANT SEMS Directive #E2.

Groundwater at the Site is not used for drinking water purposes (including bathing/showering, cooking, gardening, drinking, etc.) and is not anticipated to be used for these purposes in the future; drinking water is supplied by a municipal water distribution system (Halifax Water) and it is understood the proposed LBTF will be connected to municipal services. However, based on the presence of groundwater concentrations that exceed the applicable guidelines/standards for arsenic and iron, groundwater at the Site must not be used as a source of drinking water in the future. Groundwater arsenic and iron concentrations at the Site appear to be within background regional ranges (NSE, 2015), therefore they were not carried forward as final COPCs for dermal contact.

1.3.2 Ecological Receptor and Exposure Pathway Identification

The primary goal of an ecological risk assessment is to ensure the continued presence of a biologically diverse, functional, self-sustaining, and interdependent community or ecosystem as an essential component of the remediation of contamination at the Site. Protection of ecological receptors at the community-to-population-level is imperative for the continued existence of individual species and the health of ecosystems. Though the primary focus of the current CSM is to assess potential exposure and effects at the community-to-population-level, in some circumstances, such as for species of special concern, protection at the individual level may be required. This section identifies potential ecological ROCs and evaluates potentially operable exposure pathways at the Site. Guidance provided by CCME (2020) was used to identify candidate ROCs at the Site for further consideration in an ERA.

The Site is located within the south-central nova scotia uplands, which is strongly influence by the Atlantic Ocean with warm summers and mild, snowy winters (Webb and Marshall, 1999). The Site is specifically within the coast spruce ecological land classification (NSLF, 2021a, see [Attachment 3](#)) but is also occupied by mixed wood forests such as red and white spruce, balsam fir, yellow birch and eastern hemlock. Wildlife includes white-tailed deer, snowshoe hare, porcupine, raccoon, fisher, red fox, coyote and beaver. As the Site is beside the Atlantic Ocean, sea birds are common in the area which include double-crested cormorants, great blue heron, osprey, bald eagle and herring gull (NSLF, 2021b). The Site is within a deer and migratory bird zone (NSLF, 2021a, see [Attachment 3](#)), and as described in Section 4.10 of the main report, there are no surface water bodies at the Site.

Species at risk in Nova Scotia, and specific to the Halifax region, include the following:

- › Piping plover (*Charadrius melodus*)
- › Roseate tern (*Sterna dougallii*)
- › Harlequin duck (*Histrionicus histrionicus*)
- › Ipswich sparrow (*Passerculus sandwichensis princeps*)
- › Wood turtle (*Glyptemys insculpta*)
- › Moose (*Alces alces americana*)
- › Boreal felt lichen (*Erioderma pedicellatum*)



In accordance with CCME (2020) guidance, the following ecological receptor groups should be considered for inclusion as ROCs in primarily terrestrial environments and thus, have been identified as preliminary ROCs for evaluation in the ERA:

- › Primary producers: i.e., mosses/grasses/shrubs/trees/forbs (including deep-rooting vegetation);
- › Invertebrates: i.e., ground-dwelling and aerial;
- › Mammals: i.e., herbaceous, insectivorous, carnivorous and omnivorous;
- › Aquatic and Terrestrial Birds: i.e., herbivorous, insectivorous, carnivorous and omnivorous;
- › Reptiles: i.e., carnivorous; and
- › Threatened, endangered and/or sensitive species.

Iron was identified as a soil COPC for the protection of terrestrial ecological receptors at the Site, with a maximum concentration of 27,800 mg/kg exceeding the (non-specific) NSE Standard of 11,000 mg/kg. The maximum concentration of iron marginally exceeded the Dillon (2011) recommended background concentration of 25,739 mg/kg which was calculated from a 95% Student's-t UCL. The 90th percentile and 95% UCLM calculated for soil iron concentrations at the Site were 25,420 and 23,103 mg/kg (95% Student's-t UCL, see [Attachment 3](#)), respectively, which indicates that soil concentrations are likely representative of background. As the NSE Standard is not a pathway or receptor specific value and based on the descriptive statistics of the soil data at the Site, no adverse effects to terrestrial ecological receptors from direct soil contact are anticipated and no additional assessment is required.

1.4 Summary of Conceptual Site Model

The conceptual model, which provides schematic representation of the COPCs, their sources and release mechanisms, transport pathways, and exposure routes to identified human and ecological receptors, is attached as [Figure D-1](#). Operable exposure pathways were not identified for the Site for human and ecological receptors of concern, as a result no human or ecological receptors and associated exposure pathways were require further quantitative evaluation.

1.5 References

- Canadian Council for Ministers of the Environment (CCME), 2006. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines.
- Canadian Council for Ministers of the Environment (CCME), 2015. A Protocol for Derivation of Groundwater Quality Guidelines at Contaminated Sites. 2015.
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- NSLF, 2021b. Wildlife and Birds of Nova Scotia, Lands and Forestry. Available at: <https://novascotia.ca/natr/wildlife/wns/wns7e.asp>
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UCL Statistics for Uncensored Full Data Sets				
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From File	WorkSheet.xls			
Full Precision	OFF			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Arsenic				
General Statistics				
Total Number of Observations	25	Number of Distinct Observations	8	
		Number of Missing Observations	0	
Minimum	5	Mean	8.84	
Maximum	15	Median	8	
SD	2.41	Std. Error of Mean	0.482	
Coefficient of Variation	0.273	Skewness	1.291	
Normal GOF Test				
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value	0.918	Data Not Normal at 5% Significance Level		
Lilliefors Test Statistic	0.234	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.173	Data Not Normal at 5% Significance Level		
Data Not Normal at 5% Significance Level				
Assuming Normal Distribution				
95% Normal UCL		95% UCLs (Adjusted for Skewness)		
95% Student's-t UCL	9.665	95% Adjusted-CLT UCL (Chen-1995)	9.766	
		95% Modified-t UCL (Johnson-1978)	9.685	
Gamma GOF Test				
A-D Test Statistic	1.009	Anderson-Darling Gamma GOF Test		
5% A-D Critical Value	0.744	Data Not Gamma Distributed at 5% Significance Level		
K-S Test Statistic	0.198	Kolmogorov-Smirnov Gamma GOF Test		
5% K-S Critical Value	0.174	Data Not Gamma Distributed at 5% Significance Level		
Data Not Gamma Distributed at 5% Significance Level				
Gamma Statistics				
k hat (MLE)	15.84	k star (bias corrected MLE)	13.96	
Theta hat (MLE)	0.558	Theta star (bias corrected MLE)	0.633	
nu hat (MLE)	791.9	nu star (bias corrected)	698.2	
MLE Mean (bias corrected)	8.84	MLE Sd (bias corrected)	2.366	
		Approximate Chi Square Value (0.05)	637.9	
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	634	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (use when n>=50))	9.676	95% Adjusted Gamma UCL (use when n<50)	9.736	
Lognormal GOF Test				
Shapiro Wilk Test Statistic	0.925	Shapiro Wilk Lognormal GOF Test		
5% Shapiro Wilk Critical Value	0.918	Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.182	Lilliefors Lognormal GOF Test		
5% Lilliefors Critical Value	0.173	Data Not Lognormal at 5% Significance Level		
Data appear Approximate Lognormal at 5% Significance Level				

Lognormal Statistics			
Minimum of Logged Data	1.609	Mean of logged Data	2.147
Maximum of Logged Data	2.708	SD of logged Data	0.253
Assuming Lognormal Distribution			
95% H-UCL	9.692	90% Chebyshev (MVUE) UCL	10.18
95% Chebyshev (MVUE) UCL	10.79	97.5% Chebyshev (MVUE) UCL	11.64
99% Chebyshev (MVUE) UCL	13.32		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9.633	95% Jackknife UCL	9.665
95% Standard Bootstrap UCL	9.611	95% Bootstrap-t UCL	9.853
95% Hall's Bootstrap UCL	9.915	95% Percentile Bootstrap UCL	9.64
95% BCA Bootstrap UCL	9.76		
90% Chebyshev(Mean, Sd) UCL	10.29	95% Chebyshev(Mean, Sd) UCL	10.94
97.5% Chebyshev(Mean, Sd) UCL	11.85	99% Chebyshev(Mean, Sd) UCL	13.64
Suggested UCL to Use			
95% Student's-t UCL	9.665	or 95% Modified-t UCL	9.685
or 95% H-UCL	9.692		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.			
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.			
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.			
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.			

UCL Statistics for Uncensored Full Data Sets			
User Selected Options			
Date/Time of Computation	ProUCL 5.12021-10-21 3:47:00 PM		
From File	WorkSheet.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Iron			
General Statistics			
Total Number of Observations	25	Number of Distinct Observations	22
		Number of Missing Observations	0
Minimum	10600	Mean	21792
Maximum	27800	Median	22900
SD	3831	Std. Error of Mean	766.3
Coefficient of Variation	0.176	Skewness	-1.102
Normal GOF Test			
Shapiro Wilk Test Statistic	0.92	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.164	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.173	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	23103	95% Adjusted-CLT UCL (Chen-1995)	22872
		95% Modified-t UCL (Johnson-1978)	23075
Gamma GOF Test			
A-D Test Statistic	1.081	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.179	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.174	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	27.81	k star (bias corrected MLE)	24.5
Theta hat (MLE)	783.6	Theta star (bias corrected MLE)	889.5
nu hat (MLE)	1390	nu star (bias corrected)	1225
MLE Mean (bias corrected)	21792	MLE Sd (bias corrected)	4403
		Approximate Chi Square Value (0.05)	1145
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	1139
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	23320	95% Adjusted Gamma UCL (use when n<50)	23428
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.918	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.186	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.173	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	9.269	Mean of logged Data	9.971
Maximum of Logged Data	10.23	SD of logged Data	0.205
Assuming Lognormal Distribution			
95% H-UCL	23530	90% Chebyshev (MVUE) UCL	24550
95% Chebyshev (MVUE) UCL	25778	97.5% Chebyshev (MVUE) UCL	27482
99% Chebyshev (MVUE) UCL	30830		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	23052	95% Jackknife UCL	23103
95% Standard Bootstrap UCL	23023	95% Bootstrap-t UCL	22924
95% Hall's Bootstrap UCL	22925	95% Percentile Bootstrap UCL	22964
95% BCA Bootstrap UCL	22864		
90% Chebyshev(Mean, Sd) UCL	24091	95% Chebyshev(Mean, Sd) UCL	25132
97.5% Chebyshev(Mean, Sd) UCL	26577	99% Chebyshev(Mean, Sd) UCL	29416
Suggested UCL to Use			
95% Student's-t UCL	23103		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.			



Legend

- Water Well Logs (March 2020)
 - Test Holes (May 2020, h510ns)
 - Pumping Tests (April 2020, h4)
 - Municipal Wells (May 2020, h5)
 - Provincial Observation Wells (I h513nswb)
 - Provincial Observation Wells - (May 2020, h513nswi)
 - Well Water Chemistry (Feb 20)
 - Primary Watersheds
 - Secondary Watersheds
 - Tertiary Watersheds
 - Ocean (50K)
 - New Brunswick and PEI
- Labels
- Road Point
- RRCL60
 - RRRRTT60
- 1Km Interval
- Trans Canada Highways
 - Arterial Highways
 - Local Arterial Highways
 - Trunk Highways
 - Local Trunk Highways
 - Collector Highways
 - Local Collector Highways

1: 10,000

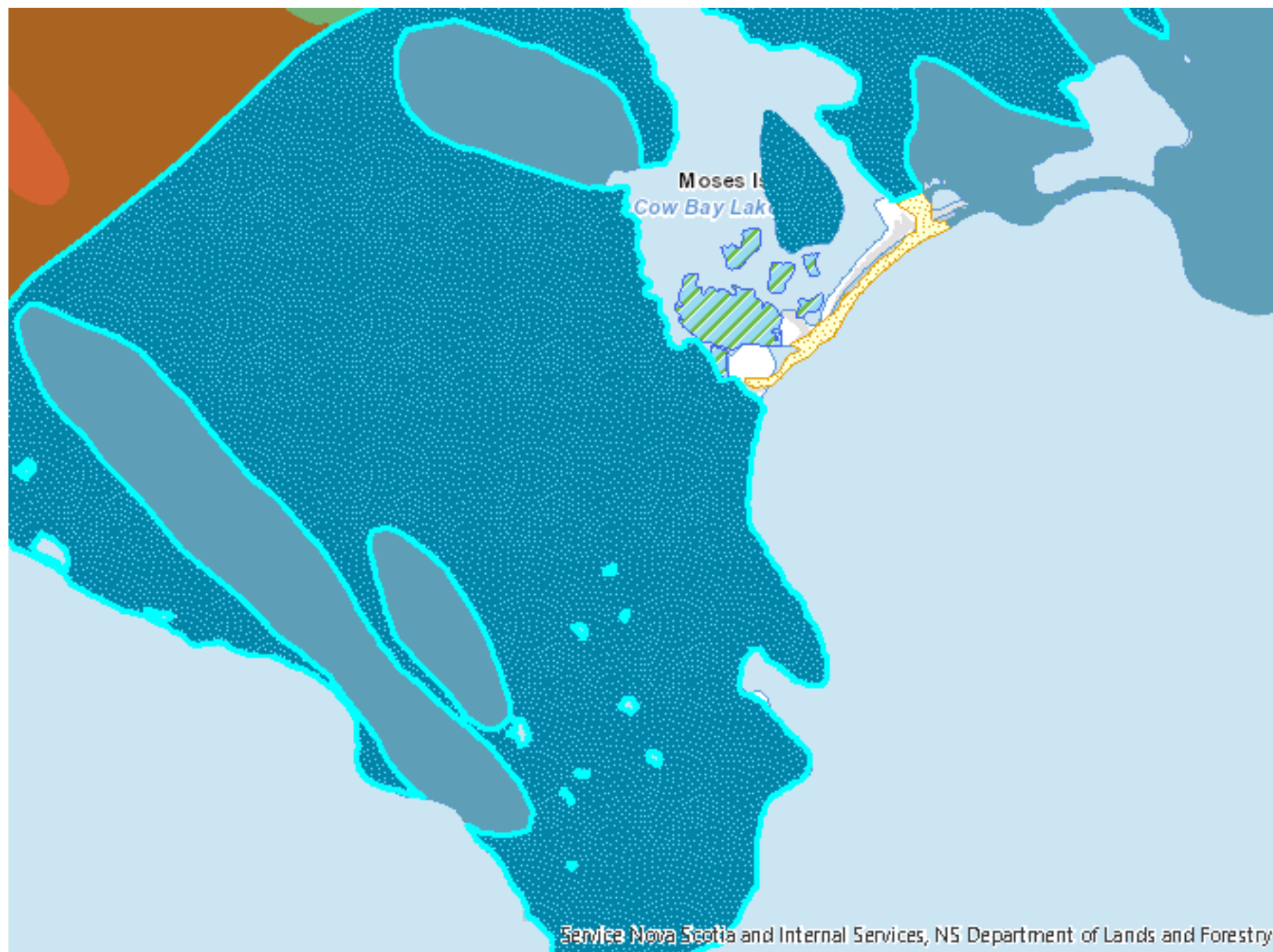


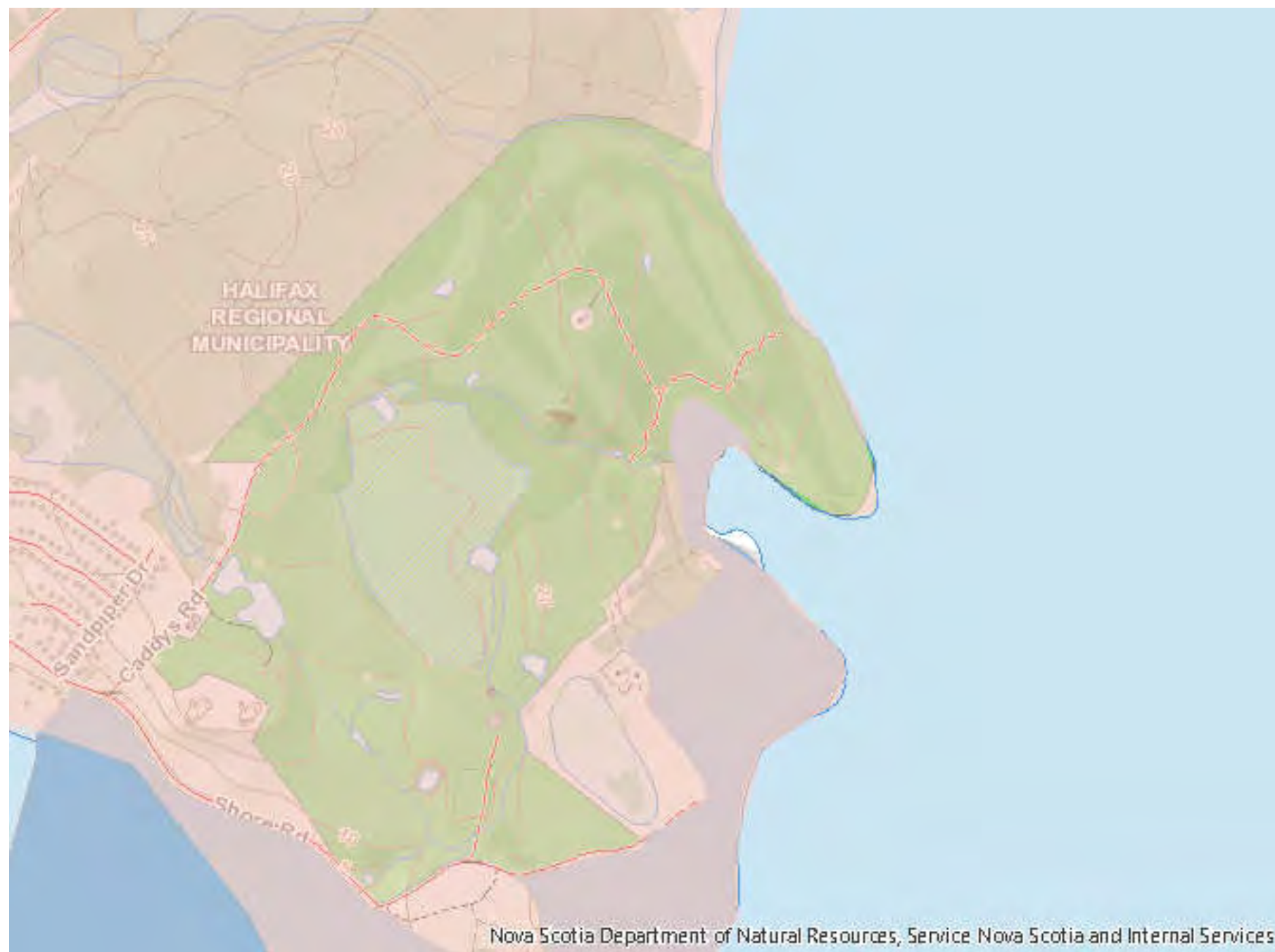
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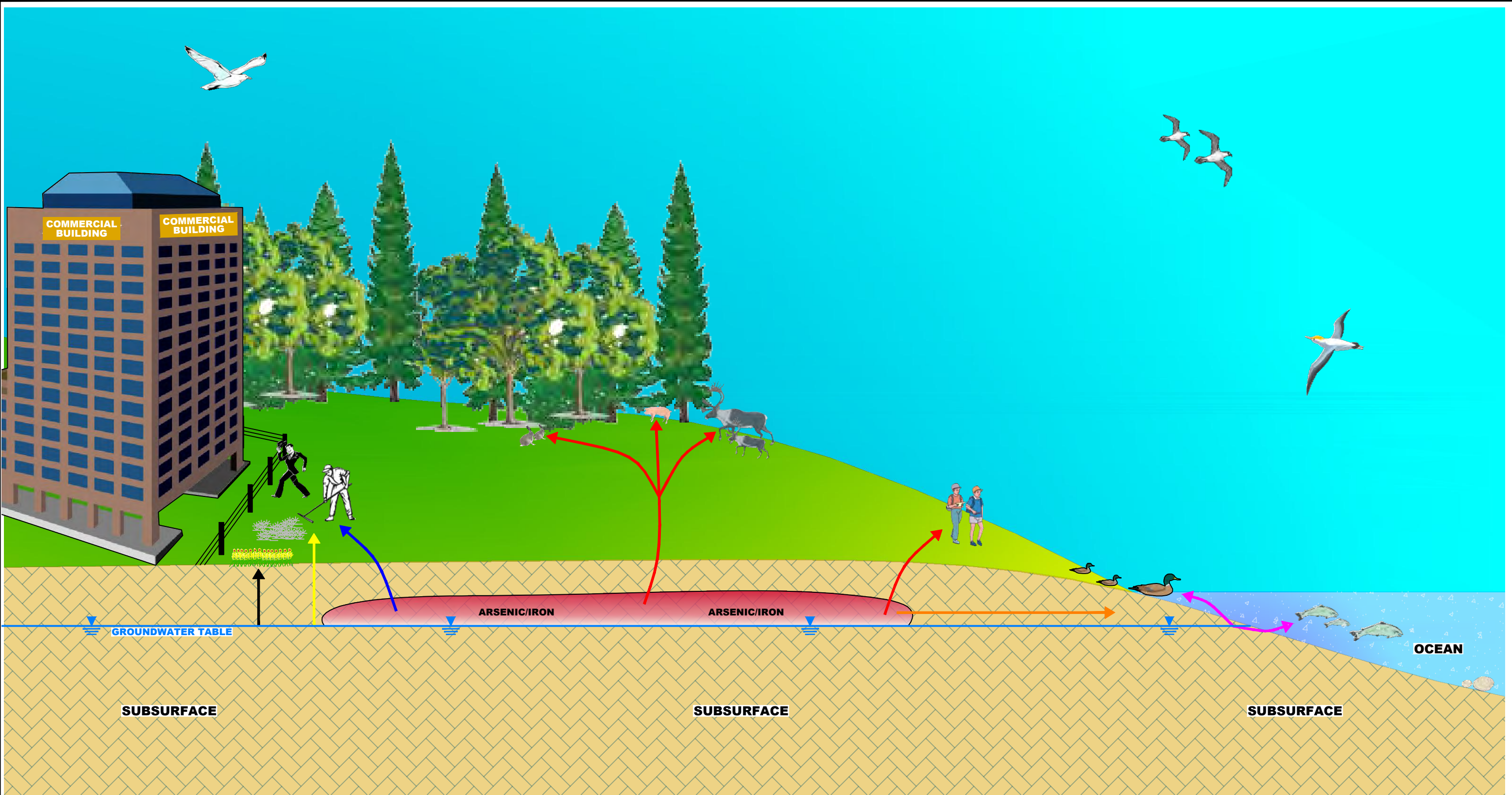
Base and digital data derived from the Nova Scotia Topographic Database (NSTDB). Copyright Her Majesty the Queen Right of the Province of Nova Scotia. The NSTDB is available from Service Nova Scotia and Municipal Relations (SNSMR), Land Information Services Division (LIS), Nova Scotia Geomatics Centre (NSGC), Amherst, Nova Scotia.


NAD_1983_CSRS_UTM_Zone_20N


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**DIRECT CONTACT (INGESTION, DERMAL, INHALATION)**

**ECOLOGICAL DIRECT CONTACT (INGESTION, INHALATION)**

**GROUNDWATER FLOW TO AQUATIC LIFE**

**GROUNDWATER DIRECT CONTACT (POTABLE INGESTION, DERMAL)**

**GROUNDWATER ROOT UPTAKE**


**OFF SITE MIGRATION**

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. SCALE IS APPROXIMATE.

REFERENCE DRAWINGS

—	—	—
DWG. NO.	DATE	DESCRIPTION
REVISIONS		
—	—	—
REV.	DATE	DESCRIPTION
BY	CHK	



CLIENT NAME:
DEFENCE CONSTRUCTION CANADA

PROJECT LOCATION:
FACILITY (LBTF)
HARTLEN POINT, NS

**FIGURE D-1:
CONCEPTUAL SITE MODEL**

DWN BY: BB

SCALE: NTS

DATE: 2021 10 22

SERIES No: REV.: **0**

CHK'D: LW/JP

PLOT: 20211022.2126

CADFILE: 680449—CSM

680449-CSM

Appendix E

Photos





Photo 1. S5551-21MW01



Photo 2. S5551-21MW02



Photo 3. S5551-21MW03

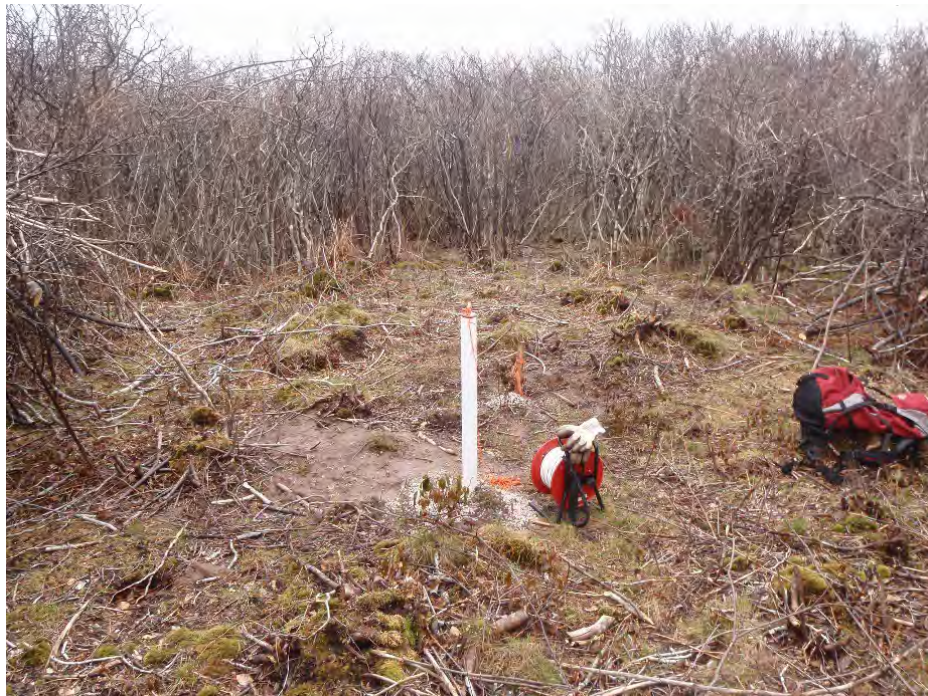


Photo 4. S5551-21MW04



Photo 5. S5551-21MW05



Photo 6. S5551-21MW06

Appendix F

Laboratory Certificates



CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX, NS B3J3R4
(902) 492-4544

ATTENTION TO: Alan Parker

PROJECT: 680449

AGAT WORK ORDER: 21X723447

SOIL ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

ULTRA TRACE REVIEWED BY: Olivier Lachance, Method Development Supervisor

DATE REPORTED: May 25, 2021

PAGES (INCLUDING COVER): 26

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW03-		S5551-21MW05-		S5551-21MW05-		S5551-21BH05-		S5551-21BH05-		S5551-21BH05-		S5551-21BH03-	
SAMPLE DESCRIPTION:		21SS-01		21SS-06		21SS-01		21SS-07		01		07		08		01	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-15		2021-03-15		2021-03-15		2021-03-15		2021-03-16		2021-03-16		2021-03-16		2021-03-16	
Parameter	Unit	G / S	RDL	2234378	2234384	2234389	2234395	2234398	2234407	2234409	2234409	2234409	2234409	2234409	2234409	2234411	2234411
Aluminum	mg/kg		10	10700	14800	11500	12700	14000	14900	12900	6300						
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Arsenic	mg/kg		1	8	7	8	7	10	14	14	5						
Barium	mg/kg		5	11	70	11	71	18	92	80	11						
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Boron	mg/kg		2	4	7	3	6	3	4	4	<2						
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3						
Chromium	mg/kg		2	12	20	14	19	19	18	18	8						
Cobalt	mg/kg		1	4	12	5	11	7	11	10	4						
Copper	mg/kg		2	6	18	5	18	8	18	17	4						
Iron	mg/kg		50	20600	23300	22900	20700	27700	22800	19900	10600						
Lead	mg/kg		0.5	8.6	14.7	6.1	6.4	8.9	7.7	7.2	5.1						
Lithium	mg/kg		5	19	36	24	31	31	36	32	13						
Manganese	mg/kg		2	150	657	210	627	243	615	522	183						
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Nickel	mg/kg		2	10	24	19	23	16	22	20	7						
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Strontium	mg/kg		5	<5	21	<5	20	<5	16	15	<5						
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Tin	mg/kg		2	2	4	3	3	3	3	3	<2						
Uranium	mg/kg		0.1	0.3	0.4	0.3	0.4	0.4	1.2	0.8	0.3						
Vanadium	mg/kg		2	29	21	24	20	26	19	19	16						
Zinc	mg/kg		5	23	57	28	55	41	53	50	18						

Certified By:

Marla Manka



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21BH03-		S5551-21MW01-		S5551-21MW01-		S5551-21BH02-		S5551-21BH02-		S5551-21MW04-		S5551-21MW04-		S5551-21BH06-	
SAMPLE DESCRIPTION:		07		21SS-01		21SS-08		01		08		21SS-01		21SS-08		01	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-16		2021-03-17		2021-03-17		2021-03-17		2021-03-17		2021-03-17		2021-03-17		2021-03-18	
Parameter	Unit	G / S	RDL	2234418	2234419	2234430	2234431	2234439	2234441	2234459	2234583						
Aluminum	mg/kg		10	14900	12700	13900	14500	14100	12600	15300	10800						
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Arsenic	mg/kg		1	8	6	7	10	8	9	9	7						
Barium	mg/kg		5	76	20	80	50	75	23	79	50						
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Boron	mg/kg		2	7	3	7	5	7	3	7	4						
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3						
Chromium	mg/kg		2	20	16	19	21	22	15	26	16						
Cobalt	mg/kg		1	12	6	12	12	12	12	12	7						
Copper	mg/kg		2	19	11	17	22	20	14	42	13						
Iron	mg/kg		50	23100	17500	21900	23600	24800	19600	25300	16300						
Lead	mg/kg		0.5	7.2	6.2	7.5	7.6	7.9	8.9	7.4	5.3						
Lithium	mg/kg		5	36	27	33	30	37	24	37	25						
Manganese	mg/kg		2	620	240	611	555	707	668	760	410						
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Nickel	mg/kg		2	28	13	24	23	26	15	35	19						
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Strontium	mg/kg		5	23	<5	22	8	24	<5	20	15						
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Tin	mg/kg		2	3	3	3	2	3	2	3	3						
Uranium	mg/kg		0.1	0.5	0.4	0.4	0.5	0.5	0.3	0.4	0.5						
Vanadium	mg/kg		2	23	18	21	24	23	17	23	18						
Zinc	mg/kg		5	66	33	55	54	58	35	60	39						

Certified By:

Marla Manka



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Available Metals in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

Parameter	Unit	S5551-21BH06-		S5551-21BH06-	
		SAMPLE DESCRIPTION:		08	
		SAMPLE TYPE:		Soil	
		DATE SAMPLED:		2021-03-17	
		G / S	RDL	2234670	2234684
Aluminum	mg/kg		10	11700	13600
Antimony	mg/kg		1	<1	<1
Arsenic	mg/kg		1	14	15
Barium	mg/kg		5	65	74
Beryllium	mg/kg		2	<2	<2
Boron	mg/kg		2	4	4
Cadmium	mg/kg		0.3	<0.3	<0.3
Chromium	mg/kg		2	20	25
Cobalt	mg/kg		1	11	11
Copper	mg/kg		2	15	18
Iron	mg/kg		50	19400	21300
Lead	mg/kg		0.5	8.4	9.6
Lithium	mg/kg		5	30	35
Manganese	mg/kg		2	524	573
Molybdenum	mg/kg		2	<2	<2
Nickel	mg/kg		2	19	22
Selenium	mg/kg		1	<1	<1
Silver	mg/kg		0.5	<0.5	<0.5
Strontium	mg/kg		5	13	17
Thallium	mg/kg		0.1	<0.1	<0.1
Tin	mg/kg		2	3	3
Uranium	mg/kg		0.1	0.6	0.7
Vanadium	mg/kg		2	16	20
Zinc	mg/kg		5	45	51

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2234378-2234684 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Marla Manka



Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

CCME Petroleum Hydrocarbon F1 - F4 in Soil - Field Preserved

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

				S5551-21MW03-	S5551-21MW05-	S5551-21BH05-	S5551-21BH03-	S5551-21MW01-	S5551-21BH02-	S5551-21MW04-	S5551-21BH06-
		SAMPLE DESCRIPTION:		21SS-06	21SS-04	07	03	21SS-02	05	21SS-05	06
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-15	2021-03-15	2021-03-16	2021-03-16	2021-03-17	2021-03-17	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2234384	2234392	2234407	2234414	2234420	2234435	2234446	2234588
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 (F2)	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
>C16 - C34 (F3)	µg/g		50	<50	<50	<50	<50	<50	<50	<50	<50
>C34 - C50 (F4)	µg/g		50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons (F4G)	µg/g		50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Surrogate	Unit	Acceptable Limits									
o-terphenyl	%	50-140	103	106	106	96	102	106	102	103	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2234384-2234588 Results are based on sample dry weight.

Xylene(Total)and C6-C10(F1 minus BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Moisture									
DATE RECEIVED: 2021-03-19					DATE REPORTED: 2021-05-25				
		S5551-21MW03-		S5551-21MW03-	S5551-21MW05-	S5551-21MW05-	S5551-21MW05-	S5551-21BH05-	S5551-21BH05-
SAMPLE DESCRIPTION:		21SS-01		21SS-06	21SS-01	21SS-04	21SS-07	01	07
SAMPLE TYPE:		Soil		Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-03-15		2021-03-15	2021-03-15	2021-03-15	2021-03-15	2021-03-16	2021-03-16
Parameter	Unit	G / S	RDL	2234378	2234384	2234389	2234392	2234395	2234398
% Moisture	%	0.5	31	11	16	12	12	21	9.5
		S5551-21BH03-		S5551-21BH03-	S5551-21BH03-	S5551-21MW01-	S5551-21MW01-	S5551-21MW01-	S5551-21BH02-
SAMPLE DESCRIPTION:		01		03	07	21SS-01	21SS-02	21SS-08	01
SAMPLE TYPE:		Soil		Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-03-16		2021-03-16	2021-03-16	2021-03-17	2021-03-17	2021-03-17	2021-03-17
Parameter	Unit	G / S	RDL	2234411	2234414	2234418	2234419	2234420	2234430
% Moisture	%	0.5	16	13	11	14	12	11	25
		S5551-21BH02-		S5551-21MW04-	S5551-21MW04-	S5551-21MW04-	S5551-21BH06-	S5551-21BH06-	S5551-21BH06-
SAMPLE DESCRIPTION:		08		21SS-01	21SS-05	21SS-08	01	06	08
SAMPLE TYPE:		Soil		Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-03-17		2021-03-17	2021-03-17	2021-03-17	2021-03-18	2021-03-18	2021-03-17
Parameter	Unit	G / S	RDL	2234439	2234441	2234446	2234509	2234583	2234588
% Moisture	%	0.5	12	21	11	9.4	16	9.3	9.8

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

11 Morris Drive, Unit 122
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CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW03-	S5551-21MW05-	S5551-21MW05-	S5551-21BH05-	S5551-21BH05-	S5551-21BH05-	S5551-21BH03-	
		SAMPLE DESCRIPTION:	21SS-01	21SS-06	21SS-01	21SS-07	01	07	08	01	
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
		DATE SAMPLED:	2021-03-15	2021-03-15	2021-03-15	2021-03-15	2021-03-16	2021-03-16	2021-03-16	2021-03-16	
Parameter	Unit	G / S	RDL	2234378	2234384	2234389	2234395	2234398	2234407	2234409	2234411
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.01	0.05	<0.01	<0.01	<0.01	0.02	0.04	<0.01
Phenanthrene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	72	77	77	77	77	74	82	76	81
Terphenyl-d14	%	50-140	74	88	86	87	80	92	86	84	
Pyrene-d10 (%)	%	50-140	68	78	76	77	69	83	75	75	

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

				S5551-21BH03-	S5551-21MW01-	S5551-21MW01-	S5551-21BH02-	S5551-21BH02-	S5551-21MW04-	S5551-21MW04-	S5551-21BH06-
		SAMPLE DESCRIPTION:		07	21SS-01	21SS-08	01	08	21SS-01	21SS-08	01
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-16	2021-03-17	2021-03-17	2021-03-17	2021-03-17	2021-03-17	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2234418	2234419	2234430	2234431	2234439	2234441	2234509	2234583
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	80	78	78	78	78	75	77	77	80
Terphenyl-d14	%	50-140	87	84	85	87	82	86	86	88	91
Pyrene-d10 (%)	%	50-140	75	73	74	74	73	76	76	76	78

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21BH06-		S5551-21BH06-	
		SAMPLE DESCRIPTION:		08	09
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2021-03-17	2021-03-17
Parameter	Unit	G / S	RDL	2234670	2234684
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.01	<0.01
Fluorene	mg/kg		0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01
Perylene	mg/kg		0.05	0.06	0.03
Phenanthrene	mg/kg		0.03	<0.01	<0.01
Pyrene	mg/kg		0.05	<0.01	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01
Surrogate	Unit	Acceptable Limits			
Naphthalene-d8	%	50-140		75	82
Terphenyl-d14	%	50-140		89	90
Pyrene-d10 (%)	%	50-140		78	79

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
2234378-2234684 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil - Field Preserved

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW05-	S5551-21BH05-	S5551-21BH03-	S5551-21MW01-	S5551-21BH02-	S5551-21MW04-	S5551-21BH06-	
SAMPLE DESCRIPTION:		21SS-06	21SS-04	07	03	21SS-02	05	21SS-05	06		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-03-15	2021-03-15	2021-03-16	2021-03-16	2021-03-17	2021-03-17	2021-03-17	2021-03-18		
Parameter	Unit	G / S	RDL	2234384	2234392	2234407	2234414	2234420	2234435	2234446	2234588
Chloromethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Vinyl Chloride	ug/kg	20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Bromomethane	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Chloroethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Trichlorofluoromethane (FREON 11)	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Acetone	ug/kg	500	<500	<500	<500	<500	<500	<500	<500	<500	<500
1,1-Dichloroethylene	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methylene Chloride (Dichloromethane)	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,2-Dichloroethylene	ug/kg	80	<80	<80	<80	<80	<80	<80	<80	<80	<80
1,1-Dichloroethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,2-Dichloroethylene	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Chloroform	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1-Trichloroethane	ug/kg	30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Carbon Tetrachloride	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Benzene	ug/kg	6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
1,2-Dichloropropane	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Trichloroethylene	ug/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,3-Dichloropropene	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,3-Dichloropropene	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,2-Trichloroethane	ug/kg	30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Toluene	ug/kg	80	<80	<80	<80	<80	<80	<80	<80	<80	<80
2-Hexanone	ug/kg	500	<500	<500	<500	<500	<500	<500	<500	<500	<500
Dibromochloromethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,2-Dibromoethane	ug/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Tetrachloroethylene	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1,2-Tetrachloroethane	ug/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil - Field Preserved

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW05-		S5551-21BH05-		S5551-21BH03-		S5551-21MW01-		S5551-21BH02-		S5551-21MW04-		S5551-21BH06-	
SAMPLE DESCRIPTION:		21SS-06		21SS-04		07		03		21SS-02		05		21SS-05		06	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-15		2021-03-15		2021-03-16		2021-03-16		2021-03-17		2021-03-17		2021-03-17		2021-03-18	
Parameter	Unit	G / S	RDL	2234384	2234392	2234407	2234414	2234420	2234435	2234446	2234588						
Chlorobenzene	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50						
Ethylbenzene	ug/kg		18	<18	<18	<18	<18	<18	<18	<18	<18						
m,p-Xylene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100						
Bromoform	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100						
Styrene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100						
1,1,2,2-Tetrachloroethane	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50						
o-Xylene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100						
1,3-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50						
1,4-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50						
1,2-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50						
Surrogate	Unit	Acceptable Limits															
Toluene-d8	%		60-140	97	98	97	97	98	98	97	98						
4-Bromofluorobenzene	%		60-140	91	94	92	92	90	91	92	91						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2234384-2234588 Results are based on the dry weight of the soil.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

		S5551-21MW05-		S5551-21BH05-		S5551-21BH03-		S5551-21BH03-	
SAMPLE DESCRIPTION:		21SS-01		01		01		07	
SAMPLE TYPE:		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-15		2021-03-16		2021-03-16		2021-03-16	
Parameter	Unit	G / S	RDL	2234389	2234398	2234411	2234418		
Perfluorobutanoic Acid PFBA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluoropentanoic Acid PFPeA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorohexanoic Acid PFHxA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluoroheptanoic Acid PFHpA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorooctanoic Acid PFOA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorononanoic Acid PFNA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorodecanoic Acid PFDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluoroundecanoic Acid PFUnA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorododecanoic Acid PFDoA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorotridecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorotetradecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorobutanesulfonic Acid PFBS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorohexasulfonic Acid PFHxS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluoroheptanesulfonate PFHpS	ug/Kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorooctasulfonic Acid PFOS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorooctane sulfonamide PFOSA	ug/Kg		1.0	<1.0	<1.0	<1.0	<1.0		
Perfluorodecanesulfonic Acid PFDS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0		

Certified By:


Olivier Lachance

Certificate of Analysis

AGAT WORK ORDER: 21X723447

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-05-25

			S5551-21MW05-	S5551-21BH05-	S5551-21BH03-	S5551-21BH03-
SAMPLE DESCRIPTION:			21SS-01	01	01	07
SAMPLE TYPE:			Soil	Soil	Soil	Soil
DATE SAMPLED:			2021-03-15	2021-03-16	2021-03-16	2021-03-16
Surrogate	Unit	Acceptable Limits	2234389	2234398	2234411	2234418
Perfluorobutanoic Acid-13C4	%	30-140	72	49	64	57
Perfluoropentanoic Acid-13C5	%	30-140	71	46	66	55
Perfluorohexanoic Acid-13C5	%	30-140	71	45	65	59
Perfluoroheptanoic Acid-13C4	%	30-140	70	49	62	57
Perfluorooctanoic Acid-13C8	%	30-140	67	43	63	58
Perfluorononanoic Acid-13C9	%	30-140	55	35	49	48
Perfluorodecanoic Acid-13C6	%	30-140	71	48	65	62
Perfluoroundecanoic Acid-13C7	%	30-140	87	47	84	78
Perfluorododecanoic Acid-13C2	%	30-140	106	62	106	72
Perfluorotetradecanoic Acid-13C2	%	30-140	31	31	62	46
Perfluorobutanesulfonic Acid-13C3	%	30-140	83	57	65	68
Perfluorohexasulfonic Acid-13C3	%	30-140	82	50	66	73
Perfluorooctasulfonic Acid-13C8	%	30-140	65	39	50	59
Perfluorooctane sulfonamide -13C8	%	30-140	31	15	37	24
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	46	62	102	73

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2234398 Surrogate recovery percentages are compliant for more than 90% of the compounds, the quality criteria is met.

2234418 Surrogate recovery percentages are compliant for more than 90% of the compounds, the quality criteria is met.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:




Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

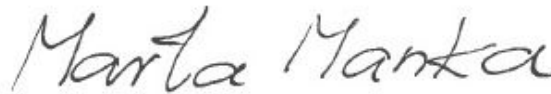
SAMPLED BY:

Soil Analysis															
RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Available Metals in Soil															
Aluminum	2245056		9200	9230	0.3%	< 10	112%	80%	120%	119%	80%	120%	101%	70%	130%
Antimony	2245056		<1	<1	NA	< 1	102%	80%	120%	109%	80%	120%	NA	70%	130%
Arsenic	2245056		16	17	7.5%	< 1	100%	80%	120%	102%	80%	120%	NA	70%	130%
Barium	2245056		11	11	NA	< 5	101%	80%	120%	106%	80%	120%	65%	70%	130%
Beryllium	2245056		<2	<2	NA	< 2	112%	80%	120%	117%	80%	120%	74%	70%	130%
Boron	2245056		<2	<2	NA	< 2	113%	80%	120%	122%	80%	120%	70%	70%	130%
Cadmium	2245056		<0.3	<0.3	NA	< 0.3	102%	80%	120%	101%	80%	120%	NA	70%	130%
Chromium	2245056		9	11	NA	< 2	99%	80%	120%	102%	80%	120%	83%	70%	130%
Cobalt	2245056		2	3	NA	< 1	101%	80%	120%	103%	80%	120%	70%	70%	130%
Copper	2245056		10	11	12.2%	< 2	101%	80%	120%	103%	80%	120%	70%	70%	130%
Iron	2245056		10100	11800	15.5%	< 50	101%	80%	120%	107%	80%	120%	87%	70%	130%
Lead	2245056		27.5	29.0	5.2%	< 0.5	101%	80%	120%	106%	80%	120%	75%	70%	130%
Lithium	2245056		11	13	NA	< 5	117%	70%	130%	120%	70%	130%	107%	70%	130%
Manganese	2245056		110	128	15.9%	< 2	100%	80%	120%	104%	80%	120%	NA	70%	130%
Molybdenum	2245056		<2	<2	NA	< 2	96%	80%	120%	98%	80%	120%	NA	70%	130%
Nickel	2245056		10	11	8.3%	< 2	100%	80%	120%	106%	80%	120%	72%	70%	130%
Selenium	2245056		<1	<1	NA	< 1	104%	80%	120%	99%	80%	120%	NA	70%	130%
Silver	2245056		<0.5	<0.5	NA	< 0.5	99%	80%	120%	102%	80%	120%	NA	70%	130%
Strontium	2245056		<5	<5	NA	< 5	95%	80%	120%	95%	80%	120%	NA	70%	130%
Thallium	2245056		<0.1	<0.1	NA	< 0.1	102%	80%	120%	105%	80%	120%	NA	70%	130%
Tin	2245056		<2	2	NA	< 2	100%	80%	120%	105%	80%	120%	NA	70%	130%
Uranium	2245056		0.3	0.3	NA	< 0.1	101%	80%	120%	104%	80%	120%	NA	70%	130%
Vanadium	2245056		25	28	11.7%	< 2	99%	80%	120%	99%	80%	120%	82%	70%	130%
Zinc	2245056		46	51	11.7%	< 5	100%	80%	120%	102%	80%	120%	70%	70%	130%

Comments: Blank spike: Less than 10% of elements not within acceptance limits.

Matrix spike: Less than 10% of elements not within acceptance limits.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723447

PROJECT: 680449

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	2234378	<0.01	<0.01	0	< 0.05	112%	50%	140%	93%	50%	140%	90%	50%	140%
2-Methylnaphthalene	1	2234378	<0.01	<0.01	0	< 0.01	109%	50%	140%	84%	50%	140%	88%	50%	140%
Acenaphthene	1	2234378	<0.00671	<0.00671	0	< 0.00671	117%	50%	140%	91%	50%	140%	91%	50%	140%
Acenaphthylene	1	2234378	<0.004	<0.004	0	< 0.004	93%	50%	140%	70%	50%	140%	85%	50%	140%
Acridine	1	2234378	<0.01	<0.01	0	< 0.05	83%	50%	140%	76%	50%	140%	69%	50%	140%
Anthracene	1	2234378	<0.01	<0.01	0	< 0.03	78%	50%	140%	72%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	2234378	<0.01	<0.01	0	< 0.01	79%	50%	140%	61%	50%	140%	89%	50%	140%
Benzo(a)pyrene	1	2234378	<0.01	<0.01	0	< 0.01	80%	50%	140%	65%	50%	140%	87%	50%	140%
Benzo(b)fluoranthene	1	2234378	<0.01	<0.01	0	< 0.05	108%	50%	140%	78%	50%	140%	63%	50%	140%
Benzo(j+k)fluoranthene	1	2234378	<0.01	<0.01	0	< 0.05	100%	50%	140%	69%	50%	140%	60%	50%	140%
Benzo(e)pyrene	1	2234378	<0.01	<0.01	0	< 0.05	111%	50%	140%	90%	50%	140%	82%	50%	140%
Benzo(ghi)perylene	1	2234378	<0.01	<0.01	0	< 0.01	69%	50%	140%	59%	50%	140%	82%	50%	140%
Chrysene	1	2234378	<0.01	<0.01	0	< 0.01	114%	50%	140%	89%	50%	140%	85%	50%	140%
Dibenzo(a,h)anthracene	1	2234378	<0.006	<0.006	0	< 0.006	62%	50%	140%	57%	50%	140%	85%	50%	140%
Fluoranthene	1	2234378	<0.01	<0.01	0	< 0.05	95%	50%	140%	77%	50%	140%	83%	50%	140%
Fluorene	1	2234378	<0.01	<0.01	0	< 0.01	103%	50%	140%	85%	50%	140%	95%	50%	140%
Indeno(1,2,3)pyrene	1	2234378	<0.01	<0.01	0	< 0.01	86%	50%	140%	80%	50%	140%	80%	50%	140%
Naphthalene	1	2234378	<0.01	<0.01	0	< 0.01	114%	50%	140%	87%	50%	140%	84%	50%	140%
Perylene	1	2234378	<0.01	<0.01	0	< 0.05	103%	50%	140%	81%	50%	140%	79%	50%	140%
Phenanthrene	1	2234378	<0.01	<0.01	0	< 0.03	108%	50%	140%	84%	50%	140%	87%	50%	140%
Pyrene	1	2234378	<0.01	<0.01	0	< 0.05	108%	50%	140%	83%	50%	140%	82%	50%	140%
Quinoline	1	2234378	<0.01	<0.01	0	< 0.05	74%	50%	140%	86%	50%	140%	52%	50%	140%
Naphthalene-d8	1	2234378	72	<0	0	<		50%	140%		50%	140%		50%	140%
Terphenyl-d14	1	2234378	74	<0	0	< 1									
Pyrene-d10 (%)	1	2234378	68	<0	0	< 1		50%	140%		50%	140%		50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

CCME Petroleum Hydrocarbon F1 - F4 in Soil - Field Preserved

Benzene	1	2234713	< 0.02	< 0.02	NA	< 0.02	88%	60%	140%	97%	60%	140%			
Toluene	1	2234713	< 0.08	< 0.08	NA	< 0.08	83%	60%	140%	85%	60%	140%			
Ethylbenzene	1	2234713	< 0.05	< 0.05	NA	< 0.05	83%	60%	140%	83%	60%	140%			
Xylenes (Total)	1	2234713	< 0.05	< 0.05	NA	< 0.05	86%	60%	140%	90%	60%	140%			
C6 - C10 (F1)	1	2234713	< 10	< 10	NA	< 10	99%	60%	140%	98%	60%	140%	101%	60%	140%
C6 - C10 (F1 minus BTEX)	1	2234713	< 10	< 10	NA	< 10	99%	60%	140%	98%	60%	140%	101%	60%	140%
>C10 - C16 (F2)	1	2234384	< 10	< 10	NA	< 10	97%	60%	140%	98%	60%	140%	97%	60%	140%
>C16 - C34 (F3)	1	2234384	< 50	< 50	NA	< 50	97%	60%	140%	98%	60%	140%	97%	60%	140%
>C34 - C50 (F4)	1	2234384	< 50	< 50	NA	< 50	95%	60%	140%	98%	60%	140%	97%	60%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Soil - Field Preserved

Chloromethane	1	2234384	< 100	< 100	NA	< 100	86%	70%	130%	92%	60%	140%	80%	60%	140%
Vinyl Chloride	1	2234384	< 20	< 20	NA	< 20	90%	50%	140%	88%	60%	130%	75%	50%	140%
Bromomethane	1	2234384	< 50	< 50	NA	< 50	156%	50%	140%	123%	60%	130%	76%	50%	140%
Chloroethane	1	2234384	< 100	< 100	NA	< 100	100%	50%	140%	118%	60%	130%	84%	50%	140%
Trichlorofluoromethane (FREON 11)	1	2234384	< 100	< 100	NA	< 100	110%	50%	140%	133%	60%	130%	98%	50%	140%
Acetone	1	2234384	< 500	< 500	NA	< 500	94%	50%	140%	105%	50%	140%	95%	50%	140%
1,1-Dichloroethylene	1	2234384	< 50	< 50	NA	< 50	102%	50%	140%	120%	60%	130%	93%	50%	140%
Methylene Chloride (Dichloromethane)	1	2234384	< 100	< 100	NA	< 100	102%	50%	140%	110%	60%	130%	95%	50%	140%
trans-1,2-Dichloroethylene	1	2234384	< 80	< 80	NA	< 80	101%	50%	140%	115%	60%	130%	93%	50%	140%
1,1-Dichloroethane	1	2234384	< 100	< 100	NA	< 100	105%	50%	140%	113%	60%	130%	97%	50%	140%
cis-1,2-Dichloroethylene	1	2234384	< 100	< 100	NA	< 100	103%	50%	140%	114%	60%	130%	95%	50%	140%
Chloroform	1	2234384	< 50	< 50	NA	< 50	108%	50%	140%	148%	60%	130%	97%	50%	140%
1,2-Dichloroethane	1	2234384	< 100	< 100	NA	< 100	97%	50%	140%	102%	60%	130%	90%	50%	140%
1,1,1-Trichloroethane	1	2234384	< 30	< 30	NA	< 30	98%	50%	140%	113%	60%	130%	87%	50%	140%
Carbon Tetrachloride	1	2234384	< 50	< 50	NA	< 50	98%	50%	140%	119%	60%	130%	85%	50%	140%
Benzene	1	2234384	< 6.8	< 6.8	NA	< 6.8	98%	70%	130%	112%	60%	140%	91%	60%	140%
1,2-Dichloropropane	1	2234384	< 50	< 50	NA	< 50	102%	50%	140%	108%	60%	130%	92%	50%	140%
Trichloroethylene	1	2234384	< 10	< 10	NA	< 10	103%	50%	140%	120%	60%	130%	92%	50%	140%
Bromodichloromethane	1	2234384	< 100	< 100	NA	< 100	101%	50%	140%	107%	60%	130%	90%	50%	140%
cis-1,3-Dichloropropene	1	2234384	< 100	< 100	NA	< 100	99%	50%	140%	105%	60%	130%	88%	50%	140%
trans-1,3-Dichloropropene	1	2234384	< 100	< 100	NA	< 100	89%	50%	140%	101%	60%	130%	83%	50%	140%
1,1,2-Trichloroethane	1	2234384	< 30	< 30	NA	< 30	94%	50%	140%	111%	60%	130%	87%	50%	140%
Toluene	1	2234384	< 80	< 80	NA	< 80	85%	70%	130%	109%	60%	140%	77%	60%	140%
2-Hexanone	1	2234384	< 500	< 500	NA	< 500	87%	50%	140%	82%	50%	140%	79%	50%	140%
Dibromochloromethane	1	2234384	< 100	< 100	NA	< 100	97%	50%	140%	107%	60%	130%	87%	50%	140%
1,2-Dibromoethane	1	2234384	< 50	< 50	NA	< 50	94%	50%	140%	131%	60%	130%	88%	50%	140%
Tetrachloroethylene	1	2234384	< 100	< 100	NA	< 100	96%	50%	140%	105%	60%	130%	84%	50%	140%
1,1,1,2-Tetrachloroethane	1	2234384	< 100	< 100	NA	< 100	96%	50%	140%	108%	60%	130%	84%	50%	140%
Chlorobenzene	1	2234384	< 50	< 50	NA	< 50	92%	50%	140%	115%	60%	130%	81%	50%	140%
Ethylbenzene	1	2234384	< 18	< 18	NA	< 18	85%	70%	130%	112%	60%	140%	75%	60%	140%
m,p-Xylene	1	2234384	< 100	< 100	NA	< 100	79%	70%	130%	106%	60%	140%	71%	60%	140%
Bromoform	1	2234384	< 100	< 100	NA	< 100	94%	50%	140%	97%	60%	130%	82%	50%	140%
Styrene	1	2234384	< 100	< 100	NA	< 100	79%	50%	140%	96%	60%	130%	68%	50%	140%
1,1,2,2-Tetrachloroethane	1	2234384	< 50	< 50	NA	< 50	92%	50%	140%	103%	60%	130%	86%	50%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: May 25, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
o-Xylene	1	2234384	< 100	< 100	NA	< 100	84%	70%	130%	105%	60%	140%	72%	60%	140%
1,3-Dichlorobenzene	1	2234384	< 50	< 50	NA	< 50	80%	50%	140%	84%	60%	130%	67%	50%	140%
1,4-Dichlorobenzene	1	2234384	< 50	< 50	NA	< 50	87%	50%	140%	72%	60%	130%	68%	50%	140%
1,2-Dichlorobenzene	1	2234384	< 50	< 50	NA	< 50	99%	50%	140%	60%	60%	130%	82%	50%	140%

Comments: Reference Material and Blank Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

Ultra Trace Analysis

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Perfluorinated Compounds (soil)

Perfluorobutanoic Acid PFBA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	91%	60%	140%	NA	60%	140%	91%	60%	140%
Perfluoropentanoic Acid PFPeA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	92%	60%	140%	NA	60%	140%	87%	60%	140%
Perfluorohexanoic Acid PFHxA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	99%	60%	140%	NA	60%	140%	94%	60%	140%
Perfluoroheptanoic Acid PFHpA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	102%	60%	140%	NA	60%	140%	98%	60%	140%
Perfluorooctanoic Acid PFOA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	91%	60%	140%	NA	60%	140%	85%	60%	140%
Perfluorononanoic Acid PFNA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	100%	60%	140%	NA	60%	140%	94%	60%	140%
Perfluorodecanoic Acid PFDA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	72%	60%	140%	NA	60%	140%	96%	60%	140%
Perfluoroundecanoic Acid PFUnA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	105%	60%	140%	NA	60%	140%	87%	60%	140%
Perfluorododecanoic Acid PFDoA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	69%	60%	140%	NA	60%	140%	75%	60%	140%
Perfluorotridecanoic Acid PFTrDA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	138%	60%	140%	NA	60%	140%	80%	60%	140%
Perfluorotetradecanoic Acid PFTeDA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	83%	60%	140%	NA	60%	140%	85%	60%	140%
Perfluorobutanesulfonic Acid PFBS	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	96%	60%	140%	NA	60%	140%	83%	60%	140%
Perfluorohexasulfonic Acid PFHxS	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	86%	60%	140%	NA	60%	140%	95%	60%	140%
Perfluoroheptanesulfonate PFHpS	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	117%	60%	140%	NA	60%	140%	100%	60%	140%
Perfluorooctasulfonic Acid PFOS	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	90%	60%	140%	NA	60%	140%	65%	60%	140%
Perfluorooctane sulfonamide PFOSA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	102%	60%	140%	NA	60%	140%	105%	60%	140%
Perfluorodecanesulfonic Acid PFDS	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	51%	60%	140%	NA	60%	140%	34%	60%	140%
N-Methylperfluorosulfonamideacetic N-MeFOSAA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	74%	60%	140%	NA	60%	140%	45%	60%	140%
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	1	2207629	< 1.0	< 1.0	0.0%	< 1.0	84%	60%	140%	NA	60%	140%	60%	60%	140%

Certified By:



QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723447

PROJECT: 680449

ATTENTION TO: Alan Parker

RPT Date: May 25, 2021										
PARAMETER				Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE		
					Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
						Lower	Upper		Lower	Upper
									Recovery	Acceptable Limits
									Lower	Upper

Available Metals in Soil

Barium	101%	80%	120%	106%	80%	120%	65%	70%	130%
Boron	113%	80%	120%	122%	80%	120%	70%	70%	130%

Comments: Blank spike: Less than 10% of elements not within acceptance limits.

Matrix spike: Less than 10% of elements not within acceptance limits.

QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723447

PROJECT: 680449

ATTENTION TO: Alan Parker

RPT Date: May 25, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Volatile Organic Compounds in Soil - Field Preserved										
Bromomethane	2234384	156%	50%	140%	123%	60%	130%	76%	50%	140%
Trichlorofluoromethane (FREON 11)	2234384	110%	50%	140%	133%	60%	130%	98%	50%	140%
Chloroform	2234384	108%	50%	140%	148%	60%	130%	97%	50%	140%
1,2-Dibromoethane	2234384	94%	50%	140%	131%	60%	130%	88%	50%	140%

Comments: Reference Material and Blank Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723447

PROJECT: 680449

ATTENTION TO: Alan Parker

RPT Date: May 25, 2021					REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE	
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits			
			Lower	Upper		Lower	Upper		Lower	Upper		
Perfluorinated Compounds (soil)												
Perfluorodecanesulfonic Acid PFDS	2207629	51%	60%	140%	NA	60%	140%	34%	60%	140%		
N-Methylperfluorosulfonamideacetic N-MeFOSAA	2207629	74%	60%	140%	NA	60%	140%	45%	60%	140%		

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Toluene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Ethylbenzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Xylenes (Total)	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
C6 - C10 (F1)	VOL-120-5015	CCME CWS Tier 1	GC/MS/FID
C6 - C10 (F1 minus BTEX)	VOL-120-5015	CCME CWS Tier 1	GC/MS/FID
>C10 - C16 (F2)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
>C16 - C34 (F3)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
>C34 - C50 (F4)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
Gravimetric Heavy Hydrocarbons (F4G)	ORG-120-5102	Based on CCME CWS Tier 1	GRAVIMETRIC
o-terphenyl	ORG-120-5102	CCME	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Vinyl Chloride	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromomethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Chloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Acetone	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,1-Dichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Chloroform	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,1-Trichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Benzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichloropropane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Trichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromodichloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
cis-1,3-Dichloropropene	VOL-120-5002	EPA SW846 5035/8260B	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Toluene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
2-Hexanone	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Dibromochloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dibromoethane	VOL-120-5002	EPA SW846 5235/8260B	GC/MS
Tetrachloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120- 5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Ethylbenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
m,p-Xylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromoform	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Styrene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
o-Xylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,3-Dichlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichlorobenzene	VOL-120-5002	EPA SW846 5235/8260B	GC/MS
Toluene-d8	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723447

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
Perfluorobutanoic Acid PFBA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid PFPeA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid PFHxA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid PFHpA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid PFOA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid PFNA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid PFDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid PFUnA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid PFDaA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotridecanoic Acid PFTriDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid PFBS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid PFHxS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanesulfonate PFHpS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid PFOS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide PFOSA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanesulfonic Acid PFDS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Methylperfluorosulfonamideacetic N-MeFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid-13C9	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid-13C6	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid-13C7	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide -13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic-D5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS

CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX, NS B3J3R4
(902) 492-4544

ATTENTION TO: Alan Parker

PROJECT: 680449

AGAT WORK ORDER: 21X723545

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

ULTRA TRACE REVIEWED BY: Olivier Lachance, Method Development Supervisor

DATE REPORTED: Apr 08, 2021

PAGES (INCLUDING COVER): 18

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

CCME Petroleum Hydrocarbon F1 - F4 in Water

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		TB1	TB2	TB3	EB1	FB2	FB3	FB4
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-16	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2235320	2235545	2235546	2235646	2235744	2235781	2235819
Benzene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylenes (Total)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
C6 - C10 (F1)	µg/L	63	<63	<63	<63	<63	<63	<63	<63	<63
C6 - C10 (F1 minus BTEX)	µg/L	63	<63	<63	<63	<63	<63	<63	<63	<63
>C10 - C16 (F2)	µg/L	49	<49	<49	<49	<49	<49	<49	<49	<49
C6 - C16 (F1 + F2)	µg/L	49	<49	<49	<49	<49	<49	<49	<49	<49
>C16 - C34 (F3)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C50 (F4)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C50 (F3 + F4)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons (F4G)	µg/L	500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sediment			NO	NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits								
o-terphenyl	%	50-140		113	112	113	112	111	111	111

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2235320-2235819 Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

The C6-C10 fraction is calculated using Toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.

Total C6-C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

n-C6 and n-C10 response factors are within 30% of Toluene response factor.

n-C10, n-C16 and n-C34 response factors are within 10% of their average.

C50 response factor is within 70% of n-C10 + n-C16 n-C34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

NA = Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		TB1	TB2	TB3	EB1	FB1	FB2	FB3	FB4
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-15	2021-03-16	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2235320	2235545	2235546	2235646	2235741	2235744	2235781	2235819
1-Methylnaphthalene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L	0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L	0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment				NO	NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		77	92	78	75	78	79	78	81
Terphenyl-d14	%	50-140		83	104	81	83	82	88	81	85
Pyrene-d10	%	50-140		81	118	78	77	79	83	78	79

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2235320-2235819 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		TB1	TB2	TB3	EB1	FB2	FB3	FB4
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-16	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2235320	2235545	2235546	2235646	2235744	2235781	2235819
Chloromethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ug/L	0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Bromomethane	ug/L	0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89
Chloroethane	ug/L	5	<5	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane (FREON 11)	ug/L	5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/L	10	<10	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethylene	ug/L	0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Methylene Chloride (Dichloromethane)	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
trans-1,2-Dichloroethylene	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloroethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethylene	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
Chloroform	ug/L	1	5	4	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
1,1,1-Trichloroethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ug/L	0.56	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56
Benzene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Trichloroethylene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
2-Hexanone	ug/L	10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Dibromochloromethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Tetrachloroethylene	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
1,1,1,2-Tetrachloroethane	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

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CANADA B3B 1M2
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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		TB1	TB2	TB3	EB1	FB2	FB3	FB4
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-16	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2235320	2235545	2235546	2235646	2235744	2235781	2235819
Ethylbenzene	ug/L	2	<2	<2	<2	<2	<2	<2	<2	<2
m,p-Xylene	ug/L	4	<4	<4	<4	<4	<4	<4	<4	<4
Bromoform	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/L	1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Surrogate	Unit	Acceptable Limits								
Toluene-d8	%	60-140	92	95	94	94	94	94	95	96
4-Bromofluorobenzene	%	60-140	84	83	86	85	85	85	88	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X723545

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		TB1	TB2	TB3	EB1	EB2	EB3	EB4	FB1
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-16	2021-03-17	2021-03-18	2021-03-15
Parameter	Unit	G / S	RDL	2235320	2235545	2235546	2235646	2235649	2235660	2235661	2235741
Perfluorobutanoic Acid PFBA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTriDA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Certified By:


Olivier Lachance

Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
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FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:	TB1	TB2	TB3	EB1	EB2	EB3	EB4	FB1
		SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:	2021-03-15	2021-03-16	2021-03-17	2021-03-15	2021-03-16	2021-03-17	2021-03-18	2021-03-15
Surrogate	Unit	Acceptable Limits	2235320	2235545	2235546	2235646	2235649	2235660	2235661	2235741
Perfluorobutanoic Acid-13C4	%	30-140	87	73	81	72	92	112	98	78
Perfluoropentanoic Acid-13C5	%	30-140	81	72	73	67	86	108	89	70
Perfluorohexanoic Acid-13C5	%	30-140	85	74	86	70	91	112	93	79
Perfluoroheptanoic Acid-13C4	%	30-140	91	78	81	72	86	101	92	77
Perfluorooctanoic Acid-13C8	%	30-140	79	80	85	75	89	107	101	82
Perfluorononanoic Acid-13C9	%	30-140	90	82	88	83	93	111	97	78
Perfluorodecanoic Acid-13C6	%	30-140	56	60	79	71	76	88	49	76
Perfluoroundecanoic Acid-13C7	%	30-140	40	39	54	87	46	56	37	45
Perfluorododecanoic Acid-13C2	%	30-140	39	26	41	30	31	41	32	30
Perfluorotetradecanoic Acid-13C2	%	30-140	31	18	41	15	43	31	32	37
Perfluorobutanesulfonic Acid-13C3	%	30-140	76	65	76	63	82	99	92	69
Perfluorohexasulfonic Acid-13C3	%	30-140	96	77	81	65	83	102	108	69
Perfluorooctasulfonic Acid-13C8	%	30-140	54	60	60	71	53	81	51	57
Perfluorooctane sulfonamide -13C8	%	30-140	37	30	46	35	31	38	30	35
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	42	31	67	33	43	49	38	41

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:		FB2	FB3	FB4
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2021-03-16	2021-03-17	2021-03-18
Parameter	Unit	G / S	RDL	2235744	2235781	2235819
Perfluorobutanoic Acid PFBA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTriDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L		1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L		1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L		1.0	<1.0	<1.0	<1.0

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X723545

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-03-19

DATE REPORTED: 2021-04-08

		SAMPLE DESCRIPTION:	FB2	FB3	FB4
		SAMPLE TYPE:	Water	Water	Water
		DATE SAMPLED:	2021-03-16	2021-03-17	2021-03-18
Surrogate	Unit	Acceptable Limits	2235744	2235781	2235819
Perfluorobutanoic Acid-13C4	%	30-140	66	79	83
Perfluoropentanoic Acid-13C5	%	30-140	58	76	77
Perfluorohexanoic Acid-13C5	%	30-140	67	83	79
Perfluoroheptanoic Acid-13C4	%	30-140	59	78	76
Perfluorooctanoic Acid-13C8	%	30-140	64	86	75
Perfluorononanoic Acid-13C9	%	30-140	66	76	80
Perfluorodecanoic Acid-13C6	%	30-140	50	54	67
Perfluoroundecanoic Acid-13C7	%	30-140	35	40	31
Perfluorododecanoic Acid-13C2	%	30-140	17	31	19
Perfluorotetradecanoic Acid-13C2	%	30-140	15	33	30
Perfluorobutanesulfonic Acid-13C3	%	30-140	54	74	86
Perfluorohexasulfonic Acid-13C3	%	30-140	59	69	81
Perfluorooctasulfonic Acid-13C8	%	30-140	57	52	78
Perfluorooctane sulfonamide -13C8	%	30-140	42	35	36
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	30	38	31

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2235545 Surrogate recovery percentages are out of compliance due to matrix interference.

2235646 Surrogate recovery percentages are out of compliance due to matrix interference.

2235744 Surrogate recovery percentages are out of compliance due to matrix interference.

2235819 Surrogate recovery percentages are out of compliance due to matrix interference.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:


Olivier Lachance

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

Trace Organics Analysis

RPT Date: Apr 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Water - (PAH)															
1-Methylnaphthalene	1	2231030	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	116%	50%	140%	127%	50%	140%
2-Methylnaphthalene	1	2231030	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	105%	50%	140%	118%	50%	140%
Acenaphthene	1	2231030	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	118%	50%	140%	126%	50%	140%
Acenaphthylene	1	2231030	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	97%	50%	140%	100%	50%	140%
Acridine	1	2231030	< 0.01	< 0.01	NA	< 0.01	92%	50%	140%	92%	50%	140%	94%	50%	140%
Anthracene	1	2231030	< 0.012	< 0.012	NA	< 0.012	88%	50%	140%	87%	50%	140%	75%	50%	140%
Benzo(a)anthracene	1	2231030	< 0.018	< 0.018	NA	< 0.018	81%	50%	140%	82%	50%	140%	83%	50%	140%
Benzo(a)pyrene	1	2231030	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	86%	50%	140%	88%	50%	140%
Benzo(b)fluoranthene	1	2231030	< 0.01	< 0.01	NA	< 0.01	123%	50%	140%	131%	50%	140%	131%	50%	140%
Benzo(j+k)fluoranthene	1	2231030	< 0.01	< 0.01	NA	< 0.01	118%	50%	140%	85%	50%	140%	89%	50%	140%
Benzo(e)pyrene	1	2231030	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	115%	50%	140%	120%	50%	140%
Benzo(ghi)perylene	1	2231030	< 0.01	< 0.01	NA	< 0.01	71%	50%	140%	78%	50%	140%	79%	50%	140%
Chrysene	1	2231030	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	127%	50%	140%	130%	50%	140%
Dibenzo(a,h)anthracene	1	2231030	< 0.01	< 0.01	NA	< 0.01	67%	50%	140%	68%	50%	140%	60%	50%	140%
Fluoranthene	1	2231030	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	106%	50%	140%	109%	50%	140%
Fluorene	1	2231030	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	114%	50%	140%	118%	50%	140%
Indeno(1,2,3-cd)pyrene	1	2231030	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	106%	50%	140%	101%	50%	140%
Naphthalene	1	2231030	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	112%	50%	140%	121%	50%	140%
Perylene	1	2231030	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	119%	50%	140%	122%	50%	140%
Phenanthrene	1	2231030	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	125%	50%	140%	121%	50%	140%
Pyrene	1	2231030	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	116%	50%	140%	117%	50%	140%
Quinoline	1	2231030	< 0.01	< 0.01	NA	< 0.01	74%	50%	140%	97%	50%	140%	114%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

CCME Petroleum Hydrocarbon F1 - F4 in Water

Benzene	1	2234844	< 0.2	< 0.2	NA	< 0.2	106%	70%	130%	119%	70%	130%			
Toluene	1	2234844	< 0.2	< 0.2	NA	< 0.2	108%	70%	130%	119%	70%	130%			
Ethylbenzene	1	2234844	< 0.1	< 0.1	NA	< 0.1	111%	70%	130%	123%	70%	130%			
Xylenes (Total)	1	2234844	< 0.2	< 0.2	NA	< 0.2	108%	70%	130%	120%	70%	130%			
C6 - C10 (F1)	1	2234844	< 63	< 63	NA	< 63	103%	60%	140%	97%	60%	140%	100%	60%	140%
C6 - C10 (F1 minus BTEX)	1	2234844	< 63	< 63	NA	< 63	103%	60%	140%	97%	60%	140%	100%	60%	140%
>C10 - C16 (F2)	1	2235320	< 49	< 49	NA	< 49	98%	60%	140%	102%	60%	140%	115%	60%	140%
>C16 - C34 (F3)	1	2235320	< 100	< 100	NA	< 100	95%	60%	140%	102%	60%	140%	115%	60%	140%
>C34 - C50 (F4)	1	2235320	< 100	< 100	NA	< 100	90%	60%	140%	102%	60%	140%	115%	60%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Water

AGAT QUALITY ASSURANCE REPORT (V1)

Page 11 of 18

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723545

PROJECT: 680449

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Apr 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Chloromethane	2230851		<1	<1	NA	< 1	81%	50%	140%	80%	60%	130%	81%	50%	140%
Vinyl Chloride	2230851		<0.6	<0.6	NA	< 0.6	88%	50%	140%	91%	60%	130%	97%	50%	140%
Bromomethane	2230851		<0.89	<0.89	NA	< 0.89	155%	50%	140%	158%	60%	130%	92%	50%	140%
Chloroethane	2230851		<5	<5	NA	< 5	100%	50%	140%	101%	60%	130%	104%	50%	140%
Trichlorofluoromethane (FREON 11)	2230851		<5	<5	NA	< 5	115%	50%	140%	119%	60%	130%	131%	50%	140%
Acetone	2230851		<10	<10	NA	< 10	98%	50%	140%	105%	50%	140%	105%	50%	140%
1,1-Dichloroethylene	2230851		<0.6	<0.6	NA	< 0.6	105%	50%	140%	109%	60%	130%	116%	50%	140%
Methylene Chloride (Dichloromethane)	2230851		<2	<2	NA	< 2	98%	50%	140%	102%	60%	130%	107%	50%	140%
trans-1,2-Dichloroethylene	2230851		<2	<2	NA	< 2	99%	50%	140%	104%	60%	130%	108%	50%	140%
1,1-Dichloroethane	2230851		<1	<1	NA	< 1	100%	50%	140%	104%	60%	130%	109%	50%	140%
cis-1,2-Dichloroethylene	2230851		<2	<2	NA	< 2	99%	50%	140%	102%	60%	130%	108%	50%	140%
Chloroform	2230851		194	174	10.9%	< 1	100%	50%	140%	106%	60%	130%	NA	50%	140%
1,2-Dichloroethane	2230851		<2	<2	NA	< 2	92%	50%	140%	99%	60%	130%	100%	50%	140%
1,1,1-Trichloroethane	2230851		<1	<1	NA	< 1	96%	50%	140%	101%	60%	130%	106%	50%	140%
Carbon Tetrachloride	2230851		<0.56	<0.56	NA	< 0.56	100%	50%	140%	106%	60%	130%	113%	50%	140%
Benzene	2230851		<1	<1	NA	< 1	94%	70%	130%	98%	60%	140%	103%	60%	140%
1,2-Dichloropropane	2230851		<0.7	<0.7	NA	< 0.7	94%	50%	140%	98%	60%	130%	100%	50%	140%
Trichloroethylene	2230851		<1	<1	NA	< 1	94%	50%	140%	101%	60%	130%	118%	50%	140%
Bromodichloromethane	2230851		5	5	6.6%	< 1	93%	50%	140%	97%	60%	130%	108%	50%	140%
cis-1,3-Dichloropropene	2230851		<0.5	<0.5	NA	< 0.5	96%	50%	140%	102%	60%	130%	70%	50%	140%
trans-1,3-Dichloropropene	2230851		<0.5	<0.5	NA	< 0.5	94%	50%	140%	99%	60%	130%	66%	50%	140%
1,1,2-Trichloroethane	2230851		<1	<1	NA	< 1	92%	50%	140%	98%	60%	130%	99%	50%	140%
Toluene	2230851		<2	<2	NA	< 2	89%	70%	130%	92%	60%	140%	95%	60%	140%
2-Hexanone	2230851		<10.0	<10.0	NA	< 10.0	97%	50%	140%	103%	50%	140%	95%	50%	140%
Dibromochloromethane	2230851		<1	<1	NA	< 1	93%	50%	140%	98%	60%	130%	104%	50%	140%
1,2-Dibromoethane	2230851		<0.2	<0.2	NA	< 0.2	93%	50%	140%	97%	60%	130%	100%	50%	140%
Tetrachloroethylene	2230851		<2	<2	NA	< 2	104%	50%	140%	109%	60%	130%	116%	50%	140%
1,1,1,2-Tetrachloroethane	2230851		<0.5	<0.5	NA	< 0.5	90%	50%	140%	96%	60%	130%	100%	50%	140%
Chlorobenzene	2230851		<1	<1	NA	< 1	90%	50%	140%	94%	60%	130%	97%	50%	140%
Ethylbenzene	2230851		<2	<2	NA	< 2	92%	70%	130%	95%	60%	140%	97%	60%	140%
m,p-Xylene	2230851		<4	<4	NA	< 4	86%	70%	130%	90%	60%	140%	91%	60%	140%
Bromoform	2230851		<1	<1	NA	< 1	90%	50%	140%	94%	60%	130%	98%	50%	140%
Styrene	2230851		<1	<1	NA	< 1	81%	50%	140%	84%	60%	130%	84%	50%	140%
1,1,2,2-Tetrachloroethane	2230851		<1	<1	NA	< 1	91%	50%	140%	97%	60%	130%	97%	50%	140%
o-Xylene	2230851		<1	<1	NA	< 1	88%	70%	130%	92%	60%	140%	94%	60%	140%
1,3-Dichlorobenzene	2230851		<1	<1	NA	< 1	84%	50%	140%	89%	60%	130%	93%	50%	140%
1,4-Dichlorobenzene	2230851		<1	<1	NA	< 1	94%	50%	140%	94%	60%	130%	100%	50%	140%
1,2-Dichlorobenzene	2230851		<0.7	<0.7	NA	< 0.7	101%	50%	140%	110%	60%	130%	106%	50%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

Trace Organics Analysis (Continued)


RPT Date: Apr 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Comments: Reference Material and Blank Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

Ultra Trace Analysis

RPT Date: Apr 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Perfluorinated Compounds (water)

Perfluorobutanoic Acid PFBA	1	2235649	< 1.0	< 1.0	NA	< 1.0	80%	60%	140%	NA	60%	140%	86%	60%	140%
Perfluoropentanoic Acid PFPeA	1	2235649	< 1.0	< 1.0	NA	< 1.0	82%	60%	140%	NA	60%	140%	85%	60%	140%
Perfluorohexanoic Acid PFHxA	1	2235649	< 1.0	< 1.0	NA	< 1.0	75%	60%	140%	NA	60%	140%	82%	60%	140%
Perfluoroheptanoic Acid PFHpA	1	2235649	< 1.0	< 1.0	NA	< 1.0	80%	60%	140%	NA	60%	140%	85%	60%	140%
Perfluorooctanoic Acid PFOA	1	2235649	< 1.0	< 1.0	NA	< 1.0	86%	60%	140%	NA	60%	140%	86%	60%	140%
Perfluorononanoic Acid PFNA	1	2235649	< 1.0	< 1.0	NA	< 1.0	78%	60%	140%	NA	60%	140%	87%	60%	140%
Perfluorodecanoic Acid PFDA	1	2235649	< 1.0	< 1.0	NA	< 1.0	68%	60%	140%	NA	60%	140%	82%	60%	140%
Perfluoroundecanoic Acid PFUnA	1	2235649	< 1.0	< 1.0	NA	< 1.0	61%	60%	140%	NA	60%	140%	68%	60%	140%
Perfluorododecanoic Acid PFDoA	1	2235649	< 1.0	< 1.0	NA	< 1.0	111%	60%	140%	NA	60%	140%	103%	60%	140%
Perfluorotridecanoic Acid PFTrDA	1	2235649	< 1.0	< 1.0	NA	< 1.0	85%	60%	140%	NA	60%	140%	70%	60%	140%
Perfluorotetradecanoic Acid PFTeDA	1	2235649	< 1.0	< 1.0	NA	< 1.0	98%	60%	140%	NA	60%	140%	86%	60%	140%
Perfluorobutanesulfonic Acid PFBS	1	2235649	< 1.0	< 1.0	NA	< 1.0	82%	60%	140%	NA	60%	140%	82%	60%	140%
Perfluorohexasulfonic Acid PFHxS	1	2235649	< 1.0	< 1.0	NA	< 1.0	79%	60%	140%	NA	60%	140%	80%	60%	140%
Perfluoroheptanesulfonate PFHpS	1	2235649	< 1.0	< 1.0	NA	< 1.0	103%	60%	140%	NA	60%	140%	90%	60%	140%
Perfluorooctasulfonic Acid PFOS	1	2235649	< 1.0	< 1.0	NA	< 1.0	76%	60%	140%	NA	60%	140%	76%	60%	140%
Perfluorooctanesulfonamide Acid PFOSA	1	2235649	< 1.0	< 1.0	NA	< 1.0	120%	60%	140%	NA	60%	140%	137%	60%	140%
Perfluorodecanesulfonic Acid PFDS	1	2235649	< 1.0	< 1.0	NA	< 1.0	138%	60%	140%	NA	60%	140%	84%	60%	140%
N-Methylperfluorosulfonamideacetic N-MeFOSAA	1	2235649	< 1.0	< 1.0	NA	< 1.0	100%	60%	140%	NA	60%	140%	99%	60%	140%
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	1	2235649	< 1.0	< 1.0	NA	< 1.0	85%	60%	140%	NA	60%	140%	81%	60%	140%

Certified By:



QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X723545

PROJECT: 680449

ATTENTION TO: Alan Parker

RPT Date: Apr 08, 2021					REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER				Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
						Lower	Upper		Lower	Upper		Lower	Upper

Volatile Organic Compounds in Water

Bromomethane

155% 50% 140% 158% 60% 130% 92% 50% 140%

Comments: Reference Material and Blank Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Toluene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Ethylbenzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Xylenes (Total)	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
C6 - C10 (F1)	VOL-120-5015	CCME CWS Tier 1	GC/MS/FID
C6 - C10 (F1 minus BTEX)	VOL-120-5015	CCME Tier 1 Method	GC/MS/FID
>C10 - C16 (F2)	ORG-120-5103	based on CCME Tier 1 Method	GC/FID
C6 - C16 (F1 + F2)	VOL-120-5014	based on CCME Tier 1 Method	Calculation
>C16 - C34 (F3)	ORG-120-5103	based on CCME Tier 1 Method	GC/FID
>C34 - C50 (F4)	ORG-120-5103	based on CCME Tier 1 Method	GC/FID
>C16 - C50 (F3 + F4)	ORG-120-5103	based on CCME Tier 1 Method	CALCULATION
Gravimetric Heavy Hydrocarbons (F4G)	ORG-120-5103	based on CCME Tier 1 Method	GRAVIMETRIC
Sediment			GC/MS/FID
o-terphenyl	ORG-120-5103	Based on CCME	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Chloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Vinyl Chloride	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromomethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Chloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Acetone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Methylene Chloride (Dichloromethane)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,1-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Benzene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
1,2-Dichloropropane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromodichloromethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
cis-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
2-Hexanone	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Dibromochloromethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,2-Dibromoethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Tetrachloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120-5001	EPA SW846 5035/8260B	GC/MS
Chlorobenzene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Ethylbenzene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
m,p-Xylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromoform	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Styrene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
o-Xylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,3-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,2-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene-d8	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X723545

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
Perfluorobutanoic Acid PFBA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid PFPeA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid PFHxA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid PFHpA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid PFOA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid PFNA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid PFDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid PFUnA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid PFDoA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotridecanoic Acid PFTriDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid PFBS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid PFHxS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanesulfonate PFHpS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid PFOS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanesulfonamide Acid PFOSA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanesulfonic Acid PFDS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Methylperfluorosulfonamideacetic N-MeFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid-13C9	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid-13C6	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid-13C7	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide -13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic-D5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS

CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX, NS B3J3R4
(902) 492-4544

ATTENTION TO: Alan Parker

PROJECT: 680449

AGAT WORK ORDER: 21X725158

SOIL ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

ULTRA TRACE REVIEWED BY: Olivier Lachance, Method Development Supervisor

DATE REPORTED: Apr 07, 2022

PAGES (INCLUDING COVER): 25

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH01-		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-	
SAMPLE DESCRIPTION:		01		08		09		01		05		08		09		21SS-01	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254220	2254353	2254356	2254375	2254381	2254382	2254383	2254384	2254385	2254386	2254387	2254388	2254389	2254390
Aluminum	mg/kg		10	10800	14700	10900	14500	13600	14900	13700	13400						
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Arsenic	mg/kg		1	8	10	8	9	9	9	7	8						
Barium	mg/kg		5	12	77	13	25	80	66	23	19						
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Boron	mg/kg		2	<2	5	<2	3	6	7	2	3						
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3						
Chromium	mg/kg		2	14	22	15	19	20	22	19	19						
Cobalt	mg/kg		1	5	12	5	12	12	12	12	5						
Copper	mg/kg		2	6	19	6	17	19	26	15	7						
Iron	mg/kg		50	23100	25500	21100	22900	21200	24300	21800	27800						
Lead	mg/kg		0.5	8.8	9.0	8.0	8.2	7.4	186	7.9	7.3						
Lithium	mg/kg		5	15	30	19	26	32	31	25	22						
Manganese	mg/kg		2	188	711	176	599	644	714	594	168						
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2						
Nickel	mg/kg		2	10	28	12	21	27	28	20	15						
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1						
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Strontium	mg/kg		5	<5	20	<5	5	20	22	5	<5						
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Tin	mg/kg		2	3	3	3	3	3	3	3	3						
Uranium	mg/kg		0.1	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.3						
Vanadium	mg/kg		2	28	24	24	21	22	24	20	29						
Zinc	mg/kg		5	24	60	26	49	61	58	45	32						

Certified By:

Marla Manka



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AGAT WORK ORDER: 21X725158

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Available Metals in Soil

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21MW06- S5551-21MW06- S5551-21MW02- S5551-21MW02-					
		SAMPLE DESCRIPTION:		21SS-08	21SS-09	21SS-01	21SS-08
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-22	2021-03-22	2021-03-22	2021-03-22
Parameter	Unit	G / S	RDL	2254461	2254462	2254468	2254478
Aluminum	mg/kg		10	14900	12400	9990	14300
Antimony	mg/kg		1	<1	<1	<1	<1
Arsenic	mg/kg		1	9	9	8	7
Barium	mg/kg		5	73	18	24	71
Beryllium	mg/kg		2	<2	<2	<2	<2
Boron	mg/kg		2	6	3	3	5
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg		2	57	18	16	22
Cobalt	mg/kg		1	13	5	5	15
Copper	mg/kg		2	24	7	9	20
Iron	mg/kg		50	23600	23600	15300	23500
Lead	mg/kg		0.5	7.3	7.7	11.0	6.9
Lithium	mg/kg		5	32	19	16	31
Manganese	mg/kg		2	674	170	215	630
Molybdenum	mg/kg		2	6	<2	<2	<2
Nickel	mg/kg		2	38	13	13	31
Selenium	mg/kg		1	<1	<1	<1	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	26	<5	14	21
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	3	3	3	3
Uranium	mg/kg		0.1	0.5	0.3	0.4	0.6
Vanadium	mg/kg		2	23	28	19	24
Zinc	mg/kg		5	62	29	31	66

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2254220-2254478 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Marla Manka



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AGAT WORK ORDER: 21X725158

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Grain Size Analysis - Coarse/Fine Classification

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21MW06-	
SAMPLE DESCRIPTION:		06		21SS-06	
SAMPLE TYPE:		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254347	2254459
Particles >75um	%	1	35.8	34.4	
Classification	Coarse/Fine		Fine	Fine	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Marla Manka

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AGAT WORK ORDER: 21X725158

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

CCME Petroleum Hydrocarbon F1 - F4 in Soil - Field Preserved

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-		S5551-21MW02-	
SAMPLE DESCRIPTION:		04		05		08		21SS-03		21SS-03	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254331	2254381	2254382	2254386	2254470			
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
Toluene	µg/g		0.08	<0.08	<0.08	<0.08	<0.08	<0.08			
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Xylenes (Total)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
C6 - C10 (F1)	µg/g		10	<10	<10	<10	<10	<10			
C6 - C10 (F1 minus BTEX)	µg/g		10	<10	<10	<10	<10	<10			
>C10 - C16 (F2)	µg/g		10	<10	<10	<10	<10	<10			
>C16 - C34 (F3)	µg/g		50	<50	<50	<50	<50	<50			
>C34 - C50 (F4)	µg/g		50	<50	<50	<50	<50	<50			
Gravimetric Heavy Hydrocarbons (F4G)	µg/g		50	N/A	N/A	N/A	N/A	N/A			
Surrogate	Unit	Acceptable Limits									
o-terphenyl	%	50-140		115	128	129	121	113			

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2254331-2254470 Results are based on sample dry weight.

Xylene(Total)and C6-C10(F1 minus BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Moisture									
DATE RECEIVED: 2021-03-23					DATE REPORTED: 2022-04-07				
		S5551-21BH01-		S5551-21BH01-	S5551-21BH01-	S5551-21BH04-	S5551-21BH04-	S5551-21BH04-	S5551-21MW06-
SAMPLE DESCRIPTION:		01		04	09	01	05	08	21SS-01
SAMPLE TYPE:		Soil		Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-03-22		2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22
Parameter	Unit	G / S	RDL	2254220	2254331	2254356	2254375	2254381	2254382
% Moisture	%	0.5	20	18	25	14	11	11	16
		S5551-21MW06-		S5551-21MW02-	S5551-21MW02-				
SAMPLE DESCRIPTION:		21SS-03		21SS-01	21SS-03				
SAMPLE TYPE:		Soil		Soil	Soil				
DATE SAMPLED:		2021-03-22		2021-03-22	2021-03-22				
Parameter	Unit	G / S	RDL	2254386	2254468				
% Moisture	%	0.5	13	16	13				

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-		S5551-21MW02-	
SAMPLE DESCRIPTION:		01		09		01		09		21SS-01		21SS-01	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254220	2254356	2254375	2254383	2254384	2254468				
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671				
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004				
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03				
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006				
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03				
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Surrogate	Unit	Acceptable Limits											
Naphthalene-d8	%	50-140		73	77	82	80	81	80				
Terphenyl-d14	%	50-140		78	84	83	88	85	90				
Pyrene-d10 (%)	%	50-140		68	72	73	74	74	75				

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
2254220-2254468 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil - Field Preserved

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-		S5551-21MW02-	
SAMPLE DESCRIPTION:		04		05		08		21SS-03		21SS-03	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254331	2254381	2254382	2254386	2254386	2254470	2254470	2254470
Chloromethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
Vinyl Chloride	ug/kg		20	<20	<20	<20	<20	<20	<20	<20	<20
Bromomethane	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
Chloroethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
Trichlorofluoromethane (FREON 11)	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
Acetone	ug/kg		500	<500	<500	<500	<500	<500	<500	<500	<500
1,1-Dichloroethylene	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
Methylene Chloride (Dichloromethane)	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,2-Dichloroethylene	ug/kg		80	<80	<80	<80	<80	<80	<80	<80	<80
1,1-Dichloroethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,2-Dichloroethylene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
Chloroform	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1-Trichloroethane	ug/kg		30	<30	<30	<30	<30	<30	<30	<30	<30
Carbon Tetrachloride	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
Benzene	ug/kg		6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
1,2-Dichloropropane	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
Trichloroethylene	ug/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloromethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
cis-1,3-Dichloropropene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
trans-1,3-Dichloropropene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,2-Trichloroethane	ug/kg		30	<30	<30	<30	<30	<30	<30	<30	<30
Toluene	ug/kg		80	<80	<80	<80	<80	<80	<80	<80	<80
2-Hexanone	ug/kg		500	<500	<500	<500	<500	<500	<500	<500	<500
Dibromochloromethane	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
1,2-Dibromoethane	ug/kg		50	<50	<50	<50	<50	<50	<50	<50	<50
Tetrachloroethylene	ug/kg		100	<100	<100	<100	<100	<100	<100	<100	<100
1,1,1,2-Tetrachloroethane	µg/kg		100	<100	<100	<100	<100	<100	<100	<100	<100

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil - Field Preserved

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-		S5551-21MW02-	
SAMPLE DESCRIPTION:		04		05		08		21SS-03		21SS-03	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254331	2254381	2254382	2254386	2254470			
Chlorobenzene	ug/kg		50	<50	<50	<50	<50	<50			
Ethylbenzene	ug/kg		18	<18	<18	<18	<18	<18			
m,p-Xylene	ug/kg		100	<100	<100	<100	<100	<100			
Bromoform	ug/kg		100	<100	<100	<100	<100	<100			
Styrene	ug/kg		100	<100	<100	<100	<100	<100			
1,1,2,2-Tetrachloroethane	ug/kg		50	<50	<50	<50	<50	<50			
o-Xylene	ug/kg		100	<100	<100	<100	<100	<100			
1,3-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50			
1,4-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50			
1,2-Dichlorobenzene	ug/kg		50	<50	<50	<50	<50	<50			
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%		60-140	98	96	97	99	99			
4-Bromofluorobenzene	%		60-140	88	90	87	87	88			

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2254331-2254470 Results are based on the dry weight of the soil.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

		S5551-21BH01-		S5551-21BH01-		S5551-21BH01-		S5551-21BH04-		S5551-21BH04-		S5551-21MW06-		S5551-21MW06-		S5551-21MW06-	
SAMPLE DESCRIPTION:		01		08		09		01		08		21SS-01		21SS-09		21Grab-01	
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254220	2254353	2254356	2254375	2254382	2254384	2254462	2254463						
Perfluorobutanoic Acid PFBA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluoropentanoic Acid PFPeA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorohexanoic Acid PFHxA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluoroheptanoic Acid PFHpA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorooctanoic Acid PFOA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorononanoic Acid PFNA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorodecanoic Acid PFDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluoroundecanoic Acid PFUnA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorododecanoic Acid PFDoA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorotridecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorotetradecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorobutanesulfonic Acid PFBS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorohexasulfonic Acid PFHxS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluoroheptanesulfonate PFHpS	ug/Kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorooctasulfonic Acid PFOS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorooctane sulfonamide PFOSA	ug/Kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
Perfluorodecanesulfonic Acid PFDS	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ug/kg		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0						

Certified By:


Olivier Lachance



Certificate of Analysis

AGAT WORK ORDER: 21X725158

PROJECT: 680449

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CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

			S5551-21BH01-	S5551-21BH01-	S5551-21BH01-	S5551-21BH04-	S5551-21BH04-	S5551-21BH04-	S5551-21MW06-	S5551-21MW06-	S5551-21MW06-
SAMPLE DESCRIPTION:			01	08	09	01	08	21SS-01	21SS-09	21Grab-01	
SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
DATE SAMPLED:			2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22	2021-03-22	
Surrogate	Unit	Acceptable Limits	2254220	2254353	2254356	2254375	2254382	2254384	2254462	2254463	
Perfluorobutanoic Acid-13C4	%	30-140	57	53	47	43	62	52	56	58	
Perfluoropentanoic Acid-13C5	%	30-140	65	56	50	50	69	57	63	62	
Perfluorohexanoic Acid-13C5	%	30-140	57	55	49	42	61	52	57	56	
Perfluoroheptanoic Acid-13C4	%	30-140	66	61	50	47	65	52	62	64	
Perfluorooctanoic Acid-13C8	%	30-140	71	49	52	48	66	62	70	80	
Perfluorononanoic Acid-13C9	%	30-140	66	53	54	45	64	61	67	80	
Perfluorodecanoic Acid-13C6	%	30-140	41	39	58	40	52	43	61	66	
Perfluoroundecanoic Acid-13C7	%	30-140	34	38	53	35	38	48	62	44	
Perfluorododecanoic Acid-13C2	%	30-140	41	27	46	28	36	39	40	42	
Perfluorotetradecanoic Acid-13C2	%	30-140	44	19	36	15	34	25	38	25	
Perfluorobutanesulfonic Acid-13C3	%	30-140	57	56	52	52	61	63	60	84	
Perfluorohexasulfonic Acid-13C3	%	30-140	58	54	46	46	55	62	60	72	
Perfluorooctasulfonic Acid-13C8	%	30-140	59	56	45	58	71	58	59	68	
Perfluorooctane sulfonamide -13C8	%	30-140	40	34	41	27	30	22	34	22	
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	51	40	44	35	41	53	62	46	

Certified By:



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CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

S5551-21MW02- S5551-21MW02-					
SAMPLE DESCRIPTION:		21SS-01		21SS-08	
SAMPLE TYPE:		Soil		Soil	
DATE SAMPLED:		2021-03-22		2021-03-22	
Parameter	Unit	G / S	RDL	2254468	2254478
Perfluorobutanoic Acid PFBA	ug/kg		1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ug/kg		1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ug/kg		1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ug/kg		1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ug/kg		1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ug/kg		1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ug/kg		1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ug/kg		1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ug/kg		1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ug/kg		1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ug/kg		1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ug/kg		1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ug/Kg		1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ug/kg		1.0	<1.0	<1.0
Perfluorooctane sulfonamide PFOSA	ug/Kg		1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ug/kg		1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ug/kg		1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ug/kg		1.0	<1.0	<1.0

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CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

S5551-21MW02- S5551-21MW02-				
SAMPLE DESCRIPTION:		21SS-01	21SS-08	
SAMPLE TYPE:		Soil	Soil	
DATE SAMPLED:		2021-03-22	2021-03-22	
Surrogate	Unit	Acceptable Limits	2254468	2254478
Perfluorobutanoic Acid-13C4	%	30-140	58	49
Perfluoropentanoic Acid-13C5	%	30-140	64	53
Perfluorohexanoic Acid-13C5	%	30-140	58	43
Perfluoroheptanoic Acid-13C4	%	30-140	60	47
Perfluorooctanoic Acid-13C8	%	30-140	56	47
Perfluorononanoic Acid-13C9	%	30-140	55	50
Perfluorodecanoic Acid-13C6	%	30-140	56	38
Perfluoroundecanoic Acid-13C7	%	30-140	40	41
Perfluorododecanoic Acid-13C2	%	30-140	32	26
Perfluorotetradecanoic Acid-13C2	%	30-140	30	25
Perfluorobutanesulfonic Acid-13C3	%	30-140	50	44
Perfluorohexasulfonic Acid-13C3	%	30-140	53	37
Perfluorooctasulfonic Acid-13C8	%	30-140	46	40
Perfluorooctane sulfonamide -13C8	%	30-140	32	24
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	40	32

Certified By:



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SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (soil)

DATE RECEIVED: 2021-03-23

DATE REPORTED: 2022-04-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2254220 The results were corrected based on the surrogate percent recoveries.

2254353 The results were corrected based on the surrogate percent recoveries.

Some surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

2254356 The results were corrected based on the surrogate percent recoveries.

2254375 The results were corrected based on the surrogate percent recoveries.

Some surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

2254382 The results were corrected based on the surrogate percent recoveries.

2254384 The results were corrected based on the surrogate percent recoveries.

Some surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

2254462 The results were corrected based on the surrogate percent recoveries.

2254463 The results were corrected based on the surrogate percent recoveries.

Some surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

2254468 The results were corrected based on the surrogate percent recoveries.

2254478 The results were corrected based on the surrogate percent recoveries.

Some surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:



Olivier Lachance

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

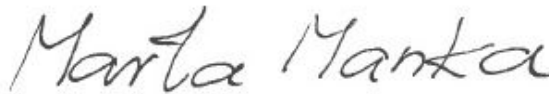
AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

Soil Analysis															
RPT Date: Apr 07, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Available Metals in Soil															
Aluminum	2254220	2254220	10800	11100	2.7%	< 10	100%	80%	120%	108%	80%	120%	NA	70%	130%
Antimony	2254220	2254220	<1	<1	NA	< 1	100%	80%	120%	102%	80%	120%	NA	70%	130%
Arsenic	2254220	2254220	8	8	4.0%	< 1	100%	80%	120%	104%	80%	120%	NA	70%	130%
Barium	2254220	2254220	12	12	NA	< 5	103%	80%	120%	109%	80%	120%	115%	70%	130%
Beryllium	2254220	2254220	<2	<2	NA	< 2	101%	80%	120%	111%	80%	120%	120%	70%	130%
Boron	2254220	2254220	<2	2	NA	< 2	98%	80%	120%	108%	80%	120%	110%	70%	130%
Cadmium	2254220	2254220	<0.3	<0.3	NA	< 0.3	102%	80%	120%	96%	80%	120%	101%	70%	130%
Chromium	2254220	2254220	14	14	1.3%	< 2	98%	80%	120%	95%	80%	120%	NA	70%	130%
Cobalt	2254220	2254220	5	5	NA	< 1	98%	80%	120%	95%	80%	120%	126%	70%	130%
Copper	2254220	2254220	6	6	NA	< 2	101%	80%	120%	99%	80%	120%	123%	70%	130%
Iron	2254220	2254220	23100	23800	3.0%	< 50	99%	80%	120%	97%	80%	120%	97%	70%	130%
Lead	2254220	2254220	8.8	13.3	NA	< 0.5	99%	80%	120%	105%	80%	120%	90%	70%	130%
Lithium	2254220	2254220	15	18	NA	< 5	93%	70%	130%	103%	70%	130%	NA	70%	130%
Manganese	2254220	2254220	188	201	6.7%	< 2	101%	80%	120%	96%	80%	120%	103%	70%	130%
Molybdenum	2254220	2254220	<2	<2	NA	< 2	96%	80%	120%	93%	80%	120%	96%	70%	130%
Nickel	2254220	2254220	10	11	1.8%	< 2	100%	80%	120%	98%	80%	120%	107%	70%	130%
Selenium	2254220	2254220	<1	<1	NA	< 1	98%	80%	120%	97%	80%	120%	89%	70%	130%
Silver	2254220	2254220	<0.5	<0.5	NA	< 0.5	95%	80%	120%	95%	80%	120%	92%	70%	130%
Strontium	2254220	2254220	<5	<5	NA	< 5	90%	80%	120%	89%	80%	120%	127%	70%	130%
Thallium	2254220	2254220	<0.1	<0.1	NA	< 0.1	95%	80%	120%	101%	80%	120%	NA	70%	130%
Tin	2254220	2254220	3	3	NA	< 2	103%	80%	120%	107%	80%	120%	114%	70%	130%
Uranium	2254220	2254220	0.3	0.3	NA	< 0.1	100%	80%	120%	107%	80%	120%	78%	70%	130%
Vanadium	2254220	2254220	28	27	3.3%	< 2	98%	80%	120%	96%	80%	120%	NA	70%	130%
Zinc	2254220	2254220	24	23	NA	< 5	100%	80%	120%	96%	80%	120%	116%	70%	130%

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X725158

PROJECT: 680449

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Apr 07, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	2254220	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	90%	50%	140%	94%	50%	140%
2-Methylnaphthalene	1	2254220	< 0.01	< 0.01	NA	< 0.01	105%	50%	140%	87%	50%	140%	85%	50%	140%
Acenaphthene	1	2254220	< 0.00671	< 0.00671	NA	< 0.00671	111%	50%	140%	92%	50%	140%	93%	50%	140%
Acenaphthylene	1	2254220	< 0.004	< 0.004	NA	< 0.004	93%	50%	140%	74%	50%	140%	79%	50%	140%
Acridine	1	2254220	< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	90%	50%	140%	86%	50%	140%
Anthracene	1	2254220	< 0.03	< 0.03	NA	< 0.03	85%	50%	140%	68%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	2254220	< 0.01	< 0.01	NA	< 0.01	76%	50%	140%	80%	50%	140%	78%	50%	140%
Benzo(a)pyrene	1	2254220	< 0.01	< 0.01	NA	< 0.01	80%	50%	140%	72%	50%	140%	81%	50%	140%
Benzo(b)fluoranthene	1	2254220	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	98%	50%	140%	88%	50%	140%
Benzo(j+k)fluoranthene	1	2254220	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	75%	50%	140%	100%	50%	140%
Benzo(e)pyrene	1	2254220	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	93%	50%	140%	90%	50%	140%
Benzo(ghi)perylene	1	2254220	< 0.01	< 0.01	NA	< 0.01	61%	50%	140%	61%	50%	140%	73%	50%	140%
Chrysene	1	2254220	< 0.01	< 0.01	NA	< 0.01	137%	50%	140%	90%	50%	140%	90%	50%	140%
Dibenzo(a,h)anthracene	1	2254220	< 0.006	< 0.006	NA	< 0.006	65%	50%	140%	59%	50%	140%	79%	50%	140%
Fluoranthene	1	2254220	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	80%	50%	140%	84%	50%	140%
Fluorene	1	2254220	< 0.01	< 0.01	NA	< 0.01	101%	50%	140%	88%	50%	140%	94%	50%	140%
Indeno(1,2,3)pyrene	1	2254220	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	90%	50%	140%	119%	50%	140%
Naphthalene	1	2254220	< 0.01	< 0.01	NA	< 0.01	110%	50%	140%	85%	50%	140%	88%	50%	140%
Perylene	1	2254220	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	97%	50%	140%	100%	50%	140%
Phenanthrene	1	2254220	< 0.03	< 0.03	NA	< 0.03	100%	50%	140%	85%	50%	140%	92%	50%	140%
Pyrene	1	2254220	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	80%	50%	140%	83%	50%	140%
Quinoline	1	2254220	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	81%	50%	140%	96%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Soil - Field Preserved

Chloromethane	2254331	2254331	<100	<100	NA	< 100	77%	70%	130%	100%	60%	140%	82%	60%	140%
Vinyl Chloride	2254331	2254331	<20	<20	NA	< 20	83%	50%	140%	86%	60%	130%	79%	50%	140%
Bromomethane	2254331	2254331	<50	<50	NA	< 50	122%	50%	140%	139%	60%	130%	75%	50%	140%
Chloroethane	2254331	2254331	<100	<100	NA	< 100	90%	50%	140%	73%	60%	130%	92%	50%	140%
Trichlorofluoromethane (FREON 11)	2254331	2254331	<100	<100	NA	< 100	106%	50%	140%	136%	60%	130%	113%	50%	140%
Acetone	2254331	2254331	<500	<500	NA	< 500	86%	50%	140%	109%	50%	140%	89%	50%	140%
1,1-Dichloroethylene	2254331	2254331	<50	<50	NA	< 50	100%	50%	140%	123%	60%	130%	104%	50%	140%
Methylene Chloride (Dichloromethane)	2254331	2254331	<100	<100	NA	< 100	101%	50%	140%	117%	60%	130%	100%	50%	140%
trans-1,2-Dichloroethylene	2254331	2254331	<80	<80	NA	< 80	100%	50%	140%	120%	60%	130%	104%	50%	140%
1,1-Dichloroethane	2254331	2254331	<100	<100	NA	< 100	101%	50%	140%	115%	60%	130%	103%	50%	140%
cis-1,2-Dichloroethylene	2254331	2254331	<100	<100	NA	< 100	102%	50%	140%	117%	60%	130%	105%	50%	140%
Chloroform	2254331	2254331	<50	<50	NA	< 50	104%	50%	140%	149%	60%	130%	106%	50%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X725158

PROJECT: 680449

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Apr 07, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,2-Dichloroethane	2254331	2254331	<100	<100	NA	< 100	91%	50%	140%	100%	60%	130%	92%	50%	140%
1,1,1-Trichloroethane	2254331	2254331	<30	<30	NA	< 30	97%	50%	140%	117%	60%	130%	101%	50%	140%
Carbon Tetrachloride	2254331	2254331	<50	<50	NA	< 50	98%	50%	140%	123%	60%	130%	103%	50%	140%
Benzene	2254331	2254331	<6.8	<6.8	NA	< 6.8	99%	70%	130%	117%	60%	140%	100%	60%	140%
1,2-Dichloropropane	2254331	2254331	<50	<50	NA	< 50	96%	50%	140%	105%	60%	130%	98%	50%	140%
Trichloroethylene	2254331	2254331	<10	<10	NA	< 10	101%	50%	140%	126%	60%	130%	108%	50%	140%
Bromodichloromethane	2254331	2254331	<100	<100	NA	< 100	95%	50%	140%	103%	60%	130%	93%	50%	140%
cis-1,3-Dichloropropene	2254331	2254331	<100	<100	NA	< 100	94%	50%	140%	103%	60%	130%	94%	50%	140%
trans-1,3-Dichloropropene	2254331	2254331	<100	<100	NA	< 100	85%	50%	140%	98%	60%	130%	89%	50%	140%
1,1,2-Trichloroethane	2254331	2254331	<30	<30	NA	< 30	92%	50%	140%	101%	60%	130%	90%	50%	140%
Toluene	2254331	2254331	<80	<80	NA	< 80	85%	70%	130%	117%	60%	140%	93%	60%	140%
2-Hexanone	2254331	2254331	<500	<500	NA	< 500	82%	50%	140%	65%	50%	140%	75%	50%	140%
Dibromochloromethane	2254331	2254331	<100	<100	NA	< 100	94%	50%	140%	105%	60%	130%	93%	50%	140%
1,2-Dibromoethane	2254331	2254331	<50	<50	NA	< 50	93%	50%	140%	100%	60%	130%	92%	50%	140%
Tetrachloroethylene	2254331	2254331	<100	<100	NA	< 100	94%	50%	140%	140%	60%	130%	108%	50%	140%
1,1,1,2-Tetrachloroethane	2254331	2254331	<100	<100	NA	< 100	92%	50%	140%	108%	60%	130%	95%	50%	140%
Chlorobenzene	2254331	2254331	<50	<50	NA	< 50	91%	50%	140%	115%	60%	130%	93%	50%	140%
Ethylbenzene	2254331	2254331	<18	<18	NA	< 18	83%	70%	130%	118%	60%	140%	91%	60%	140%
m,p-Xylene	2254331	2254331	<100	<100	NA	< 100	78%	70%	130%	110%	60%	140%	84%	60%	140%
Bromoform	2254331	2254331	<100	<100	NA	< 100	86%	50%	140%	89%	60%	130%	82%	50%	140%
Styrene	2254331	2254331	<100	<100	NA	< 100	78%	50%	140%	97%	60%	130%	79%	50%	140%
1,1,2,2-Tetrachloroethane	2254331	2254331	<50	<50	NA	< 50	94%	50%	140%	100%	60%	130%	92%	50%	140%
o-Xylene	2254331	2254331	<100	<100	NA	< 100	82%	70%	130%	108%	60%	140%	85%	60%	140%
1,3-Dichlorobenzene	2254331	2254331	<50	<50	NA	< 50	80%	50%	140%	80%	60%	130%	78%	50%	140%
1,4-Dichlorobenzene	2254331	2254331	<50	<50	NA	< 50	92%	50%	140%	74%	60%	130%	84%	50%	140%
1,2-Dichlorobenzene	2254331	2254331	<50	<50	NA	< 50	94%	50%	140%	88%	60%	130%	90%	50%	140%

Comments: Blank spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

CCME Petroleum Hydrocarbon F1 - F4 in Soil - Field Preserved

Benzene	1	2237962	< 0.02	< 0.02	NA	< 0.02	107%	60%	140%	120%	60%	140%			
Toluene	1	2237962	< 0.08	< 0.08	NA	< 0.08	106%	60%	140%	120%	60%	140%			
Ethylbenzene	1	2237962	< 0.05	< 0.05	NA	< 0.05	106%	60%	140%	120%	60%	140%			
Xylenes (Total)	1	2237962	0.43	0.42	2.4%	< 0.05	107%	60%	140%	120%	60%	140%			
C6 - C10 (F1 minus BTEX)	1	2237962	38	37	NA	< 10	103%	60%	140%	99%	60%	140%	75%	60%	140%
>C10 - C16 (F2)	1	2254331	< 10	< 10	NA	< 10	97%	60%	140%	85%	60%	140%	91%	60%	140%
>C16 - C34 (F3)	1	2254331	< 50	< 50	NA	< 50	93%	60%	140%	85%	60%	140%	91%	60%	140%
>C34 - C50 (F4)	1	2254331	< 50	< 50	NA	< 50	101%	60%	140%	85%	60%	140%	91%	60%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Apr 07, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

Ultra Trace Analysis

RPT Date: Apr 07, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Perfluorinated Compounds (soil)

Perfluorobutanoic Acid PFBA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	93%	60%	140%	102%	60%	140%
Perfluoropentanoic Acid PFPeA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	92%	60%	140%	99%	60%	140%
Perfluorohexanoic Acid PFHxA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	91%	60%	140%	103%	60%	140%
Perfluoroheptanoic Acid PFHpA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	99%	60%	140%	115%	60%	140%
Perfluorooctanoic Acid PFOA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	92%	60%	140%	101%	60%	140%
Perfluorononanoic Acid PFNA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	75%	60%	140%	99%	60%	140%
Perfluorodecanoic Acid PFDA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	113%	60%	140%	90%	60%	140%
Perfluoroundecanoic Acid PFUnA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	84%	60%	140%	73%	60%	140%
Perfluorododecanoic Acid PFDoA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	82%	60%	140%	103%	60%	140%
Perfluorotridecanoic Acid PFTrDA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	138%	60%	140%	107%	60%	140%
Perfluorotetradecanoic Acid PFTeDA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	63%	60%	140%	98%	60%	140%
Perfluorobutanesulfonic Acid PFBS	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	81%	60%	140%	97%	60%	140%
Perfluorohexasulfonic Acid PFHxS	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	94%	60%	140%	94%	60%	140%
Perfluoroheptanesulfonate PFHpS	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	77%	60%	140%	68%	60%	140%
Perfluorooctasulfonic Acid PFOS	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	79%	60%	140%	89%	60%	140%
Perfluorooctane sulfonamide PFOSA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	116%	60%	140%	116%	60%	140%
Perfluorodecanesulfonic Acid PFDS	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	94%	60%	140%	86%	60%	140%
N-Methylperfluorosulfonamideacetic N-MeFOSAA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	74%	60%	140%	81%	60%	140%
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	1	2254468	< 1.0	< 1.0	0.0%	< 1.0	NA	60%	140%	67%	60%	140%	115%	60%	140%

Certified By:



QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X725158

PROJECT: 680449

ATTENTION TO: Alan Parker

RPT Date: Apr 07, 2022										
		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

Volatile Organic Compounds in Soil - Field Preserved

Bromomethane	2254331	122%	50%	140%	139%	60%	130%	75%	50%	140%
Trichlorofluoromethane (FREON 11)	2254331	106%	50%	140%	136%	60%	130%	113%	50%	140%
Chloroform	2254331	104%	50%	140%	149%	60%	130%	106%	50%	140%
Tetrachloroethylene	2254331	94%	50%	140%	140%	60%	130%	108%	50%	140%

Comments: Blank spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Particles >75um	INOR-121-6031, INOR-121-6034	ASTM D-422-63	Sieve
Classification	INOR-121-6031, INOR-121-6031	Atlantic RBCA	Sieve

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Toluene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Ethylbenzene	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
Xylenes (Total)	VOL-120-5015	Atlantic RBCA Guidelines for Laboratories Tier 1	(P&T)GC/MS
C6 - C10 (F1)	VOL-120-5015	CCME CWS Tier 1	GC/MS/FID
C6 - C10 (F1 minus BTEX)	VOL-120-5015	CCME CWS Tier 1	GC/MS/FID
>C10 - C16 (F2)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
>C16 - C34 (F3)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
>C34 - C50 (F4)	ORG-120-5102	Based on CCME CWS Tier 1	GC/FID
Gravimetric Heavy Hydrocarbons (F4G)	ORG-120-5102	Based on CCME CWS Tier 1	GRAVIMETRIC
o-terphenyl	ORG-120-5102	CCME	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Vinyl Chloride	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromomethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Chloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Acetone	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,1-Dichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Chloroform	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,1-Trichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Benzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichloropropane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Trichloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromodichloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
cis-1,3-Dichloropropene	VOL-120-5002	EPA SW846 5035/8260B	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Toluene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
2-Hexanone	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Dibromochloromethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dibromoethane	VOL-120-5002	EPA SW846 5235/8260B	GC/MS
Tetrachloroethylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120- 5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Ethylbenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
m,p-Xylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Bromoform	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
Styrene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
o-Xylene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,3-Dichlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
1,2-Dichlorobenzene	VOL-120-5002	EPA SW846 5235/8260B	GC/MS
Toluene-d8	VOL-120-5002	EPA SW846 5035/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5002	EPA SW846 5035/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

PROJECT: 680449

SAMPLING SITE:

AGAT WORK ORDER: 21X725158

ATTENTION TO: Alan Parker

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
Perfluorobutanoic Acid PFBA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid PFPeA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid PFHxA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid PFHpA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid PFOA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid PFNA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid PFDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid PFUnA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid PFDoA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotridecanoic Acid PFTriDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid PFBS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid PFHxS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanesulfonate PFHpS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid PFOS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide PFOSA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanesulfonic Acid PFDS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Methylperfluorosulfonamideacetic N-MeFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid-13C9	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid-13C6	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid-13C7	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide -13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic-D5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS

CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX, NS B3J3R4
(902) 492-4544

ATTENTION TO: Alan Parker

PROJECT:

AGAT WORK ORDER: 21X737616

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

ULTRA TRACE REVIEWED BY: Olivier Lachance, Method Development Supervisor

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: May 25, 2021

PAGES (INCLUDING COVER): 21

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 1: Partial report. PFAS results excluded. 2021/5/4 JFH

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW05-		S5551-21MW06-		S5551-21MW07-	
SAMPLE DESCRIPTION:		21GW-01		21GW-01		21GW-01		21GW-01	
SAMPLE TYPE:		Water		Water		Water		Water	
DATE SAMPLED:		2021-04-23		2021-04-23		2021-04-23		2021-04-23	
Parameter	Unit	G / S	RDL	2379113	2379118	2379119	2379120		
Benzene	mg/L	0.370	0.001	<0.001	<0.001	<0.001	<0.001		
Toluene	mg/L	0.002	0.001	<0.001	<0.001	<0.001	<0.001		
Ethylbenzene	mg/L	0.09	0.001	<0.001	<0.001	<0.001	<0.001		
Xylene (Total)	mg/L		0.001	<0.001	<0.001	<0.001	<0.001		
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01		
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05		
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05		
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01	<0.01	<0.01		
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05	<0.05	<0.05		
Sediment			TRACE	YES	TRACE	TRACE	TRACE		
Resemblance Comment			NR	NR	NR	NR	NR		
Return to Baseline at C32			Y	Y	Y	Y	Y		
Surrogate	Unit	Acceptable Limits							
Isobutylbenzene - EPH	%	70-130		92	106	111	102		
Isobutylbenzene - VPH	%	70-130		85	89	85	80		
n-Dotriacontane - EPH	%	70-130		103	118	121	114		

Certified By:



AGAT Laboratories

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CLIENT NAME: SNC Lavalin Inc.

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SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2379113-2379120 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:

GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

SAMPLING SITE:

ATTENTION TO: Alan Parker

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03- S5551-21MW05- S5551-21MW06- S5551-21MW07-					
SAMPLE DESCRIPTION:		21GW-01		21GW-01		21GW-01	
SAMPLE TYPE:		Water		Water		Water	
DATE SAMPLED:		2021-04-23		2021-04-23		2021-04-23	
Parameter	Unit	G / S	RDL	2379113	2379118	2379119	2379120
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L	5.8	0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L	4.4	0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L	0.012	0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L	0.018	0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L	0.015	0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L	0.04	0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L	3	0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L	1.1	0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L	0.4	0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L	0.025	0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L	3.4	0.01	<0.01	<0.01	<0.01	<0.01
Sediment				TRACE	TRACE	NO	TRACE
Surrogate	Unit	Acceptable Limits					
Naphthalene-d8	%	50-140	92	87	87	83	
Terphenyl-d14	%	50-140	70	70	88	82	
Pyrene-d10	%	50-140	90	90	94	90	

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X737616

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2379113-2379120 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 21X737616

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Dartmouth, Nova Scotia
CANADA B3B 1M2
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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03- S5551-21MW05- S5551-21MW06- S5551-21MW07-					
SAMPLE DESCRIPTION:		21GW-01	21GW-01	21GW-01	21GW-01		
SAMPLE TYPE:		Water	Water	Water	Water		
DATE SAMPLED:		2021-04-23	2021-04-23	2021-04-23	2021-04-23		
Parameter	Unit	G / S	RDL	2379113	2379118	2379119	2379120
Chloromethane	ug/L		1	<1	<1	<1	<1
Vinyl Chloride	ug/L		0.6	<0.6	<0.6	<0.6	<0.6
Bromomethane	ug/L		0.89	<0.89	<0.89	<0.89	<0.89
Chloroethane	ug/L		5	<5	<5	<5	<5
Trichlorofluoromethane (FREON 11)	ug/L		5	<5	<5	<5	<5
Acetone	ug/L		10	<10	<10	<10	<10
1,1-Dichloroethylene	ug/L		0.6	<0.6	<0.6	<0.6	<0.6
Methylene Chloride (Dichloromethane)	ug/L	98.1	2	<2	<2	<2	<2
trans-1,2-Dichloroethylene	ug/L		2	<2	<2	<2	<2
1,1-Dichloroethane	ug/L		1	<1	<1	<1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2	<2	<2	<2
Chloroform	ug/L	1.8	1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	100	2	<2	<2	<2	<2
1,1,1-Trichloroethane	ug/L		1	<1	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	0.56	<0.56	<0.56	<0.56	<0.56
Benzene	ug/L	370	1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L		0.7	<0.7	<0.7	<0.7	<0.7
Trichloroethylene	ug/L	21	1	<1	<1	<1	<1
Bromodichloromethane	ug/L		1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L		1	<1	<1	<1	<1
Toluene	ug/L	2	2	<2	<2	<2	<2
2-Hexanone	ug/L		10.0	<10.0	<10.0	<10.0	<10.0
Dibromochloromethane	ug/L		1	<1	<1	<1	<1
1,2-Dibromoethane	ug/L		0.2	<0.2	<0.2	<0.2	<0.2
Tetrachloroethylene	ug/L	110	2	<2	<2	<2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5	<0.5	<0.5	<0.5

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW05-		S5551-21MW06-		S5551-21MW07-	
SAMPLE DESCRIPTION:		21GW-01		21GW-01		21GW-01		21GW-01	
SAMPLE TYPE:		Water		Water		Water		Water	
DATE SAMPLED:		2021-04-23		2021-04-23		2021-04-23		2021-04-23	
Parameter	Unit	G / S	RDL	2379113	2379118	2379119	2379120		
Chlorobenzene	ug/L	1.3	1	<1	<1	<1	<1		
Ethylbenzene	ug/L	90	2	<2	<2	<2	<2		
m,p-Xylene	ug/L		4	<4	<4	<4	<4		
Bromoform	ug/L		1	<1	<1	<1	<1		
Styrene	ug/L	72	1	<1	<1	<1	<1		
1,1,2,2-Tetrachloroethane	ug/L		1	<1	<1	<1	<1		
o-Xylene	ug/L		1	<1	<1	<1	<1		
1,3-Dichlorobenzene	ug/L	150	1	<1	<1	<1	<1		
1,4-Dichlorobenzene	ug/L	26	1	<1	<1	<1	<1		
1,2-Dichlorobenzene	ug/L	0.70	0.7	<0.7	<0.7	<0.7	<0.7		
Surrogate	Unit	Acceptable Limits							
Toluene-d8	%	60-140		97	98	100	98		
4-Bromofluorobenzene	%	60-140		92	94	94	91		

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

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Dartmouth, Nova Scotia
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TEL (902)468-8718
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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03- S5551-21MW06- S5551-21MW07-				
SAMPLE DESCRIPTION:		21GW-01	21GW-01	21GW-01		
SAMPLE TYPE:		Water	Water	Water		
DATE SAMPLED:		2021-04-23	2021-04-23	2021-04-23		
Parameter	Unit	G / S	RDL	2379113	2379119	2379120
Perfluorobutanoic Acid PFBA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoropentanoic Acid PFPeA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTeDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L		1.0	<1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L		1.0	<1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L		1.0	<1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L		1.0	<1.0	<1.0	<1.0

Certified By:


Olivier Lachance

Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

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CANADA B3B 1M2
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<http://www.agatlabs.com>

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03- S5551-21MW06- S5551-21MW07-			
SAMPLE DESCRIPTION:		21GW-01	21GW-01	21GW-01	
SAMPLE TYPE:		Water	Water	Water	
DATE SAMPLED:		2021-04-23	2021-04-23	2021-04-23	
Surrogate	Unit	Acceptable Limits	2379113	2379119	2379120
Perfluorobutanoic Acid-13C4	%	30-140	66	49	68
Perfluoropentanoic Acid-13C5	%	30-140	64	48	71
Perfluorohexanoic Acid-13C5	%	30-140	59	40	60
Perfluoroheptanoic Acid-13C4	%	30-140	61	43	62
Perfluorooctanoic Acid-13C8	%	30-140	57	52	57
Perfluorononanoic Acid-13C9	%	30-140	57	51	60
Perfluorodecanoic Acid-13C6	%	30-140	66	52	63
Perfluoroundecanoic Acid-13C7	%	30-140	46	37	35
Perfluorododecanoic Acid-13C2	%	30-140	40	19	22
Perfluorotetradecanoic Acid-13C2	%	30-140	30	12	15
Perfluorobutanesulfonic Acid-13C3	%	30-140	71	48	58
Perfluorohexasulfonic Acid-13C3	%	30-140	62	47	60
Perfluorooctasulfonic Acid-13C8	%	30-140	65	40	56
Perfluorooctane sulfonamide -13C8	%	30-140	39	39	46
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	51	18	26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2379119-2379120 Surrogate not within acceptance limits. Surrogate recovery was low bias, therefore results could potentially be biased high due to surrogate correction.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:


Olivier Lachance
2006-083
QUÉBEC



Certificate of Analysis

AGAT WORK ORDER: 21X737616

PROJECT:

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CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2021-04-23

DATE REPORTED: 2021-05-25

		S5551-21MW03-		S5551-21MW05-		S5551-21MW06-		S5551-21MW07-	
SAMPLE DESCRIPTION:		21GW-01		21GW-01		21GW-01		21GW-01	
SAMPLE TYPE:		Water		Water		Water		Water	
DATE SAMPLED:		2021-04-23		2021-04-23		2021-04-23		2021-04-23	
Parameter	Unit	G / S	RDL	2379113	2379118	2379119	2379120		
Dissolved Aluminum	ug/L	Variable	5	<5	<5	<5	<5		
Dissolved Antimony	ug/L		2	<2	<2	<2	<2		
Dissolved Arsenic	ug/L	5	2	4	14	46	47		
Dissolved Barium	ug/L		5	363	151	123	123		
Dissolved Beryllium	ug/L		2	<2	<2	<2	<2		
Dissolved Bismuth	ug/L		2	<2	<2	<2	<2		
Dissolved Boron	ug/L	29000,	5	23	48	34	34		
Dissolved Cadmium	ug/L	1.0, 0.09	0.09	<0.09	<0.09	<0.09	<0.09		
Dissolved Chromium	ug/L		1	5	4	4	3		
Dissolved Cobalt	ug/L		1	<1	<1	<1	<1		
Dissolved Copper	ug/L	Equation	2	<2	<2	<2	<2		
Dissolved Iron	ug/L	300	50	<50	<50	671	642		
Dissolved Lead	ug/L	Equation	0.5	<0.5	<0.5	<0.5	<0.5		
Dissolved Manganese	ug/L		2	277	470	242	267		
Dissolved Molybdenum	ug/L	73	2	<2	18	7	7		
Dissolved Nickel	ug/L	Equation	2	<2	4	<2	<2		
Dissolved Selenium	ug/L	1.0	1	<1	<1	<1	<1		
Dissolved Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1	<0.1		
Dissolved Strontium	ug/L		5	330	291	223	240		
Dissolved Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1	<0.1		
Dissolved Tin	ug/L		2	<2	<2	<2	<2		
Dissolved Titanium	ug/L		2	<2	<2	<2	<2		
Dissolved Uranium	ug/L	33, 15	0.1	4.7	6.2	2.7	2.6		
Dissolved Vanadium	ug/L		2	<2	<2	<2	<2		
Dissolved Zinc	ug/L	30	5	6	14	<5	<5		

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2379113-2379120 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Marla Manka

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

Benzene	1	2378267	< 0.001	< 0.001	NA	< 0.001	76%	70%	130%	95%	70%	130%			
Toluene	1	2378267	< 0.001	< 0.001	NA	< 0.001	78%	70%	130%	89%	70%	130%			
Ethylbenzene	1	2378267	< 0.001	< 0.001	NA	< 0.001	92%	70%	130%	102%	70%	130%			
Xylene (Total)	1	2378267	< 0.001	< 0.001	NA	< 0.001	87%	70%	130%	99%	70%	130%			
C6-C10 (less BTEX)	1	2378267	< 0.01	< 0.01	NA	< 0.01	83%	70%	130%	99%	70%	130%	94%	70%	130%
>C10-C16 Hydrocarbons	1	2373801	< 0.05	< 0.05	NA	< 0.05	82%	70%	130%	103%	70%	130%	90%	70%	130%
>C16-C21 Hydrocarbons	1	2373801	< 0.05	< 0.05	NA	< 0.05	80%	70%	130%	103%	70%	130%	90%	70%	130%
>C21-C32 Hydrocarbons	1	2373801	< 0.01	< 0.01	NA	< 0.01	80%	70%	130%	103%	70%	130%	90%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

1-Methylnaphthalene	1	2378494	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	115%	50%	140%	111%	50%	140%
2-Methylnaphthalene	1	2378494	< 0.01	< 0.01	NA	< 0.01	91%	50%	140%	107%	50%	140%	105%	50%	140%
Acenaphthene	1	2378494	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	112%	50%	140%	110%	50%	140%
Acenaphthylene	1	2378494	< 0.01	< 0.01	NA	< 0.01	73%	50%	140%	93%	50%	140%	91%	50%	140%
Acridine	1	2378494	< 0.01	< 0.01	NA	< 0.01	76%	50%	140%	117%	50%	140%	121%	50%	140%
Anthracene	1	2378494	< 0.012	< 0.012	NA	< 0.012	71%	50%	140%	85%	50%	140%	87%	50%	140%
Benzo(a)anthracene	1	2378494	< 0.018	< 0.018	NA	< 0.018	71%	50%	140%	87%	50%	140%	95%	50%	140%
Benzo(a)pyrene	1	2378494	< 0.010	< 0.010	NA	< 0.010	69%	50%	140%	81%	50%	140%	86%	50%	140%
Benzo(b)fluoranthene	1	2378494	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	94%	50%	140%	81%	50%	140%
Benzo(j+k)fluoranthene	1	2378494	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	96%	50%	140%	103%	50%	140%
Benzo(e)pyrene	1	2378494	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	105%	50%	140%	101%	50%	140%
Benzo(ghi)perylene	1	2378494	< 0.01	< 0.01	NA	< 0.01	90%	50%	140%	71%	50%	140%	76%	50%	140%
Chrysene	1	2378494	< 0.01	< 0.01	NA	< 0.01	95%	50%	140%	116%	50%	140%	110%	50%	140%
Dibenzo(a,h)anthracene	1	2378494	< 0.01	< 0.01	NA	< 0.01	73%	50%	140%	46%	50%	140%	62%	50%	140%
Fluoranthene	1	2378494	< 0.01	< 0.01	NA	< 0.01	92%	50%	140%	113%	50%	140%	113%	50%	140%
Fluorene	1	2378494	< 0.01	< 0.01	NA	< 0.01	85%	50%	140%	103%	50%	140%	103%	50%	140%
Indeno(1,2,3-cd)pyrene	1	2378494	< 0.01	< 0.01	NA	< 0.01	71%	50%	140%	80%	50%	140%	86%	50%	140%
Naphthalene	1	2378494	< 0.01	< 0.01	NA	< 0.01	100%	50%	140%	117%	50%	140%	112%	50%	140%
Perylene	1	2378494	< 0.01	< 0.01	NA	< 0.01	94%	50%	140%	90%	50%	140%	84%	50%	140%
Phenanthrene	1	2378494	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	115%	50%	140%	110%	50%	140%
Pyrene	1	2378494	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	119%	50%	140%	113%	50%	140%
Quinoline	1	2378494	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	172%	50%	140%	173%	50%	140%

Comments: Blank spike and matrix spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Water

Chloromethane	2378547	<1	<1	NA	< 1	51%	50%	140%	58%	60%	130%	50%	50%	140%
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Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Vinyl Chloride	2378547		<0.6	<0.6	NA	< 0.6	58%	50%	140%	67%	60%	130%	63%	50%	140%
Bromomethane	2378547		<0.89	<0.89	NA	< 0.89	109%	50%	140%	121%	60%	130%	33%	50%	140%
Chloroethane	2378547		<5	<5	NA	< 5	69%	50%	140%	80%	60%	130%	76%	50%	140%
Trichlorofluoromethane (FREON 11)	2378547		<5	<5	NA	< 5	67%	50%	140%	80%	60%	130%	78%	50%	140%
Acetone	2378547		<10	<10	NA	< 10	81%	50%	140%	89%	50%	140%	90%	50%	140%
1,1-Dichloroethylene	2378547		<0.6	<0.6	NA	< 0.6	84%	50%	140%	96%	60%	130%	93%	50%	140%
Methylene Chloride (Dichloromethane)	2378547		<2	<2	NA	< 2	93%	50%	140%	105%	60%	130%	102%	50%	140%
trans-1,2-Dichloroethylene	2378547		<2	<2	NA	< 2	87%	50%	140%	100%	60%	130%	95%	50%	140%
1,1-Dichloroethane	2378547		<1	<1	NA	< 1	87%	50%	140%	98%	60%	130%	94%	50%	140%
cis-1,2-Dichloroethylene	2378547		<2	<2	NA	< 2	86%	50%	140%	98%	60%	130%	95%	50%	140%
Chloroform	2378547		211	209	1.0%	< 1	94%	50%	140%	106%	60%	130%	93%	50%	140%
1,2-Dichloroethane	2378547		<2	<2	NA	< 2	80%	50%	140%	98%	60%	130%	96%	50%	140%
1,1,1-Trichloroethane	2378547		<1	<1	NA	< 1	80%	50%	140%	91%	60%	130%	89%	50%	140%
Carbon Tetrachloride	2378547		<0.56	<0.56	NA	< 0.56	76%	50%	140%	92%	60%	130%	86%	50%	140%
Benzene	2378547		<1	<1	NA	< 1	85%	70%	130%	95%	60%	140%	89%	60%	140%
1,2-Dichloropropane	2378547		<0.7	<0.7	NA	< 0.7	86%	50%	140%	98%	60%	130%	93%	50%	140%
Trichloroethylene	2378547		<1	<1	NA	< 1	80%	50%	140%	96%	60%	130%	91%	50%	140%
Bromodichloromethane	2378547		11	12	2.6%	< 1	82%	50%	140%	92%	60%	130%	90%	50%	140%
cis-1,3-Dichloropropene	2378547		<0.5	<0.5	NA	< 0.5	82%	50%	140%	93%	60%	130%	32%	50%	140%
trans-1,3-Dichloropropene	2378547		<0.5	<0.5	NA	< 0.5	81%	50%	140%	88%	60%	130%	31%	50%	140%
1,1,2-Trichloroethane	2378547		<1	<1	NA	< 1	83%	50%	140%	91%	60%	130%	90%	50%	140%
Toluene	2378547		<2	<2	NA	< 2	79%	70%	130%	87%	60%	140%	85%	60%	140%
2-Hexanone	2378547		<10.0	<10.0	NA	< 10.0	83%	50%	140%	93%	50%	140%	92%	50%	140%
Dibromochloromethane	2378547		<1	<1	NA	< 1	78%	50%	140%	85%	60%	130%	88%	50%	140%
1,2-Dibromoethane	2378547		<0.2	<0.2	NA	< 0.2	82%	50%	140%	88%	60%	130%	88%	50%	140%
Tetrachloroethylene	2378547		<2	<2	NA	< 2	71%	50%	140%	86%	60%	130%	81%	50%	140%
1,1,1,2-Tetrachloroethane	2378547		<0.5	<0.5	NA	< 0.5	76%	50%	140%	85%	60%	130%	84%	50%	140%
Chlorobenzene	2378547		<1	<1	NA	< 1	79%	50%	140%	88%	60%	130%	87%	50%	140%
Ethylbenzene	2378547		<2	<2	NA	< 2	76%	70%	130%	89%	60%	140%	85%	60%	140%
m,p-Xylene	2378547		<4	<4	NA	< 4	75%	70%	130%	85%	60%	140%	83%	60%	140%
Bromoform	2378547		<1	<1	NA	< 1	74%	50%	140%	79%	60%	130%	81%	50%	140%
Styrene	2378547		<1	<1	NA	< 1	75%	50%	140%	86%	60%	130%	82%	50%	140%
1,1,2,2-Tetrachloroethane	2378547		<1	<1	NA	< 1	82%	50%	140%	89%	60%	130%	88%	50%	140%
o-Xylene	2378547		<1	<1	NA	< 1	77%	70%	130%	90%	60%	140%	86%	60%	140%
1,3-Dichlorobenzene	2378547		<1	<1	NA	< 1	72%	50%	140%	83%	60%	130%	78%	50%	140%
1,4-Dichlorobenzene	2378547		<1	<1	NA	< 1	81%	50%	140%	94%	60%	130%	89%	50%	140%
1,2-Dichlorobenzene	2378547		<0.7	<0.7	NA	< 0.7	83%	50%	140%	94%	60%	130%	90%	50%	140%

Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)


RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Comments: Blank spike and Matrix Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

Ultra Trace Analysis

RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Perfluorinated Compounds (water)															
Perfluorobutanoic Acid PFBA	1	2425929	24.1	23.8	1.3%	< 1.0	NA	60%	140%	106%	60%	140%	104%	60%	140%
Perfluoropentanoic Acid PFPeA	1	2425929	6.7	< 1.0	NA	< 1.0	NA	60%	140%	106%	60%	140%	92%	60%	140%
Perfluorohexanoic Acid PFHxA	1	2425929	6.1	4.8	NA	< 1.0	NA	60%	140%	106%	60%	140%	89%	60%	140%
Perfluoroheptanoic Acid PFHpA	1	2425929	6.9	7.8	12.2%	< 1.0	NA	60%	140%	98%	60%	140%	100%	60%	140%
Perfluorooctanoic Acid PFOA	1	2425929	9.1	8.2	10.4%	< 1.0	NA	60%	140%	118%	60%	140%	107%	60%	140%
Perfluorononanoic Acid PFNA	1	2425929	1.8	2.2	NA	< 1.0	NA	60%	140%	109%	60%	140%	108%	60%	140%
Perfluorodecanoic Acid PFDA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	99%	60%	140%	96%	60%	140%
Perfluoroundecanoic Acid PFUnA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	75%	60%	140%	101%	60%	140%
Perfluorododecanoic Acid PFDoA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	91%	60%	140%	92%	60%	140%
Perfluorotridecanoic Acid PFTrDA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	110%	60%	140%	100%	60%	140%
Perfluorotetradecanoic Acid PFTeDA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	103%	60%	140%	125%	60%	140%
Perfluorobutanesulfonic Acid PFBS	1	2425929	1.5	1.4	NA	< 1.0	NA	60%	140%	116%	60%	140%	88%	60%	140%
Perfluorohexasulfonic Acid PFHxS	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	117%	60%	140%	81%	60%	140%
Perfluoroheptanesulfonate PFHpS	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	91%	60%	140%	90%	60%	140%
Perfluorooctasulfonic Acid PFOS	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	109%	60%	140%	109%	60%	140%
Perfluorooctanesulfonamide Acid PFOSA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	133%	60%	140%	104%	60%	140%
Perfluorodecanesulfonic Acid PFDS	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	90%	60%	140%	75%	60%	140%
N-Methylperfluorosulfonamideacetic N-MeFOSAA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	118%	60%	140%	94%	60%	140%
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	1	2425929	< 1.0	< 1.0	NA	< 1.0	NA	60%	140%	159%	60%	140%	82%	60%	140%

Comments: Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Certified By:



Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

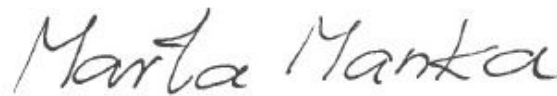
SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: May 25, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Metals															
Dissolved Aluminum	2397544		< 5	< 5	0.0%	< 5	106%	80%	120%	107%	80%	120%	95%	70%	130%
Dissolved Antimony	2397544		< 2	< 2	0.0%	< 2	101%	80%	120%	103%	80%	120%	113%	70%	130%
Dissolved Arsenic	2397544		10	10	NA	< 2	101%	80%	120%	100%	80%	120%	NA	70%	130%
Dissolved Barium	2397544		< 5	< 5	0.0%	< 5	106%	80%	120%	110%	80%	120%	107%	70%	130%
Dissolved Beryllium	2397544		< 2	< 2	0.0%	< 2	106%	80%	120%	105%	80%	120%	105%	70%	130%
Dissolved Bismuth															
Dissolved Bismuth	2397544		< 2	< 2	0.0%	< 2	102%	80%	120%	102%	80%	120%	86%	70%	130%
Dissolved Boron	2397544		72	76	5.7%	< 5	102%	80%	120%	104%	80%	120%	NA	70%	130%
Dissolved Cadmium	2397544		< 0.09	< 0.09	0.0%	< 0.09	107%	80%	120%	104%	80%	120%	111%	70%	130%
Dissolved Chromium	2397544		3	2	NA	< 1	101%	80%	120%	100%	80%	120%	99%	70%	130%
Dissolved Cobalt	2397544		< 1	< 1	0.0%	< 1	102%	80%	120%	101%	80%	120%	101%	70%	130%
Dissolved Copper															
Dissolved Copper	2397544		< 2	< 2	0.0%	< 2	104%	80%	120%	104%	80%	120%	104%	70%	130%
Dissolved Iron	2397544		< 50	< 50	0.0%	< 50	99%	80%	120%	101%	80%	120%	109%	70%	130%
Dissolved Lead	2397544		< 0.5	< 0.5	0.0%	< 0.5	100%	80%	120%	102%	80%	120%	97%	70%	130%
Dissolved Manganese	2397544		< 2	< 2	0.0%	< 2	103%	80%	120%	104%	80%	120%	101%	70%	130%
Dissolved Molybdenum	2397544		< 2	< 2	0.0%	< 2	99%	80%	120%	99%	80%	120%	105%	70%	130%
Dissolved Nickel															
Dissolved Nickel	2397544		< 2	< 2	0.0%	< 2	104%	80%	120%	107%	80%	120%	104%	70%	130%
Dissolved Selenium	2397544		< 1	< 1	0.0%	< 1	104%	80%	120%	103%	80%	120%	128%	70%	130%
Dissolved Silver	2397544		< 0.1	< 0.1	0.0%	< 0.1	102%	80%	120%	102%	80%	120%	92%	70%	130%
Dissolved Strontium	2397544		164	170	3.6%	< 5	102%	80%	120%	101%	80%	120%	100%	70%	130%
Dissolved Thallium	2397544		< 0.1	< 0.1	0.0%	< 0.1	94%	80%	120%	97%	80%	120%	91%	70%	130%
Dissolved Tin															
Dissolved Tin	2397544		< 2	< 2	0.0%	< 2	105%	80%	120%	107%	80%	120%	109%	70%	130%
Dissolved Titanium	2397544		< 2	< 2	0.0%	< 2	104%	80%	120%	105%	80%	120%	98%	70%	130%
Dissolved Uranium	2397544		6.7	6.8	1.8%	< 0.1	102%	80%	120%	105%	80%	120%	NA	70%	130%
Dissolved Vanadium	2397544		15	15	1.9%	< 2	101%	80%	120%	99%	80%	120%	NA	70%	130%
Dissolved Zinc	2397544		< 5	< 5	0.0%	< 5	102%	80%	120%	100%	80%	120%	115%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

RPT Date: May 25, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

Polycyclic Aromatic Hydrocarbons in Water - (PAH)

Dibenzo(a,h)anthracene	2378494	73%	50%	140%	46%	50%	140%	62%	50%	140%
Quinoline	2378494	96%	50%	140%	172%	50%	140%	173%	50%	140%

Comments: Blank spike and matrix spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Volatile Organic Compounds in Water

Chloromethane	51%	50%	140%	58%	60%	130%	50%	50%	140%
Bromomethane	109%	50%	140%	121%	60%	130%	33%	50%	140%
cis-1,3-Dichloropropene	82%	50%	140%	93%	60%	130%	32%	50%	140%
trans-1,3-Dichloropropene	81%	50%	140%	88%	60%	130%	31%	50%	140%

Comments: Blank spike and Matrix Spike: Less than 10% of elements not within acceptance limits.

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

QC Exceedance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

RPT Date: May 25, 2021										
PARAMETER		Sample Id	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE		
			Measured Value	Acceptable Limits	Recovery	Acceptable Limits		Recovery	Acceptable Limits	
				Lower Upper		Lower	Upper		Lower	Upper
Perfluorinated Compounds (water)										
N-Ethylperfluorosulfonamideacetic N-EtFOSAA		2425929	NA	60% 140%	159%	60% 140%		82%	60% 140%	

Comments: Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Chloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Vinyl Chloride	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromomethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Chloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Acetone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,1-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Benzene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
1,2-Dichloropropane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromodichloromethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
cis-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
2-Hexanone	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Dibromochloromethane	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,2-Dibromoethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Tetrachloroethylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120-5001	EPA SW846 5035/8260B	GC/MS
Chlorobenzene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Ethylbenzene	VOL-120-5001	EPA SW-846 5030B/8260	GC/MS
m,p-Xylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Bromoform	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
Styrene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
o-Xylene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,3-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5001	EPA SW846 5230B/8260	GC/MS
1,2-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene-d8	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
Perfluorobutanoic Acid PFBA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid PFPeA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid PFHxA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid PFHpA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid PFOA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid PFNA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid PFDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid PFUnA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid PFDoA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotridecanoic Acid PFTriDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid PFBS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid PFHxS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanesulfonate PFHpS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid PFOS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanesulfonamide Acid PFOSA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanesulfonic Acid PFDS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Methylperfluorosulfonamideacetic N-MeFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid-13C9	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid-13C6	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid-13C7	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctasulfonic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide -13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic-D5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS

Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 21X737616

PROJECT:

ATTENTION TO: Alan Parker

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Appendix G

Field Notes



BH1

Field Borehole Log

TEST HOLE NO.:

BH7

ELEV.:

PROJECT NO.:

Huntley Point

DATE:

22 March 21

LOGS BY:

SL

PROJECT:

LOCATION:

DRILL RIG:

Logan

DIA.:

50 Angers

OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

DENSITY

GRADATION poorly or well

SIZE RANGE fine, medium, coarse

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

N

DENSITY

0-4

VERY LOOSE

4-10

LOOSE

10-30

MED. DENSE

30-50

DENSE

>50

VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

CONSISTENCY

PLASTICITY low, medium, highly

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (tsf)

N

CONSISTENCY

0-0.25

<2

VERY SOFT

0.25-0.5

2-4

SOFT

0.5-1

4-8

FIRM

1-2

8-15

STIFF

2-4

15-30

VERY STIFF

>4

>30

HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

COBBLE: 75-200mm BOULDER >200mm

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-4"		dark humus, root mat	1	SS1	0-2	1/2/6/12 15"
			2			
4' -		red-brown silt & fine sand & pebbles - moist	3	SS2	2-4	7/6/6/7 6"
		rusty string near u.c.t. low - med plasticity	4			
		less rust in dip 12. Also rusty	5	SS3	4-6	3/4/7/10 24"
		string also	6			
		4-6' layer with along pebbles	7	SS4	6-8	3/9/14/14 6"
		6-8' Spoon crest. pebble	8			
		bleeding s. above	9	SS5	8-10	6/9/15/14 20"
		8-10' Spoon - dry	10			
			11	SS6	10-12	14/13/14/14 20"
			12			
		14-16' Spoon layer to water	13	SS7	12-14	8/10/12/16 22"
		along pebbles	14			
		LOA @ 16'	15	SS8	14-16	4/8/12/15 20"
			16			
		Backfill w cuttings sand & bent	17	SS9	0-2	dup of #1
			18			
			19			
			20			
			21			
			22			
			23			
		* metals, PAHs, PFAS Dup SS9	24			
		Grain Size Sample #6	25			
		10-12'	26			
			27			
			28			
			29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

Field Borehole Log			TEST HOLE NO.: <u>BH2</u> ELEV.: _____			
PROJECT NO.: <u>Hartlen Point</u>			DATE: <u>17 mar 21</u> LOGS BY: <u>SL</u>			
PROJECT: _____			LOCATION: _____			
DRILL RIG: <u>Logan</u>			DIA.: <u>Std Auger</u> OPERATOR: _____			
MINOR SOIL TYPE e.g. silty, clayey, etc WATER CONTENT dry, damp, moist, wet DENSITY GRADATION poorly or well SIZE RANGE fine, medium, coarse COLOUR INCLUSIONS/ODOUR oxides, roots, mica, etc.	N 0-4 4-10 10-30 30-50 >50	DENSITY VERY LOOSE LOOSE MED. DENSE DENSE VERY DENSE	MINOR SOIL TYPE e.g. silty, clayey, etc WATER CONTENT dry, damp, moist, wet CONSISTENCY PLASTICITY low, medium, highly COLOUR INCLUSIONS/ODOUR oxides, roots, mica, etc.	PP (tsf) 0-0.25 0.25-0.5 0.5-1 1-2 2-4 >4	N <2 2-4 4-8 8-15 15-30 >30	CONSISTENCY VERY SOFT SOFT FIRM STIFF VERY STIFF HARD
CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay "and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%			COBBLE: 75-200mm BOULDER >200mm Occasional, Frequent, Abundant			
ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
		Difficult setting up. Tight space soft ground, looking for best open hole if drill in 12 way into hole	1	SS1	0-2'	11/1/2
			2			4"
			3	SS2	2-4'	4/4/12/18
			4			24"
0-1"		blk rootmat over Till	5	SS3	4-6'	6/7/10/10
			6			10"
1"		redbrn silt sand, to pebbles, intly silt, low plastic, moist (@ 6' being more dry and platy + x r.)	7	SS4	6-8'	5/7/14/18
			8			18"
			9	SS5	8-10'	7/8/12/26
			10			24"
± 8'		@ 8' Till wet posy sandy. Seam soil below only moist top 6" of 8-10' seam wet.	11	SS6	10-12'	15/11/20/5
			12			62" 30"
			13	SS7	12-14'	6/8/11/14
			14			22"
		12-14' seam appears more moist loose moist, rounded pebbles	15	SS8	14-16'	4/6/10/16
			16			23"
			17			
			18			
		FOH @ 16'	19			
		Backfill w Sand-BENT and Cuttings	20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			
Sloughing zones -			INSTALLATION DETAILS			
Seepage zones -			LENGTH OF			
Depth to bottom of hole upon completion -			LENGTH OF			
Depth to water upon completion -			CUTTINGS - FROM			
REMARKS			BENTONITE - FROM			
			SAND - FROM			
			HEIGHT ABOVE GROUND			
			DEPTH TIP BELOW GROUND			
			TYPE OF COVER			

Field Borehole Log

TEST HOLE NO.:

B113

ELEV.:

PROJECT NO.: Hartlen Point

DATE: 16 March 21

LOGS BY: SV

PROJECT:

LOCATION:

DRILL RIG: Logan

DIA.: Std. Augers OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc	N	DENSITY	MINOR SOIL TYPE e.g. silty, clayey, etc	PP (tsf)	N	CONSISTENCY
WATER CONTENT dry, damp, moist, wet	0-4	VERY LOOSE	WATER CONTENT dry, damp, moist, wet	0-0.25	<2	VERY SOFT
DENSITY	4-10	LOOSE	CONSISTENCY	0.25-0.5	2-4	SOFT
GRADATION poorly or well	10-30	MED. DENSE	PLASTICITY low, medium, highly	0.5-1	4-8	FIRM
SIZE RANGE fine, medium, coarse	30-50	DENSE	COLOUR	1-2	8-15	STIFF
COLOUR	>50	VERY DENSE	INCLUSIONS/ODOUR oxides, roots, mica, etc.	2-4	15-30	VERY STIFF
INCLUSIONS/ODOUR oxides, roots, mica, etc.				>4	>30	HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

COBBLE: 75-200mm BOULDER >200mm

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM	
0-4"		blk rootmat, humus	1	SS1	0-2'	1/3/1/6	14"
4-6.5'		rusty brn - gry Silt some sand moist, low plastic to pebbles	2				
			3	SS2	2-4	3/4/4/6	11"
			4				
6.5-14'	14'	rd-brn silt some sand, moist, low plastic, to pebbles	5	SS3	4-6	3/4/5/8	24"
			6				
			7	SS4	6-8	3/5/6/10	24"
			8				
		@ 5'4" wet Sand in seam red brn mg sand	9	SS5	8-10	7/10/13/15	24"
		Base is silt some silt (27cm)	10				
		@ 6-8" moist around pebbles.	11	SS6	10-12	5/11/10/16	22"
			12				
			13	SS7	12-14	5/7/12/16	18"
			14				
		EOH @ 14'	15				
			16				
		Backfill w sand back and cuttings	17				
			18				
			19				
			20				
			21				
			22				
			23				
			24				
			25				
			26				
			27				
			28				
			29				
			30				

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

Field Borehole Log

TEST HOLE NO.:

BH4

~~DAW4~~

ELEV.:

PROJECT NO.:

Hartley Pond

DATE:

22 March 21

LOGS BY:

SV

PROJECT:

LOCATION:

DRILL RIG:

Logan

DIA.:

5.0 inches

OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc

N

DENSITY

MINOR SOIL TYPE e.g. silty, clayey, etc

PP (tsf)

N

CONSISTENCY

WATER CONTENT dry, damp, moist, wet

0-4

VERY LOOSE

WATER CONTENT dry, damp, moist, wet

0-0.25

<2

VERY SOFT

DENSITY

4-10

LOOSE

CONSISTENCY

0.25-0.5

2-4

SOFT

GRADATION poorly or well

10-30

MED. DENSE

PLASTICITY low, medium, highly

0.5-1

4-8

FIRM

SIZE RANGE fine, medium, coarse

30-50

DENSE

COLOUR

1-2

8-15

STIFF

COLOUR

>50

VERY DENSE

INCLUSIONS/ODOUR oxides, roots, mica, etc.

2-4

15-30

VERY STIFF

INCLUSIONS/ODOUR oxides, roots, mica, etc.

>4

>30

HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

COBBLE: 75-200mm BOULDER >200mm

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-3"		all rooted & humus	1	SS1	0-2'	1/1/3/4 6"
3' -		red brn silt & sand, 2 pebbles as before, moist brown red plastic	2			
			3	SS 2	2-4'	3/20/33/6 12"
			4			
			5	SS3	4-6	2/4/8/10 20"
			6			
		COH@ 9.5' Arizer refusal	7	SS4	6-8	4/9/20/23 6"
		dry above 9.5'	8			
			9	SS5	8-10	10/9/12/50-2"
		Backfill with sand Bont & cuttings	10			
			11			
			12			
			13			
		SSB: BTEX, VOC, C6-C12 PFAS	14			
		SS9: metals PAH, PFAS	15	SS8	8-10	dup 8/5
			16			
			17	SS9	0-2	dup 8/1
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

BH5

<h1 style="margin: 0;">Field Borehole Log</h1>		TEST HOLE NO.: <u>BH5</u> ELEV.: _____				
PROJECT NO.: <u>Hanthe Point</u> PROJECT: _____ DRILL RIG: <u>Loam</u>		DATE: <u>16 March 21</u> LOGS BY: <u>SU</u> LOCATION: _____ DIA.: <u>5.64" Auger</u> OPERATOR: _____				
MINOR SOIL TYPE e.g. silty, clayey, etc WATER CONTENT dry, damp, moist, wet DENSITY GRADATION poorly or well SIZE RANGE fine, medium, coarse COLOUR INCLUSIONS/ODOUR oxides, roots, mica, etc.	N 0-4 4-10 10-30 30-50 >50	DENSITY VERY LOOSE LOOSE MED. DENSE DENSE VERY DENSE	MINOR SOIL TYPE e.g. silty, clayey, etc WATER CONTENT dry, damp, moist, wet CONSISTENCY PLASTICITY low, medium, highly COLOUR INCLUSIONS/ODOUR oxides, roots, mica, etc.			
PP (tsf) 0-0.25 0.25-0.5 0.5-1 1-2 2-4 >4	N <2 2-4 4-8 8-15 15-30 >30	CONSISTENCY VERY SOFT SOFT FIRM STIFF VERY STIFF HARD				
CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay "and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%		COBBLE: 75-200mm BOULDER >200mm Occasional, Frequent, Abundant				
ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-4'		b/k humus rootmat	1	SS1	0-2'	9/2/3/4 18"
4"-8'		grey sandy silt & some pebbles Rootlets tripebbles - moist	2			
			3	SS2	2-4'	1/4/14/4 20"
			4			
8'-12.5'		red brn sandy silt & till, only started to pebbles, some rusty and iron patches 20-30% 2-4' moist	5	SS3	4-6'	2/4/6/12 20"
			6			
			7	SS4	6-8'	9/5/8/9 24"
			8			
		at 7.5' moist & some pebbles.	9	SS5	8-10'	14/19/19/22 24"
		8-10' green - pebbles partially blocking ss.	10			
		10-12' pebble blocking green	11	SS6	10-12'	9/12/50-4" 12"
		some	12			
12.5-		green grainy silt & sand, dry, low plastic only silt & some green + pebbles more dry than above	13	SS7	12-14'	16/19/30 6" 17"
		spaced to 16" still dry	14			
		Aspen to 20' to 2nd floor water	15	SS8	14-16'	48/58/46/50-5
		@ 20' still no evidence of water in A.W.	16			
		EOH @ 20'	17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			
Sloughing zones - Seepage zones - Depth to bottom of hole upon completion - Depth to water upon completion - REMARKS _____			INSTALLATION DETAILS LENGTH OF SALEM: 20-5' LENGTH OF RISER: 5-0' CUTTINGS - FROM 0-2' BENTONITE - FROM 4-2' SAND - FROM 20-4' HEIGHT ABOVE GROUND DEPTH TIP BELOW GROUND TYPE OF COVER			

Field Borehole Log

TEST HOLE NO.: BH6 ELEV.: 10m

PROJECT NO: Hartlan Point

DATE: 18 March 21 LOGS BY: SV

PROJECT:

LOCATION:

DRILL RIG: Logan

DIA.: Std Augers OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc
WATER CONTENT dry, damp, moist, wet
DENSITY
GRADATION poorly or well
SIZE RANGE fine, medium, coarse
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

N	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
10-30	MED. DENSE
30-50	DENSE
>50	VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey, etc
WATER CONTENT dry, damp, moist, wet
CONSISTENCY
PLASTICITY low, medium, highly
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (lbf)	N	CONSISTENCY
0-0.25	<2	VERY SOFT
0.25-0.5	2-4	SOFT
0.5-1	4-8	FIRM
1-2	8-15	STIFF
2-4	15-30	VERY STIFF
>4	>30	HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

COBBLE: 75-200mm BOULDER >200mm

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-1'		moist normal	1	SS-1	0-2	Push / 1
1-11'		red brn silt sand moist	2			
		tr pebbles, med plastic - silty, platy	3	SS-2	2-4	1/2/2/4
		in depth	4			
		being less moist @ 6'	5	SS-3	4-6	1/2/4/6
		dry platy @ 8'	6			1/3/10/13
			7	SS-4	6-8	
			8			
			9	SS-5	8-10	10/13/14/2
			10			
			11	SS-6	10-12	7/17/19/20
			12			
			13	SS-7	12-14	15/17/20/25
			14			
			15	SS-8	14-16	7/11/17/18
			16			
			17	SS-9	16-18	1/5/15/17/18
			18			
			19	dup		
			20	SS-9	18-20	1/5/15/17/18
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

Field Borehole Log

TEST HOLE NO.: MW 1 ELEV.:

PROJECT NO.: Hatter Point DATE: 17 March 21 LOGS BY: SV
 PROJECT: LOCATION:
 DRILL RIG: Local DIA: 5" x 1/2" Auger OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc	N	DENSITY	MINOR SOIL TYPE e.g. silty, clayey, etc	PP (tsf)	N	CONSISTENCY
WATER CONTENT dry, damp, moist, wet	0-4	VERY LOOSE	WATER CONTENT dry, damp, moist, wet	0-0.25	<2	VERY SOFT
DENSITY	4-10	LOOSE	CONSISTENCY	0.25-0.5	2-4	SOFT
GRADATION poorly or well	10-30	MED. DENSE	PLASTICITY low, medium, highly	0.5-1	4-8	FIRM
SIZE RANGE fine, medium, coarse	30-50	DENSE	COLOUR	1-2	8-15	STIFF
COLOUR	>50	VERY DENSE	INCLUSIONS/ODOUR oxides, roots, mica, etc.	2-4	15-30	VERY STIFF
INCLUSIONS/ODOUR oxides, roots, mica, etc.				>4	>30	HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay
 "and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%
 COBBLE: 75-200mm BOULDER >200mm
 Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-7"		1" not nat. fine grey brn gravel, sand silt, clay, dry.	1	SS1	0-2'	5/3/5/5
			2			
			3	SS2	2-4'	3/3/5/7
7" - 28'		red-brn silt-sand, fine pebbles, dry, low plasticity, red, grey silt, silt, pebbles, grey.	4			
			5	SS3	4-6'	4/4/8/8
			6			
		4-6' pebbles, blocky, spongy	7	SS4	6-8'	1/5/8/13
		@ 7' clay from mass to platy + xtr.	8			
			9	SS5	8-10'	8/12/16/17
		@ 11' more mass, less platy, spongy to 16' dry.	10			
		Auger to 20' no gw obs	11	SS6	10-12'	7/13/15/18
		Auger to 25' dry	12			
		Auger to 30'	13	SS7	12-14'	7/11/14/17
		hard drill line @ 28 ft ±	14			
		grey slate, like 14 ft in AW.	15	SS8	14-16'	6/10/14/18
		grey powder also and in Auger test.	16			
			17			
		bedrock ± 28 ft. dry.	18			
			19			
28-30'		grey slate/grey chips, posn bedrock	20			
			21			
		refusal @ 30'	22			
			23			
			24			
			25			
		screen 20-30'	26			
			27			
			28			
			29			
			30			

Sloughing zones -	INSTALLATION DETAILS
Seepage zones -	LENGTH OF Screen: 29.5 - 19.5'
Depth to bottom of hole upon completion -	LENGTH OF riser: 19.5 - 0
Depth to water upon completion -	CUTTINGS - FROM 18.5 - 0
REMARKS	BENTONITE - FROM 18.5 - 16.5
	SAND - FROM 29.5 - 18.5
	HEIGHT ABOVE GROUND
	DEPTH TIP BELOW GROUND
	TYPE OF COVER Steel casing + cover

Field Borehole Log

TEST HOLE NO.: MW 2

ELEV.: _____

PROJECT NO.: Hartley Port

DATE: 22 March 21 LOGS BY: SV

PROJECT: _____

LOCATION: _____

DRILL RIG: Logan

DIA.: Std. 4" auger OPERATOR: _____

MINOR SOIL TYPE e.g. silty, clayey, etc
WATER CONTENT dry, damp, moist, wet
DENSITY
GRADATION poorly or well
SIZE RANGE fine, medium, coarse
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

N	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
10-30	MED. DENSE
30-50	DENSE
>50	VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey etc
WATER CONTENT dry, damp, moist, wet
CONSISTENCY
PLASTICITY low, medium, highly
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (pcf)	N	CONSISTENCY
0-0.25	<2	VERY SOFT
0.25-0.5	2-4	SOFT
0.5-1	4-8	FIRM
1-2	8-15	STIFF
2-4	15-30	VERY STIFF
>4	>30	HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

COBBLE: 75-200mm BOULDER >200mm

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-4"		rooted topsoil brn sandy silt & loam	1	SS1	0-2'	2/1/2/3 16"
4-1.5'		gray brn silt & sand	2			
			3	SS2	2-4	3/9/5/7 18"
1.5-		red brn silty clay sand as before with patches near u.c.t.	4			
			5	SS3	4-6	3/9/6/7 22"
			6			
		4-6' loam with along pebbles	7	SS4	6-8	5/8/12/14 24"
			8			
		6-8' being less moist and more platy	9	SS5	8-10	13/16/15/18 24"
			10			
		after 16" from auger to 30' and installed m.w.	11	SS6	10-12	7/12/16/18 18"
			12			
			13	SS7	12-14	8/13/15/17 24"
			14			
		Auger Refused @ 21 ft	15	SS8	14-16	7/13/15/21 24"
			16			
		No soil @ auger head :- can't get a sample @ 15 ft	17			
			18			
			19			
			20			
		SS1 = 0-1' interval sampled from 2' from	21			
			22			
		install m.w.	23			
			24			
		10' screen	25			
		10' screen	26			
			27			
		Bent 9-11'	28			
		sample cuttings to surface	29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

mw 3

Field Borehole Log

TEST HOLE NO.: SS1-27BHL-

ELEV.: _____

PROJECT NO.: Hartlen Point

DATE: 15 March 21

LOGS BY: SL

PROJECT: _____

LOCATION: _____

DRILL RIG: Logan

DIA.: Std Auger OPERATOR: _____

MINOR SOIL TYPE e.g. silty, clayey, etc
WATER CONTENT dry, damp, moist, wet
DENSITY
GRADATION poorly or well
SIZE RANGE fine, medium, coarse
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

N	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
10-30	MED. DENSE
30-50	DENSE
>50	VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey, etc
WATER CONTENT dry, damp, moist, wet
CONSISTENCY
PLASTICITY low, medium, highly
COLOUR
INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (Isf)	N	CONSISTENCY
0-0.25	<2	VERY SOFT
0.25-0.5	2-4	SOFT
0.5-1	4-8	FIRM
1-2	8-15	STIFF
2-4	15-30	VERY STIFF
>4	>30	HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay
"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

COBBLE: 75-200mm BOULDER >200mm
Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM	
0-4"		blk root mat + moss, twigs	2/SS 1	SS1	0-2	0/2/3/47	24"
			2				
			3				
4-9"		grey brn silt + sand some pebbles	4	SS2	2-4	36/10/18/8	6"
			5				
9'-11'		red-brn silt + some sand and pebbles + cobbles	6				
			7	SS3	4-6	1/3/5/6	24"
		@ 6.5' ± sandy silt + 0.5 cm.	8				
		@ 11' being more silty	9	SS4	6-8	7/8/11/14	24"
		to 11.5'	10				
		@ 11.5' being more silty	11	SS5	8-10	7/10/11/16	23"
11-12		red-brn silt + some sand + pebbles	12				
		min at 11.5 ft	13	*SS6	10-12	13/21/27/26	20"
		12-14 water in space	14				
11.5		being sandy in depth 11.5 - more sand	15	SS7	12-14	8/13/15/8	24"
12-16"		red brn silt + some sand and pebbles as above. more dense	16				
			17	SS8	14-16	18/29/24/28	9"
			18				
			19				
		EDHP 16" backfill w sand-bent. mix	20				
		14 drilled beside hole 18 March	21				
			22				
		10' screen	23				
		5' Septid	24				
		sand to 1' above screen	25				
		2' Bentonite	26				
		sand to surface	27				
			28				
			29				
			30				

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

mw 4

Field Borehole Log

TEST HOLE NO.:

BH4

ELEV.:

PROJECT NO.: Hartlen Point

DATE: 17 March 21

LOGS BY: SL

PROJECT:

LOCATION:

DRILL RIG: Logan

DIA.: 5 1/2" Angers OPERATOR:

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

DENSITY

GRADATION poorly or well

SIZE RANGE fine, medium, coarse

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

N

DENSITY

0-4

VERY LOOSE

4-10

LOOSE

10-30

MED. DENSE

30-50

DENSE

>50

VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

CONSISTENCY

PLASTICITY low, medium, highly

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (tsf)

0-0.25

N

CONSISTENCY

0.25-0.5

<2

VERY SOFT

0.5-1

2-4

SOFT

1-2

4-8

FIRM

2-4

8-15

STIFF

>4

15-30

VERY STIFF

>30

HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

COBBLE: 75-200mm BOULDER >200mm

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-6"		dk humus & rootlets	1	SS 1	0-2'	1/2/4/5 12"
6"-7"		grey Silt Fine Sand coarse moist & pebbles.	2			
			3	SS 2	2-4'	4/6/6/7 20"
7"-		red brn silt & sand, moist, & pebbles	4			
		Some rusty and dk brn patches <1cm Ø near uct	5	SS 3	4-6'	3/4/5/7 24"
			6			
			7	SS 4	6-8'	2/4/15/13 19"
15' ±		4 x 9" rusty sand & silt wet	8			
		±1cm mid	9	SS 5	8-10'	8/12/15/19 24"
		4.5-5' more sandy less damp.	10			
			11	SS 6	10-12'	6/12/14/21 20"
		8'6"-8'10" brn fine sand/silt	12			
		dry	13	SS 7	12-14'	11/20/23/37 6"
			14			
		EDH 16'	15	SS 8	14-16'	11/21/24/50.4" 24"
			16			
		Refused.	17			
		Backfill with Bent-sand & cuttings	18			
			19			
		Re-drilled 18 m and beside	20			
		hole.	21			
		10' Screen	22			
		5' Solid.	23			
		Screen to 1' above screen	24			
		2' Bentonite.	25			
		Screen to Surface.	26			
			27			
			28			
			29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

m w 5

Field Borehole Log			TEST HOLE NO.: <u>SS1-21BHS</u> ELEV.: _____			
PROJECT NO.: <u>Hartley Point</u>			DATE: <u>15 March 21</u> LOGS BY: <u>SV</u>			
PROJECT: _____			LOCATION: _____			
DRILL RIG: <u>Logan</u>			DIA.: <u>Std Auger</u> OPERATOR: _____			
MINOR SOIL TYPE e.g. silty, clayey, etc	N	DENSITY	MINOR SOIL TYPE e.g. silty, clayey, etc	PP (tsf)	N	CONSISTENCY
WATER CONTENT dry, damp, moist, wet	0-4	VERY LOOSE	WATER CONTENT dry, damp, moist, wet	0-0.25	<2	VERY SOFT
DENSITY	4-10	LOOSE	CONSISTENCY	0.25-0.5	2-4	SOFT
GRADATION poorly or well	10-30	MED. DENSE	PLASTICITY low, medium, highly	0.5-1	4-8	FIRM
SIZE RANGE fine, medium, coarse	30-50	DENSE	COLOUR	1-2	8-15	STIFF
COLOUR	>50	VERY DENSE	INCLUSIONS/ODOUR oxides, roots, mica, etc.	2-4	15-30	VERY STIFF
INCLUSIONS/ODOUR oxides, roots, mica, etc.				>4	>30	HARD
CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay			COBBLE: 75-200mm BOULDER >200mm			
"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%			Occasional, Frequent, Abundant			
ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-4"		black organic humus & root mat	21 SS1	SS1	0-2'	2/2/3/6
4"-8"		grey to grey brn sandy silt.	2			
8"-11'		red brn silt & some sand dry	3	SS2	2-4	7/6/7/10
		only sand, low plastic. Fr rusty and	4			
		blk mn patches 6 mm Ø	5	SS3	4-6	3/4/5/8
			6			
			7	SS4	6-8	6/7/9/14
			8			
			9	SS5	8-10	12/15/18/24
			10			
			11	SS6	10-12	22/23/29/25
11-12		@6.5' met sandy seam ± 6"	12			
		brn loam, sandy silt, wet.	13	SS7	12-14	6/8/11/17
12-14'		silt some sand as above	14			
		met seam.	15			
			16			
			17			
		LEAD @ 14'	18			
		Backfill w sand-bent not cuttings	19			
		Redrilled 18 mark beside	20			
		hole.	21			
		10' screen	22			
		5' riser	23			
		sand to 1' above screen.	24			
		2' bentonite.	25			
		sand to surface.	26			
			27			
			28			
			29			
			30			
Sloughing zones -			INSTALLATION DETAILS			
Seepage zones -			LENGTH OF			
Depth to bottom of hole upon completion -			LENGTH OF			
Depth to water upon completion -			CUTTINGS - FROM			
REMARKS			BENTONITE - FROM			
			SAND - FROM			
			HEIGHT ABOVE GROUND			
			DEPTH TIP BELOW GROUND			
			TYPE OF COVER			

Field Borehole Log

TEST HOLE NO.: MW6

ELEV.: _____

PROJECT NO.: Hunter Point

DATE: 22 March 21

LOGS BY: SU

PROJECT: _____

LOCATION: _____

DRILL RIG: Loam

DIA.: Std Auger

OPERATOR: _____

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

DENSITY

GRADATION poorly or well

SIZE RANGE fine, medium, coarse

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

N

DENSITY

0-4

VERY LOOSE

4-10

LOOSE

10-30

MED. DENSE

30-50

DENSE

>50

VERY DENSE

MINOR SOIL TYPE e.g. silty, clayey, etc

WATER CONTENT dry, damp, moist, wet

CONSISTENCY

PLASTICITY low, medium, highly

COLOUR

INCLUSIONS/ODOUR oxides, roots, mica, etc.

PP (tsf)

0-0.25

N

CONSISTENCY

0.25-0.5

<2

VERY SOFT

0.5-1

2-4

SOFT

1-2

4-8

FIRM

2-4

8-15

STIFF

>4

15-30

VERY STIFF

>30

HARD

CLAY TILL - heterogeneous mixture of gravel, sand, silt and clay

COBBLE: 75-200mm BOULDER >200mm

"and" 35-50%, "y" 20-35%, "some" 10-20%, "trace" 0-10%

Occasional, Frequent, Abundant

ZONE (ft)	USC	CLASSIFICATION	SAMPLE NO.	TYPE	DEPTH (ft)	PPM
0-6"		At Hunter Point creek	1	SS1	0-2	11/1/3/4 18"
6-10"		gray silty silt	2			
10"-27"		red silt with fine sand as before	3	SS2	2-4	3/3/9/5 20"
		mostly pale brown silt	4			
			5	SS3	4-6	2/4/7/6 18"
			6			
27-		Gray silty red clay pass	7	SS4	6-8	4/5/12/16 20"
		gravel in gravel bed	8			
			9	SS5	8-10	9/50-4" 16"
		LOH @ 27'	10			
		Spun to 16'	11	SS6	10-12	5/8/12/15 20"
		Auger to 27' and install MW	12			
			13	SS7	12-14	11/18/14/19 21"
		Auger refusal @ 27' dry	14			
		with auger	15	SS8	14-16	6/9/13/16 18"
		when tripping out load auger wet	16			
		bottom - 4'	17	SS9	0-2	dup of #1
			18			
		→ SS9 dup of #1 metals PAH	19	Grab	26-27'	grab from Auger
			20			
		→ SS6 soil from full GS	21			
			22			
			23			
			24			
		10' gravel 27-17'	25			
		part 14-16'	26			
		Swirl 27-16'	27			
			28			
			29			
			30			

Sloughing zones -

Seepage zones -

Depth to bottom of hole upon completion -

Depth to water upon completion -

REMARKS

INSTALLATION DETAILS

LENGTH OF

LENGTH OF

CUTTINGS - FROM

BENTONITE - FROM

SAND - FROM

HEIGHT ABOVE GROUND

DEPTH TIP BELOW GROUND

TYPE OF COVER

Hart Ln Point

680449

Logan DrillingMatthew MacAulay

222-1920

639-2311 ext. 103

mmacaulay@logandrillinggroup.com

All Clean UXO - Gary

809-1259

John Mac Isaac

876-2258

Gate 2403 Locked.

Surveyors:

SDM in Daniel Gerard

455-1537

25 Feb. 21

SV visited the site 2-4 PM

- Gate 2403 locked, walked into site
- Bldg 151 fenced compound.
- Scrub 5- more than 6' high few spruce > 10'. Very little snow.
- Starter TP location still visible and marked with a labeled stake.
- Concrete foundation along embankment

$\Sigma 64 \text{ km}$

②

march 8 monday

SV @ site 9:30 AM

Charlie on @ 9:50 AM.

- safety mty
 - start locating holes
 - finish and back @ time 5:00 PM
- E 64 Km

march 10 Wednesday

- left office 7:00 AM

- @ site 7:30 AM.

- 8:00 AM Joe arr

- 10:00 AM Joe left

- Charlie and Keith on site to clear pathways to hole locations

- CE on site could not open gate so relocated MW 1 outside fence

- SV left site @ 10:30 AM.

- CE came back sawed off lock and we located MW 1 inside gate on east side of Bldg B/57.

- SV left & closed gate 11:00 AM.
(dummy locked). E 64 Km

March 12

pick up PFAS free water
mini Rae
Gloves

Σ 46 Km

551-21 MW1-21551

March 15

$\frac{1}{3}$

- left @ 6:30 arr @ 7:30 AM.
- Commissioner arr @ 7:30 AM
Harris: 817-7069
- Charlie's Drillers arr @ 8:00

15' hole = 7 samples per hole

1.2 holes = 84 Containers

{ BTX F1-F4

{ VOC

{ PAH - metals

Water sample Bottles - Blanks

3 days

- Dana Jarne (DCC) onsite for
quit ~~was~~ 9:00 AM. She left ~
9:15 and will try to get key for
Bldg 51 gate.

(5)

- SV called lab @ 9:45 Am.
- PFAS blanks not arrived.
- BH1 stat ~ 11:00 finished ~ 1:00
- left @ 1:30 for AGAT.
 - need Equip. Blank bottles
 - need more Sample Bottle and soil cores.
- back @ 2:30 Pm
- drilled BH5
- finished day @ 5:30 Pm
- SV left Site @ 6:00 arr office 7:00
- Σ 86 Pm

march 16

- left @ 7:00 on @ site 8:00
- Drilled 3 blanks in @ 8:00
- Line cutter arr @ 8:15 Am
- SV left @ 1:00 for lab.
- ✓: 4 boxes 40ml - picked up
- ✓: 3 boxes 120ml - "
- 200 labels - 1 roll.
- SV back @ site 2:15 Pm
- called Mike to give him update regarding
of water encountered so far and
possible adjustment to new program.

- SV left site @ 4:30 PM
+ Drillers
- Charlie stayed with UXO group
cleaning other holes of brush etc.
- arriving 5:30 label & pkg. done 8:00 PM 88 km
- 17 March

- left @ 7:00 AM @ 8:00
Drillers & Charlie on @ 8:00 AM
- called Mike & Telecom with Mike &
Dave @ 11 AM ± re: the drill program
for GW. noted shallow & deep
also deeper m.w.'s. sent 6 shallow
and 6 deep.

BH/mw Summary

BH1: EOH 16' wet sand @ 6.5' 11.5'
(5m) (0.5-1cm)

BH5: EOH 14' wet sand 6.5'
(4.3m) (± 30 cm)

mw5: EOH 20' No evidence of water
Screen = 5-20'

BH3: EOH 14' wet sand 5.5'
(4.3m) (41cm)

mw3: EOH 30' No evidence of water
(9m)

Bdrk @ 28' \pm (8.5m)

Propose:

3 deep MW's : 30' \pm (9m) \approx 27m
Screen 20-30'

MW1, MW2, MW6

3 Shallow MW's : 15' \pm (5m) \approx 15m
Screen 5-15'

BH1, BH4, BH5

ocean sandy sands and @ 5m depth.

Already drilled BH1 and BH5
 \therefore need to redrill and install beside
completed BH.

maybe deepen MW3 in case
MW1 doesn't produce water.

- Should have contingency to
deepen holes to install MW's
if required.
- Also need flexibility to
replace BH's with MW's if
required.

Hunter Point

17 March 21

⑨

OriginalProposed program $6 \times 5\text{m deep MW's} : \Sigma 30\text{m}$ $6 \times 5\text{m deep BH's} : \Sigma 30\text{m}$ Present status $13.3\text{m MW's} : 5, 3 \rightarrow 16.7\text{m left}$ $13.6\text{m BH's} : 1, 3, 5 \rightarrow 16.4\text{m left}$

$$\therefore \left(\text{MW's } \frac{16.7}{5} = \pm 3 \text{ MW's} \right)$$

Remaining
Program
allocated

$$\left(\text{BH's } \frac{16.4}{5} = \pm 3 \text{ BH's} \right)$$

new proposed programDeep MW's 27m Shallow MW's 15m 42m

$$- 30 = 12\text{m (39.4')} \text{ extra}$$

- left Sill @ 5:00 PM arr @ 6:00 PM
Σ 55 Km + 9 Km
- label 1 ply 5ms 6:00 - 8:00 PM

18 march 21

- left @ 6:30 AM arr @ 7:30 AM
- elevation @ mwt = 21 m
- Kirk & Dillens in @ 8:00 AM
- installed 15' mws at

BH1	10' Screen
BH4	5' Solid
BH5	Scrub to 1' above Screen
	2' bentonite
	Sand to Surface

CME75-2

- dillens left @ 1:45 PM
- Kirk left @ 2:00 PM
- SV left @ 2:15 PM @ Home 3:10 PM

CDN Hydrographic Service
number # 19511

Duplicates

	BTEX	VOC	C ₆ - C ₁₂	metals	PAH	PFAS
BH6-1					✓	✓
-9(Dupog)					✓	✓

Blanks

TB1 - 15 wcd 21	BTEX FI
TB2 - 16 wcd 21	PAH
TB3 - 17 wcd 21	PAH VOC PFAS

EB1 - 15 wcd 21	6X40ml, 4X120ml	2X plastic
EB2 - 16 wcd 21	2X plastic	
EB3 - 17 wcd 21	2X plastic	
EB4 - 18 wcd 21	2X plastic	

FB1 - 15 wcd 21	6X40ml, 4X120ml	2X plastic
FB2 - 16 wcd 21		11
FB3 - 17 wcd 21		11
FB4 - 18 wcd 21		11

(12)

- worked on COC's and delivered samples to the lab. End: 6:30 PM
- 0.5 hr, blank COC completion and send to lab + 0.5 hr
- Σ 70 km + 16 km

19 March 20

- left @ 6:30 am @ 7:30 Am
- Snow, high winds

- Logan (Matthew) called ~ 7:30 to check conditions, he says maybe this afternoon would be good to start. SV said safety concerns with snow and ice @ site.

He will call Mike to discuss

- Evan (Logan Driller) called 7:30±

he isn't driving from Truss the wing roads are too bad. SV said afternoon drilling has safety concerns due to snow, ice and cold weather. Matthew will call Mike to discuss.

- SV waiting for Commissioners.

- Spoke with Matthew regarding Standby. Don't think Standby warranted.

- program to restart Monday morning, no work today due to weather.
- went to lab to pick up coolers and FB, EB blank sample bottles.
- 11-12 PM
- $\Sigma 68 \text{ Km}$
- Back to lab @ 4:30 - 5:30 PM
- $\Sigma 15 \text{ Km}$

21 mod 21

- labelling and bagging samples prep for field. 1-5 PM

SS/21 MW6-2155-1 } metals
SS 9 dup #1 } PFAS.

22 mod 21

- left 6:30 AM arr ~ 7:30 AM
- Harris arr 7:30
- Kitch arr 7:45
- SV called lab for PFAS free water to be delivered. In sand
Someone should deliver it today

(14)

- Kroll left @ 5:00 PM

- SV left @ 5:15 PM

- drillers stayed to organize the truck

- Picked up ice and left arr @ house 6:15 PM

Σ 6 1/2 hr

23 March 21

- Check Samples and Amplify COE's

- Send COE to lab and deliver samples.

Σ 22 hr

26 March 21

- return P.I.D. to Gisla 1 hr

- trouble shooting expense entry and logging in, online training as well

2 hr

13 April 21

(15)

Hartman Pond

- left office @ 10 AM, picked up boulders from Paul Lane, Picked up WL meter from Gislard.
- arrived Site 11:30 AM.

Hole	H ₂ O	Depth	H	Bailed
mw2	6.414	6.656	0.24	0.75L → dry - NR

mw1	-	7.788	-	dry
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* BH 1	1.002	5.298	4.296	1.5L → dry ~ 11 min
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1 well vol = 9L

mw6	7.00	8.827	8.827	100L	96 min
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Artesian. 1 well vol = ± 18L still turbid.

BH					
mw5	3.188	6.764	3.576	1.2	still turbid

1 well vol = ± 7L

12L bailed dry in 6 min 15 sec.

* recovery 1 cm in 2.1 mins

BH4	3.498	5.409	1.911	8.5
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1 well vol = 4L

8.5L bailed dry in 2 mins 5 sec.

* recovery 1 cm in 1.9 min.

(16)

mw	N	W	3rd
			ELV
mw2	44.59516°	063.44416°	9-10m
mw1	44.59644°	063.44609°	13m
BH1	44.59722	063.44610°	15m
mw6	44.59747	063.44331°	0-1
mw5	44.59706	063.44407	4m
BH4	44.59597	063.44500	12m
all meas ± 3m			

Back @ truck 5:30 pm & left for
 the office. back @ office 16:20 pm
 Σ 68 km at 9 km

Hartley Point

(17)

April 22

	H ₂ O	Depth	H	Barrel.
mw1	—	7.083	—	dry
→ mw3	0.846	5.315	4.45	1 well vol = 9L
recovery 1 cm in 37 sec				15L in 5 min (dry)
$\frac{0.01 \text{ m}}{0.62 \text{ min}} = 0.016 \frac{\text{m}}{\text{min}} = 4.6 \text{ hr for 1 well vol.}$				
→ mw5	4.869	6.773	1.904	1 well vol = 3.9L
recovery 1 cm in 48 sec.				7L in 4 min (dry)
$\frac{0.01 \text{ m}}{0.8 \text{ min}} = 0.0125 \frac{\text{m}}{\text{min}} = 2.5 \text{ hr for 1 well vol.}$				
→ mw6	TOC	8.833	8.833	1 well vol = 17.9L
Artesian recovery 1 cm in 5.8 sec				30L in 14 mins
$\frac{0.01}{0.097} = 0.103 \frac{\text{m}}{\text{min}} = 1.4 \text{ hr for 1 well vol}$				
→ mw4	4.418	5.411	0.993	1 well vol = 2L
recovery 5 mm in 4 min				3L in 2.5 mins
$\frac{0.005}{4 \text{ min}} = 0.00125 \frac{\text{m}}{\text{min}} = 16.6 \text{ hr for 1 well vol}$				(dry)
mw2	6.377	6.672	0.295	1 well vol = 0.6L
				insufficient for sampling.

@ Site 7:30 Am.

- left Site @ 11:30 AM
- picked up sample bottles.
- dropped off water level meter.

cloudy, fog, high winds,
rain, salt.
Σ 78 km

Hartlen Point

(19)

April 23

- left office 7:00 am @ 8:00

MW	BTEX	FI-FH	VOC	PAH	metals	PFAS
mw3	3	2	3	2	1	2
	slly turbid.					
mw5	3	2	3	2	1	—
	Insufficient water in hole for all param, v turbid & sandy water.					
mw6	3	2	3	2	1	2
*mw7	3	2	3	2	1	2
	slly turbid.					
	mw 7 dup of mw6					
mw4	1	1	1	1	1*	
	Turbid.					

* bottle 1/2 full.

Insufficient water for full suite.

→ Don't analyze mw4

→ Field Blank VOC only
others on Hold.

Σ 69K

