VANCOUVER FRASER PORT AUTHORITY

PHASE II ENVIRONMENTAL SITE ASSESSMENT

FRASER SURREY PORT LANDS - TRANSPORTATION IMPROVEMENTS, SURREY, BC

FEBRUARY 25, 2021

WSP FILE NO.: 20M-00758-00 PHASE 600

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PROJECT NO.: 20M-00758-00
DATE: FEBRUARY 2021

WSP
UNIT 100
20339 96TH AVENUE
LANGLEY, BC, CANADA V1M 0E4

T 604-533-2992
F 604-533-0768
WSP.COM

UNIT 100
20339 96TH AVENUE
LANGLEY, BC, CANADA V1M 0E4

T 604-533-2992
F 604-533-0768
wsp.com

February 25, 2021

Vancouver Fraser Port Authority
100 The Pointe, 999 Canada Place,
Vancouver, B.C. Canada V6C 3T4

Attn: Vinil Reddy

Subject: **Phase II Environmental Site Assessment at Fraser Surrey Port Lands Transportation Improvements, Surrey, British Columbia, Canada**

WSP Canada Inc. (WSP) is pleased to submit two (2) copies of the Phase II Environmental Site Assessment report for the above-referenced property.

As a Canadian multi-national company, WSP is one of the world's leading engineering and consulting firms. Our scientific expertise spans a full range of services including environmental, geotechnical, metallurgical, materials and building sciences, as well as industrial hygiene, industrial compliance monitoring and other specialty scientific and engineering-related services. Please visit our website at www.wsp.com for details regarding our comprehensive services, our client testimonials, and our core values, which focus on serving and protecting our clients' best interests.

We trust that the enclosed report meets your current requirements. If you have any questions regarding this project, the enclosed reports, or our services, please do not hesitate to call the undersigned at (604) 533-2992.

Thank you for utilizing our professional services. We look forward to serving your future environmental and engineering needs.

Sincerely,

Marina Makovetski, P. Ag.
Environmental Scientist

WSP ref.: 20M-00758-00

SIGNATURES

PREPARED BY

Rory Chudley, B.Tech.
Environmental Technician

BRITISH COLUMBIA 3157 Marina Nakovetski P.Ag. INSTITUTE OF AGROLOGISTS 2021-03-01

Marina Nakovetski, P. Ag.
Environmental Science

REVIEWED BY

Jas Minhas, R.P.Bio.
Environmental Toxicologist

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TABLE OF CONTENTS

TABLES IN REPORT

FIGURES

APPENDICES

1 INTRODUCTION

Mr. Vinil Reddy, on behalf of Vancouver Fraser Port Authority (VFPA), retained WSP Canada Inc. (WSP) to conduct a Phase II Environmental Site Assessment (ESA) within the proposed transportation improvement project at Fraser Surrey Port Lands in Surrey, BC (herein referred to as "Site" or "Subject Site"). The intrusive environmental investigation was conducted at the area of potential environmental concern (APEC) and areas of environmental concern (AECs) identified during the Phase I ESA[1] completed by WSP in February 2021.

We understand that VFPA requires this Phase II ESA for project and environmental (PER) review prior to the construction activities associated with the road improvements at Fraser Surrey Port Lands. We also understand that this report is not being submitted to the Ministry of Environment and Climate Change Strategy (BC ENV) for the purposes of obtaining a legal instrument, such as a Certificate of Compliance or Approval-In-Principle. This report describes the work associated with the subsurface investigations and WSP's findings.

1.1 BACKGROUND

From a review of the historical records, previous environmental investigation reports, Site walkthrough notes and interview information collected during the Phase I ESA, WSP was able to establish that Surrey Fraser Port Lands area was filled and developed for commercial and industrial activities in the 1960s. Various commercial and industrial activities occupied the Site and adjoining properties, some of which were associated with storage and handling of large quantities of chemicals, fuel or hazardous waste. Based on the historical information review, one APEC and two AECs were identified at the proposed transportation improvements locations. A summary of the identified AECs and APEC and associated PCOCs in soil, vapour and groundwater is provided in the following table.

Table 1-1 Summary of Identified APEC and PCOCs

AEC/APEC NO.	AEC/APEC DESCRIPTION	REGULATED* COCS/PCOCS IN SOIL	REGULATED* PCOCS IN VAPOUR	REGULATED* COCS/PCOCS IN GROUNDWATER
APEC #1** (On-site)	A section of Timberland Road adjacent to 10619 Timberland Road (based on historical and current activities and previous environmental investigations and BC Site Registry (Site IDs	PCOCs: BTEX, F1 - F4, VOCs, PAHs, phenols and metals	PCOCs: BTEX, F1, F2, trimethylbenzenes, naphthalene, and straight-chain alkane compounds.	PCOCs: BTEX, F1 F4, VOCs, PAHs, phenols and metals (arsenic and sodium).

[1] Phase I ESA, Fraser Surrey Port Lands – Transportation Improvements, Surrey, British Columbia. Prepared for VFPA by WSP. Dated February 4, 2021 (File No.: 20M-00758-00).

AEC/APEC NO.	AEC/APEC DESCRIPTION	REGULATED* COCS/PCOCS IN SOIL	REGULATED* PCOCS IN VAPOUR	REGULATED* COCS/PCOCS IN GROUNDWATER
	16719 – Across from 10619 Timberland Road and 23211 – Surrounds Timberland Road).			
AEC #2 (On-site)	10440 Timberland Road – due to former operations of CTL Steel and based on previous environmental investigations.	COCs: chromium, copper and nickel, LEPH and F2 (based on SLR's Phase II ESA, 2011)	PCOCs: BTEX, F1, F2, trimethylbenzenes, naphthalene, and straight-chain alkane compounds.	COCs: Dissolved iron (possibly elevated natural background concentration)
AEC #3 (On-site)	10520 Timberland Road – due to historical and current activities (Chemetron Railway Products and CP Yard) and previous environmental investigation (Stage 2 PSI, SNC Lavalin Environment, 2013)	COCs: arsenic, chromium, copper, phenanthrene.	PCOCs: BTEX, F1, F2, trimethylbenzenes, naphthalene, and straight-chain alkane compounds.	COCs: arsenic, cobalt, cadmium. Iron and manganese – possibly elevated natural background concentrations.

Notes:

*Regulated by Federal Government

BTEX	Benzene, toluene, ethylbenzene, and xylene
F1	Fraction #1: normal straight-chain hydrocarbon (nC) boiling point ranges nC6 to nC10
F2	Fraction #2: normal straight-chain hydrocarbon (nC) boiling point ranges >nC10 to nC16
F3	Fraction #3: normal straight-chain hydrocarbon (nC) boiling point ranges >nC16 to nC34
F4	Fraction #2: normal straight-chain hydrocarbon (nC) boiling point ranges >nC34 to nC35+
PAHs	Polycyclic aromatic hydrocarbons
VOCs	Volatile organic compounds

** Based on the information provided by the Client, a Notice of Actual or Potential Migration of contaminants issued for 10619 Timberland Road was pertinent to dissolved arsenic and sodium exceedances of drinking water standards at the southwest portion of the lot. Additional information is required to assess potential risk to the environmental conditions of the Site.

WSP recommended to conduct an intrusive field investigation within two AECs and APEC prior to proposed transportation improvement construction activities to assess the quality of environmental media (soil, groundwater and soil vapour) and to make recommendations on contaminated soil (if any) disposal.

2 PHASE II ESA PROCEDURE

2.1 OBJECTIVE

The objective of the Phase II ESA was to assess the presence or absence of soil, soil vapour and groundwater contamination at the Site due to the identified PCOCs/CoCs within the APEC/AECs. The investigation was conducted in general accordance with the Canadian Standards Association guidance documents CAN/CSA-Z769-00 (R2013) and CCME Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment (2016).

2.2 SCOPE OF WORK

WSP's scope of work for conducting Phase II ESA was as follows:

1. Complete a BC One Call and retain the services of a private utility locator prior to commencing any intrusive investigations at the Site.
2. Retain the services of a hydro-vacuum truck to excavate top 1.5m of soil from all boreholes to avoid potential utility strike.
3. Retain the services of a drilling contractor for the completion of six boreholes with a truck mounted auger drill rig to a maximum depth of approximately 4.6 m below grade. Three groundwater monitoring wells were installed at the APEC/AECs identified during the Phase I ESA. Three boreholes were proposed to be completed as soil-vapour probes. Two boreholes were completed as soil-vapour probes at APEC #1 and AEC #2.
4. Collect soil samples from each of the borehole locations at different depths depending upon the encountered stratigraphy for potential laboratory analyses of PCOCs.
5. Log the encountered soil stratigraphy at all of the borehole locations.
6. Develop the installed monitoring wells using Waterra™ tubing and foot valves or a dedicated bailer following installation.
7. Complete sampling of groundwater at least 24 hrs following the well development, from the installed monitoring wells for the analyses of PCOCs.
8. Complete leak and flow tests prior to soil vapour sampling. Collect soil vapour samples using thermal desorption tubes and low flow pump callibrated by an environmental laboratory.
9. Complete a horizontal and vertical surveys of the monitoring well locations using field survey equipment to determine groundwater flow direction.

10 Submit soil, soil vapour and groundwater samples collected from this investigation program to an analytical laboratory accredited by 'Canadian Association for Laboratory Accreditation', which has BC Ministry of Environment and Climate Change Strategy recognized procedures for laboratory analyses.

11 Compare the analytical results to the applicable standards.

12 Prepare a report summarizing the Site activities, methodology and results of the Phase II ESA and comparing the results to applicable CCME and BC CSR standards upon completion of the investigation program.

WSP completed the proposed scope of work with the exception of one soil probe installation within AEC #3. Due to the shallow groundwater level in the borehole (0.7m below site grade) and unpaved surface, there was a concern that the soil vapour sample may not be representative as a result of short circuiting of ambient air underground.

2.3 REGULATORY FRAMEWORK

In British Columbia, Phase II ESA is conducted to meet the requirements of the currently applicable provincial EMA and the CSR and CSA Standard CAN/CSA-Z769-00 (R2013). Detailed background on the Regulatory Framework and Assessment Standards is included in Appendix F and Section 4 of the report.

3 SITE DESCRIPTION

As required by the CSA Standard CAN/CSA-Z769-00 (R2013), the Site's legal information is provided below:

Table 3-1 Summary of Site Information

Civic Address	**10619 Timberland Road**	**10610 and 10650 Timberland Road**	**10550 Timberland Road (civic addresses 11440 & 10520 Timberland Road**	**11015 Elevator Road**	**11015 Elevator Road**	**9815 Robson Road**
Current Legal Description	LOT3 District Lots 10 Plan EPP83386 NWD BCAGROUP 2 & DL11	LOT 1 DISTRICT LOT 9, 10 and 11 PLAN BCP31356 NWD BCAGROUP 2	LOT 1 DISTRICT LOT 12 and 13 PLAN GROUP 2 AND OF THE BED OF THE FRASER RIVER NWD PLAN LMP29318	LOT 2 DISTRICT LOT 14 GROUP 2 AND OF THE BED OF THE FRASER RIVER NWD PLAN LMP29318	LOT 3 SECTION 34 AND 35 BLOCK 5 NORTH RANGE 3 WEST NWD PLAN LMP29318	LOT 5 SECTION 34 AND 35 BLOCK 5 NORTH RANGE 3 WEST NWD PLAN LMP29318
Parcel Identifier (PID)	030-643-864	027-132-145 and 006-173-527	023-512-512	023-512-521	023-512-539	023-512-555
Current Title Holder	Southern Railway of Vancouver Island Limited, Inc. No. BC1146758	Her Majesty The Queen In Right of Canada as Represented by The Minister of Transport, C/O The Fraser River Port Authority	Fraser River Harbour Commission	Fraser River Harbour Commission	The Crown in Right of Canada C/O The Fraser River Harbour Commission	Fraser River Harbour Commission
Current Occupant	Mainland Sand & Gravel Ltd.	Westran Intermodal Ltd.	CP Rail, IDC Distribution Services and Westran Intermodal Ltd.	IDC Distribution Services	DP World	CanWel Building Materials Group Ltd. / Western Cleanwood Preservers Ltd.
Watercourse[2]	Ditch – 93m in length; sensitivity - B	Ditch – 158m in length, Sensitivity - C	Ditch along Timberland Road – Sensitivity B	Ditch – 8m, Sensitivity B	Shadow Brook – 85m, Sensitivity A; several ditches – Sensitivity A and C	Shadow Brook – 85m, Sensitivity A; several ditches – Sensitivity A and C
Coordinates	N49° 11' 12.06 "/ W122° 54' 50.70" (at approximately the centre of the Site)					
Zoning	Industrial Land					

[2] Based on the information provided in the City of Surrey GIS COSMOS, October 2020.

Notes:
General Guidance to Construction Over or Near Watercourses, the City of Surrey Engineering Department describes sensitivity classes as follows:
Class A – Indicate year-round presence of fish
Class B – Provide valuable food and nutrients to downstream fisheries watercourses but do not support salmon or regionally significant fish. They are considered fish habitat.
Class C – Typically ditches with insignificant food and nutrient input and do not support fish.

The Site is designed as a roadway alignment, irregular in shape and approximately 2.5km in length. Approximately 70% of the Site is currently used as a roadway (Timberland Road and Robson Road), and the remainder of the Site (the corridor) is currently occupied by several commercial and industrial activities. Phase II ESA focused on intrusive investigation within two lots highlighted in grey in the above table as the APEC and AECs fall within these two legal lots.

The Site layout is depicted on Figure 2, Appendix A.

4 APPLICABLE STANDARDS

At the time of preparation of this report, the Site was used for industrial purposes (roadway) and/or was proposed to be developed with a road and was located on Federal Land. As such, the following standards/guidelines would apply to the Site:

SOIL

Federal Standards:

— Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health, 1999

— Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008 - for coarse soil

Provincial Standards are provided as guidance and are applicable for soil intended to be disposed off-site, within provincial land:

CSR IL standards - Site Specific factors include:

- Intake of contaminated soil – applicable to all sites in BC;
- Toxicity to soil invertebrates and plants – applicable to all sites in BC;
- Groundwater used for drinking water – applicable to all sites in BC, unless the underlying aquifers' hydraulic conductivity, quality and/or yield proves that it is not capable of being a drinking water source; and
- Groundwater flow to surface water used by freshwater and marine aquatic life, since Fraser River and other surface water bodies are present within 500m radius from the Site.

GROUNDWATER

Federal Standards:

— Canadian Water Quality Guidelines for the Protection of Aquatic Life (freshwater and marine life)[3].

— *Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites[4] - Tier 1 Industrial Land Use and pathway specific Tier 2 conditions including:

- Inhalation – based on soil type (coarse or fine);
- Soil organisms, direct contact with contaminated groundwater;
- Groundwater transport to surface water at least 10m from the contamination and subsequent ingestion by wildlife.

- Guidelines for Canadian Drinking Water Quality (Health Canada, September 2020)[5].

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[3] All values to be multiplied by an assumed 10x dilution factor for the groundwater entering surface water body. For contaminated groundwater within 10m of a surface water body, the Canadian Water Quality Guidelines for the Protection of Aquatic Life should be applied directly.

[4] Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012 (Update of the May 2010 version).

[5] Applied to groundwater that is used as a potable water source or to groundwater defined as a potential potable water source by the province or other agency with jurisdiction over drinking water issues.

Note: *Federal Interim Groundwater Quality Guidelines that are protective of aquatic habitat assume transport of contaminants through unconsolidated soils. If transport occurs in very coarse textured soils (where median particle diameter is greater than 75um) or fractured bedrock, then the CEQG for the Protection of Aquatic Life should be applied. More detailed soil type assessment should be conducted for the Site to determine true applicability of the standards for groundwater.

Provincial Standards:

- CSR Drinking Water (DW) - applicable to all sites in BC, unless the underlying aquifers' hydraulic conductivity, quality and/or yield proves that it is not capable of being a drinking water source;
- CSR Freshwater and Marine Aquatic Life (AW-m&f); and
- CSR Groundwater standards for $EPHw_{10-19}$ and VHw_{6-10} apply to all sites irrespective of water uses.

SOIL VAPOUR

Federal Standards:

- Federal Contaminated Site Risk Assessment in Canada, Part VII: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites.

Provincial Standards:

- CSR Industrial Land Use

For soil classification/disposal purposes, the BC Hazardous Waste Regulation (HWR) standards/criteria also apply to the Site.

5 INVESTIGATION SCHEDULE & METHODOLOGY

5.1 NAMING CONVENTIONS

WSP developed a borehole sample naming convention as follows:

Table 5-1 Naming Conventions

Borehole Name	Description
20-BH/MW#	20: Year borehole was drilled
	BH: indicated a borehole drilled MW: Indicates a monitoring well installed
	#: sequential number of borehole drilled

If a sample is collected from a borehole, the following sample name is used:

20-MW2@0.2m - sample collected from monitoring well #2 at a depth of 0.2m below site grade.

If a groundwater sample is collected from a monitoring well, the following sample name is used:

20-MW2 – sample is collected from monitoring well #2.

5.2 DRILLING AND SOIL SAMPLING

All boreholes were excavated using a hydro-vacuum truck to 1.8m below site grade. A solid stem auger drill rig was employed to complete the boreholes for this investigation. During drilling, auger flights were advanced in approximately 1.5m lengths to allow for sampling and visual logging of soil conditions. Soil logging was conducted by visually observing soil conditions when the auger flights were removed from the boreholes during drilling. Grab soil samples were collected from the auger flights and immediately transferred into laboratory-supplied pre-cleaned jars.

The laboratory-supplied pre-cleaned glass jars had Teflon lids. Indelible markers were used for marking the lids and the soil jars with the appropriate sample identification number or reference. WSP's field engineer used new nitrile powder-free gloves before the collection of each soil sample. Soil samples were also transferred into plastic bags and were allowed to equilibrate with the ambient temperature after which the field engineer monitored the soil gas in the plastic bags using a Photoionization Detector (PID) MiniRAE 3000™. The PID was rented from Pine Environmental Canada LLC of Burnaby, BC (Pine). Headspace vapour readings for soil samples were recorded in the field notes. Considerations for selection of soil samples for laboratory analyses were field indications of potential contamination such as headspace readings, suspect staining, odour, soil stratigraphic layer, location of the soil sample with respect to the water table and the potential for contamination in different layers. Soil samples were submitted to ALS Environmental in Burnaby, BC, for laboratory analyses of PCOCs/COCs.

5.3 MONITORING WELL INSTALLATION

Monitoring wells were constructed inside hollow-stem auger flights with of 2" (51 mm) slotted and solid PVC pipes. The slotted pipe was used in the screened portion of the monitoring well in the vicinity of the groundwater table. Bentonite seals were installed between approximately 0.3m above the screen to the surface. These seals served to provide a surface seal and hydraulically isolate the screen. Silica sand was used to fill the screened portion of the well. Monitoring wells were completed with flush to grade road boxes and encased in concrete in order to protect the PVC monitoring well casings.

5.4 DEVELOPMENT & PURGING OF MONITORING WELLS

The wells were developed by removing a minimum of five casing volumes of water using a Waterra™ foot valve and tubing. The monitoring wells were left to settle for a minimum of 24 hours before groundwater sampling was attempted.

5.5 GROUNDWATER SAMPLING

WSP used low-flow groundwater sampling techniques using a peristaltic pump for both purging and sampling the groundwater. Prior to sampling, a volume of water equal to one casing volume was purged from the monitoring well at a rate of approximately 250ml/min. After purging the correct volume of water from the well, pH, temperature, and conductivity measurements were recorded at fixed volume intervals. Groundwater samples were collected for PCOCs when the difference between two consecutive readings of pH, temperature and conductivity were not greater than 5%.

The peristaltic pump was used to collect groundwater samples to be analysed for LEPH, HEPH, PAH and dissolved metals. A dedicated bailer and VOC tip were used to collect the groundwater samples for VOC and VPH at each well.

The following table outlines the containers, preservatives and protocol applied to each groundwater sample type.

Table 5-2 Groundwater Sampling Containers, Preservatives, and Protocols

Parameter	Details	Sampling Protocol
LEPH/HEPH, PAH	2 x 125ml amber glass, $NaHSO_4$	Peristaltic Pump
VOC, VPH, F1-F4	2 x 40 ml glass, $NaHSO_4$	Plastic Bailer with VOC tip
Dissolved Metals	125 ml plastic, HNO_3	Peristaltic Pump, field filtered
Dissolved Mercury	40 ml glass, HCl	Peristaltic Pump, field filtered
Chloride	250ml, plastic, no preservative	Peristaltic Pump
Phenols	2 x 500ml amber glass, NaHSO4	Peristaltic Pump

The groundwater sampling and analytical program is presented in the following table.

Table 5-3 Groundwater Sampling Program

Monitoring Well	Parameters
20-MW1	LEPH/HEPH, PAH, VOC/VPH, F1-F4, dissolved metals, chloride, chlorinated & non-chlorinated phenols
20-MW2	LEPH/HEPH, PAH, VOC/VPH, dissolved metals, chloride
20-MW3 / 20-DUP1	LEPH/HEPH, PAH, VOC/VPH, dissolved metals, chloride

A discussion of the results of these analyses is included in Section 0.

Once collected, the groundwater samples were stored in coolers with ice packs until they were transported to and received by the analytical laboratory. Chain of custody procedure was followed.

5.6 SOIL VAPOUR SAMPLING

Before soil vapour sampling was attempted, each vapour probe underwent both a flow/vacuum test and a leak test. The flow/vacuum test was conducted by attaching both a flow and vacuum meter while pumping air out of the probe with the attached Nylaflow™ tubing.

The leak test is designed to test the integrity of the vapour probe's surface seal by introducing a tracer gas at the contact with the ground surface and then monitoring the soil-gas for the presence of the tracer. A shroud, consisting of a 4 Litre pail sealed to the surface with hydrated granular bentonite, is placed over the test probe. Helium is introduced to fill the air space under the shroud. Helium concentration is maintained within the shroud at 50% (500,000 ppm). Soil-vapour from the probe is extracted while the Helium shroud concentration is maintained by attaching the probe tubing to a Tedlar™ bag held within a vacuum box. A sample pump calibrated to 100mL/min draws air out of the vacuum box until the pressure inside the box is less than that of the probe connection. Due to the pressure differential, vapours are drawn into the Tedlar™ bag. Once filled, the bag is removed from the box and the helium concentration in the Tedlar™ bag is measured with a helium detector and recorded. The difference in helium concentrations between the shroud and soil-vapour sample provides a ratio to compare the relative "leakage" in the sample.

WSP used a soil-vapour sampling pump provided by ALS Environmental Services in Burnaby, BC. The pump was calibrated to a flow rate of 100mL/min when the Thermal Desorption sampling tube (TD tube) was connected to the system.

Below is a diagram depicting the typical set-up for vapour sampling.

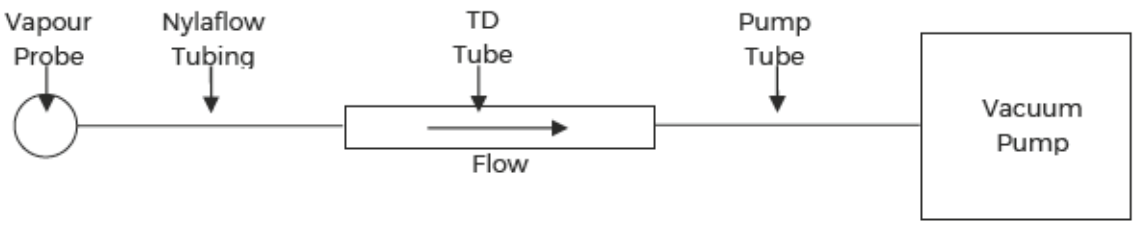


Diagram 1: Vapour Sampling Set-up

Once the sample tube was connected, the countdown timer in the pump was set to the desired sampling time period (20 minutes) as prescribed by ALS and as shown on the soil-vapour chain of custody forms in Appendix E. The pump was turned on to allow the soil-vapour to pass through the TD tube for a period of 20 minutes. Once sampling was completed, the TD tube was disconnected from the system and sealed. Swagelok™ fittings were used to seal both ends of the TD tube. Each sealed TD tube was stored in a laboratory-provided plastic container. The sample identification name, sampling date and associated project number was inscribed onto laboratory-supplied labels that are affixed to each plastic container. The plastic containers containing the soil-vapour sampling tubes were then placed into a laboratory-supplied cooler without icepacks. The samples were submitted to ALS in Burnaby, BC for analysis.

6 QUALITY ASSURANCE / QUALITY CONTROL

In order to provide confidence in the field data collected from the Site, a Quality Control/Quality Assurance (QA/QC) component was included in the sampling program. The field QA/QC component is summarized below. The laboratory chosen to conduct analyses on soil and groundwater samples collected during this project have their own internal QA/QC program, which is also briefly summarized below.

Table 6-1 Field & Laboratory QA/QC

Field QA/QC	Field equipment was cleaned, calibrated and maintained in good working condition. Common equipment was cleaned in the field, between each sampling location. New powder-free nitrile gloves were used for each sample collected. All sample containers were provided by the laboratory clean and sterile and were appropriate for the parameters analyzed. All sample containers and lids were labelled with the consultant's name (i.e., WSP), their respective sampling location identification, date and project reference number. Samples were kept cool by storing and transporting them in a laboratory-supplied cooler with ice packs. Field duplicates were collected during the investigation program to ascertain field collection QA/QC procedures. Chain-of-custody protocol was followed.
Laboratory QA/QC	ALS routinely analyses laboratory replicates, standard reference materials and method blanks as part of its internal QA/QC program. ALS also determines matrix spike recoveries (only for water samples) and surrogate spike recoveries (soil and water samples for volatiles and polycyclic aromatic hydrocarbons). Analytical results are compared to internal data quality objectives and results not meeting their internal QA/QC criteria are flagged. The laboratory results are reviewed by the chief project chemist and results are released when the data meets the internal data quality objectives of ALS.

6.1 QA/QC FOR ANALYTICAL DATA

WSP implemented a QA/QC program to evaluate the quality of sampling and analytical testing. WSP collected and submitted blind duplicate soil and groundwater samples for analyses of PCOCs along with the other soil and groundwater samples collected during the investigation program.

The results of the duplicate analyses were evaluated using a statistic called relative percentage difference (RPD). The RPD between measured concentrations of a PCOC in a sample and the measured concentrations of a PCOC in a duplicate sample was calculated as follows:

$$RPD(\%) = 100 \times ABS\left|\frac{X_1 - X_2}{(X_1 + X_2)/2}\right|$$

ABS = Absolute Value

X_1 = Measured concentration in the original sample

X_2 = Measured concentration in the duplicate sample

The criteria for determining field sample quality assurance are adapted from the BC Field Sampling Manual (2003);

1) The ratio of duplicates to total samples should be approximately 10%,
2) Both parent and duplicate values must be greater than five times the laboratory detection limit (RDL), and
3) RPD values >20% indicate a possible problem, and > 50% indicate a definite problem, most likely either sample contamination or lack of sample representativeness.

Because analytical error increases near the laboratory detection limit (RDL or MRL), an RPD calculation should be only applied when the measured concentration in both samples is greater than five times the reported detection limit (RDL).

If the RPD of duplicate samples is < 20%, then it would be concluded that the QA is acceptable.

If the RPD of duplicate samples ranges from >20% to <= 50%, then reasons for higher variation should be discussed. These would typically include, for instance, natural heterogeneity.

If the RPD of duplicate samples exceeds 50%, then the possibility of inadequate QA should be explicitly addressed and dealt with.

Results of the field QA/QC for soil and groundwater samples collected during this investigation are discussed in Section 8.3.

7 GENERAL FIELD OBSERVATIONS

7.1 FIELD WORK SCHEDULE

WSP completed a BC One Call before undertaking sub-surface investigations at the Site. Information obtained from the BC One Call was passed on to Quadra Utility Locating Ltd. of Surrey, BC; a private utility locator retained to assess the presence of underground utilities at the proposed investigation locations. WSP personnel were present on-site for each field activity. The following table summarizes the schedule of field activities.

Table 7-1 Schedule for Field Activities

Activity	CONTRACTOR	Date	Locations	Method
Utility Locates	Quadra Utility Locating	4 December, 2020	20-MW1 through 20-MW3	GPR (Ground Penetrating Radar) and EM (electromagnetic) scans
Hydro-vacuuming, Drilling, Monitoring Well and vapour probe Installation	Downrite Drilling	15 December, 2020	20-MW1 through 20-MW3, 20-VP1, 20-VP2	Hydro-vacuum, Solid and Hollow Stem Auger
Develop Groundwater wells	-	16 December, 2020	20-MW1 through 20-MW3	Wattera™ Tubing & Foot Valves
Sample Groundwater Monitoring Wells	-	17 December, 2020	20-MW1 through 20-MW3	Peristaltic pump & Bailer
Preparing soil vapour probes for sampling / protection from rain water	-	8 January, 2021	20-VP2	Plastic sheeting and gravel ballast
Sample soil vapour probes	-	22 January, 2020	20-VP1, 20-VP2	TD Tubes & air pump

A copy of selected photographs captured during the investigation is provided in Appendix B.

7.2 SOIL STRATIGRAPHY & DRILLING OBSERVATIONS

Detailed descriptions of the subsurface soils encountered at the borehole locations are presented in the borehole logs included in Appendix C.

The soil stratigraphy encountered within the investigated area typically consisted of 0.07m to 0.7m thick of sand & gravel or silty sand fill overlying grey fine river sand to the bottom of the boreholes at 4.6m below ground surface (bgs).

End of holes (EOH) for 20-MW1, 20-MW2, and 20-MW3 were extended to a depth of 4.6m bgs, while 20-VP1 and 20-VP2 were advanced to 0.91m bgs.

7.3 SOIL-ODOUR & SOIL-GAS MEASUREMENTS

Soil-gas concentrations were measured in soil samples collected from borehole locations and surficial soils using a PID. Results are presented in the following table.

Table 7-2 Soil Vapour Measurements

Sample ID & Depth	Soil Vapours (ppm_v)	Sample ID & Depth	Soil Vapours (ppm_v)
20-MW1@0.3m	ND	20-MW2@1.2m	ND
20-MW1@0.6m	ND	20-MW2@3.2m	ND
20-MW1@1.2m	0.2	20-MW2@4.5m	ND
20-MW1@2m	ND	20-MW3@0.3m	0.1
20-MW1@2.7m	0.1	20-MW3@0.6m	ND
20-MW1@4.4m	0.1	20-MW3@1.2m	ND
20-MW2@0.3m	0.1	20-MW3@2.2m	ND
20-MW2@0.6m	ND	20-MW3@4.5m	ND

Note: ND – below detectable limits of instrument

No hydrocarbon-like odour was observed during drilling. The highest PID soil-vapour reading was $0.2ppm_v$ measured at 1.2m bgs in borehole 20-MW1, and 0.1 ppm_v measured at 0.3m bgs in boreholes 20-MW2 and 20-MW3. These samples were selected for analysis of PCOCs.

7.4 MONITORING WELL INSTALLATION & BOREHOLE BACKFILLING

Three boreholes were drilled and completed as monitoring wells at locations 20-MW1, 20-MW2, and 20-MW3 by Downrite Drilling as directed by WSP staff. An additional two boreholes were drilled and completed as vapour probes at locations 20-VP1 and 20-VP2.

The installation of the groundwater monitoring wells targeted the top of the saturated layer at the Site. All of the wells were completed using 1.5m of screen as close to straddling the top of the water table as field conditions would allow. All wells were finished with flush mount road boxes encased in concrete and had bentonite seals extending from 0.15m above the screen to the road boxes.

The vapour probes were installed to target the vadose (unsaturated) zone above the water table. 0.15m stainless steel screens were installed down to 0.91m bgs then encased in filter sand to 0.07m above the top of the screen. The vapour probe screens were connected to the surface with Nylaflow tubing, kinked to prevent vapour or liquid from passing through it, then sealed from the surface by granulated bentonite installed and

hydrated in thin layers. Both vapour probe heads were installed in road boxes for protection from traffic and the elements.

Drill cuttings generated from the monitoring well and vapour probe installations were placed in barrels near monitoring well 20-MW02 for later disposal.

The locations of the boreholes and installed monitoring wells are indicated on Figures 3 and 4 in Appendix A. Borehole logs showing well installation details are included in Appendix C.

7.5 GROUNDWATER DEVELOPMENT & SAMPLING

Waterra™ tubing and foot valves were used to develop the installed monitoring wells approximately 24 hours after installation. All three wells had excellent recharge and were developed until a minimum of five casing volumes of water was removed. At each monitoring well location, the water was initially grey and silty. A very slight hydrocarbon-like sheen was observed at 20-MW3.

WSP collected groundwater samples from all three wells as per our proposed methodology. One casing volume was removed from all monitoring wells prior to ensuring pH, temperature and electrical conductivity of the groundwater had stabilized.

7.6 GROUNDWATER MONITORING WELL VAPOURS

Monitoring well vapour concentrations were detected at each well using a PID. Monitoring well vapours recorded in the wells ranged from 0.1ppmv to 0.6ppmv. Table 7-3 provides the results of the headspace vapour monitoring of wells.

Table 7-3 Petroleum Hydrocarbon Vapours in Well Column

	Headspace Hydrocarbon Vapours Measured in Monitoring Wells	
Sample ID & Depth	DATE	PID (PPM_V)
20-MW1	16 December, 2020	0.6
20-MW1	17 December, 2020	0.6
20-MW2	16 December, 2020	0.1
20-MW2	17 December, 2020	0.1
20-MW3	16 December, 2020	0.1
20-MW3	17 December, 2020	0.1

ND – below detectable limits of instrument

7.7 SITE HYDROGEOLOGY

A vertical survey of the Site was performed on 22 January, 2021 by WSP. The top of the PVC pipe casings and grade elevations of the monitoring well locations were surveyed and the elevations were determined by referencing to a local benchmark (i.e., top of nut on fire hydrant near west corner of 10610 Timberland Road) assuming its elevation to be 100m above sea level. The table below summarizes the relative elevations of the top-of-pipe, grade and water table elevations for each monitoring well location installed by WSP during the investigation.

Table 7-4 Site Survey Results

Well ID	Well Grade Elevation (m)	Top of Pipe (m)	Depth to Groundwater from Top of Pipe (m)	Groundwater Elevation (m)
20-MW1	98.994	98.830	1.249	97.581
20-MW2	98.839	98.717	0.686	98.031
20-MW3	98.959	98.793	0.565	98.228

Based on the groundwater elevation data measured at the installed monitoring wells, a groundwater contour map was prepared and is presented on Figure 6 in Appendix A. The on-site groundwater gradient direction was determined to be northeast towards Manson Canal, based on groundwater elevation levels measured on 22 January 2021. The hydraulic gradient was calculated to be approximately 0.003 m/m.

7.8 VAPOUR PROBE PURGING & SAMPLING

Two vapour probes were installed onsite on December 15, 2020 by Downrite Drilling as directed by WSP staff. Vapour probe 20-VP1 was installed approximately 1.2m west-southwest of monitoring well 20-MW1, while vapour probe 20-VP2 was installed approximately 1.4m northeast of monitoring well 20-MW2. A vapour probe could not be installed near monitoring well 20-MW3 due to a shallow groundwater table in this area. The vapour probes were installed as per the proposed methodology.

The vapour probe integrity testing was conducted by Rory Chudley, B.Tech., of WSP on 22 January 2021. First, a vacuum test was conducted at each probe, followed by a leak test. The results of the integrity test results are presented in Table 7-2.

Table 7-2 Soil Probe Integrity Tests

Soil Vapour Probe Installation Details	20-VP1
Drill Date	15 December 2020
Integrity Test Date	22 January 2021
Surface State	Road box in asphalt
Probe Length (cm)	15
Install Method	Auger drill
Helium Concentration in Shroud (ppm)	500,000
Helium Concentration in Tedlar Bag Sample (ppm)	0
Percent Leakage (%)	0
Sample Vacuum ("H_2O)	0

	20-VP2
Drill Date	15 December 2020
Integrity Test Date	22 January 2021
Surface State	Road box gravel
Probe Length (cm)	15

Install Method	Auger drill
Helium Concentration in Shroud (ppm)	500,000
Helium Concentration in Tedlar Bag Sample (ppm)	0
Percent Leakage (%)	0
Sample Vacuum ("H_2O)	5

The soil vapour samples were collected at a flow rate of 100ml/min for 20mins. The vapour samples were analyzed for the following parameters:

Table 7-3 Soil-Vapour Parameters

Vapour Sample No.	Parameter Analyzed
20-VP1	VOC/VPH
20-VP2	VOC/VPH

8 INVESTIGATION LOCATIONS & ANALYTICAL RESULTS

The locations of the boreholes, monitoring wells and soil vapour probes at the Site and analytical results are presented on Figures 3 through 5 in Appendix A. Tabulated results of the soil, soil-vapour and groundwater analyses are included in Appendix D. Appendix E contains the completed Chain-of-Custody forms and Laboratory Certificates for the analytical data obtained from ALS.

The following table outlines the soil, soil vapour and groundwater samples collected within identified APEC and AECs. If analyzed parameters were above the applicable standards, the APEC was designated as area of environmental concern (AEC) and PCOCs were confirmed to be contaminants of concern (COCs).

Table 8-1 Summary of Soil, Soil Vapour and Groundwater Samples with associated AECs and COCs

Soil Sample No.	Parameters Analyzed	COCs	AECs
20-MW1@0.3m	metals	**pH (8.8)**	AEC #1
20-MW1@0.6m	PAH and metals	**pH (8.9)**	AEC #1
20-MW1@1.2m	F1-F4, VOC, L/HEPH, PAH, phenols and metals	**pH (8.5)**	AEC #1
20-12@2'	metals	**pH (8.05)**	AEC #1
20-13@2'	metals	**pH (8.35)**	AEC #1
20-15@3'	metals	**pH (8.05)**	AEC #1
20-16@4'	metals	-	-
20-MW2@0.3m	F1-F4, L/HEPH and metals	-	-
20-MW2@0.6m	L/HEPH, PAH, VOC and metals	**pH (8.09)**	AEC #2
20-MW3@0.3m	F1-F4, VOC, L/HEPH, PAH and metals	-	-
20-MW3@0.6m	metals	-	-
Groundwater Sample No.	**Parameters Analyzed**	**COCs**	
20-MW1	LEPHw/HEPHw, PAH, VOC/VPH, phenols and metals	**Iron** (3,340ug/L) and **manganese** (1,690 ug/L)	AEC #1
20-MW2	LEPHw/HEPHw, PAH, VOC/VPH and metals	**Arsenic** (11.2 ug/L), **Iron** (2,500ug/L) **and manganese** (877ug/L)	AEC #2
20-MW3	LEPHw/HEPHw, PAH, VOC/VPH and metals	**Arsenic** (10.1 ug/L), **iron** (34,900 ug/L and 35,200 ug/L in duplicate sample) and **manganese** (4,780 ug/L and 4,680 ug/L in duplicate sample)	AEC #3

Soil Sample No.	Parameters Analyzed	COCs	AECs
Soil Vapour Sample No.	**Parameters Analyzed**	**COCs**	**AEC**
20-VP1	VOC/VPH	-	-
20-VP2	VOC/VPH	-	-

Bold – analytical parameters that exceeded federal environmental protection standards

AEC #1

AEC #1 is a section of Timberland Road close to 10619 Timberland Road.

Analytical data for the soil samples revealed that concentrations of LEPH, HEPH, PAH, VOC, F1-F4, phenols and heavy metals were below CCME CEQG, PHC CWS the CSR IL standards in soil samples collected from AEC #1. Soil pH was above the federal environmental quality guidelines (8>pH>6) at five investigative locations (20-MW1, 20-MW2, 20-12, 20-13 and 20-15) collected from fill material between 0.3m and 1.2m bsg.

The concentrations of VOC were below the provincial CSR IL standards in soil vapour at 20-VP1. Detectable concentrations (32ug/L and 34ug/L) of tetrachloroethylene (TCE) were measured in soil vapour sample collected from 20-VP1 and its duplicate.

The groundwater quality was sampled from one monitoring well (20-MW1) within AEC #1. The analytical results revealed that dissolved iron concentration at 20-MW1 (3,340ug/L) was above the federal CCME Water Quality Guideline for the Protection of Aquatic Life in freshwater x 10 (3,000 ug/L) and Federal Interim Groundwater Quality Guidelines (300ug/L). Dissolved manganese at 20-MW1 (1,690ug/L) was found to be above the Federal Interim Groundwater Quality Guidelines (200ug/L) and provincial CSR Drinking Water standard (1,500ug/L). The remaining analytical parameters were below the applicable standards in groundwater sampled at AEC #1.

AEC #2

AEC #2 10440 Timberland Road – due to former operations of CTL Steel and based on previous environmental investigations.

The analytical results for soil samples collected at 20-MW2 during the Phase II ESA field work revealed that pH in soil was above the range recommended by federal environmental quality guidelines (8>pH>6). The remaining sampling parameters (LEPH, HEPH, PAH, VOC, F1-F4 and heavy metals) were below the applicable environmental protection standards.

The concentrations of VOC were below the provincial CSR IL standards in soil vapour at 20-VP2. Detectable concentration (38ug/L) of tetrachloroethylene (TCE) was found in soil vapour sample collected from 20-VP2 and its duplicate.

The groundwater sample collected from 20-MW2 was analyzed for LEPHw/HEPHw, PAH, VOC/VPH and metals. Dissolved iron (2,500ug/L) in 20-MW2 was above the federal CCME Water Quality Guideline for the Protection of Aquatic Life in freshwater x 10 (3,000 ug/L) and Federal Interim Groundwater Quality Guidelines (300ug/L). Dissolved manganese in 20-MW2 (877ug/L) exceeded Federal Interim Groundwater Quality Guideline (200ug/L) and Guideline for Canadian Drinking Water Quality (120ug/L). Dissolved arsenic concentration at 20-MW2 (11.2ug/L) exceeded Federal Interim Groundwater Quality Guidelines (5ug/L) and provincial CSR Drinking Water standard of 10ug/L.

AEC #3

AEC #3 - 10520 Timberland Road – due to historical and current activities (Chemetron Railway Products and CP Yard) and previous environmental investigation (Stage 2 PSI, SNC Lavalin Environment, 2013).

All analytical results for soil collected at 20-MW3 (F1-F4, VOC, L/HEPH, PAH and metals) were below the applicable federal standards and below provincial soil standards for industrial land use.

The analytical results for groundwater sample and its duplicate (20-DUP1) indicated exceedances of federal and provincial groundwater standards for dissolved arsenic. The analytical results revealed that dissolved iron concentrations at 20-MW3(34,900ug/L) were above federal CCME Water Quality Guideline for the Protection of Aquatic Life in freshwater x 10 (3,000 ug/L) and Federal Interim Groundwater Quality Guidelines (300ug/L). Dissolved manganese at 20-MW3 (4,780ug/L) was found to be above Federal Interim Groundwater Quality Guidelines (200ug/L), Guidelines for Canadian Drinking Water Quality (120ug/L) and provincial CSR Drinking Water standard (1,500ug/L).

8.1 FIELD QA/QC

Samples were submitted to ALS within 24 hours of sampling. Analyses were completed within the required sample hold times.

The field QA/QC program specified the collection of one duplicate sample for every ten samples collected. During the Phase II ESA, eleven soil samples, three groundwater samples, and two soil vapour samples were submitted for analyses. One soil, one groundwater, and one soil vapour duplicate sample were analyzed alongside the parent samples. The duplicate soil samples were analyzed for PAH, VOC, VPH and metals, the duplicate groundwater sample was analyzed for LEPH/HEPH, PAH, VH, VPH, and dissolved metals.

According to the 2013 edition of the BC Field Sampling Manual, "If one or a set of duplicate values at or greater than five times the Method Detection Limit (MDL), then Relative Percent Difference (RPD) values >20% indicate a possible problem, and >50% indicates a definite problem, most likely either contamination or lack of sample representativeness." Therefore, the threshold RPD was set at 20% and those samples and duplicates that had concentrations less than five times the laboratory detection limit (MDL) were not calculated.

Relative percent difference (RPD) values for parent and duplicate sample results were calculated and included in the analytical tables in Appendix D. RPD values for all samples were either below 20% or could not be calculated because the parameter concentration in the parent sample and/or its duplicate sample was less than five times the method detection limit or the parameter concentrations were below the laboratory method detection limits.

8.2 LABORATORY QA/QC

WSP also reviewed the laboratory QA/QC data provided by ALS in the laboratory certificates. The laboratory certificates included results for laboratory blanks, replicates and reference samples. They also included results of the laboratory's calibration check.

The laboratory runs blanks to determine if their analytical instruments are clean and do not positively bias sample results. Reference samples are analyzed to determine if recoveries are within the range allowed by the BC ENV. Replicates are analyzed to prove that the analytical results for the duplicate sample are within the allowable range of laboratory acceptance, in accordance with the BC ENV laboratory manual and procedures.

WSP identified three issues pertaining to the laboratory QA/QC provided in the laboratory certificates for the soil and groundwater samples analyzed during this investigation. The following issue was identified a total of three times in ALS Work Orders #: VA20C3698 and VA20C3415:

- Lab control sample recovery was slightly outside ALS Data Quality Objective (DQO). Reported non-detect results for associated samples were unaffected.

The ALS QA/QC analytical results met all the internal data quality objectives, therefore the ALS results are considered acceptable. The results of ALS's QA/QC samples are included in each of the laboratory certificates attached in Appendix E.

9 DISCUSSION AND CONCLUSIONS

Phase II ESA was conducted in December 2020 – January 2021 during which a total of five boreholes were drilled and completed as monitoring wells. Two soil vapour probes were also installed. The boreholes were drilled within the proposed transportation improvement project and within the areas of potential environmental concern and areas of environmental concern identified in the Phase I ESA. Fill soils were encountered at all investigative locations. Samples were analyzed for a range of PCOCs/COCs. Based on the comparison of the analytical results for Phase II ESA with the federal environmental protection standards, three AECs were identified at the Site:

Table 9-1 Summary of Identified AEC and COCs

AEC NO.	AEC DESCRIPTION	REGULATED COCS*	COCS IDENTIFIED DURING PREVIOUS ENVIRONMENTAL INVESTIGATIONS BY OTHER CONSULTANTS
AEC #1	A section of Timberland Road close to 10619 Timberland Road (based on historical and current activities and previous environmental investigations and BC Site Registry (Site IDs 16719 – Across from 10619 Timberland Road and 23211 – Surrounds Timberland Road).	Soil: **pH** Groundwater: **dissolved iron and manganese**	Groundwater: arsenic and sodium (based on a Notification of Likely or Actual Contaminant Migration issued after ESA conducted for 10619 Timberland Road)
AEC #2	10440 Timberland Road – due to former operations of CTL Steel and based on previous environmental investigations.	Soil: **pH** Groundwater: **dissolved arsenic, iron and manganese**	Soil: chromium, copper and nickel), F2 (C10-C16)/LEPH and F3 (C16-C34) Groundwater: dissolved iron (based on Phase II ESA, SLR Global Environmental Solutions, 2012)
AEC #3	10520 Timberland Road – due to historical and current activities (Chemetron Railway Products and CP Yard) and previous environmental investigation (Stage 2 PSI, SNC Lavalin Environment, 2013)	Groundwater: **dissolved arsenic, iron and manganese**	Soil: pH, arsenic, chromium, copper and phenanthrene (PAH) Groundwater: arsenic, cadmium, iron and manganese (based on Stage 2 PSI, SNC Lavalin, 2013 and Phase I and II ESA, Hemmera Envirochem Inc., 2018.

Notes:

* regulated within federal jurisdictions.

WSP reviewed the analytical database for background groundwater quality for the Site area and surrounding properties (Subregion 1 – Lower Mainland, BC) compiled by the Ministry of Environment and Climate Change Strategy (ENV). The regional background concentration of substances in groundwater were collected by the ministry from various sources including academic studies and technical reports. Based on the regional background concentration map[6], dissolved iron within Subregion 1 is 290,000ug/L, manganese – 26,000ug/L and arsenic – 38ug/L. The nearest groundwater monitoring site location is approximately 400m to the east-northeast, at 10619, 10627, 10633, 10641 Fir Road and adjacent lane (Site ID 17709). Based on the site-specific background groundwater concentrations, dissolved arsenic was between 5.7ug/L to 41.7ug/L, dissolved iron was 14,300ug/L to 114,000ug/L and dissolved manganese was 2,800ug/L to 3,410ug/L in samples collected on seasonal basis. Therefore, it appears that elevated concentrations of arsenic, iron and manganese in groundwater at the Site are within the regional background concentrations of dissolved metals suggested by ENV.

Based on the Federal Interim Groundwater Quality Guidelines (Section 4.3 Special Considerations on the Application of the Numerical Guidelines), it is not expected that remediation of a contaminated site would be done to the levels below natural background concentrations. The guidelines may be considered in the development of risk management approach to ensure that elevated concentrations of chemicals do not pose an unacceptable risk to human health.

No information was available for WSP to review with regards to the source of the fill material at the Site. It appears that elevated pH levels were observed at several sections of the proposed transportation project. pH of the soil influences biogeochemical processes that affect plant growth and biomass yield. Therefore, the fill material excavated during construction activities should not be used for ditch infilling or deposition within environmentally sensitive areas.

[6] iMapBC - https://maps.gov.bc.ca/ess/hm/imap4m/

10 RECOMMENDATIONS

WSP recommends the following:

- Due to elevated concentrations of heavy metals and high pH, the soil excavated from the areas located within AEC #1 through AEC #3 during construction activities at the Site should be characterized and disposed accordingly, possibly to a licenced landfill.
- If groundwater is encountered during construction activities, it should be collected and disposed offsite as contaminated water or treated at the site. The effluent quality should comply with the requirements of federal and provincial regulations[7].
- Erosion and sediment control (ESC) plan should be prepared by a Qualified Professional (QP) to address the storm water management during construction. The quality of discharge should comply with the ESC plan and the City of Surrey ESC Bylaw No. 16138.
- If a Ministry Instrument is requested for the Site at a later date, further work would likely be required such as on- and off-site delineation of identified COCs in soil and/or groundwater.
- As per the BC Groundwater Protection Regulation (effective November 2005), any well (including monitoring wells) not used for more than 5 years should be deactivated or decommissioned since such water wells pose a preferential pathway to the underlying aquifer. Water wells have to be decommissioned by a qualified well driller or under the supervision of a qualified professional. A copy of the well decommissioning report should to be submitted to the BC ENV.
- During potential future redevelopment of the Site, if any hidden source(s) of contamination or any suspected/odorous soils are discovered, a qualified environmental professional should be contacted prior to the source removal to initiate soil characterization.

7 Fisheries Act, CCME Water Quality Guidelines for the Protection of Aquatic Life, BC Hazardous Waste Regulations, Schedule 1.2 (Standards for Discharges to the Environment and Storm Sewers), BC Approved Water Quality Guidelines

11 PROFESSIONAL STATEMENT

As required under Part 4, Section 62 of the "Environmental Management Act", Contaminated Sites Regulations (CSR, BC Reg. 375/96 including amendments up to Stage 13, January 26, 2021), WSP confirms that:

1. The Site investigation report has been prepared in accordance with the requirements of the Act and its regulations, policies, procedures and protocols; and
2. The person(s) signing this report has (have) demonstrable experience in conducting investigations of this type and are familiar with the investigation completed at the Site.

11.1 ROLES AND RESPONSIBILITIES

Mr. Rory Chudley, B.Tech., Environmental Technician
Field Staff, Report Author

Mr. Rory Chudley is an environmental technician with experience in conducting Stage 1 and 2 Preliminary Site Investigations, Spill Remediation, and soil, groundwater, soil vapour, and surface water monitoring and sampling since 2017. He has experience conducting environmental investigations on municipal, industrial, commercial, and residential properties, including a sewage treatment plant, school, and hospitals. He has also been involved in in-situ and ex-situ remediation of contaminated sites and remediation following truck spills. Rory holds a Bachelor's Degree of Technology in Environmental Engineering Technology from British Columbia Institute of Technology as well as a Diploma of Technology in Architectural and Building Engineering Technology from British Columbia Institute of Technology.

Ms. Marina Makovetski, P. Ag., Environmental Scientist
Project Manager, Report Author

Ms. Marina Makovetski is an Environmental Scientist with more than eight years of experience in environmental engineering projects in British Columbia. Ms. Makovetski has conducted various Phase II and Phase III, Detailed Site Investigations, and Remediation projects in British Columbia. She has been leading field work and report preparation for this Phase II ESA.

Ms. Jas Minhas
Report review

Ms. Jas Minhas is an Environmental Toxicologist. She has over nine years of experience in contaminated site assessment including over 300 Stage 1 Preliminary Site Investigations (PSI), several Stage 2 PSIs, Detailed Site Investigations (DSIs), underground storage tank removals, due diligence reviews, and human health and ecological risk assessments.

12 CLOSURE

WSP has prepared this report exclusively for VFPA. The conclusions made in this report reflect WSP's best judgement in light of the information available at the time of preparation. No other warranty, expressed or implied, is made. Any use which a third party makes of this report, or any reliance on or decisions to be made or actions based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report. The standard limitations of this report are provided in Section 13. Your attention is also drawn to the conditions outlined in the "Terms of Engagement" which will be applicable to this report.

13 STANDARD LIMITATIONS

1 The findings and conclusions documented in this Report have been prepared for specific application to this Project and have been developed in a manner consistent with that level of care normally exercised by environmental professionals currently practicing under similar conditions in the area.

2 The findings of this Report are based solely on data collected on Site during this investigation and pertain only to the locations that have been investigated and on the conditions of the Site during the completion of the work and services. WSP Canada Inc. has relied on good faith on information provided by individuals and sources noted in the Report. No other warranty, expressed or implied, is made.

3 If new information is developed in future work that affects the conclusions of this Report, WSP Canada Inc. should be contacted to re-evaluate the conclusions of this Report and provide amendments as required.

4 The service provided by WSP Canada Inc. in completing this Report is intended to assist the Client in a business decision. The liability of the Site is not transferred to WSP Canada Inc. as a result of such work and services, and WSP Canada Inc. does not make recommendation regarding the purchase, sale, or investment in the property.

5 This document is intended for the exclusive use of VFPA, for whom it has been prepared. WSP does not accept responsibility to any third party for the use of information presented in this Report, or decisions made or actions taken based on its content.

6 The information presented in this Report is based on, and limited by, the circumstances and conditions acknowledged herein, and on information available at the time of its preparation. WSP has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this Report, but cannot guarantee or warrant the accuracy or completeness of the information. Information provided by others, whether represented or otherwise utilized, is believed to be accurate but cannot be guaranteed.

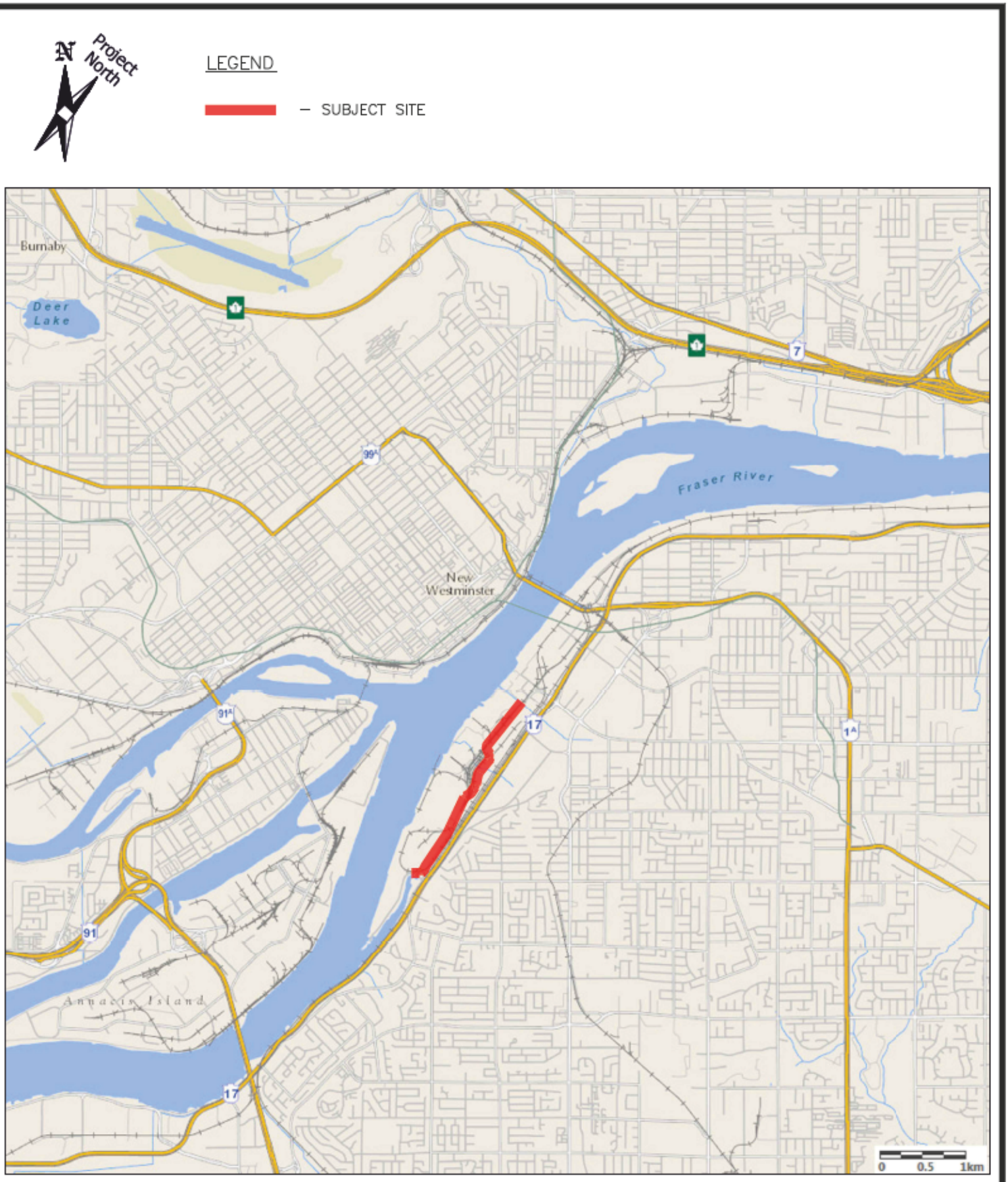
7 The report intended to be used in their entirety. No excerpts may be taken to be representative of the findings in the assessment / investigation.

8 The Report may not be reproduced in whole or in part, except as required by your accountants, regulators or legal advisors, without our prior written consent. In any event, the Report shall be provided in its entirety.

9 This report is not assignable and does not confer any right or benefit upon any third party unless written agreement is made between WSP and the third party. We accept no responsibility for any loss or damage suffered by a third party as a result of decisions made or actions based on the Report. In the event that a third party has a concern about the Property and seeks a report upon which it may rely, it is obligated to hire an environmental consultant at its own cost.

APPENDIX

A FIGURES



WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE:	Site Location Map
PROJECT:	Phase II Environmental Site Assessment Fraser Surrey Port Lands - Transportation Improvements
CLIENT:	Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO.	20M-00758-00
DWG. NO.	FIGURE 1

EXTENTS OF FIGURE 3

EXTENTS OF FIGURES 4 TO 6

Project North

APEC #1

AEC #2

AEC #3

10619 TIMBERLAND RD

10610 & 10650 TIMBERLAND RD

10440 TIMBERLAND RD

10550 TIMBERLAND RD

10520 TIMBERLAND RD

11015 ELEVATOR RD

9815 ROBSON RD

Timberland Rd

BC Hydro (SWM) Rwy

Canadian National (SWM) Rwy

Burrill/North (SWM) Rwy

Plywood Rd

Millar Rd

River Rd

Robson Rd

Royal Cr

Princess Dr

Crown Cr

Townline Div

Regal Dr

Queen

Elevator Rd

Bailey Cr

Hwy 17 (South Fraser Perimeter Rd)

117 St

116 St

115A St

99A Ave

99 Ave

98A Ave

98 Ave

97A Ave

97 Ave

96A Ave

LEGEND

– SUBJECT SITE

– PROPERTY LINE

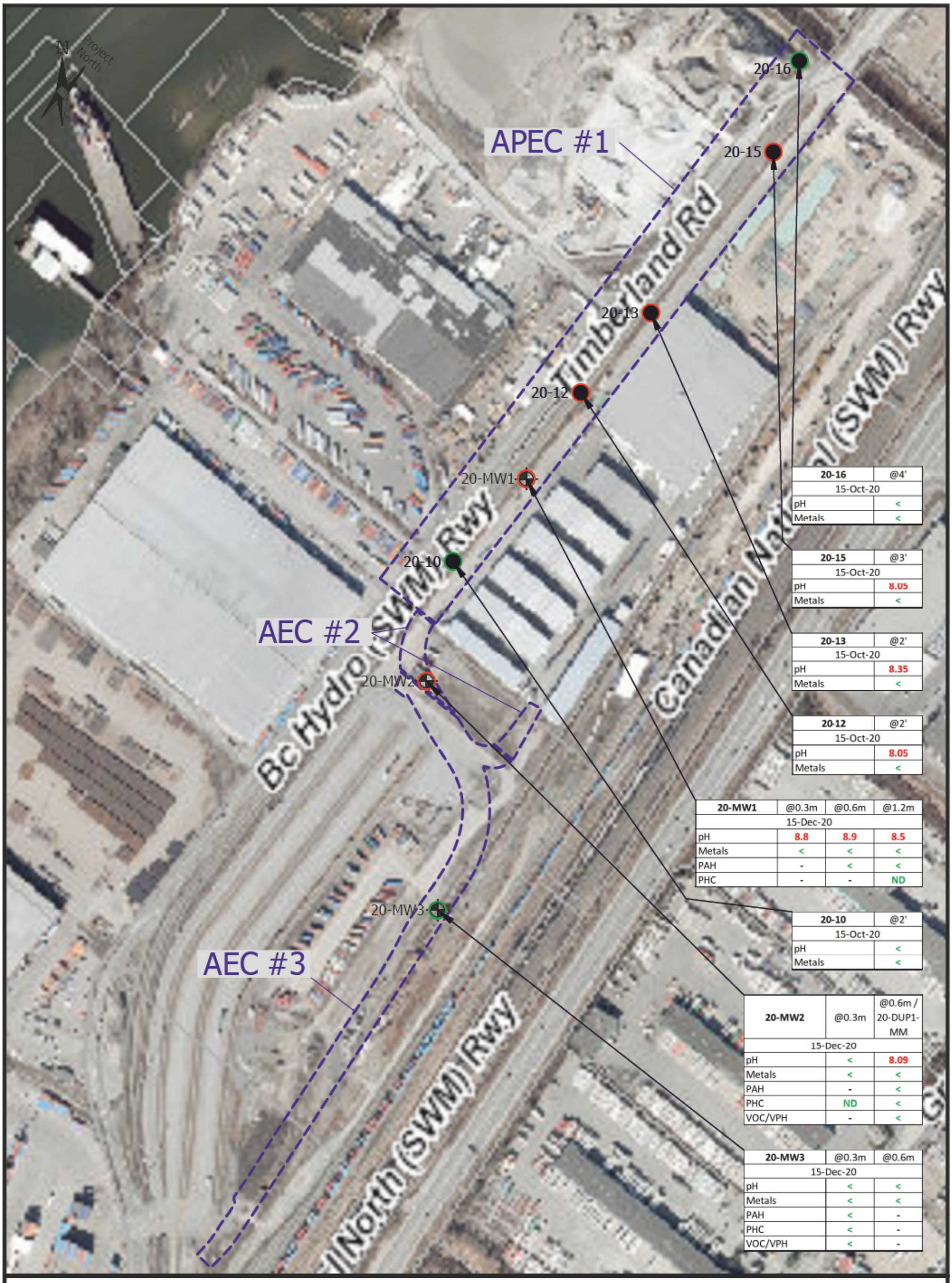
WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE: Site Plan

PROJECT: Phase II Environmental Site Assessment
Fraser Surrey Port Lands - Transportation Improvements

CLIENT: Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO. 20M-00758-00	
DWG. NO. FIGURE 2	



20-16	@4'
15-Oct-20	
pH	<
Metals	<

20-15	@3'
15-Oct-20	
pH	8.05
Metals	<

20-13	@2'
15-Oct-20	
pH	8.35
Metals	<

20-12	@2'
15-Oct-20	
pH	8.05
Metals	<

20-MW1	@0.3m	@0.6m	@1.2m
15-Dec-20			
pH	8.8	8.9	8.5
Metals	<	<	<
PAH	-	<	<
PHC	-	-	ND

20-10	@2'
15-Oct-20	
pH	<
Metals	<

20-MW2	@0.3m	@0.6m / 20-DUP1-MM
15-Dec-20		
pH	<	8.09
Metals	<	<
PAH	-	<
PHC	ND	<
VOC/VPH	-	<

20-MW3	@0.3m	@0.6m
15-Dec-20		
pH	<	<
Metals	<	<
PAH	<	-
PHC	<	-
VOC/VPH	<	-

LEGEND

- — MONITORING WELL LOCATION
- — GEOTECHNICAL INVESTIGATION LOCATION
- — SOIL SAMPLE CONCENTRATIONS MEET APPLICABLE STANDARDS
- — SOIL SAMPLE CONCENTRATIONS EXCEED APPLICABLE STANDARDS
- < — SOIL SAMPLE CONCENTRATION BELOW APPLICABLE STANDARDS
- ND — SOIL SAMPLE CONCENTRATION BELOW LABORATORY DETECTION LIMIT

SCALE

0 20 40 60 80 100m

ALL DIMENSIONS ARE APPROXIMATE

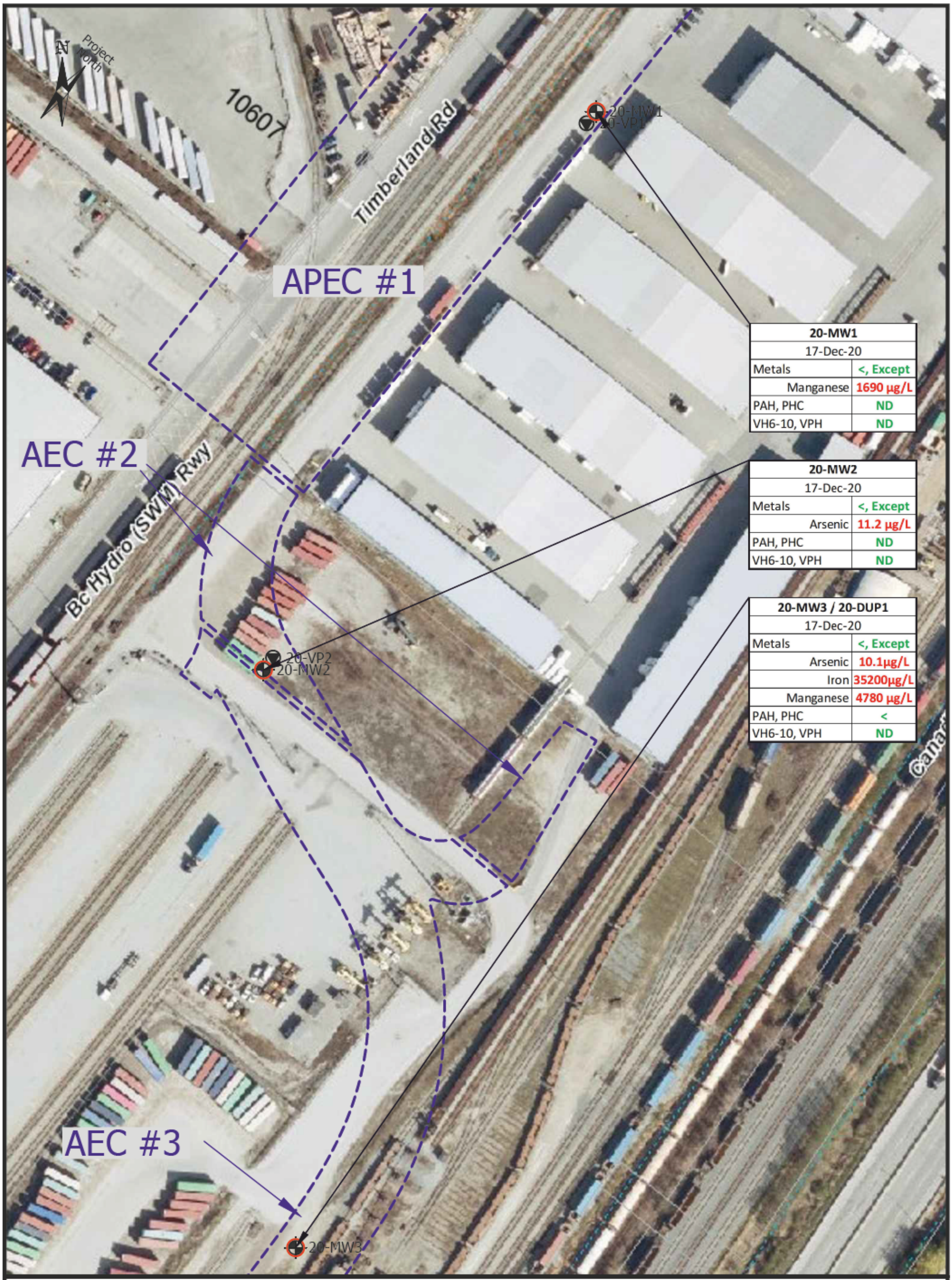
WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE: Site Plan Showing Soil Analytical Results

PROJECT: Phase II Environmental Site Assessment
Fraser Surrey Port Lands - Transportation Improvements

CLIENT: Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO. 20M-00758-00	
DWG. NO. FIGURE 3	



20-MW1	
17-Dec-20	
Metals	<, Except
Manganese	1690 µg/L
PAH, PHC	ND
VH6-10, VPH	ND

20-MW2	
17-Dec-20	
Metals	<, Except
Arsenic	11.2 µg/L
PAH, PHC	ND
VH6-10, VPH	ND

20-MW3 / 20-DUP1	
17-Dec-20	
Metals	<, Except
Arsenic	10.1µg/L
Iron	35200µg/L
Manganese	4780 µg/L
PAH, PHC	<
VH6-10, VPH	ND

LEGEND

- MONITORING WELL LOCATION
- SOIL VAPOUR PROBE LOCATION
- WATER SAMPLE CONCENTRATION MEETS APPLICABLE STANDARDS
- WATER SAMPLE CONCENTRATION EXCEEDS APPLICABLE STANDARDS
- < WATER SAMPLE CONCENTRATION BELOW APPLICABLE STANDARDS
- ND WATER SAMPLE CONCENTRATION BELOW LABORATORY DETECTION LIMIT

SCALE

0 10 20 30 40 50m

ALL DIMENSIONS ARE APPROXIMATE

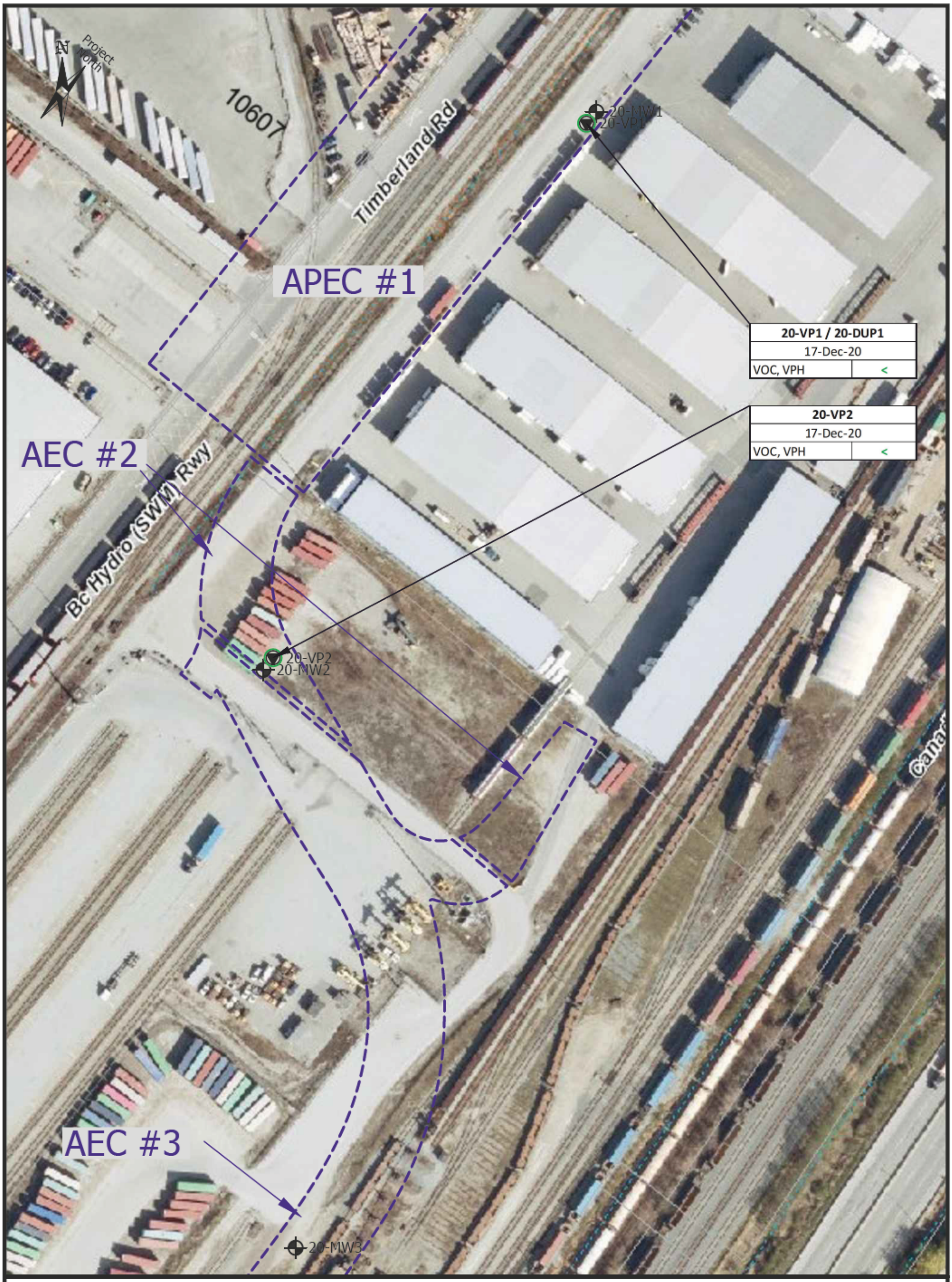
WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE: Site Plan Showing Groundwater Analytical Results

PROJECT: Phase II Environmental Site Assessment
Fraser Surrey Port Lands - Transportation Improvements

CLIENT: Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO.	20M-00758-00
DWG. NO.	FIGURE 4



LEGEND

- MONITORING WELL LOCATION
- SOIL VAPOUR PROBE LOCATION
- SAMPLE CONCENTRATION MEETS APPLICABLE STANDARDS
- SAMPLE CONCENTRATION EXCEEDS APPLICABLE STANDARDS
- < SAMPLE CONCENTRATION BELOW APPLICABLE STANDARDS
- ND SAMPLE CONCENTRATION BELOW LABORATORY DETECTION LIMIT

SCALE

0 10 20 30 40 50m

ALL DIMENSIONS ARE APPROXIMATE

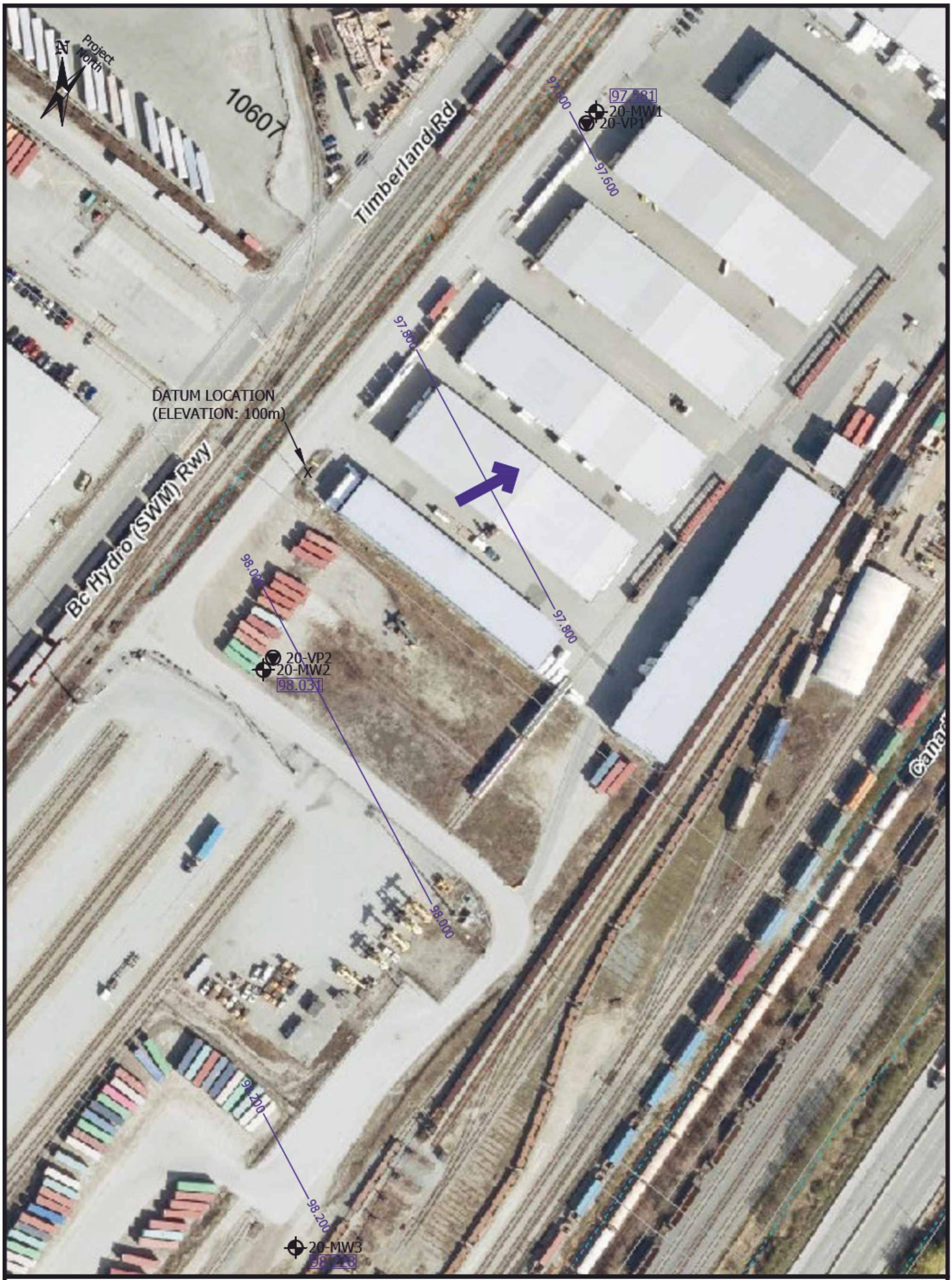
WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE: Site Plan Showing Soil Vapour Analytical Results

PROJECT: Phase II Environmental Site Assessment
Fraser Surrey Port Lands - Transportation Improvements

CLIENT: Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO.	20M-00758-00
DWG. NO.	FIGURE 5



LEGEND

- MONITORING WELL LOCATION
- SOIL VAPOUR PROBE LOCATION
- 98.228 — GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

NOTES

- GROUNDWATER DEPTHS MEASURED DECEMBER 17, 2020.
- ELEVATIONS BASED ON ARBITRARY DATUM OF 100m AT TOP OF NUT OF FIRE HYDRANT LOCATED NEAR WEST CORNER OF 10610 TIMBERLAND ROAD.

SCALE

0 10 20 30 40 50m

ALL DIMENSIONS ARE APPROXIMATE

WSP CANADA INC.
#100 - 20339 96 AVENUE, LANGLEY, BC V1M 0E4
PHONE: 604 533-2992 - FAX: 604 533-0768 - WWW.WSP.COM

TITLE: Site Plan Showing Groundwater Elevation

PROJECT: Phase II Environmental Site Assessment
Fraser Surrey Port Lands - Transportation Improvements

CLIENT: Vancouver Fraser Port Authority

DES.	DR. JL/RC
CH.	SCALE AS SHOWN
APP.	DATE MAR 2021
FILE NO. 20M-00758-00	
DWG. NO. FIGURE 6	

APPENDIX

B PHOTOGRAPHS

Photograph 1: View of Timberland Road looking north.

Photograph 2: 10440 Timberland Road – proposed development area (used by Westran Intermodal Ltd.).

Photograph 3: 10550 Timberland Road – proposed development area (occupied by IDC Distribution Services Ltd.).

Photograph 4: 10520 Timberland Road – proposed development area (occupied by CP Welding Plant).

Photograph 5: 10550 Timberland Road – occupied by IDC Distribution Services Ltd.

Photograph 6: Storage of railway ties at 10520 Timberland Road.

APPENDIX

C BOREHOLE AND MONITORING WELL LOGS

MONITORING WELL RECORD: **20-MW1**

Project Number:**20M-00758-00**

Project Name: **VFPA FSPL Transportation Improvement**
Site: **Fraser Surrey Port**
Borehole Location: **20-MW1**
Client: **Vancouver Fraser Port Authority**

Drilling Details:
Date (start): 15/12/2020
Date (end): 15/12/2020
Drilling Company: Downrite Drilling
Drilling Equipment: Other
Drilling Method: Solid Stem / Hollow Stem Auger
Borehole Diameter: 152 mm
Drilling Fluid:

Survey Details:

Well Details:
Well Casing Type: Flushmount

Levels:
Water Level
Free Phase

Sample State:
Intact / Undisturbed
Reworked / Remoulded
Lost
Cored

Sample Type:
AS - Auger sample
GS - Grab sample
MA - Manual Auger
SS - Split Spoon
ST - Shelby Tube
TA - Auger
TR - Trowel
TU - DT32 Liner

Chemical Analysis:
Metals = AT1 Metals
Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH, Cl. & non Cl.
Phenols =

Odour:
S - Slight
M - Moderate
P - Persistent

Visual:
D - Dispersed
S - Saturated

mbgs DEPTH ELEVATION masl	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	COMPLETION DETAILS: DIAG.	COMPLETION DETAILS: DESCRIPTION	% RECOVERY	N Value	SAMPLES: SAMPLE STATE	SAMPLES: SAMPLE NAME	SAMPLES: DEPTH (m)	SAMPLES: PID (ppm)	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	OBSERVATIONS: ODOUR	OBSERVATIONS: VISUAL	DEPTH (ft)
		Ground surface.											S M P	D S	
0.10		ASPHALT.		0.00 Concrete 0.10											
		SAND & GRAVEL: road base, grey.						20-MW1@0.3m	0.25-0.35	0	Metals				1
0.5				Bentonite											
0.60		SAND: fine, brown, trace well-rounded gravel.		PVC, 51 mm				20-MW1@0.6m	0.60-0.70	0	Metals				2
				0.91											
1.0															3
								20-MW1@1.2m	1.15-1.25	0.2	Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH, Cl. & non Cl. Phenols				4
1.5				WATER (17/12/2020) Depth: 1.40 m Elev.: m Diam.: 51 mm											5
				Sand											
		–Grey below 1.8m		PVC (#10),											6
2.0								20-MW1@2m	1.95-2.05	0					7
2.5				2.59											8
		–Wood debris encountered at 2.7m						20-MW1@2.7m	2.65-2.75	0.1					9
3.0															10
															11
3.5				Slough											
															12
4.0															13
															14
4.5								20-MW1@4.4m	4.35-4.45	0.1					15
4.60															
		End of borehole at 4.60 m.													16
5.0															17

Logged by: **Rory**
Reviewed by:

Project : 20M-00758-00 LOGS.GPJ Type of report : WSP_EN_WELL-ENVIRONMENTAL Data Template : 20190604_CD.GDT 21/12/2020

MONITORING WELL RECORD: **20-MW2**

Project Number:**20M-00758-00**

Project Name: **VFPA FSPL Transportation Improvement**
Site: **Fraser Surrey Port**
Borehole Location: **20-MW2**
Client: **Vancouver Fraser Port Authority**

Drilling Details:
Date (start): 15/12/2020
Date (end): 15/12/2020
Drilling Company: Downrite Drilling
Drilling Equipment: Other
Drilling Method: Solid Stem / Hollow Stem Auger
Borehole Diameter: 152 mm
Drilling Fluid:

Survey Details:

Well Details:
Well Casing Type: Flushmount

Levels:
Water Level
Free Phase

Sample State:
Intact / Undisturbed
Reworked / Remoulded
Lost
Cored

Sample Type:
AS - Auger sample
GS - Grab sample
MA - Manual Auger
SS - Split Spoon
ST - Shelby Tube
TA - Auger
TR - Trowel
TU - DT32 Liner

Chemical Analysis:
Metals = AT1 Metals
Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH =

Odour:
S - Slight
M - Moderate
P - Persistent

Visual:
D - Dispersed
S - Saturated

mbgs DEPTH ELEVATION masl	LITHOLOGY	DESCRIPTION	DIAG.	COMPLETION DETAILS DESCRIPTION	% RECOVERY	N Value	SAMPLE STATE	SAMPLE NAME	DEPTH (m)	PID (ppm)	ANALYSIS	DUPLICATE	ODOUR S	ODOUR M	ODOUR P	VISUAL D	VISUAL S	DEPTH (ft)
		Ground surface.																
0.5		Silty SAND: grey/brown, some gravel		0.00 Concrete 0.10 Bentonite				20-MW2@0.3m	0.25-0.35	0.1	Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH							1
0.70		–Metal debris encountered at 0.6m		PVC, 51 mm				20-MW2@0.6m	0.55-0.65	0	Metals	20-DUP1-MM						2
1.0		SAND: Fine, grey		0.76 WATER (17/12/2020) Depth: 0.80 m Elev.: m Diam.: 51 mm				20-MW2@1.2m	1.15-1.25	0								3 4
1.5				Sand														5
2.0				PVC (#10),														6 7
2.5				2.56														8
3.0																		9 10
								20-MW2@3.2m	3.15-3.25	0								
3.5				Slough														11 12
4.0																		13
4.60																		14
4.5								20-MW2@4.5m	4.45-4.55	0								15
5.0		End of borehole at 4.60 m.																16 17

Logged by: **Rory**
Reviewed by:

MONITORING WELL RECORD: **20-MW3**

Project Number:**20M-00758-00**

Project Name: **VFPA FSPL Transportation Improvement**
Site: **Fraser Surrey Port**
Borehole Location: **20-MW3**
Client: **Vancouver Fraser Port Authority**

Drilling Details:
Date (start): 15/12/2020
Date (end): 15/12/2020
Drilling Company: Downrite Drilling
Drilling Equipment: Other
Drilling Method: Solid Stem / Hollow Stem Auger
Borehole Diameter: 152 mm
Drilling Fluid:

Survey Details:

Well Details:
Well Casing Type: Flushmount

Levels:
Water Level
Free Phase

Sample State:
Intact / Undisturbed
Reworked / Remoulded
Lost
Cored

Sample Type:
AS - Auger sample
GS - Grab sample
MA - Manual Auger
SS - Split Spoon
ST - Shelby Tube
TA - Auger
TR - Trowel
TU - DT32 Liner

Chemical Analysis:
Metals = AT1 Metals
Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH =

Odour:
S - Slight
M - Moderate
P - Persistent

Visual:
D - Dispersed
S - Saturated

mbgs DEPTH ELEVATION masl	LITHOLOGY	DESCRIPTION	DIAG.	COMPLETION DETAILS DESCRIPTION	% RECOVERY	N Value	SAMPLE STATE	SAMPLE NAME	DEPTH (m)	PID (ppm)	ANALYSIS	DUPLICATE	OBSERVATIONS ODOUR S	ODOUR M	ODOUR P	VISUAL D	VISUAL S	DEPTH (ft)
		Ground surface.																
0.07		SAND & GRAVEL: Grey		0.00 Concrete 0.10														
		SAND: Fine, grey, trace gravel, trace wood debris		Bentonite PVC, 51 mm 0.53				20-MW3@0.3m	0.25-0.35	0.1	Metals, VOC/VPH, F1-F4, LEPH/HEPH, PAH							1
0.5				WATER (17/12/2020) Depth: 0.69 m Elev.: m Diam.: 51 mm				20-MW3@0.6m	0.55-0.65	0	Metals							2
1.0		–Some Silt from 1 to 1.2m																3
				Sand PVC (#10),				20-MW3@1.2m	1.15-1.25	0								4
1.5																		5
																		6
2.0				2.13														7
								20-MW3@2.2m	2.15-2.25	0								8
2.5																		9
																		10
3.0				Slough														11
																		12
3.5																		13
																		14
4.0								20-MW3@4.5m	4.35-4.45	0								15
4.5																		16
4.60		End of borehole at 4.60 m.																17
5.0																		

Logged by: **Rory**
Reviewed by:

Project : 20M-00758-00 LOGS.GPJ Type of report : WSP_EN_WELL-ENVIRONMENTAL Data Template : 20190604_CD.GDT 21/12/2020

APPENDIX

D ANALYTICAL DATA TABLES

Table 1
Results of Soil Samples
Metals Analyses
page 1 of 1

PARAMETERS	RDL	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m	20-DUP1-MM	RPD (%)	20-MW3@0.3m	20-MW3@0.6m	20-10@2'	20-12@2'	20-13@2'	20-15@3'	20-16@4'	CSR IL Standards (1)	CCME CSQG, Industrial Land Use (7)
Sample Date		15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020		15-Dec-2020	15-Dec-2020	15-Oct-2020	15-Oct-2020	15-Oct-2020	15-Oct-2020	15-Oct-2020		
pH	0.1	**8.8**	**8.9**	**8.5**	7.84	**8.09**	**8.08**	-	7.41	7.52	6.9	**8.05**	**8.35**	**8.05**	7.3	NS	6 to 8
Aluminum	40	9840	9600	9230	14800	10800	10300	5%	15600	19900	16000	8980	10000	10400	13600	250 000 (2)	NA
Antimony	0.1	0.22	0.2	0.18	0.51	0.33	0.34	-	0.45	0.57	0.64	0.32	0.28	0.28	0.36	40 000 (2), 40 (3)	40
Arsenic	0.3	3.13	3.26	2.79	5.64	4.02	4.02	-	5.44	7.8	7.83	3.98	4.04	3.7	3.77	10	12
Barium	1	50.9	52.8	48.7	97.8	86.5	76.8	12%	111	145	134	64.8	80.8	64.8	78.5	350	2000
Beryllium	0.1	0.19	0.18	0.16	0.32	0.23	0.22	-	0.31	0.4	0.35	0.2	0.2	0.18	0.25	1 - 350	8
Boron	2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	> 1 000 000 (2)	NA
Cadmium	0.04	0.12	0.124	0.126	0.322	0.155	0.17	-	0.21	0.311	0.349	0.201	0.143	0.133	0.142	1 - 50	22
Chromium hexavalent (Cr VI)	0.1	0.1	0.12	<0.10	<0.10	<0.10	0.11		<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	60	1.4
Chromium trivalent (Cr III)	0.03	30.7	23.1	22.8	37.3	33.1	28.1	16%	38.7	46.7	60.4	25	30.6	27.1	25.6	250	87*
Cobalt	0.1	8.11	8.06	7.12	12.1	9.35	8.97	4%	12.4	15.7	14.8	7.69	8.68	7.05	7.59	25	300
Copper	0.4	15.8	14.9	13.7	31.2	19.3	18.9	2%	28.5	37.8	37	16.5	18.1	15	17.6	75 - 300	91
Iron	20	18200	17500	16100	25800	20200	19300	5%	27000	32400	30400	18000	19600	19000	18500	150 000 (2)	NA
Lead	0.2	2.65	2.14	2.06	19	4.26	4.74	11%	5.51	9.07	7.88	4.3	3.08	7.64	9.03	200 (6) - 4 000	600
Lithium	0.1	8	7.3	7.1	13.1	9.4	9.3	1%	14	18.6	13.2	7.1	8.2	6.9	6.5	450 (2)	NA
Manganese**	0.4	398	348	299	607	365	370	1%	547	672	578	423	340	373	380	2 000	NA
Mercury	0.04	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	-	0.0528	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	75	50
Molybdenum	0.1	0.33	0.34	0.3	0.71	0.43	0.47	-	0.7	0.94	1.06	0.49	0.59	0.64	0.97	15	40
Nickel	0.6	32.8	34.2	30.6	42.9	37.1	34.5	7%	43.7	51.9	55.4	32.1	35.4	26.5	24.3	75- 250 (6)	89
Selenium	0.2	<0.20	<0.20	<0.20	0.36	<0.20	<0.20	-	0.29	0.44	0.43	<0.20	<0.20	<0.20	<0.20	1	2.9
Silver	0.1	<0.10	<0.10	<0.10	0.14	<0.10	<0.10	-	<0.10	0.13	0.13	<0.10	<0.10	<0.10	<0.10	35 000 (2), 40 (3)	40
Strontium	0.2	21.3	20.5	20.8	41.3	36.3	34.2	6%	53.9	59.5	51.3	29.3	35	34.5	45.3	150 000 (2)	NA
Thallium	0.1	<0.050	<0.050	<0.050	0.093	0.052	0.053	2%	0.08	0.109	0.094	<0.050	0.052	<0.050	<0.050	25 (3)	1
Tin	0.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	> 1 000 000 (2), 300 (3	300
Tungsten	0.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	200 (2)	NA
Uranium	0.05	0.296	0.221	0.261	0.657	0.339	0.395	15%	0.701	0.866	0.703	0.398	0.37	0.328	0.448	30	300
Vanadium	1	45.1	41.4	39.6	52	44.9	42.8	5%	50.4	63.2	62	41.7	42	41.4	37	100	130
Zinc	2	40.8	38	35.2	64.8	46.2	45.1	2%	62.2	79.9	72.4	39.6	43.3	43	45.4	150 - 450	410

NOTES

Results and standards in µg/g or parts per million (ppm) unless otherwise stated
RDL - Reported Detection Limit
*'-' - Not analyzed / cannot be calculated
*Standard for total chromium
** - Manganese standards apply if site used for an industrial or commercial purpose or activitiy set out in Schedule 2 as: B1, C1, C3, C4, D2, D3, D5, D6, E4, H3, H11, H14, or H20.
NS indicates that no standard applies
1 - CSR Schedule 3.1, Part 1 - Matrix Numerical Soil Standards unless noted otherwise
2 - CSR Schedule 3.1 - Part 2 - Generic Soil Standards to Protect Human Health
3 - CSR Schedule 3.1 - Part 3 - Generic Soil Standards to Protect Ecological Health
4 - Standard for hexavalent chromium
5 - Standard for all chromium speciations
6 - Protocol 4 - Determining Background Soil Quality (Surrey - Regional Background Concentration for Lower Mainland)
7 - Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health, 1999 - Industrial Land Use

RPD - Relative Percentage Difference
BOLD Sample concentration exceeds the applicable standard or criteria
BOLD RPD values exceed 20%

Table 2
Results of Soil Samples
PAH Analyses
Page 1 of 1

PARAMETERS	RDL	20-MW1@1.2m	20-MW1@0.6m	20-MW2@0.6m	20-DUP1-MM	RPD (%)	20-MW3@0.3m	CSR IL Standards (1)	Canadian Soil Quality Guidelines (CSQG) for the protection of Environmental Health (4)	Soil Quality Guideline for the Protection of Freshwater Life (5)	Soil Quality Guidelines for the protection of potable water (6)
Sample Date		15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020		15-Dec-2020				
1-Methylnaphthalene	0.01	<0.010	<0.010	-	<0.010	-	<0.010	1000 (2)	NG	NG	NG
2-Methylnaphthalene	0.01	<0.010	<0.010	-	<0.010	-	<0.010	950 (2)	NG	NG	NG
Acenaphthene	0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	15 000 (2)	NG	0.28	NG
Acenaphthylene	0.005	**0.0187**	**0.013**	**0.0087**	**0.0118**	-	<0.0050	NS	NG	320	NG
Anthracene	0.004	<0.0040	**0.0101**	**0.0182**	**0.0087**	-	<0.0040	30	32	NG	NG
Benz (a) anthracene	0.01	<0.010	**0.016**	**0.027**	**0.012**	-	<0.010	500 (2), 10 (3)	10	NG	0.33
Benzo (a) pyrene	0.01	<0.010	**0.013**	**0.022**	**0.012**	-	<0.010	50	72	8800	0.37
Benzo (b+j) fluoranthenes	0.01	<0.010	**0.017**	**0.029**	**0.015**	-	<0.010	500 (2), 10 (3)	10	NG	0.16
Benzo(g,h,i)perylene	0.01	<0.010	<0.010	**0.014**	<0.010	-	<0.010	NS	NG	NG	6.8
Benzo (k) fluoranthene	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	500 (2), 10 (3)	10	NG	0.16
Chrysene	0.01	<0.010	**0.015**	**0.024**	**0.012**	-	<0.010	4 500 (2)	NG	NG	2.1
Dibenz (a,h) anthracene	0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	50 (2), 10 (3)	10	NG	0.23
Fluoranthene	0.01	<0.010	**0.039**	**0.063**	**0.028**	-	**0.014**	200	180	NG	NG
Fluorene	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	9 500 (2)	NG	0.25	NG
Indeno (1,2,3-cd) pyrene	0.01	<0.010	<0.010	**0.013**	<0.010	-	<0.010	500 (2), 10 (3)	10	NG	2.7
Naphthalene	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	20	0.013	0.013	NG
Phenanthrene	0.01	<0.010	**0.023**	**0.050**	**0.016**	-	**0.014**	300 000 (2), 50 (3)	0.046	0.046	NG
Pyrene	0.01	<0.010	**0.024**	**0.046**	**0.019**	-	<0.010	200 000 (2), 100 (3)	100	NG	NG
Quinoline	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	10 (2)	NG	NG	NG
Total for B(a)P TPE*	-	-	0.01645	0.02798	0.01482	-	-	NS	NG	NG	NG
IACR (CCME)**	0.15	<0.15	**0.24**	**0.383**	**0.21**	-	<0.15	NS	NG	NG	<=1

NOTES

Results and standards in µg/g or parts per million (ppm) unless otherwise stated
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
NG indicates that no guidance applies
RPD Relative percent difference
IACR - Index of Additive Cancer Risks
1 - CSR Schedule 3.1, Part 1 - Matrix Numerical Soil Standards unless noted otherwise
2 - CSR Schedule 3.1 - Part 2 - Generic Soil Standards to Protect Human Health
3 - CSR Schedule 3.1 - Part 3 - Generic Soil Standards to Protect Ecological Health
4 - Canadian Soil Quality Guidelines (CSQG) for Carcinogenic and Other PAHs for the protection of Environmental Health.
5- Soil Quality Guideline for the Protection of Freshwater Life
6- Soil Quality Guidelines for the protection of potable water

Bold	*The unsubstituted PAHs that are known or strongly suspected to act as carcinogens in humans and other mammals" as per Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment, 2008, revised 2010. Benzo(a)pyrene Total Potency Equivalents (B(a)P TPE) was calculated using these parameters to assess carcenogenic effects of PAHs for the protection of Human Health.

*The calculated value of B(a)P TPE was compared with the human health guidelines based on carcinigenic effects of PAHs for industrial land (0.6 B(a)P TPE - based on an incremental lifetime cancer risk of 1 in 1,000,000 and 5.3 B(a)P TPE based on an incremental lifetime cancer risk of 1 in 100,000)

**The IACR calculated value was compared with human health guideline based on carciogenic effects of PAHs for the protection of potable water at industrial sites (IACR<=1)

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

Table 3
Results of Soil Samples
Petroleum Hydrocarbons (PHC)
Page 1 of 1

PARAMETERS	RDL	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m	20-DUP1-MM	RPD (%)	20-MW3@0.3m	CSR IL Standards (1)	CWS, Industrial Use (Coarse Soil) (4)
Sample Date		15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020		15-Dec-2020		
EPHs (10-19)	50	<200	<200	<200	<200	-	<200	~ 2 000	NS
EPHs (19-32)	50	<200	<200	<200	<200	-	<200	~ 5 000	NS
LEPH	50	<200	<200	<200	<200	-	<200	2 000 (2, 3)	NS
HEPH	50	<200	<200	<200	<200	-	<200	5 000 (2,3)	NS
F1 (C6-C10)	5	<5.0	-	-	<5.0	-	<5.0	NS	240*
F2 (C10-C16)	25	<25	<25	-	<25	-	<25	NS	260
F3 (C16-C34)	50	<50	<50	-	**54**	-	**66**	NS	1700
F4 (C34-C50)	50	<50	<50	-	**50**	-	<50	NS	3300
TPH (C10-C50)	75	<75	<75	-	**104**	-	<75	NS	NS
TPH (C16-C50)	75	<75	<75	-	**104**	-	<75	NS	NS

NOTES

Results and standards in µg/g or parts per million (ppm) unless otherwise stated
"~" - Compared to LEPH/HEPH standards
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
RPD Relative percent difference
1 - CSR Schedule 3.1, Part 1 - Matrix Numerical Soil Standards unless noted otherwise
2 - CSR Schedule 3.1 - Part 2 - Generic Soil Standards to Protect Human Health
3 - CSR Schedule 3.1 - Part 3 - Generic Soil Standards to Protect Ecological Health
4-Canada-Wide Standards for Petroleum Hydrocarbons in Soil, 2008 (Industrial Land Use, Coarse Soil)
*where applicable, for protection of potable groundwater
Coarse Soil means soil having a median grain size of >75um as defined by the American Society for Testing and Materials

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

Table 4
Results of Soil Samples
VOCs / VPH Analyses
Page 1 of 1

PARAMETERS	RDL	20-MW1@1.2m	20-MW2@0.6m	20-DUP1-MM	RPD	20-MW3@0.3m	CSR IL Standards (1)	CCME CSQG Industrial Land (4)
Sample Date		15-Dec-2020	15-Dec-2020	15-Dec-2020		15-Dec-2020		
1,1,1,2-Tetrachloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	1 500 (2)	NG
1,1,1-Trichloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	> 1 000mg/g (2), 50 (3)	50
1,1,2,2-Tetrachloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	150 (2)	50
1,1,2-Trichloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	30 000 (2), 50 (3)	50
1,1-Dichloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	> 1 000mg/g (2), 50 (3)	50
1,1-Dichloroethene	0.05	<0.050	<0.050	<0.050	-	<0.050	350 000 (2), 50 (3)	50
1,2-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	-	<0.050	650 000 (2), 10 (3)	10
1,2-Dichloroethane	0.05	<0.050	<0.050	<0.050	-	<0.050	350 (2), 50 (3)	50
1,2-Dichloropropane	0.05	<0.050	<0.050	<0.050	-	<0.050	10 000 (2), 50 (3)	50
1,3-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	-	<0.050	200 000 (2), 10 (3)	10
1,3-Dichloropropene (cis + trans)	0.075	<0.075	<0.075	<0.075	-	<0.075	200 000 (2), 50 (3)	50
1,4-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	-	<0.050	800 000 (2), 10 (3)	10
Benzene	0.02	<0.0050	<0.0050	<0.0050	-	<0.0050	0.035	0.03
Bromodichloromethane	0.1	<0.050	<0.050	<0.050	-	<0.050	550 (2)	NG
Bromoform	0.1	<0.050	<0.050	<0.050	-	<0.050	4 000 (2)	NG
Carbon tetrachloride	0.05	<0.050	<0.050	<0.050	-	<0.050	5 000 (2), 50 (3)	50
Chlorobenzene	0.05	<0.050	<0.050	<0.050	-	<0.050	150 000 (2), 10 (3)	10
Chloroform	0.05	<0.050	<0.050	<0.050	-	<0.050	70 000 (2), 50 (3)	50
cis-1,2-Dichloroethene	0.05	<0.050	<0.050	<0.050	-	<0.050	15 000 (2), 50 (3)	50
Dibromochloromethane	0.1	<0.050	<0.050	<0.050	-	<0.050	400 (2)	NG
Dichloromethane	0.1	<0.050	<0.050	<0.050	-	<0.050	40 000 (2), 50 (3)	50
Ethylbenzene	0.05	<0.015	<0.015	<0.015	-	<0.015	15	0.082
Methyl tert-butyl ether	0.04	<0.050	<0.050	<0.050	-	<0.050	20 000 (2)	NG
Styrene	0.05	<0.050	<0.050	<0.050	-	<0.050	> 1 000mg/g (2), 50 (3)	50
Tetrachloroethylene	0.05	<0.050	<0.050	<0.050	-	<0.050	2.5	50
Toluene	0.05	<0.050	<0.050	<0.050	-	<0.050	0.5	0.37
trans-1,2-Dichloroethylene	0.05	<0.050	<0.050	<0.050	-	<0.050	150 000 (2), 50 (3)	NG
Trichloroethylene	0.01	<0.010	<0.010	<0.010	-	<0.010	0.3	0.01
Trichlorofluoromethane	0.1	<0.050	<0.050	<0.050	-	<0.050	70 000 (2)	NG
Vinyl chloride	0.05	<0.050	<0.050	<0.050	-	<0.050	45 (2)	NG
Xylenes (total)	0.075	<0.075	<0.075	<0.075	-	<0.075	6.5	11

NOTES

Results and standards in µg/g or parts per million (ppm) unless otherwise stated
RDL - Reported Detection Limit
'-' - Not analyzed / cannot be calculated
NS indicates that no standard applies
1 - CSR Schedule 3.1, Part 1 - Matrix Numerical Soil Standards unless noted otherwise
2 - CSR Schedule 3.1 - Part 2 - Generic Soil Standards to Protect Human Health
3 - CSR Schedule 3.1 - Part 3 - Generic Soil Standards to Protect Ecological Health

4 - Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health, 1999 - Industrial Land Use, coarse soil

RPD - Relative Percentage Difference

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration is detectable
BOLD	RPD values exceed 20%

Table 5
Results of Soil Samples
Phenols Analyses
Page 1 of 1

PARAMETERS	RDL	20-MW1@1.2m	CSR Industrial Land Use	CCME CSQG Industrial Land Use (3)
Sample Date		15-Dec-2020		
2-Chlorophenol	0.020	<0.020	35,000	5
3 & 4-Chlorophenol	0.020	<0.020	20,000	5
2,3-Dichlorophenol	0.020	<0.020	20,000	5
2,4 & 2,5-Dichlorophenol	0.020	<0.020	20,000	5
2,6-Dichlorophenol	0.020	<0.020	20,000	5
3,4-Dichlorophenol	0.020	<0.020	20,000	5
3,5-Dichlorophenol	0.020	<0.020	20,000	5
2,3,4-Trichlorophenol	0.020	<0.020	7,000	5
2,3,5-Trichlorophenol	0.020	<0.020	7,000	5
2,3,6-Trichlorophenol	0.020	<0.020	7,000	5
2,4,5-Trichlorophenol	0.020	<0.020	700,000	5
2,4,6-Trichlorophenol	0.020	<0.020	7,000	5
3,4,5-Trichlorophenol	0.020	<0.020	7,000	5
2,3,5,6-Tetrachlorophenol,	0.020	<0.028	20,000	5
2,3,4,6-Tetrachlorophenol	0.020	<0.020	200,000	5
Pentachlorophenol	0.020	<0.020	0.1-55	8
Phenol	0.020	<0.020	7	4
2-Methylphenol	0.020	<0.020	350000 (2)	NG
3-Methylphenol	0.020	<0.020	350000 (2)	NG
4-Methylphenol	0.020	<0.020	35000 (2)	NG
2,4-Dimethylphenol	0.020	<0.020	150000 (2)	NG

NOTES

Results and standards in µg/g or parts per million (ppm) unless otherwise stated
RDL - Reported Detection Limit
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
NG indicates that no guidance applies
1- CSR, Schedule 3.1 Part 2 - Generic Numerical Soil Standards to Protect Human Health
2- CSR, Schedule 3.1 Part 3 - Generic Numerical Soil Standards to Protect Ecological Health
3 - Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health, 1999 - Industrial Land Use

BOLD Sample concentration exceeds the applicable standard or criteria
BOLD Sample concentration is detectable

Table 6
Results of Groundwater Samples
Dissolved Metals Analyses
Page 1 of 1

PARAMETERS	RDL	20-MW1	20-MW2	20-MW3	20-DUP1	RPD	CSR AQUATIC LIFE STANDARDS (1)	CSR DRINKING WATER STANDARDS (1)	CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater (7) and Marine Life (8) X 10	Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses (coarse soil) (9)	Guidelines for Canadian Drinking Water Quality (Health Canada 2020) (10)
Sample Date		17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020						
Hardness mg/L	0.5	87.3	92.2	354	359	1%	NS	NS	NG	NG	NG
Aluminum	5	5.1	35.4	6.7	7.2	7%	NS	9 500	50-1000	50-1000	NG
Antimony	0.2	<0.10	0.12	0.15	0.15	0%	90 (2), 2 500 (3)	6	NG	2000	6
Arsenic	0.5	2.43	**11.2**	**9.99**	**10.1**	1%	50 (2), 125 (3)	10	50 (7), 125 (8)	5	100
Barium	5	94.1	66.4	310	296	5%	10 000 (2), 5 000 (3)	1 000	NG	500	2000
Beryllium	0.1	<0.100	<0.100	<0.100	<0.100	-	1.5 (2), 1 000 (3)	8	NG	5.3	NG
Boron	5	51	39	65	64	2%	12 000	5 000	15000 (7)	500	5000
Cadmium	0.01	<0.0050	<0.0150	0.0133	0.0158	-	0.5 - 4 (2), 15 (3)	5	0.14-0.37 (7), 1.2 (8)	0.017	7
Calcium	200	23400	26500	108000	111000	3%	NS	NS	NG	NG	NG
Chromium	0.5	0.14	1.03	0.56	0.61	-	10 (2,4), 90 (2,5), 15	50 (4), 6 000 (5)	10 (7), 15 (8)	8.9	50
Cobalt	0.1	1.82	0.72	6.77	6.77	0%	40	20 (6)	NG	50	NG
Copper	0.4	0.68	0.47	<0.20	<0.20	-	20 - 90 (2), 20 (3)	1 500	21-40 (7)	21-40	200
Iron	10	**3340**	**2500**	**34900**	**35200**	1%	NS	6 500	3000 (7)	300	NG
Lead	0.2	<0.050	<0.050	<0.050	<0.050	-	40 - 180 (2), 20 (3)	10	25-70 (7)	25-70	5
Lithium	0.1	1.8	1.7	7.7	7.7	0%	NS	8	NG	NG	NG
Magnesium	10	7010	6490	20500	19900	3%	NS	NS	NG	NG	NG
Manganese	0.2	**1690**	**877**	**4730**	**4680**	2%	NS	1 500	NG	200	120
Mercury	0.1	<0.0050	<0.0050	<0.0050	<0.0050	-	0.25	1	0.26 (7), 0.16 (8)	0.026	1
Molybdenum	0.4	1.38	23.4	4.2	4.29	2%	10 000	250	730 (7)	73	NG
Nickel	0.5	2.82	1.63	5.45	5.36	2%	250 - 1 500 (2), 83 (3)	80	844-1500 (7)	844-1500	NG
Selenium	0.05	<0.050	0.175	0.463	0.46	1%	20	10	10 (7)	1	50
Silver	100	<0.010	<0.010	<0.010	<0.010	-	0.5 or 15 (2), 15 (3)	20	2.5 (7), 75 (8)	0.1	NG
Sodium	1	97100	102000	42000	41000	2%	NS	200 mg/L	NG	NG	NG
Strontium	0.02	156	122	510	529	3%	NS	2 500	NG	NG	7000
Thallium	0.2	<0.010	<0.010	<0.010	<0.010	-	3	NS	8 (7)	0.8	NG
Titanium	5	<0.30	3.06	0.58	0.52	-	1 000	NS	NG	100	NG
Tin	0	0.11	0.14	<0.10	0.1	-	NS	2500	NG	NG	NG
Tungsten	0.001	<0.10	<0.10	<0.10	<0.10	-	NS	3	NG	NG	NG
Uranium	0.02	0.144	0.28	1.08	1.07	1%	85	20	150 (7)	10	20
Vanadium	1	0.54	4.09	0.84	0.82	-	NS	20	NG	100	NG
Zinc	4	1.9	1.3	3.6	3.8	-	75 - 2 400 (2), 100 (3)	3 000	300 (7)	10	NG
Chloride	0.50	84.5	41.4	7.40	7.42	-	1500mg/L (2)	250mg/L	1.200mg/L (7)	100mg/L	NG

NOTES

Results and standards in µg/L or parts per billion (ppb) unless otherwise stated
RDL - Reported Detection Limit
RPD - Relative Percent Difference
"<" - Sample concentration is below Reported Detection Limit
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
NG indicates that no guidance applies
1 - CSR Schedule 3.2, Numerical Water Standards unless noted otherwise
2 - Standard for Freshwater Aquatic Life
3 - Standard for Marine Aquatic Life
4 - Standard for Hexavalent Chromium
5 - Standard for Trivalent Chromium
6- Cobalt - Interim background groundwater estimate - Moe Email dated 7 Nov 2017
7 - CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater, 2018. All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
8 - CCME Water Quality Guideline for the Protection of Aquatic Life - Marine (2018). All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
9 - Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines, November 2012, Commercial and Industrial Land Uses (coarse soil)
10 - Guidelines for Canadian Drinking Water Quality (Health Canada, September 2020)

BOLD Sample concentration exceeds the applicable standard or criteria
BOLD RPD values exceed 20%

Table 7
Results of Groundwater Samples
Petroleum Hydrocarbons
Page 1 of 1

PARAMETERS / Sample Date	RDL	20-MW1 17-Dec-2020	20-MW2 17-Dec-2020	20-MW3 17-Dec-2020	20-DUP1 17-Dec-2020	RPD, %	CSR AQUATIC LIFE STANDARDS (1)	CSR Drinking Water Standards	CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater (2) and Marine Life (3) X 10	Federal Interiam Groundwater Quality Guidelines, Commercial and Industrial Land Uses (coarse soil) (4)	Guidelines for Canadian Drinking Water Quality (Health Canada 2020) (5)
EPHw (10-19)	250	<250	<250	<250	<250	-	5000	5000	NG	NG	NG
EPHw (19-32)	250	<250	<250	<250	<250	-	NS	NS	NG	NG	NG
LEPHw	250	<250	<250	<250	<250	-	500	NS	NG	NG	NG
HEPHw	250	<250	<250	<250	<250	-	NS	NS	NG	NG	NG
F1 (C6-C10)	100	<100	-	-	-	-	NS	NS	9800 (2)	810	NG
F2 (C10-C16)	300	<300	-	-	-	-	NS	NS	NG	1300	NG
F3 (C16-C34)	300	<300	-	-	-	-	NS	NS	NG	NG	NG
F4 (C34-C50)	300	<300	-	-	-	-	NS	NS	NG	NG	NG
Acenaphthene	0.010	<0.010	<0.010	**0.023**	**0.021**	9%	60	250	58 (2)	5.8	NG
Acenaphthylene	0.010	<0.010	<0.010	<0.010	<0.010	-	NS	NS	NG	4.6	NG
Acridine	0.010	<0.010	<0.010	<0.010	<0.010	-	0.5	NS	44 (2)	0.05	NG
Anthracene	0.010	<0.010	<0.010	**0.010**	<0.010	-	1	1 000	0.12 (2)	0.012	NG
Anthraquinone, 9, 10-	0.050	<0.050	<0.050	<0.050	<0.050	-	NS	4	NG	NG	NG
Benz (a) anthracene	0.010	<0.010	<0.010	<0.010	<0.010	-	1	0.07	0.18 (2)	0.018	NG
Benzo (a) pyrene	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	0.1	0.01	0.15 (2)	0.01	0.04
Benzo (b+j) fluoranthenes	0.010	<0.010	<0.010	<0.010	<0.010	-	NS	0.07	NG	0.48	NG
Benzo (g,h,i) perylene	0.010	<0.010	<0.010	<0.010	<0.010	-	NS	NS	NG	0.17	NG
Benzo (k) fluoranthene	0.010	<0.010	<0.010	<0.010	<0.010	-	NS	NS	NG	0.48	NG
Chrysene	0.010	<0.010	<0.010	<0.010	<0.010	-	1	7	NG	0.1	NG
Dibenz (a,h) anthracene	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	NS	0.01	NG	0.26	NG
Fluoranthene	0.010	<0.010	<0.010	<0.010	<0.010	-	2	150	0.4	0.04	NG
Fluorene	0.010	<0.010	<0.010	<0.010	<0.010	-	120	150	30	3	NG
Indeno (1,2,3-cd) pyrene	0.010	<0.010	<0.010	<0.010	<0.010	-	NS	NS	NG	0.21	NG
Naphthalene	0.050	<0.050	<0.050	<0.050	<0.050	-	10	80	11 (2), 14(3)	1.1	NG
Phenanthrene	0.020	<0.020	<0.020	<0.020	<0.020	-	3	NS	4 (2)	4	NG
Pyrene	0.010	<0.010	<0.010	<0.010	<0.010	-	0.2	100	0.25 (2)	0.025	NG
Quinoline	0.050	<0.050	<0.050	<0.050	<0.050	-	34	0.05	34 (2)	3.4	NG

NOTES

Results and standards in µg/L or parts per billion (ppb) unless otherwise stated
RDL - Reported Detection Limit
"<" - Sample concentration is below Reported Detection Limit
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
NG - no guidance
1 - CSR Schedule 3.2, Numerical Water Standards unless noted otherwise
2 - CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater, 2018. All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
3 - CCME Water Quality Guideline for the Protection of Aquatic Life - Marine (2018). All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
4 - Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interiam Groundwater Quality Guidelines, November 2012, Commercial and Industrial Land Uses (coarse soil)
5 - Guidelines for Canadian Drinking Water Quality (Health Canada, September 2020)
RPD - Relative Percentage Difference

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

Table 8
VOCs / VPH Analyses
Page 1 of 1

PARAMETERS	RDL	20-MW1	20-MW2	20-MW3	20-DUP1	RPD	CSR AQUATIC LIFE STANDARDS (1)	CSR DRINKING WATER STANDARDS (1)	CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater (4) and Marine Life (5) X 10*	Federal Interim Groundwater Quality Guidelines, Commercial and Industrial Land Uses (coarse soil) (6)	Guidelines for Canadian Drinking Water Quality (Health Canada 2010) (7)
Sample Date		17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020						
VH-hw (6-10)	100	<100	<100	<100	<100	-	15000	15000	NG	NG	NG
VPH-hw	100	<100	<100	<100	<100	-	1500	NS	NG	NG	NG
1,1,1,2-Tetrachloroethane	1	<1.00	<0.50	<0.50	<0.50	-	NS	6	NG	3.3	NG
1,1,1-Trichloroethane	0.5	<0.50	<0.50	<0.50	<0.50	-	NS	9000	NG	640	NG
1,1,2,2-Tetrachloroethane	0.2	<0.20	<0.20	<0.20	<0.20	-	NS	0.8	NG	3.2	NG
1,1,2-Trichloroethane	0.5	<0.50	<0.50	<0.50	<0.50	-	NS	3	NG	4.7	NG
1,1-Dichloroethane	1	<1.00	<0.50	<0.50	<0.50	-	NS	30	NG	320	NG
1,1-Dichloroethylene	1	<1.00	<0.50	<0.50	<0.50	-	NS	14	NG	NG	14
1,2-Dichlorobenzene	0.5	<0.50	<0.50	<0.50	<0.50	-	7 (2), 420 (3)	200	7 (4), 420 (5)	0.7	200
1,2-Dichloroethane	1	<1.00	<0.50	<0.50	<0.50	-	1000	5	1000 (4)	5	5
1,2-Dichloropropane	1	<1.00	<0.50	<0.50	<0.50	-	NS	4.5	NG	1.6	NG
1,3-Dichlorobenzene	1	<1.00	<0.50	<0.50	<0.50	-	1500	NS	1500 (4)	42	NG
1,3-Dichloropropene (cis + trans	1	<1.00	<0.75	<0.75	<0.75	-	NS	1.5	NG	5.2	NG
1,4-Dichlorobenzene	1	<1.00	<0.50	<0.50	<0.50	-	260	5	260 (4)	26	5
Benzene	0.5	<0.50	<0.50	<0.50	<0.50	-	400 (2), 1 000 (3)	5	3700 (4), 1100 (5)	8.8	5
Bromodichloromethane	1	<1.00	<0.50	<0.50	<0.50	-	NS	100	NG	9500	NG
Bromoform	1	<1.00	<0.50	<0.50	<0.50	-	NS	100	NG	380	NG
Carbon tetrachloride	0.5	<0.50	<0.50	<0.50	<0.50	-	130	2	133 (4)	0.56	2
Chlorobenzene	1	<1.00	<0.50	<0.50	<0.50	-	13 (2), 250 (3)	80	13 (4), 250 (5)	1.3	NG
Chloroform	1	<1.00	<0.50	<0.50	<0.50	-	20	100	18 (4)	NG	NG
cis-1,2-Dichloroethylene	0.5	<0.50	<0.50	<0.50	<0.50	-	NS	8	NG	1.6	NG
Dibromochloromethane	1	<1.00	<0.50	<0.50	<0.50	-	NS	100	NG	100	NG
Dichloromethane	5	<5.00	<0.50	<0.50	<0.50	-	980	50	981 (4)	NG	NG
Ethylbenzene	0.5	<0.50	<0.50	<0.50	<0.50	-	2 000 (2), 2 500 (3)	140	900 (4), 250 (5)	3,200	140
Methyl tert-butyl ether	0.5	<0.50	<0.50	<0.50	<0.50	-	34 000 (2), 4 400 (3)	95	100,000 (4), 50,000(5)	340	NG
Styrene	0.5	<0.50	<0.50	<0.50	<0.50	-	720	800	720 (4)	7.2	NG
Tetrachloroethylene	1	<1.00	<0.50	<0.50	<0.50	-	1 100	30	1100 (4)	110	10
Toluene	0.4	<0.40	<0.40	<0.40	<0.40	-	5 (2), 2 000 (3)	60	20 (4), 2150 (5)	8.3	60
trans-1,2-Dichloroethylene	1	<1.00	<0.50	<0.50	<0.50	-	NS	80	NG	1.6	NG
Trichloroethylene	1	<1.00	<0.50	<0.50	<0.50	-	200	5	210 (4)	20	5
Trichlorofluoromethane	1	<1.00	<0.50	<0.50	<0.50	-	NS	1 000	NG	NG	NG
Vinyl chloride	0.4	<0.40	<0.40	<0.40	<0.40	-	NS	2	NG	1.1	2
Xylenes (total)	0.75	<0.75	<0.75	<0.75	<0.75	-	300	90	NG	3,900	90

NOTES

Results and standards in µg/L or parts per billion (ppb) unless otherwise stated
RDL - Reported Detection Limit
RPD - Relative Percent Difference
"<" - Sample concentration is below Reported Detection Limit
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
NG - no guidance
1 - CSR Schedule 3.2, Numerical Water Standards unless noted otherwise
2 - Standard for Freshwater Aquatic Life
3 - Standard for Marine Aquatic Life
4 - CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater, 2018. All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
5 - CCME Water Quality Guideline for the Protection of Aquatic Life - Marine (2018). All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)
6 - Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines, November 2012, Commercial and Industrial Land Uses (coarse soil)
7 - Guidelines for Canadian Drinking Water Quality (Health Canada, September 2020)

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

Table 9
Results of Groundwater Samples
Phenols Analyses

PARAMETERS	RDL	20-MW1	CSR AQUATIC LIFE STANDARDS (1)	CSR Drinking Water Standards	CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater Life X 10 (2)	CCME Water Quality Guideline for the Protection of Aquatic Life - Marine Life X 10 (3)	Federal Interiam Groundwater Quality Guidelines, Commercial and Industrial Land Uses (coarse soil) (4)	Guidelines for Canadian Drinking Water Quality (Health Canada 2010) (5)
Sample Date		17-Dec-2020						
2-Chlorophenol	0.05	<0.050	19.5	45	70	NG	330	NG
3-Chlorophenol	0.05	<0.050	17	0.1	70	NG	NG	NG
4-Chlorophenol	0.05	<0.050	8.5	NS	70	NG	NG	NG
2,3-Dichlorophenol	0.05	<0.050	5.5-760	NS	2	NG	NG	NG
2,4 & 2,5-Dichlorophenol	0.05	<0.050	2.5-400	900	2	NG	0.2	900
2,6-Dichlorophenol	0.05	<0.050	10-1360	NS	2	NG	NG	NG
3,4-Dichlorophenol	0.05	<0.050	3-400	NS	2	NG	NG	NG
3,5-Dichlorophenol	0.05	<0.050	2.5-300	NS	2	NG	NG	NG
2,3,4-Trichlorophenol	0.1	<0.10	2.5-320	NS	180	NG	NG	NG
2,3,5-Trichlorophenol	0.1	<0.10	2.5-340	NS	180	NG	NG	NG
2,3,6-Trichlorophenol	0.1	<0.10	8-1080	NS	180	NG	NG	NG
2,4,5-Trichlorophenol	0.1	<0.10	2.5-300	400	180	NG	160	NG
2,4,6-Trichlorophenol	0.1	<0.10	6-800	5	180	NG	18	5
3,4,5-Trichlorophenol	0.1	<0.10	1-128	NS	180	NG	NG	NG
tetrachlorophenol, 2,3,4,5-	0.1	<0.10	2-260	NS	10	NG	NG	NG
tetrachlorophenol, 2,3,5,6-	0.1	<0.10	2.5-340	NS	10	NG	NG	NG
2,3,4,6-Tetrachlorophenol	0.1	<0.10	5.5-720	100	10	NG	1	100
Pentachlorophenol	0.1	<0.10	1-110	60	5	NG	0.5	60
Phenol	0.2	<0.20	2000	1000	40	NG	4	NG
2-Methylphenol	0.5	<0.50	2500	200	NG	NG	NG	NG
3 & 4-Methylphenol	0.2	<0.20	700	200	NG	NG	NG	NG
2,4-Dimethylphenol	0.2	<0.20	NS	80	NG	NG	NG	NG

NOTES

Results and standards in µg/L or parts per billion (ppb) unless otherwise stated
RPD - Relative Percent Difference
RDL - Reported Detection Limit
"<" - Sample concentration is below Reported Detection Limit
NS indicates that no standard applies
NG - no guidance
1 - CSR Schedule 3.2, Numerical Water Standards unless noted otherwise
2 - CCME Water Quality Guideline for the Protection of Aquatic Life - Freshwater
3 - CCME Water Quality Guideline for the Protection of Aquatic Life - Marine
4 - Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interiam Groundwater Quality Guidelines, November 2012, Commercial and Industrial Land Uses (coarse soil)
5 - Guidelines for Canadian Drinking Water Quality (Health Canada, September 2020)

BOLD	Sample concentration exceeds the applicable standard or criteria
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

**CCME Water Quality Guideline for the Protection of Aquatic Life, Freshwater and Marine, updated to 2018. All values are multiplied by an assumed x10 dilution factor for groundwater entering surface water (according to Chapter 4 CCME WQG)

Table 10
Results of Vapour Samples
VOC Analyses
Page 1 of 1

Sample		20-VP1			20-DUP1			RPD (%)	20-VP2			CSR IL Standards (1)
Sample Date		22-Jan-21			22-Jan-21				22-Jan-21			
Sample Depth (m)		0.91m			0.91m				0.91m			
PARAMETERS	RDL	Unattenuated	Indoor Atten. Factor	Outdoor Atten. Factor	Unattenuated	Indoor Atten. Factor	Outdoor Atten. Factor		Unattenuated	Indoor Atten. Factor	Outdoor Atten. Factor	
		-	0.02	0.0001	-	0.02	0.0001		-	0.02	0.0001	
VHv (6-13)	1000	<1000	-	-	<1000	-	-		1000	20	0.1	NS
VPHv	1000	<1000	-	-	<1000	-	-		1000	20	0.1	11 500
1,1,1,2-Tetrachloroethane	1.0	<1.0	-	-	<1.0	-	-		<1.0	-	-	10
1,1,1-Trichloroethane	5.0	<5.0	-	-	<5.0	-	-		<5.0	-	-	45 000
1,1,2,2-Tetrachloroethane	0.60	<0.60	-	-	<0.60	-	-		<0.60	-	-	800
1,1,2-Trichloroethane	0.40	<0.40	-	-	<0.40	-	-		<0.40	-	-	2
1,1-Dichloroethane	5.0	<5.0	-	-	<5.0	-	-		<5.0	-	-	4 500
1,1-Dichloroethylene	0.50	<0.50	-	-	<0.50	-	-		<0.50	-	-	2 000
1,2-Dichlorobenzene	30	<30	-	-	<30	-	-		<30	-	-	2 000
1,2-Dichloroethane	0.40	<0.40	-	-	<0.40	-	-		<0.40	-	-	65
1,2-Dichloropropane	0.50	<0.50	-	-	<0.50	-	-		<0.50	-	-	35
1,3-Dichlorobenzene	10	<10	-	-	<10	-	-		<10	-	-	1 000
1,3-Dichloropropene (cis + trans)	1.5	<1.5	-	-	<1.5	-	-		<1.5	-	-	25
1,4-Dichlorobenzene	10	<10	-	-	<10	-	-		<10	-	-	7 500
Benzene	1.5	<1.5	-	-	<1.5	-	-		<1.5	-	-	10
Bromodichloromethane	0.50	<0.50	-	-	<0.50	-	-		<0.50	-	-	800
Bromoform	6.0	<6.0	-	-	<6.0	-	-		<6.0	-	-	85
Carbon tetrachloride	0.40	<0.40	-	-	<0.40	-	-		<0.40	-	-	15
Chlorobenzene	5.0	<5.0	-	-	<5.0	-	-		<5.0	-	-	90
Chloroethane	100	<100	-	-	<100	-	-		<100	-	-	90 000
Chloroform	0.60	<0.60	-	-	<0.60	-	-		<0.60	-	-	900
chloromethane	5.6	<5.6	-	-	<5.6	-	-		<5.6	-	-	800
cis-1,2-Dichloroethylene	10	<10	-	-	<10	-	-		<10	-	-	550
Dibromochloromethane	20	<20	-	-	<20	-	-		<20	-	-	800
Dichloromethane	10	<10	-	-	<10	-	-		<10	-	-	5 500
Ethylbenzene	5.0	<5.0	-	-	<5.0	-	-		<5.0	-	-	9 000
Methyl tert-butyl ether	50	<50	-	-	<50	-	-		<50	-	-	25 000
n-Decane	50	<50	-	-	<50	-	-		<50	-	-	25 000
n-Hexane	50	<50	-	-	<50	-	-		<50	-	-	6 500
Styrene	5.0	<5.0	-	-	<5.0	-	-		<5.0	-	-	9 000
Tetrachloroethylene	20	32	0.64	0.0032	34	0.68	0.0034	6%	38	0.76	0.0038	350
Toluene	40	<40	-	-	<40	-	-		<40	-	-	45 000
trans-1,2-Dichloroethylene	10	<10	-	-	<10	-	-		<10	-	-	550
Trichloroethylene	0.40	<0.40	-	-	<0.40	-	-		<0.40	-	-	20
Trichlorofluoromethane	50	<50	-	-	<50	-	-		<50	-	-	6 500
Vinyl chloride	0.50	<0.50	-	-	<0.50	-	-		<0.50	-	-	10
Xylenes (total)	12	<12	-	-	<12	-	-		<12	-	-	900

NOTES

Results reported in µg/m3 unless otherwise stated
RDL - Reported Detection Limit
"<" - Sample concentration is below Reported Detection Limit
"-" - Not analyzed / cannot be calculated
NS indicates that no standard applies
1 - CSR Schedule 3.3, General Numeric Vapour Standards
RPD - Relative Percentage Difference

BOLD	Attenuated sample concentration exceeds the applicable CSR standard
BOLD	Sample concentration detectable
BOLD	RPD values exceed 20%

APPENDIX

E

CHAIN OF CUSTODY FORMS AND LABORATORY CERTIFICATES

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20C3415**	Page	: 1 of 13
Client	: **WSP Canada Inc.**	Laboratory	: Vancouver - Environmental
Contact	: **Marina Makovetski**	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 15-Dec-2020 15:30
PO	: ----	Date Analysis Commenced	: 17-Dec-2020
C-O-C number	: 17-865484	Issue Date	: 23-Dec-2020 13:39
Sampler	: MM/RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 8		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

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

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

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.
Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent
µg/g	micrograms per gram
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

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

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

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

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

Workorder Comments

Please note: F1/VOC data was not possible for 20-MW2@0.3m, as we did not recieve vials for this sample

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
						VA20C3415-001	VA20C3415-002	VA20C3415-003	VA20C3415-007	VA20C3415-008
						Result	Result	Result	Result	Result
Physical Tests										
moisture	---	E144	0.25	%		---	---	23.1	14.0	---
pH (1:2 soil:water)	---	E108	0.10	pH units		8.80	8.90	8.50	7.84	8.09
Non-Chlorinated Phenolics										
dimethylphenol, 2,4-	105-67-9	E651A	0.020	µg/g		---	---	<0.020	---	---
methylphenol, 2-	95-48-7	E651A	0.020	µg/g		---	---	<0.020	---	---
methylphenol, 3-	108-39-4	E651A	0.020	µg/g		---	---	<0.020	---	---
methylphenol, 4-	106-44-5	E651A	0.020	µg/g		---	---	<0.020	---	---
phenol	108-95-2	E651A	0.020	µg/g		---	---	<0.020	---	---
Metals										
aluminum	7429-90-5	E440	50	µg/g		9840	9600	9230	14800	10800
antimony	7440-36-0	E440	0.10	µg/g		0.22	0.20	0.18	0.51	0.33
arsenic	7440-38-2	E440	0.10	µg/g		3.13	3.26	2.79	5.64	4.02
barium	7440-39-3	E440	0.50	µg/g		50.9	52.8	48.7	97.8	86.5
beryllium	7440-41-7	E440	0.10	µg/g		0.19	0.18	0.16	0.32	0.23
bismuth	7440-69-9	E440	0.20	µg/g		<0.20	<0.20	<0.20	<0.20	<0.20
boron	7440-42-8	E440	5.0	µg/g		<5.0	<5.0	<5.0	<5.0	<5.0
cadmium	7440-43-9	E440	0.020	µg/g		0.120	0.124	0.126	0.322	0.155
calcium	7440-70-2	E440	50	µg/g		5240	4570	4260	6810	5460
chromium	7440-47-3	E440	0.50	µg/g		30.8	23.2	22.8	37.3	33.1
cobalt	7440-48-4	E440	0.10	µg/g		8.11	8.06	7.12	12.1	9.35
copper	7440-50-8	E440	0.50	µg/g		15.8	14.9	13.7	31.2	19.3
iron	7439-89-6	E440	50	µg/g		18200	17500	16100	25800	20200
lead	7439-92-1	E440	0.50	µg/g		2.65	2.14	2.06	19.0	4.26
lithium	7439-93-2	E440	2.0	µg/g		8.0	7.3	7.1	13.1	9.4
magnesium	7439-95-4	E440	20	µg/g		7530	7430	7040	9580	8550
manganese	7439-96-5	E440	1.0	µg/g		398	348	299	607	365
mercury	7439-97-6	E510	0.0500	µg/g		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
molybdenum	7439-98-7	E440	0.10	µg/g		0.33	0.34	0.30	0.71	0.43
nickel	7440-02-0	E440	0.50	µg/g		32.8	34.2	30.6	42.9	37.1
phosphorus	7723-14-0	E440	50	µg/g		451	438	410	580	505
potassium	7440-09-7	E440	100	µg/g		510	480	470	900	650

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
						VA20C3415-001	VA20C3415-002	VA20C3415-003	VA20C3415-007	VA20C3415-008
						Result	Result	Result	Result	Result
Metals										
selenium	7782-49-2	E440	0.20	µg/g		<0.20	<0.20	<0.20	0.36	<0.20
silver	7440-22-4	E440	0.10	µg/g		<0.10	<0.10	<0.10	0.14	<0.10
sodium	7440-23-5	E440	50	µg/g		317	305	284	325	273
strontium	7440-24-6	E440	0.50	µg/g		21.3	20.5	20.8	41.3	36.3
sulfur	7704-34-9	E440	1000	µg/g		<1000	<1000	<1000	<1000	<1000
thallium	7440-28-0	E440	0.050	µg/g		<0.050	<0.050	<0.050	0.093	0.052
tin	7440-31-5	E440	2.0	µg/g		<2.0	<2.0	<2.0	<2.0	<2.0
titanium	7440-32-6	E440	1.0	µg/g		814	738	741	883	827
tungsten	7440-33-7	E440	0.50	µg/g		<0.50	<0.50	<0.50	<0.50	<0.50
uranium	7440-61-1	E440	0.050	µg/g		0.296	0.221	0.261	0.657	0.339
vanadium	7440-62-2	E440	0.20	µg/g		45.1	41.4	39.6	52.0	44.9
zinc	7440-66-6	E440	2.0	µg/g		40.8	38.0	35.2	64.8	46.2
zirconium	7440-67-7	E440	1.0	µg/g		5.0	4.6	4.7	7.4	6.2
Volatile Organic Compounds										
chlorobenzene	108-90-7	E611C	0.050	µg/g		---	---	<0.050	---	---
chloromethane	74-87-3	E611C	0.050	µg/g		---	---	<0.050	---	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	µg/g		---	---	<0.050	---	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	µg/g		---	---	<0.050	---	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloropropane, 1,2-	78-87-5	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	µg/g		---	---	<0.075	---	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	µg/g		---	---	<0.050	---	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	µg/g		---	---	<0.050	---	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	µg/g		---	---	<0.050	---	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	µg/g		---	---	<0.050	---	---
trichlorofluoromethane	75-69-4	E611C	0.050	µg/g		---	---	<0.050	---	---
Volatile Organic Compounds [Drycleaning]										
carbon tetrachloride	56-23-5	E611C	0.050	µg/g		---	---	<0.050	---	---
chloroethane	75-00-3	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloroethane, 1,1-	75-34-3	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloroethane, 1,2-	107-06-2	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloroethylene, 1,1-	75-35-4	E611C	0.050	µg/g		---	---	<0.050	---	---

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
						VA20C3415-001	VA20C3415-002	VA20C3415-003	VA20C3415-007	VA20C3415-008
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Drycleaning]										
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloromethane	75-09-2	E611C	0.050	µg/g		---	---	<0.050	---	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	µg/g		---	---	<0.050	---	---
tetrachloroethylene	127-18-4	E611C	0.050	µg/g		---	---	<0.050	---	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	µg/g		---	---	<0.050	---	---
trichloroethylene	79-01-6	E611C	0.010	µg/g		---	---	<0.010	---	---
vinyl chloride	75-01-4	E611C	0.050	µg/g		---	---	<0.050	---	---
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611C	0.0050	µg/g		---	---	<0.0050	---	---
ethylbenzene	100-41-4	E611C	0.015	µg/g		---	---	<0.015	---	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	µg/g		---	---	<0.050	---	---
styrene	100-42-5	E611C	0.050	µg/g		---	---	<0.050	---	---
toluene	108-88-3	E611C	0.050	µg/g		---	---	<0.050	---	---
xylene, m+p-	179601-23-1	E611C	0.050	µg/g		---	---	<0.050	---	---
xylene, o-	95-47-6	E611C	0.050	µg/g		---	---	<0.050	---	---
xylenes, total	1330-20-7	E611C	0.075	µg/g		---	---	<0.075	---	---
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%		---	---	92.0	---	---
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%		---	---	87.3	---	---
Hydrocarbons										
chromatogram to baseline at nC50	---	E601.SG	-	µg/g		---	---	No	Yes	---
EPH (C10-C19)	---	E601A	200	µg/g		---	---	<200	<200	---
EPH (C19-C32)	---	E601A	200	µg/g		---	---	<200	<200	---
F1-BTEX	---	EC580	5.0	mg/kg		---	---	<5.0	---	---
F2 (C10-C16)	---	E601.SG	25	µg/g		---	---	<25	<25	---
F3 (C16-C34)	---	E601.SG	50	µg/g		---	---	<50	<50	---
F4 (C34-C50)	---	E601.SG	50	µg/g		---	---	<50	<50	---
TEH (C10-C50)	---	E601.SG	75	µg/g		---	---	<75	<75	---
TEH (C16-C50)	---	E601.SG	75	µg/g		---	---	<75	<75	---
VHs (C6-C10)	---	E581.VH+F1	10	µg/g		---	---	<10	---	---
HEPHs	---	EC600A	200	µg/g		---	---	<200	<200	---

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
Analyte	CAS Number	Method	LOR	Unit		VA20C3415-001	VA20C3415-002	VA20C3415-003	VA20C3415-007	VA20C3415-008
						Result	Result	Result	Result	Result
Hydrocarbons										
LEPHs	---	EC600A	200	µg/g		---	---	<200	<200	---
VPHs	---	EC580A	10	µg/g		---	---	<10	---	---
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%		---	---	107	102	---
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%		---	---	87.6	93.4	---
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		---	---	72.4	---	---
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A-L	0.0050	µg/g		---	---	<0.0050	<0.0050	---
acenaphthylene	208-96-8	E641A-L	0.0050	µg/g		---	---	0.0187	0.0130	---
acridine	260-94-6	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
anthracene	120-12-7	E641A-L	0.0040	µg/g		---	---	<0.0040	0.0101	---
benz(a)anthracene	56-55-3	E641A-L	0.010	µg/g		---	---	<0.010	0.016	---
benzo(a)pyrene	50-32-8	E641A-L	0.010	µg/g		---	---	<0.010	0.013	---
benzo(b+j)fluoranthene	---	E641A-L	0.010	µg/g		---	---	<0.010	0.017	---
benzo(b+j+k)fluoranthene	---	E641A-L	0.015	µg/g		---	---	<0.015	0.017	---
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
chrysene	218-01-9	E641A-L	0.010	µg/g		---	---	<0.010	0.015	---
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	µg/g		---	---	<0.0050	<0.0050	---
fluoranthene	206-44-0	E641A-L	0.010	µg/g		---	---	<0.010	0.039	---
fluorene	86-73-7	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
naphthalene	91-20-3	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
phenanthrene	85-01-8	E641A-L	0.010	µg/g		---	---	<0.010	0.023	---
pyrene	129-00-0	E641A-L	0.010	µg/g		---	---	<0.010	0.024	---
quinoline	6027-02-7	E641A-L	0.010	µg/g		---	---	<0.010	<0.010	---
B(a)P total potency equivalents [B(a)P TPE]	---	E641A-L	0.020	µg/g		---	---	<0.020	0.020	---
IACR (CCME)	---	E641A-L	0.15	-		---	---	<0.15	0.24	---
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.010	%		---	---	108	85.1	---

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW1@0.3m	20-MW1@0.6m	20-MW1@1.2m	20-MW2@0.3m	20-MW2@0.6m
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020	15-Dec-2020
						VA20C3415-001	VA20C3415-002	VA20C3415-003	VA20C3415-007	VA20C3415-008
						Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates										
chrysene-d12	1719-03-5	E641A-L	0.010	%		---	---	108	110	---
naphthalene-d8	1146-65-2	E641A-L	0.010	%		---	---	88.0	89.2	---
phenanthrene-d10	1517-22-2	E641A-L	0.010	%		---	---	108	109	---
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611C	0.050	µg/g		---	---	<0.050	---	---
bromoform	75-25-2	E611C	0.050	µg/g		---	---	<0.050	---	---
chloroform	67-66-3	E611C	0.050	µg/g		---	---	<0.050	---	---
dibromochloromethane	124-48-1	E611C	0.050	µg/g		---	---	<0.050	---	---
Phenolics										
chlorophenol, 2-	95-57-8	E651A	0.020	µg/g		---	---	<0.020	---	---
chlorophenol, 3-	108-43-0	E651A	0.020	µg/g		---	---	<0.020	---	---
chlorophenol, 4-	106-48-9	E651A	0.020	µg/g		---	---	<0.020	---	---
dichlorophenol, 2,3-	576-24-9	E651A	0.020	µg/g		---	---	<0.020	---	---
dichlorophenol, 2,4- + 2,5-	---	E651A	0.020	µg/g		---	---	<0.020	---	---
dichlorophenol, 2,6-	87-65-0	E651A	0.020	µg/g		---	---	<0.020	---	---
dichlorophenol, 3,4-	95-77-2	E651A	0.020	µg/g		---	---	<0.020	---	---
dichlorophenol, 3,5-	591-35-5	E651A	0.020	µg/g		---	---	<0.020	---	---
methylphenol, 4-chloro-3-	59-50-7	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 2,3,5-	933-78-8	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 2,3,6-	933-75-5	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 2,4,5-	95-95-4	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 2,4,6-	88-06-2	E651A	0.020	µg/g		---	---	<0.020	---	---
trichlorophenol, 3,4,5-	609-19-8	E651A	0.020	µg/g		---	---	<0.020	---	---
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.020	µg/g		---	---	<0.020	---	---
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.020	µg/g		---	---	<0.020	---	---
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.020	µg/g		---	---	<0.028 DLCI	---	---
pentachlorophenol [PCP]	87-86-5	E651A	0.020	µg/g		---	---	<0.020	---	---
Phenolics Surrogates										
chlorophenol-d4, 2-	93951-73-6	E651A	0.020	%		---	---	99.5	---	---
dichlorophenol-d3, 2,4-	93951-74-7	E651A	0.020	%		---	---	97.2	---	---
tribromophenol, 2,4,6-	118-79-6	E651A	0.020	%		---	---	107	---	---

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	20-MW3@0.3m	20-MW3@0.6m	20-DUP1-MM	----	----
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	----	----
Analyte	CAS Number	Method	LOR	Unit		VA20C3415-012	VA20C3415-013	VA20C3415-017	------	------
						Result	Result	Result	----	----
Physical Tests										
moisture	----	E144	0.25	%		22.8	----	16.4	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		7.41	7.52	8.08	----	----
Metals										
aluminum	7429-90-5	E440	50	µg/g		15600	19900	10300	----	----
antimony	7440-36-0	E440	0.10	µg/g		0.45	0.57	0.34	----	----
arsenic	7440-38-2	E440	0.10	µg/g		5.44	7.80	4.02	----	----
barium	7440-39-3	E440	0.50	µg/g		111	145	76.8	----	----
beryllium	7440-41-7	E440	0.10	µg/g		0.31	0.40	0.22	----	----
bismuth	7440-69-9	E440	0.20	µg/g		<0.20	<0.20	<0.20	----	----
boron	7440-42-8	E440	5.0	µg/g		<5.0	<5.0	<5.0	----	----
cadmium	7440-43-9	E440	0.020	µg/g		0.210	0.311	0.170	----	----
calcium	7440-70-2	E440	50	µg/g		9280	10400	5390	----	----
chromium	7440-47-3	E440	0.50	µg/g		38.7	46.7	28.2	----	----
cobalt	7440-48-4	E440	0.10	µg/g		12.4	15.7	8.97	----	----
copper	7440-50-8	E440	0.50	µg/g		28.5	37.8	18.9	----	----
iron	7439-89-6	E440	50	µg/g		27000	32400	19300	----	----
lead	7439-92-1	E440	0.50	µg/g		5.51	9.07	4.74	----	----
lithium	7439-93-2	E440	2.0	µg/g		14.0	18.6	9.3	----	----
magnesium	7439-95-4	E440	20	µg/g		10400	12300	7940	----	----
manganese	7439-96-5	E440	1.0	µg/g		547	672	370	----	----
mercury	7439-97-6	E510	0.0500	µg/g		0.0528	<0.0500	<0.0500	----	----
molybdenum	7439-98-7	E440	0.10	µg/g		0.70	0.94	0.47	----	----
nickel	7440-02-0	E440	0.50	µg/g		43.7	51.9	34.5	----	----
phosphorus	7723-14-0	E440	50	µg/g		621	755	509	----	----
potassium	7440-09-7	E440	100	µg/g		960	1330	620	----	----
selenium	7782-49-2	E440	0.20	µg/g		0.29	0.44	<0.20	----	----
silver	7440-22-4	E440	0.10	µg/g		<0.10	0.13	<0.10	----	----
sodium	7440-23-5	E440	50	µg/g		307	375	266	----	----
strontium	7440-24-6	E440	0.50	µg/g		53.9	59.5	34.2	----	----
sulfur	7704-34-9	E440	1000	µg/g		<1000	<1000	<1000	----	----
thallium	7440-28-0	E440	0.050	µg/g		0.080	0.109	0.053	----	----
tin	7440-31-5	E440	2.0	µg/g		<2.0	<2.0	<2.0	----	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW3@0.3m	20-MW3@0.6m	20-DUP1-MM	---	---
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	---	---
						VA20C3415-012	VA20C3415-013	VA20C3415-017	------	------
						Result	Result	Result	---	---
Metals										
titanium	7440-32-6	E440	1.0	µg/g		933	1130	760	---	---
tungsten	7440-33-7	E440	0.50	µg/g		<0.50	<0.50	<0.50	---	---
uranium	7440-61-1	E440	0.050	µg/g		0.701	0.866	0.395	---	---
vanadium	7440-62-2	E440	0.20	µg/g		50.4	63.2	42.8	---	---
zinc	7440-66-6	E440	2.0	µg/g		62.2	79.9	45.1	---	---
zirconium	7440-67-7	E440	1.0	µg/g		8.0	8.8	5.9	---	---
Volatile Organic Compounds										
chlorobenzene	108-90-7	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
chloromethane	74-87-3	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloropropane, 1,2-	78-87-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	µg/g		<0.075	---	<0.075	---	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
trichlorofluoromethane	75-69-4	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
Volatile Organic Compounds [Drycleaning]										
carbon tetrachloride	56-23-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
chloroethane	75-00-3	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloroethane, 1,1-	75-34-3	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloroethane, 1,2-	107-06-2	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloroethylene, 1,1-	75-35-4	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloromethane	75-09-2	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
tetrachloroethylene	127-18-4	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
trichloroethylene	79-01-6	E611C	0.010	µg/g		<0.010	---	<0.010	---	---

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)			Client sample ID		20-MW3@0.3m	20-MW3@0.6m	20-DUP1-MM	---	---
			Client sampling date / time		15-Dec-2020	15-Dec-2020	15-Dec-2020	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20C3415-012	VA20C3415-013	VA20C3415-017	------	------
					Result	Result	Result	---	---
Volatile Organic Compounds [Drycleaning]									
vinyl chloride	75-01-4	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611C	0.0050	µg/g	<0.0050	---	<0.0050	---	---
ethylbenzene	100-41-4	E611C	0.015	µg/g	<0.015	---	<0.015	---	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
styrene	100-42-5	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
toluene	108-88-3	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
xylene, m+p-	179601-23-1	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
xylene, o-	95-47-6	E611C	0.050	µg/g	<0.050	---	<0.050	---	---
xylenes, total	1330-20-7	E611C	0.075	µg/g	<0.075	---	<0.075	---	---
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	98.7	---	104	---	---
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	89.3	---	91.8	---	---
Hydrocarbons									
chromatogram to baseline at nC50	---	E601.SG	-	µg/g	Yes	---	Yes	---	---
EPH (C10-C19)	---	E601A	200	µg/g	<200	---	<200	---	---
EPH (C19-C32)	---	E601A	200	µg/g	<200	---	<200	---	---
F1-BTEX	---	EC580	5.0	mg/kg	<5.0	---	<5.0	---	---
F2 (C10-C16)	---	E601.SG	25	µg/g	<25	---	<25	---	---
F3 (C16-C34)	---	E601.SG	50	µg/g	66	---	54	---	---
F4 (C34-C50)	---	E601.SG	50	µg/g	<50	---	50	---	---
TEH (C10-C50)	---	E601.SG	75	µg/g	<75	---	104	---	---
TEH (C16-C50)	---	E601.SG	75	µg/g	<75	---	104	---	---
VHs (C6-C10)	---	E581.VH+F1	10	µg/g	<10	---	<10	---	---
HEPHs	---	EC600A	200	µg/g	<200	---	<200	---	---
LEPHs	---	EC600A	200	µg/g	<200	---	<200	---	---
VPHs	---	EC580A	10	µg/g	<10	---	<10	---	---
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	106	---	102	---	---
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601.SG	10	%	93.8	---	92.5	---	---
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	108	---	107	---	---
Polycyclic Aromatic Hydrocarbons									

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW3@0.3m	20-MW3@0.6m	20-DUP1-MM	---	---
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	---	---
						VA20C3415-012	VA20C3415-013	VA20C3415-017	------	------
						Result	Result	Result	---	---
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A-L	0.0050	µg/g		<0.0050	---	<0.0050	---	---
acenaphthylene	208-96-8	E641A-L	0.0050	µg/g		<0.0050	---	0.0118	---	---
acridine	260-94-6	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
anthracene	120-12-7	E641A-L	0.0040	µg/g		<0.0040	---	0.0087	---	---
benz(a)anthracene	56-55-3	E641A-L	0.010	µg/g		<0.010	---	0.012	---	---
benzo(a)pyrene	50-32-8	E641A-L	0.010	µg/g		<0.010	---	0.012	---	---
benzo(b+j)fluoranthene	---	E641A-L	0.010	µg/g		<0.010	---	0.015	---	---
benzo(b+j+k)fluoranthene	---	E641A-L	0.015	µg/g		<0.015	---	0.015	---	---
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
chrysene	218-01-9	E641A-L	0.010	µg/g		<0.010	---	0.012	---	---
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	µg/g		<0.0050	---	<0.0050	---	---
fluoranthene	206-44-0	E641A-L	0.010	µg/g		0.014	---	0.028	---	---
fluorene	86-73-7	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
naphthalene	91-20-3	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
phenanthrene	85-01-8	E641A-L	0.010	µg/g		0.014	---	0.016	---	---
pyrene	129-00-0	E641A-L	0.010	µg/g		<0.010	---	0.019	---	---
quinoline	6027-02-7	E641A-L	0.010	µg/g		<0.010	---	<0.010	---	---
B(a)P total potency equivalents [B(a)P TPE]	---	E641A-L	0.020	µg/g		<0.020	---	<0.020	---	---
IACR (CCME)	---	E641A-L	0.15	-		<0.15	---	0.21	---	---
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.010	%		102	---	113	---	---
chrysene-d12	1719-03-5	E641A-L	0.010	%		119	---	114	---	---
naphthalene-d8	1146-65-2	E641A-L	0.010	%		110	---	91.0	---	---
phenanthrene-d10	1517-22-2	E641A-L	0.010	%		123	---	110	---	---
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
bromoform	75-25-2	E611C	0.050	µg/g		<0.050	---	<0.050	---	---
chloroform	67-66-3	E611C	0.050	µg/g		<0.050	---	<0.050	---	---

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	20-MW3@0.3m	20-MW3@0.6m	20-DUP1-MM	----	----
					Client sampling date / time	15-Dec-2020	15-Dec-2020	15-Dec-2020	----	----
Analyte	CAS Number	Method	LOR	Unit		VA20C3415-012	VA20C3415-013	VA20C3415-017	------	------
						Result	Result	Result	----	----
Volatile Organic Compounds [THMs]										
dibromochloromethane	124-48-1	E611C	0.050	µg/g		<0.050	----	<0.050	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20C3415**	Page	: 1 of 12
Client	: **WSP Canada Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 15-Dec-2020 15:30
PO	: ----	Issue Date	: 23-Dec-2020 13:39
C-O-C number	: 17-865484		
Sampler	: MM/RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 8		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E601A	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	21-Dec-2020	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E601A	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E601A	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E601A	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E601.SG	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	21-Dec-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E601.SG	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E601.SG	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E601.SG	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial 20-DUP1-MM	E581.VH+F1	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial 20-MW1@1.2m	E581.VH+F1	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial 20-MW3@0.3m	E581.VH+F1	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW1@0.3m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW1@0.6m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW2@0.6m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap 20-MW3@0.6m	E510	15-Dec-2020	22-Dec-2020	28 days	7 days	✓	23-Dec-2020	20 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW1@0.3m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW1@0.6m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW2@0.6m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap 20-MW3@0.6m	E440	15-Dec-2020	22-Dec-2020	180 days	7 days	✓	22-Dec-2020	172 days	0 days	✓
Non-Chlorinated Phenolics : Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E651A	15-Dec-2020	20-Dec-2020	---	---		22-Dec-2020	---	---	
Phenolics : Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E651A	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E144	15-Dec-2020	---	---	---		20-Dec-2020	---	---	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E144	15-Dec-2020	---	---	---		20-Dec-2020	---	---	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E144	15-Dec-2020	---	---	---		20-Dec-2020	---	---	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E144	15-Dec-2020	---	---	---		20-Dec-2020	---	---	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW1@0.3m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW1@0.6m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW2@0.6m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap 20-MW3@0.6m	E108	15-Dec-2020	22-Dec-2020	30 days	7 days	✓	22-Dec-2020	22 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap 20-MW3@0.3m	E641A-L	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	21-Dec-2020	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap 20-DUP1-MM	E641A-L	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap 20-MW1@1.2m	E641A-L	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap 20-MW2@0.3m	E641A-L	15-Dec-2020	20-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	1 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-DUP1-MM	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW1@1.2m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW3@0.3m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-DUP1-MM	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW1@1.2m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW3@0.3m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-DUP1-MM	E611C	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW1@1.2m	E611C	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW3@0.3m	E611C	15-Dec-2020	17-Dec-2020	40 days	2 days	✓	18-Dec-2020	37 days	0 days	✓
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-DUP1-MM	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW1@1.2m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass soil methanol vial 20-MW3@0.3m	E611C	15-Dec-2020	17-Dec-2020	---	---		18-Dec-2020	---	---	

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHC - EPH by GC-FID	E601A	133682	1	15	6.6	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	133683	1	4	25.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	133686	1	9	11.1	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	133687	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	133688	1	15	6.6	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	133681	1	15	6.6	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	133685	1	15	6.6	5.0	✓
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133684	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	132108	1	14	7.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	132110	1	13	7.6	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	133682	2	15	13.3	10.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	133683	2	4	50.0	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	133686	2	9	22.2	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	133687	2	9	22.2	10.0	✓
Moisture Content by Gravimetry	E144	133688	1	15	6.6	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	133681	2	15	13.3	10.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	133685	1	15	6.6	5.0	✓
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133684	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	132108	1	14	7.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	132110	1	13	7.6	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	133682	1	15	6.6	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601.SG	133683	1	4	25.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	133686	1	9	11.1	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	133687	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	133688	1	15	6.6	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	133681	1	15	6.6	5.0	✓
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133684	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	132108	1	14	7.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	132110	1	13	7.6	5.0	✓
Matrix Spikes (MS)							
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133684	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	132108	1	14	7.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	132110	1	13	7.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601.SG Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME Fractions 2-4 (F2-F4).
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Phenolics are analyzed by GC-MS.
F1-BTEX	EC580 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Phenolics Extraction	EP651 Vancouver - Environmental	Soil/Solid	EPA 3570 (mod)	Samples are subsampled and Phenolics are extracted with solvents using a mechanical shaking extractor.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: VA20C3415	Page	: 1 of 20
Client	: WSP Canada Inc.	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 15-Dec-2020 15:30
PO	: ----	Date Analysis Commenced	: 17-Dec-2020
C-O-C number	: 17-865484	Issue Date	: 23-Dec-2020 13:39
Sampler	: MM/RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 8		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 133685)											
VA20C3271-064	Anonymous	pH (1:2 soil:water)	---	E108	0.10	pH units	6.16	6.14	0.325%	5%	---
Physical Tests (QC Lot: 133688)											
VA20C3271-064	Anonymous	moisture	---	E144	0.25	%	7.93	9.02	12.8%	20%	---
Non-Chlorinated Phenolics (QC Lot: 133684)											
VA20C3384-001	Anonymous	dimethylphenol, 2,4-	105-67-9	E651A	0.020	mg/kg	<0.020	0.022	0.002	Diff <2x LOR	---
		methylphenol, 2-	95-48-7	E651A	0.020	mg/kg	0.033	0.045	0.012	Diff <2x LOR	---
		methylphenol, 3-	108-39-4	E651A	0.020	mg/kg	0.040	0.052	0.011	Diff <2x LOR	---
		methylphenol, 4-	106-44-5	E651A	0.020	mg/kg	0.056	0.052	0.004	Diff <2x LOR	---
		phenol	108-95-2	E651A	0.020	mg/kg	0.047	0.056	0.009	Diff <2x LOR	---
Metals (QC Lot: 133686)											
VA20C3271-064	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	---
Metals (QC Lot: 133687)											
VA20C3271-064	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	5200	4260	19.8%	40%	---
		antimony	7440-36-0	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	---
		arsenic	7440-38-2	E440	0.10	mg/kg	0.43	0.36	0.06	Diff <2x LOR	---
		barium	7440-39-3	E440	0.50	mg/kg	36.1	34.8	3.55%	40%	---
		beryllium	7440-41-7	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	---
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	---
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	---
		cadmium	7440-43-9	E440	0.020	mg/kg	<0.020	0.022	0.002	Diff <2x LOR	---
		calcium	7440-70-2	E440	50	mg/kg	2700	2270	17.2%	30%	---
		chromium	7440-47-3	E440	0.50	mg/kg	6.52	5.55	16.1%	30%	---
		cobalt	7440-48-4	E440	0.10	mg/kg	3.26	2.94	10.2%	30%	---
		copper	7440-50-8	E440	0.50	mg/kg	10.4	11.6	11.0%	30%	---
		iron	7439-89-6	E440	50	mg/kg	9640	8520	12.4%	30%	---
		lead	7439-92-1	E440	0.50	mg/kg	0.80	0.73	0.07	Diff <2x LOR	---
		lithium	7439-93-2	E440	2.0	mg/kg	3.1	2.4	0.7	Diff <2x LOR	---
		magnesium	7439-95-4	E440	20	mg/kg	2550	2080	20.0%	30%	---
		manganese	7439-96-5	E440	1.0	mg/kg	133	108	20.3%	30%	---
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.24	0.18	0.06	Diff <2x LOR	---
		nickel	7440-02-0	E440	0.50	mg/kg	4.42	3.99	10.2%	30%	---

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 133687) - continued											
VA20C3271-004	Anonymous	phosphorus	7723-14-0	E440	50	mg/kg	416	440	5.51%	30%	—
		potassium	7440-09-7	E440	100	mg/kg	740	670	10.3%	40%	—
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	—
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	—
		sodium	7440-23-5	E440	50	mg/kg	377	319	16.7%	40%	—
		strontium	7440-24-6	E440	0.50	mg/kg	31.4	29.3	6.87%	40%	—
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	—
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	—
		titanium	7440-32-6	E440	1.0	mg/kg	545	470	14.8%	40%	—
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	—
		uranium	7440-61-1	E440	0.050	mg/kg	0.164	0.157	0.006	Diff <2x LOR	—
		vanadium	7440-62-2	E440	0.20	mg/kg	31.7	27.9	12.8%	30%	—
		zinc	7440-66-6	E440	2.0	mg/kg	24.5	19.7	21.6%	30%	—
		zirconium	7440-67-7	E440	1.0	mg/kg	2.5	2.5	0.002	Diff <2x LOR	—
Volatile Organic Compounds (QC Lot: 132110)											
VA20C3369-001	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	—
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Volatile Organic Compounds (QC Lot: 132110) - continued											
VA20C3369-001	Anonymous	dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	—
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	—
Hydrocarbons (QC Lot: 132108)											
VA20C3279-009	Anonymous	VHs (C6-C10)	—	E581.VH+F1	10	mg/kg	<10	<10	0	Diff <2x LOR	—
Hydrocarbons (QC Lot: 133682)											
VA20C3271-064	Anonymous	EPH (C10-C19)	—	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	—
		EPH (C19-C32)	—	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	—
Hydrocarbons (QC Lot: 133683)											
VA20C3415-003	20-MW1@1.2m	F2 (C10-C16)	—	E601.SG	25	mg/kg	<25 µg/g	<25	0	Diff <2x LOR	—
		F3 (C16-C34)	—	E601.SG	50	mg/kg	<50 µg/g	<50	0	Diff <2x LOR	—
		F4 (C34-C50)	—	E601.SG	50	mg/kg	<50 µg/g	<50	0	Diff <2x LOR	—
Polycyclic Aromatic Hydrocarbons (QC Lot: 133681)											
VA20C3271-064	Anonymous	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	—
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	—
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	—
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		benzo(b+j)fluoranthene	—	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Polycyclic Aromatic Hydrocarbons (QC Lot: 133681) - continued											
VA20C3271-064	Anonymous	chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	—
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	—
Phenolics (QC Lot: 133684)											
VA20C3384-001	Anonymous	chlorophenol, 2-	95-57-8	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		chlorophenol, 3-	108-43-0	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		chlorophenol, 4-	106-48-9	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		dichlorophenol, 2,3-	576-24-9	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		dichlorophenol, 2,4- + 2,5-	—	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		dichlorophenol, 2,6-	87-65-0	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		dichlorophenol, 3,4-	95-77-2	E651A	0.035	mg/kg	<0.035	<0.020	0.015	Diff <2x LOR	—
		dichlorophenol, 3,5-	591-35-5	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		methylphenol, 4-chloro-3-	59-50-7	E651A	0.020	mg/kg	<0.020	0.036	0.016	Diff <2x LOR	—
		pentachlorophenol [PCP]	87-86-5	E651A	0.020	mg/kg	0.094	0.103	9.38%	50%	—
		tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.030	mg/kg	<0.030	0.029	0.0009	Diff <2x LOR	—
		trichlorophenol, 2,3,4-	15950-66-0	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		trichlorophenol, 2,3,5-	933-78-8	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		trichlorophenol, 2,3,6-	933-75-5	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		trichlorophenol, 2,4,5-	95-95-4	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		trichlorophenol, 2,4,6-	88-06-2	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—
		trichlorophenol, 3,4,5-	609-19-8	E651A	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	—

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 133688)						
moisture	---	E144	0.25	%	<0.25	---
Non-Chlorinated Phenolics (QCLot: 133684)						
dimethylphenol, 2,4-	105-67-9	E651A	0.02	mg/kg	<0.020	---
methylphenol, 2-	95-48-7	E651A	0.02	mg/kg	<0.020	---
methylphenol, 3-	108-39-4	E651A	0.02	mg/kg	<0.020	---
methylphenol, 4-	106-44-5	E651A	0.02	mg/kg	<0.020	---
phenol	108-95-2	E651A	0.02	mg/kg	<0.020	---
Metals (QCLot: 133686)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 133687)						
aluminum	7429-90-5	E440	50	mg/kg	<50	---
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	---
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	---
barium	7440-39-3	E440	0.5	mg/kg	<0.50	---
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	---
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	---
boron	7440-42-8	E440	5	mg/kg	<5.0	---
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	---
calcium	7440-70-2	E440	50	mg/kg	<50	---
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	---
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	---
copper	7440-50-8	E440	0.5	mg/kg	<0.50	---
iron	7439-89-6	E440	50	mg/kg	<50	---
lead	7439-92-1	E440	0.5	mg/kg	<0.50	---
lithium	7439-93-2	E440	2	mg/kg	<2.0	---
magnesium	7439-95-4	E440	20	mg/kg	<20	---
manganese	7439-96-5	E440	1	mg/kg	<1.0	---
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	---
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	---
phosphorus	7723-14-0	E440	50	mg/kg	<50	---
potassium	7440-09-7	E440	100	mg/kg	<100	---
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	---
silver	7440-22-4	E440	0.1	mg/kg	<0.10	---

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 133687) - continued						
sodium	7440-23-5	E440	50	mg/kg	<50	—
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	—
sulfur	7704-34-9	E440	1000	mg/kg	<1000	—
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	—
tin	7440-31-5	E440	2	mg/kg	<2.0	—
titanium	7440-32-6	E440	1	mg/kg	<1.0	—
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	—
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	—
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	—
zinc	7440-66-6	E440	2	mg/kg	<2.0	—
zirconium	7440-67-7	E440	1	mg/kg	<1.0	—
Volatile Organic Compounds (QCLot: 132110)						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	—
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	—
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	—
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	—
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	—
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	—
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	—
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	—
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	—
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	—
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	—
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	—
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	—
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	—
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	—
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	—
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	—
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	—
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	—
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	—
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	—
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	—
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	—
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	—

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 132110) - continued						
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	—
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	—
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	—
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	—
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	—
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	—
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	—
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	—
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	—
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	—
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	—
Hydrocarbons (QCLot: 132108)						
VHs (C6-C10)	—	E581.VH+F1	10	mg/kg	<10	—
Hydrocarbons (QCLot: 133682)						
EPH (C10-C19)	—	E601A	200	mg/kg	<200	—
EPH (C19-C32)	—	E601A	200	mg/kg	<200	—
					<200	—
Hydrocarbons (QCLot: 133683)						
F2 (C10-C16)	—	E601.SG	25	mg/kg	<25	—
					<25	—
F3 (C16-C34)	—	E601.SG	50	mg/kg	<50	—
					<50	—
F4 (C34-C50)	—	E601.SG	50	mg/kg	<50	—
Polycyclic Aromatic Hydrocarbons (QCLot: 133681)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	—
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	—
					<0.0050	—
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	—
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	—
					<0.0040	—
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	—
benzo(b+j)fluoranthene	—	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 133681) - continued						
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	—
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	—
					<0.0050	—
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	—
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	—
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	—
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	—
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	—
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	—
					<0.010	—
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	—
Phenolics (QCLot: 133684)						
chlorophenol, 2-	95-57-8	E651A	0.02	mg/kg	<0.020	—
chlorophenol, 3-	108-43-0	E651A	0.02	mg/kg	<0.020	—
chlorophenol, 4-	106-48-9	E651A	0.02	mg/kg	<0.020	—
dichlorophenol, 2,3-	576-24-9	E651A	0.02	mg/kg	<0.020	—
dichlorophenol, 2,4- + 2,5-	—	E651A	0.02	mg/kg	<0.020	—
dichlorophenol, 2,6-	87-65-0	E651A	0.02	mg/kg	<0.020	—
dichlorophenol, 3,4-	95-77-2	E651A	0.02	mg/kg	<0.020	—
dichlorophenol, 3,5-	591-35-5	E651A	0.02	mg/kg	<0.020	—
methylphenol, 4-chloro-3-	59-50-7	E651A	0.02	mg/kg	<0.020	—
pentachlorophenol [PCP]	87-86-5	E651A	0.02	mg/kg	<0.020	—
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.02	mg/kg	<0.020	—
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.02	mg/kg	<0.020	—
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 2,3,5-	933-78-8	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 2,3,6-	933-75-5	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 2,4,5-	95-95-4	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 2,4,6-	88-06-2	E651A	0.02	mg/kg	<0.020	—
trichlorophenol, 3,4,5-	609-19-8	E651A	0.02	mg/kg	<0.020	—

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 133685)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.8	95.0	105	---
Physical Tests (QCLot: 133688)									
moisture	---	E144	0.25	%	50 %	102	90.0	110	---
Non-Chlorinated Phenolics (QCLot: 133684)									
dimethylphenol, 2,4-	105-67-9	E651A	0.02	mg/kg	0.5 mg/kg	90.0	30.0	130	---
methylphenol, 2-	95-48-7	E651A	0.02	mg/kg	0.5 mg/kg	88.2	50.0	130	---
methylphenol, 3-	108-39-4	E651A	0.02	mg/kg	0.5 mg/kg	90.9	50.0	130	---
methylphenol, 4-	106-44-5	E651A	0.02	mg/kg	0.5 mg/kg	106	50.0	130	---
phenol	108-95-2	E651A	0.02	mg/kg	0.5 mg/kg	93.5	50.0	130	---
Metals (QCLot: 133686)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	98.6	80.0	120	---
Metals (QCLot: 133687)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	114	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	87.3	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	116	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	89.1	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	93.4	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	101	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	112	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	87.8	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	117	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	107	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	109	80.0	120	---

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 133687) - continued									
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	113	80.0	120	—
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	—
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	—
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	112	80.0	120	—
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	—
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	105	80.0	120	—
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	120	80.0	120	—
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	—
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.6	80.0	120	—
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	103	80.0	120	—
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	103	80.0	120	—
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	110	80.0	120	—
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	108	80.0	120	—
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.2	80.0	120	—
Volatile Organic Compounds (QCLot: 132110)									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	87.9	70.0	130	—
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	110	70.0	130	—
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	—
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	—
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	90.6	70.0	130	—
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	68.3	60.0	140	—
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	94.5	70.0	130	—
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	98.4	60.0	140	—
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	120	70.0	130	—
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	91.5	70.0	130	—
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	93.9	70.0	130	—
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	90.9	70.0	130	—
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	81.1	70.0	130	—
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	93.8	70.0	130	—
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	78.6	70.0	130	—
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	81.1	70.0	130	—
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	79.7	70.0	130	—
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	84.2	60.0	140	—
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	79.8	70.0	130	—
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	70.3	70.0	130	—
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	97.4	70.0	130	—
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	83.4	70.0	130	—

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 132110) - continued									
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	93.2	70.0	130	—
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	78.6	70.0	130	—
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	—
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	87.4	70.0	130	—
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	95.8	70.0	130	—
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	94.3	70.0	130	—
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	86.7	70.0	130	—
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	82.1	70.0	130	—
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	96.7	70.0	130	—
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	133	60.0	140	—
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	60.3	60.0	140	—
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	88.9	70.0	130	—
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	88.2	70.0	130	—
Hydrocarbons (QCLot: 132108)									
VHs (C6-C10)	—	E581.VH+F1	10	mg/kg	85.8 mg/kg	100	70.0	130	—
Hydrocarbons (QCLot: 133682)									
EPH (C10-C19)	—	E601A	200	mg/kg	1134.37 mg/kg	108	70.0	130	—
EPH (C19-C32)	—	E601A	200	mg/kg	575.98 mg/kg	108	70.0	130	—
					10183 mg/kg	105	70.0	130	—
Hydrocarbons (QCLot: 133683)									
F2 (C10-C16)	—	E601.SG	25	mg/kg	618.75 mg/kg	105	70.0	130	—
					4720 mg/kg	99.6	70.0	130	—
F3 (C16-C34)	—	E601.SG	50	mg/kg	1242.49 mg/kg	100	70.0	130	—
					14124 mg/kg	96.2	70.0	130	—
F4 (C34-C50)	—	E601.SG	50	mg/kg	993.9 mg/kg	94.0	70.0	130	—
Polycyclic Aromatic Hydrocarbons (QCLot: 133681)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	87.7	60.0	130	—
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	87.4	60.0	130	—
					0.2 mg/kg	96.3	60.0	130	—
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	96.0	60.0	130	—
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	96.0	60.0	130	—
					0.32 mg/kg	95.9	60.0	130	—
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	80.6	60.0	130	—
					0.545 mg/kg	80.7	60.0	130	—
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	92.3	60.0	130	—

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 133681) - continued									
benzo(b+j)fluoranthene	—	E641A-L	0.01	mg/kg	0.5 mg/kg	84.6	60.0	130	—
					0.793 mg/kg	79.9	60.0	130	—
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	84.9	60.0	130	—
					0.377 mg/kg	85.1	60.0	130	—
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	80.0	60.0	130	—
					0.34 mg/kg	71.1	60.0	130	—
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	73.5	60.0	130	—
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	93.8	60.0	130	—
					1.196 mg/kg	94.9	60.0	130	—
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	96.7	60.0	130	—
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	99.1	60.0	130	—
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	99.5	60.0	130	—
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	83.0	60.0	130	—
					1.256 mg/kg	84.5	60.0	130	—
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	75.6	60.0	130	—
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	77.8	50.0	130	—
					1.03 mg/kg	87.6	50.0	130	—
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	96.9	60.0	130	—
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	93.2	60.0	130	—
					1.325 mg/kg	87.8	60.0	130	—
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	82.4	60.0	130	—
Phenolics (QCLot: 133684)									
chlorophenol, 2-	95-57-8	E651A	0.02	mg/kg	0.5 mg/kg	96.8	60.0	130	—
chlorophenol, 3-	108-43-0	E651A	0.02	mg/kg	0.5 mg/kg	99.5	60.0	130	—
chlorophenol, 4-	106-48-9	E651A	0.02	mg/kg	0.5 mg/kg	101	60.0	130	—
dichlorophenol, 2,3-	576-24-9	E651A	0.02	mg/kg	0.5 mg/kg	100	60.0	130	—
dichlorophenol, 2,4- + 2,5-	—	E651A	0.02	mg/kg	1 mg/kg	101	60.0	130	—
dichlorophenol, 2,6-	87-65-0	E651A	0.02	mg/kg	0.5 mg/kg	99.4	60.0	130	—
dichlorophenol, 3,4-	95-77-2	E651A	0.02	mg/kg	0.5 mg/kg	98.3	60.0	130	—
dichlorophenol, 3,5-	591-35-5	E651A	0.02	mg/kg	0.5 mg/kg	101	60.0	130	—
methylphenol, 4-chloro-3-	59-50-7	E651A	0.02	mg/kg	0.5 mg/kg	102	60.0	130	—
pentachlorophenol [PCP]	87-86-5	E651A	0.02	mg/kg	0.5 mg/kg	102	60.0	130	—
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.02	mg/kg	0.5 mg/kg	99.1	60.0	130	—
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.02	mg/kg	0.5 mg/kg	102	60.0	130	—
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.02	mg/kg	0.5 mg/kg	101	60.0	130	—
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.02	mg/kg	0.5 mg/kg	98.2	60.0	130	—
trichlorophenol, 2,3,5-	933-78-8	E651A	0.02	mg/kg	0.5 mg/kg	99.8	60.0	130	—

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Phenolics (QCLot: 133684) - continued									
trichlorophenol, 2,3,6-	933-75-5	E651A	0.02	mg/kg	0.5 mg/kg	101	60.0	130	----
trichlorophenol, 2,4,5-	95-95-4	E651A	0.02	mg/kg	0.5 mg/kg	99.4	60.0	130	----
trichlorophenol, 2,4,6-	88-06-2	E651A	0.02	mg/kg	0.5 mg/kg	102	60.0	130	----
trichlorophenol, 3,4,5-	609-19-8	E651A	0.02	mg/kg	0.5 mg/kg	98.7	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Non-Chlorinated Phenolics (QCLot: 133684)										
VA20C3384-002	Anonymous	dimethylphenol, 2,4-	105-67-9	E651A	0.418 mg/kg	0.5 mg/kg	90.5	30.0	150	—
		methylphenol, 2-	95-48-7	E651A	0.373 mg/kg	0.5 mg/kg	80.9	50.0	150	—
		methylphenol, 3-	108-39-4	E651A	0.450 mg/kg	0.5 mg/kg	97.6	50.0	150	—
		methylphenol, 4-	106-44-5	E651A	0.449 mg/kg	0.5 mg/kg	97.2	50.0	150	—
		phenol	108-95-2	E651A	0.423 mg/kg	0.5 mg/kg	91.6	50.0	150	—
Volatile Organic Compounds (QCLot: 132110)										
VA20C3369-002	Anonymous	benzene	71-43-2	E611C	6.06 mg/kg	3.125 mg/kg	86.4	60.0	140	—
		bromodichloromethane	75-27-4	E611C	7.24 mg/kg	3.125 mg/kg	103	60.0	140	—
		bromoform	75-25-2	E611C	9.72 mg/kg	3.125 mg/kg	138	60.0	140	—
		carbon tetrachloride	56-23-5	E611C	7.52 mg/kg	3.125 mg/kg	107	60.0	140	—
		chlorobenzene	108-90-7	E611C	6.89 mg/kg	3.125 mg/kg	98.2	60.0	140	—
		chloroethane	75-00-3	E611C	5.66 mg/kg	3.125 mg/kg	80.7	60.0	140	—
		chloroform	67-66-3	E611C	7.22 mg/kg	3.125 mg/kg	103	60.0	140	—
		chloromethane	74-87-3	E611C	5.13 mg/kg	3.125 mg/kg	73.2	60.0	140	—
		dibromochloromethane	124-48-1	E611C	8.73 mg/kg	3.125 mg/kg	124	60.0	140	—
		dichlorobenzene, 1,2-	95-50-1	E611C	6.89 mg/kg	3.125 mg/kg	98.2	60.0	140	—
		dichlorobenzene, 1,3-	541-73-1	E611C	7.00 mg/kg	3.125 mg/kg	99.8	60.0	140	—
		dichlorobenzene, 1,4-	106-46-7	E611C	6.90 mg/kg	3.125 mg/kg	98.3	60.0	140	—
		dichloroethane, 1,1-	75-34-3	E611C	5.57 mg/kg	3.125 mg/kg	79.5	60.0	140	—
		dichloroethane, 1,2-	107-06-2	E611C	6.25 mg/kg	3.125 mg/kg	89.1	60.0	140	—
		dichloroethylene, 1,1-	75-35-4	E611C	5.94 mg/kg	3.125 mg/kg	84.6	60.0	140	—
		dichloroethylene, cis-1,2-	156-59-4	E611C	5.50 mg/kg	3.125 mg/kg	78.4	60.0	140	—
		dichloroethylene, trans-1,2-	156-60-5	E611C	5.69 mg/kg	3.125 mg/kg	81.1	60.0	140	—
		dichloromethane	75-09-2	E611C	5.85 mg/kg	3.125 mg/kg	83.5	60.0	140	—
		dichloropropane, 1,2-	78-87-5	E611C	5.41 mg/kg	3.125 mg/kg	77.1	60.0	140	—
		dichloropropylene, cis-1,3-	10061-01-5	E611C	4.86 mg/kg	3.125 mg/kg	69.3	60.0	140	—
		dichloropropylene, trans-1,3-	10061-02-6	E611C	4.37 mg/kg	3.125 mg/kg	62.3	60.0	140	—
		ethylbenzene	100-41-4	E611C	6.42 mg/kg	3.125 mg/kg	91.6	60.0	140	—
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	7.32 mg/kg	3.125 mg/kg	104	60.0	140	—
		styrene	100-42-5	E611C	8.94 mg/kg	3.125 mg/kg	128	60.0	140	—
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	7.54 mg/kg	3.125 mg/kg	108	60.0	140	—

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 132110) - continued										
VA20C3369-002	Anonymous	tetrachloroethane, 1,1,2,2-	79-34-5	E611C	6.52 mg/kg	3.125 mg/kg	92.9	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	7.23 mg/kg	3.125 mg/kg	103	60.0	140	----
		toluene	108-88-3	E611C	7.20 mg/kg	3.125 mg/kg	102	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	5.97 mg/kg	3.125 mg/kg	85.2	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	6.03 mg/kg	3.125 mg/kg	86.0	60.0	140	----
		trichloroethylene	79-01-6	E611C	6.53 mg/kg	3.125 mg/kg	93.1	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	9.68 mg/kg	3.125 mg/kg	138	60.0	140	----
		vinyl chloride	75-01-4	E611C	5.64 mg/kg	3.125 mg/kg	80.4	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	13.7 mg/kg	6.25 mg/kg	97.8	60.0	140	----
		xylene, o-	95-47-6	E611C	6.76 mg/kg	3.125 mg/kg	96.3	60.0	140	----
Hydrocarbons (QCLot: 132108)										
VA20C3279-009	Anonymous	VHs (C6-C10)	----	E581.VH+F1	138 mg/kg	171.9 mg/kg	90.2	60.0	140	----
Phenolics (QCLot: 133684)										
VA20C3384-002	Anonymous	chlorophenol, 2-	95-57-8	E651A	0.414 mg/kg	0.5 mg/kg	89.7	50.0	150	----
		chlorophenol, 3-	108-43-0	E651A	0.466 mg/kg	0.5 mg/kg	101	50.0	150	----
		chlorophenol, 4-	106-48-9	E651A	0.460 mg/kg	0.5 mg/kg	99.7	50.0	150	----
		dichlorophenol, 2,3-	576-24-9	E651A	0.458 mg/kg	0.5 mg/kg	99.3	50.0	150	----
		dichlorophenol, 2,4- + 2,5-	----	E651A	0.916 mg/kg	1 mg/kg	99.2	50.0	150	----
		dichlorophenol, 2,6-	87-65-0	E651A	0.445 mg/kg	0.5 mg/kg	96.4	50.0	150	----
		dichlorophenol, 3,4-	95-77-2	E651A	0.482 mg/kg	0.5 mg/kg	104	50.0	150	----
		dichlorophenol, 3,5-	591-35-5	E651A	0.459 mg/kg	0.5 mg/kg	99.4	50.0	150	----
		methylphenol, 4-chloro-3-	59-50-7	E651A	0.462 mg/kg	0.5 mg/kg	100	50.0	150	----
		pentachlorophenol [PCP]	87-86-5	E651A	0.431 mg/kg	0.5 mg/kg	93.4	50.0	150	----
		tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.463 mg/kg	0.5 mg/kg	100	50.0	150	----
		tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.506 mg/kg	0.5 mg/kg	110	50.0	150	----
		tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.640 mg/kg	0.5 mg/kg	139	50.0	150	----
		trichlorophenol, 2,3,4-	15950-66-0	E651A	0.476 mg/kg	0.5 mg/kg	103	50.0	150	----
		trichlorophenol, 2,3,5-	933-78-8	E651A	0.464 mg/kg	0.5 mg/kg	100	50.0	150	----
		trichlorophenol, 2,3,6-	933-75-5	E651A	0.463 mg/kg	0.5 mg/kg	100	50.0	150	----
		trichlorophenol, 2,4,5-	95-95-4	E651A	0.463 mg/kg	0.5 mg/kg	100	50.0	150	----
		trichlorophenol, 2,4,6-	88-06-2	E651A	0.469 mg/kg	0.5 mg/kg	102	50.0	150	----
		trichlorophenol, 3,4,5-	609-19-8	E651A	0.468 mg/kg	0.5 mg/kg	101	50.0	150	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 133686)									
QC-133686-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	93.2	70.0	130	---
Metals (QCLot: 133687)									
QC-133687-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	128	70.0	130	---
QC-133687-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	105	70.0	130	---
QC-133687-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	106	70.0	130	---
QC-133687-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	110	70.0	130	---
QC-133687-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	113	70.0	130	---
QC-133687-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	126	40.0	160	---
QC-133687-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	110	70.0	130	---
QC-133687-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	123	70.0	130	---
QC-133687-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	---
QC-133687-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	111	70.0	130	---
QC-133687-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	111	70.0	130	---
QC-133687-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	---
QC-133687-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	118	70.0	130	---
QC-133687-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	109	70.0	130	---
QC-133687-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	116	70.0	130	---
QC-133687-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	114	70.0	130	---
QC-133687-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	---
QC-133687-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	---
QC-133687-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	108	70.0	130	---
QC-133687-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	119	70.0	130	---
QC-133687-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	107	70.0	130	---
QC-133687-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	116	70.0	130	---
QC-133687-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	113	40.0	160	---
QC-133687-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	107	70.0	130	---
QC-133687-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	118	70.0	130	---
QC-133687-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	107	70.0	130	---

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 133687) - continued									
QC-133687-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	113	70.0	130	---
QC-133687-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	---
QC-133687-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	106	70.0	130	---
Hydrocarbons (QCLot: 133682)									
QC-133682-003	Petroleum Hydrocarbon IRM	EPH (C10-C19)	---	E601A	7113 mg/kg	102	70.0	130	---
Hydrocarbons (QCLot: 133683)									
QC-133683-003	Petroleum Hydrocarbon IRM	F4 (C34-C50)	---	E601.SG	1238 mg/kg	103	70.0	130	---
Polycyclic Aromatic Hydrocarbons (QCLot: 133681)									
QC-133681-003	RM	acenaphthene	83-32-9	E641A-L	0.638 mg/kg	84.4	60.0	130	---
QC-133681-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	93.5	60.0	130	---
QC-133681-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	74.2	60.0	130	---
QC-133681-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	90.6	60.0	130	---
QC-133681-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	96.2	60.0	130	---
QC-133681-003	RM	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.445 mg/kg	95.0	60.0	130	---
QC-133681-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	79.6	60.0	130	---
QC-133681-003	RM	phenanthrene	85-01-8	E641A-L	1.13 mg/kg	92.0	60.0	130	---

ALS Environmental
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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 865484

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	WSP Canada Inc.	Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Marina Makovetski	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐; 3 day [P3-25%] ☐; 2 day [P2-50%] ☐
Phone:	604-353-7077	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: ——— dd-mmm-yy hh:mm ———
Street:	100-20339 96 Ave	Email 1 or Fax: Marina.Makovetski@WSP.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Langley, BC	Email 2: tony.chutley@WSP.com	
Postal Code:		Email 3:	

Invoice To		Invoice Distribution
	Same as Report To ☐ YES ☐ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☐ YES ☐ NO	
Company:		Email 1 or Fax:
Contact:		Email 2:

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	20MA-00758-00	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: MM/RC

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	20-MW1@ 0.3m	15DEC20		Soil	2	X	
	20-MW1@ 0.6m				4		
	20-MW1@ 1.2m				4		
	20-MW1@ 2m				2		
	20-MW1@ 2.7m				2		
	20-MW1@ 4.4m				2		
	20-MW2@ 0.3m				2		
	20-MW2@ 0.6m				4		
	20-MW2@ 1.2m				4		
	20-MW2@ 3.2m				4		
	20-MW2@ 4.5m				2		
	20-MW3@ 0.3m				4		

Environmental Division Vancouver
Work Order Reference
VA20C3415
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6	4		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rony C.	Date: 15 DEC 2020	Time: 3:25	Received by:	Date:	Time:	Received by: MB	Date: DEC 15	Time: 3:30PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

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

ALS Environmental
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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 - 865479
Page 2 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	WSP Canada Inc.	Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Marina Makovetski	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	604-353-7077	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	100-20339 96 Ave.	Email 1 or Fax: Marina.makovetski@wsp.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Langley, BC	Email 2: tory.chudley@wsp.com	
Postal Code:		Email 3	

Invoice To		Invoice Distribution	
	Same as Report To ☐ YES ☐ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
	Copy of Invoice with Report ☐ YES ☐ NO		
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	20M-00758-00	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: MM / RC

Analysis Request

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	20-MW3@0.6m	15 DEC 20		Soil	2		X	
	20-MW3@1.2m	↓		↓	4		↓	
	20-MW3@2.2m				4			
	20-MW3@4.5m				2			
	20-DUP1-MM				4			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Rory C.	15 DEC 2020	5:25						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AR-E 2018 FRONT

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

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 865484

Page 1 of 2

Report To
Company: WSP Canada Inc.
Contact: Marina Makovetski
Phone: 604-353-7077

Company address below will appear on the final report
Street: 100-20339 96 Ave
City/Province: Langley, BC
Postal Code:

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

Project Information
ALS Account # / Quote #:
Job #: 20MA-00758-90 phase 612
PO / AFE:
LSD:
ALS Lab Work Order # (lab use only):

Report Format / Distribution
Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report: [X] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: Marina.Makovetski@WSP.com
Email 2: Holly.Chutter@WSP.com
Email 3:

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

Oil and Gas Required Fields (client use)
AFE/Cost Center: PO#:
Major/Minor Code: Routing Code:
Requisitioner:
Location:
ALS Contact: Carla F Sampler: MM/RC

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Regular [R]: [X] Standard TAT if received by 3 pm - business days - no surcharges apply
4 day [P4-20%] [ ]
3 day [P3-25%] [ ]
2 day [P2-50%] [ ]
1 Business day [E - 100%] [ ]
Same Day, Weekend or Statutory holiday [E2 - 200%] (Laboratory opening fees may apply) [ ]
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOC/VSH	F1-TF1 (Coarse)	L/HERH/DAFH	Chlorides/Sulphate/Nitrate/Nitrite	Mercury										SAMPLES ON HOLD
	20-MW1@0.3m	15 DEC 20		Soil	2					X										
	20-MW1@0.6m				4	X	X	X	X	X										
	20-MW1@1.2m				2															
	20-MW1@2m				2															
	20-MW1@2.7m				2															
	20-MW1@4.4m				2	X	X	X	X											
	20-MW2@0.3m				4				X											
	20-MW2@0.6m				4															
	20-MW2@1.2m				4															
	20-MW2@3.2m				2															
	20-MW2@4.5m				2															
	20-MW3@0.3m				4	X	X	X	X											

Drinking Water (DW) Samples (client use)
Are samples taken from a Regulated DW System? [X] YES [X] NO
Are samples for human consumption/use? [X] YES [X] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Results to be compared to BCCSR and CCME/CWS (Federal) standards

SHIPMENT RELEASE (client use)
Released by: Holly Chutter Date: 15 DEC 2020 Time: 3:23

INITIAL SHIPMENT RECEPTION (lab use only)
Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Environmental Division
Vancouver
Work Order Reference
VA20C3415

Telephone : +1 604 253 4188

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 865479

Page 2 of 2

Report To — Contact and company name below will appear on the final report

Company:	WSP Canada Inc.
Contact:	Marim Makowetski
Phone:	604-353-7077
Street:	100-20339 96 Ave.
City/Province:	Langley, BC
Postal Code:	

Invoice To

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

Project Information

ALS Account # / Quote #:
Job #: 20M-00758-00
PO / AFE:
LSD:

ALS Lab Work Order # (lab use only):

Report Format / Distribution

Select Report Format: PDF / EXCEL / EDD (DIGITAL)
Quality Control (QC) Report with Report: YES / NO
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL / MAIL / FAX
Email 1 or Fax: Marim.makowetski@wsp.com
Email 2: rory.chatley@wsp.com
Email 3:

Invoice Distribution

Select Invoice Distribution: EMAIL / MAIL / FAX
Email 1 or Fax:
Email 2:

Oil and Gas Required Fields (client use)

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

ALS Contact: | Sampler: MM / RC

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

Regular [R] — Standard TAT if received by 3 pm - business days - no surcharges apply
4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%]
1 Business day [E - 100%]
Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Number of Containers	VOC/VPH	EPH/LEPH/PAH	[illegible]	Chloride/[illegible]	[illegible]	Samples on Hold
	20-MW3@0.6m	15 DEC 2020		Soil	2					X	X
	20-MW3@1.2m	↓		↓	4						↓
	20-MW3@2.2m	↓		↓	4						↓
	20-MW3@4.5m	↓		↓	2						↓
	20-DUP1-MM	↓		↓	4	X	X	X		X	↓

Drinking Water (DW) Samples¹ (client use)

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

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

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen / Ice Packs / Ice Cubes / Custody seal intact / Cooling Initiated
INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)	
Released by: Rory C.	Date: 15 DEC 2020	Time: 3:25	Received by:	Date:	Received by:	Date: / Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY   YELLOW - CLIENT COPY

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20C3698**	Page	: 1 of 9
Client	: **WSP Canada Group Limited**	Laboratory	: Vancouver - Environmental
Contact	: **Marina Makovetski**	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 0E4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 17-Dec-2020 16:05
PO	: ----	Date Analysis Commenced	: 19-Dec-2020
C-O-C number	: 17-865482	Issue Date	: 29-Dec-2020 16:00
Sampler	: ----		
Site	: MetroVan RFP 17-161 - Study for Grit and Screenings Phase 2		
Quote number	: Q76820		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

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

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

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

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

Qualifiers

Qualifier	*Description*
DLM	***Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).***

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-MW1	20-MW2	20-MW3	20-DUP1	----
					Client sampling date / time	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
						VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	-------
						Result	Result	Result	Result	---
Physical Tests										
pH	----	E108	0.10	pH units		7.32	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L		87300	92900	354000	359000	----
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L		64.5	41.4	7.40	7.42	----
Non-Chlorinated Phenolics										
dimethylphenol, 2,4-	105-67-9	E651A	0.20	µg/L		<0.20	----	----	----	----
methylphenol, 2-	95-48-7	E651A	0.50	µg/L		<0.50	----	----	----	----
methylphenol, 3-	108-39-4	E651A	0.20	µg/L		<0.20	----	----	----	----
methylphenol, 4-	106-44-5	E651A	0.20	µg/L		<0.20	----	----	----	----
phenol	108-95-2	E651A	0.20	µg/L		<0.20	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	1.0	µg/L		5.1	35.4	6.7	7.2	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L		<0.10	0.12	0.15	0.15	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L		2.43	11.2	9.99	10.1	----
barium, dissolved	7440-39-3	E421	0.10	µg/L		94.1	66.4	310	296	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L		<0.100	<0.100	<0.100	<0.100	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L		<0.050	<0.050	<0.050	<0.050	----
boron, dissolved	7440-42-8	E421	10	µg/L		51	39	65	64	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L		<0.0050	<0.0150 DLM	0.0133	0.0158	----
calcium, dissolved	7440-70-2	E421	50	µg/L		23400	26500	108000	111000	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L		0.015	<0.010	0.020	0.021	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L		0.14	1.03	0.56	0.61	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L		1.82	0.72	6.77	6.77	----
copper, dissolved	7440-50-8	E421	0.20	µg/L		0.68	0.47	<0.20	<0.20	----
iron, dissolved	7439-89-6	E421	10	µg/L		3340	2500	34900	35200	----
lead, dissolved	7439-92-1	E421	0.050	µg/L		<0.050	<0.050	<0.050	<0.050	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L		1.8	1.7	7.7	7.7	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L		7010	6490	20500	19800	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L		1690	877	4780	4680	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L		<0.0050	<0.0050	<0.0050	<0.0050	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L		1.38	23.4	4.20	4.28	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	20-MW1	20-MW2	20-MW3	20-DUP1	----
					Client sampling date / time	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit		VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
						Result	Result	Result	Result	---
Dissolved Metals										
nickel, dissolved	7440-02-0	E421	0.50	µg/L		2.82	1.63	5.45	5.36	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L		94	164	70	54	----
potassium, dissolved	7440-09-7	E421	50	µg/L		3640	3080	5760	5730	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L		3.21	1.84	4.67	4.91	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L		<0.050	0.175	0.463	0.460	----
silicon, dissolved	7440-21-3	E421	50	µg/L		12600	9630	15000	14600	----
silver, dissolved	7440-22-4	E421	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
sodium, dissolved	17341-25-2	E421	50	µg/L		97100	102000	42000	41000	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L		156	122	510	528	----
sulfur, dissolved	7704-34-9	E421	500	µg/L		<500	7090	13200	13000	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L		<0.20	<0.20	<0.20	<0.20	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L		<0.10	<0.10	<0.10	<0.10	----
tin, dissolved	7440-31-5	E421	0.10	µg/L		0.11	0.14	<0.10	0.10	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L		<0.30	3.06	0.58	0.52	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L		<0.10	<0.10	<0.10	<0.10	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L		0.144	0.280	1.08	1.07	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L		0.54	4.09	0.84	0.82	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L		1.9	1.3	3.6	3.8	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L		<0.20	1.58	0.47	0.45	----
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	----
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	----
Volatile Organic Compounds										
chlorobenzene	108-90-7	E611C	0.50	µg/L		----	<0.50	<0.50	<0.50	----
chlorobenzene	108-90-7	E611C	1.00	µg/L		<1.00	----	----	----	----
chloromethane	74-87-3	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L		----	<0.50	<0.50	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611C	1.00	µg/L		<1.00	----	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L		----	<0.50	<0.50	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611C	1.00	µg/L		<1.00	----	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L		----	<0.50	<0.50	<0.50	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)			Client sample ID		20-MW1	20-MW2	20-MW3	20-DUP1	----
			Client sampling date / time		17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit	VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
					Result	Result	Result	Result	---
Volatile Organic Compounds									
dichloropropane, 1,2-	78-87-5	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	---	<0.75	<0.75	<0.75	---
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	1.00	µg/L	<1.00	---	---	---	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
trichlorofluoromethane	75-69-4	E611C	1.00	µg/L	<1.00	---	---	---	---
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
chloroethane	75-00-3	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
chloroethane	75-00-3	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
dichloroethane, 1,1-	75-34-3	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
dichloroethane, 1,2-	107-06-2	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611C	1.00	µg/L	<1.00	---	---	---	---
dichloromethane	75-09-2	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
dichloromethane	75-09-2	E611C	5.00	µg/L	<5.00	---	---	---	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
tetrachloroethylene	127-18-4	E611C	1.00	µg/L	<1.00	---	---	---	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	---
trichloroethylene	79-01-6	E611C	0.50	µg/L	---	<0.50	<0.50	<0.50	---
trichloroethylene	79-01-6	E611C	1.00	µg/L	<1.00	---	---	---	---
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	---

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	20-MW1	20-MW2	20-MW3	20-DUP1	----
					Client sampling date / time	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit		VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
						Result	Result	Result	Result	---
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
ethylbenzene	100-41-4	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
styrene	100-42-5	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
toluene	108-88-3	E611C	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
xylene, o-	95-47-6	E611C	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	---
xylenes, total	1330-20-7	E611C	0.75	µg/L		<0.75	<0.75	<0.75	<0.75	---
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%		95.5	98.3	89.7	95.4	---
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%		106	111	110	102	---
Hydrocarbons										
EPH (C10-C19)	---	E601A	250	µg/L		<250	<250	<250	<250	---
EPH (C19-C32)	---	E601A	250	µg/L		<250	<250	<250	<250	---
F2 (C10-C16)	---	E601	300	µg/L		<300	---	---	---	---
F3 (C16-C34)	---	E601	300	µg/L		<300	---	---	---	---
F4 (C34-C50)	---	E601	300	µg/L		<300	---	---	---	---
HEPHw	---	EC600A	250	µg/L		<250	<250	<250	<250	---
LEPHw	---	EC600A	250	µg/L		<250	<250	<250	<250	---
VHw (C6-C10)	---	E581.VH+F1	100	µg/L		<100	<100	<100	<100	---
F1 (C6-C10)	---	E581.VH+F1	100	µg/L		<100	---	---	---	---
F1-BTEX	---	EC580	100	µg/L		<100	---	---	---	---
VPHw	---	EC580A	100	µg/L		<100	<100	<100	<100	---
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%		88.0	92.0	81.5	93.8	---
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	50	%		81.8	---	---	---	---
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		79.2	75.3	72.5	75.3	---
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641B	0.010	µg/L		<0.010	<0.010	0.023	0.021	---
acenaphthylene	208-96-8	E641B	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	---
acridine	260-94-6	E641B	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	---
anthracene	120-12-7	E641B	0.010	µg/L		<0.010	<0.010	0.010	<0.010	---

Analytical Results

Sub-Matrix: Water (Matrix: Water)			Client sample ID		20-MW1	20-MW2	20-MW3	20-DUP1	----
			Client sampling date / time		17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit	VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
					Result	Result	Result	Result	---
Polycyclic Aromatic Hydrocarbons									
anthraquinone, 9,10-	84-65-1	E641B	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	---
benz(a)anthracene	56-55-3	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
benzo(a)pyrene	50-32-8	E641B	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	---
benzo(b+j)fluoranthene	---	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
benzo(b+j+k)fluoranthene	---	E641B	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	---
benzo(e)pyrene	192-97-2	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
benzo(k)fluoranthene	207-08-9	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
chloronaphthalene, 2-	91-58-7	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
chrysene	218-01-9	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641B	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	---
dimethylbenz(a)anthracene, 7,12-	57-97-6	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
fluoranthene	206-44-0	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
fluorene	86-73-7	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
methylcholanthrene, 3-	56-49-5	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
methylnaphthalene, 1-	90-12-0	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
methylnaphthalene, 2-	91-57-6	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
methylnaphthalenes, 1+2-	---	E641B	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	---
naphthalene	91-20-3	E641B	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	---
nitropyrene, 4-	57835-92-4	E641B	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	---
perylene	198-55-0	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
phenanthrene	85-01-8	E641B	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	---
pyrene	129-00-0	E641B	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	---
quinoline	8027-02-7	E641B	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	---
B(a)P total potency equivalents [B(a)P TPE]	---	E641B	0.0075	µg/L	<0.0075	<0.0075	<0.0075	<0.0075	---
PAHs, high molecular weight (BC AWQ)	---	E641B	0.030	µg/L	<0.030	<0.030	<0.030	<0.030	---
PAHs, low molecular weight (BC AWQ)	---	E641B	0.060	µg/L	<0.060	<0.060	<0.060	<0.060	---
PAHs, total (EPA 16)	---	E641B	0.065	µg/L	<0.065	<0.065	<0.065	<0.065	---
PAHs, total (P2MMP)	---	E641B	0.040	µg/L	<0.040	<0.040	<0.040	<0.040	---
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641B	0.010	%	113	72.9	100	102	---

Analytical Results

Sub-Matrix: Water (Matrix: Water)			Client sample ID		20-MW1	20-MW2	20-MW3	20-DUP1	----
			Client sampling date / time		17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit	VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
					Result	Result	Result	Result	---
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	E641B	0.010	%	118	89.4	109	94.3	----
naphthalene-d8	1146-65-2	E641B	0.010	%	97.6	80.4	84.1	93.7	----
phenanthrene-d10	1517-22-2	E641B	0.010	%	112	98.1	102	110	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	----	<0.50	<0.50	<0.50	----
bromodichloromethane	75-27-4	E611C	1.00	µg/L	<1.00	----	----	----	----
bromoform	75-25-2	E611C	0.50	µg/L	----	<0.50	<0.50	<0.50	----
bromoform	75-25-2	E611C	1.00	µg/L	<1.00	----	----	----	----
chloroform	67-66-3	E611C	0.50	µg/L	----	<0.50	<0.50	<0.50	----
chloroform	67-66-3	E611C	1.00	µg/L	<1.00	----	----	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	----	<0.50	<0.50	<0.50	----
dibromochloromethane	124-48-1	E611C	1.00	µg/L	<1.00	----	----	----	----
Phenolics									
chlorophenol, 2-	95-57-8	E651A	0.050	µg/L	<0.050	----	----	----	----
chlorophenol, 3-	108-43-0	E651A	0.050	µg/L	<0.050	----	----	----	----
chlorophenol, 4-	106-48-9	E651A	0.050	µg/L	<0.050	----	----	----	----
dichlorophenol, 2,3-	576-24-9	E651A	0.050	µg/L	<0.050	----	----	----	----
dichlorophenol, 2,4- + 2,5-	----	E651A	0.050	µg/L	<0.050	----	----	----	----
dichlorophenol, 2,6-	87-65-0	E651A	0.050	µg/L	<0.050	----	----	----	----
dichlorophenol, 3,4-	95-77-2	E651A	0.050	µg/L	<0.050	----	----	----	----
dichlorophenol, 3,5-	591-35-5	E651A	0.050	µg/L	<0.050	----	----	----	----
methylphenol, 4-chloro-3-	59-50-7	E651A	0.10	µg/L	<0.10	----	----	----	----
pentachlorophenol [PCP]	87-86-5	E651A	0.10	µg/L	<0.10	----	----	----	----
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.10	µg/L	<0.10	----	----	----	----
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.10	µg/L	<0.10	----	----	----	----
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 2,3,5-	933-78-8	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 2,3,6-	933-75-5	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 2,4,5-	95-95-4	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 2,4,6-	88-06-2	E651A	0.10	µg/L	<0.10	----	----	----	----
trichlorophenol, 3,4,5-	609-19-8	E651A	0.10	µg/L	<0.10	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	20-MW1	20-MW2	20-MW3	20-DUP1	----
					Client sampling date / time	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	---
Analyte	CAS Number	Method	LOR	Unit		VA20C3698-001	VA20C3698-002	VA20C3698-003	VA20C3698-004	------
						Result	Result	Result	Result	---
Phenolics Surrogates										
chlorophenol-d4, 2-	93951-73-6	E651A	0.10	%		96.1	---	---	---	---
dichlorophenol-d3, 2,4-	93951-74-7	E651A	0.10	%		92.5	---	---	---	---
tribromophenol, 2,4,6-	118-79-6	E651A	0.10	%		106	---	---	---	---

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA20C3698**	Page	: 1 of 12
Client	: **WSP Canada Group Limited**	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 17-Dec-2020 16:05
PO	: ----	Issue Date	: 29-Dec-2020 16:00
C-O-C number	: 17-865482		
Sampler	: ----		
Site	: MetroVan RFP 17-161 - Study for Grit and Screenings Phase 2		
Quote number	: Q76820		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Volatile Organic Compounds	QC-133524-002	---	dichloropropylene, trans-1,3-	10061-02-6	E611C	62.6 % LCS-ND	70.0-130%	Recovery less than lower control limit
Polycyclic Aromatic Hydrocarbons	QC-MRG2-1337900 02	---	nitropyrene, 4-	57835-92-4	E641B	154 % LCS-ND	50.0-140%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE 20-DUP1	E235.Cl	17-Dec-2020	----	----	----		21-Dec-2020	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 20-MW1	E235.Cl	17-Dec-2020	----	----	----		21-Dec-2020	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 20-MW2	E235.Cl	17-Dec-2020	----	----	----		21-Dec-2020	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 20-MW3	E235.Cl	17-Dec-2020	----	----	----		21-Dec-2020	28 days	4 days	✓
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid) 20-DUP1	E421.Cr-L	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid) 20-MW1	E421.Cr-L	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid) 20-MW2	E421.Cr-L	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid)										
20-MW3	E421.Cr-L	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
20-DUP1	E509	17-Dec-2020	22-Dec-2020	28 days	5 days	✓	22-Dec-2020	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
20-MW1	E509	17-Dec-2020	22-Dec-2020	28 days	5 days	✓	22-Dec-2020	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
20-MW2	E509	17-Dec-2020	22-Dec-2020	28 days	5 days	✓	22-Dec-2020	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
20-MW3	E509	17-Dec-2020	22-Dec-2020	28 days	5 days	✓	22-Dec-2020	22 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
20-DUP1	E421	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
20-MW1	E421	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
20-MW2	E421	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
20-MW3	E421	17-Dec-2020	19-Dec-2020	180 days	2 days	✓	21-Dec-2020	177 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW1	E601A	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	23-Dec-2020	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW2	E601A	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	23-Dec-2020	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW3	E601A	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	23-Dec-2020	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-DUP1	E601A	17-Dec-2020	22-Dec-2020	14 days	5 days	✓	23-Dec-2020	40 days	0 days	✓
Hydrocarbons : CCME PHC - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW1	E601	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	23-Dec-2020	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
20-DUP1	E581.VH+F1	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
20-MW1	E581.VH+F1	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
20-MW2	E581.VH+F1	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
20-MW3	E581.VH+F1	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Non-Chlorinated Phenolics : Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW1	E651A	17-Dec-2020	19-Dec-2020	---	---		23-Dec-2020	---	---	
Phenolics : Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW1	E651A	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	23-Dec-2020	40 days	3 days	✓
Physical Tests : pH by Meter										
HDPE										
20-MW1	E108	17-Dec-2020	---	---	---		21-Dec-2020	0.25 hrs	108 hrs	✗ EHTR-FM
Polycyclic Aromatic Hydrocarbons : PAHs (BC Special List) by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW1	E641B	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	22-Dec-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs (BC Special List) by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW2	E641B	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	22-Dec-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs (BC Special List) by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-MW3	E641B	17-Dec-2020	21-Dec-2020	14 days	4 days	✓	22-Dec-2020	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs (BC Special List) by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
20-DUP1	E641B	17-Dec-2020	22-Dec-2020	14 days	5 days	✓	22-Dec-2020	40 days	0 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
20-DUP1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
20-MW1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW2	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW3	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-DUP1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW2	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW3	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-DUP1	E611C	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW1	E611C	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW2	E611C	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW3	E611C	17-Dec-2020	19-Dec-2020	14 days	2 days	✓	19-Dec-2020	11 days	0 days	✓
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-DUP1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW1	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW2	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 20-MW3	E611C	17-Dec-2020	19-Dec-2020	---	---		19-Dec-2020	---	---	

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Chloride in Water by IC	E235.Cl	133829	2	21	9.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	133470	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	134456	1	10	10.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	133469	1	20	5.0	5.0	✓
pH by Meter	E108	133826	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	133523	1	12	8.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	133524	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	133789	2	27	7.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	133791	1	1	100.0	5.0	✓
Chloride in Water by IC	E235.Cl	133829	2	21	9.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	133470	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	134456	1	10	10.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	133469	1	20	5.0	5.0	✓
PAHs (BC Special List) by Hexane LVI GC-MS	E641B	133790	2	9	22.2	5.0	✓
pH by Meter	E108	133826	1	8	12.5	5.0	✓
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133407	1	10	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	133523	1	12	8.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	133524	1	12	8.3	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	133789	2	27	7.4	5.0	✓
CCME PHC - F2-F4 by GC-FID	E601	133791	1	1	100.0	5.0	✓
Chloride in Water by IC	E235.Cl	133829	2	21	9.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	133470	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	134456	1	10	10.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	133469	1	20	5.0	5.0	✓
PAHs (BC Special List) by Hexane LVI GC-MS	E641B	133790	2	9	22.2	5.0	✓
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A	133407	1	10	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	133523	1	12	8.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	133524	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	133829	2	21	9.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	133470	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	134456	1	10	10.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	133469	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	133523	1	12	8.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	133524	1	12	8.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHC - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fractions 2-4 (F2-F4) are analyzed by GC-FID.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs (BC Special List) by Hexane LVI GC-MS	E641B Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Phenolics (Western Canada List, No Nitro-Phenols) by GC-MS	E651A Vancouver - Environmental	Water	EPA 8270E (mod)	Phenolics are analyzed by GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
Phenolics Extraction	EP651 Vancouver - Environmental	Water	EPA 3511 (mod)	Phenolics are extracted from acidic aqueous sample using DCM liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: VA20C3698	Page	: 1 of 20
Client	: WSP Canada Group Limited	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 17-Dec-2020 16:05
PO	: ----	Date Analysis Commenced	: 19-Dec-2020
C-O-C number	: 17-865482	Issue Date	: 29-Dec-2020 16:00
Sampler	: ----		
Site	: MetroVan RFP 17-161 - Study for Grit and Screenings Phase 2		
Quote number	: Q76820		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Laboratory Department*
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 133826)											
VA20C2661-002	Anonymous	pH	---	E108	0.10	pH units	7.57	7.57	0.00%	4%	---
Anions and Nutrients (QC Lot: 133829)											
VA20C3273-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.12	1.42	0.70	Diff <2x LOR	---
Anions and Nutrients (QC Lot: 133919)											
VA20C3706-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	20.6	21.0	0.41	Diff <2x LOR	---
Dissolved Metals (QC Lot: 133469)											
KS2002946-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0018	0.0015	0.0002	Diff <2x LOR	---
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00126	0.00123	1.78%	20%	---
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0341	0.0352	3.25%	20%	---
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	---
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		boron, dissolved	7440-42-8	E421	0.010	mg/L	0.016	0.016	0.0005	Diff <2x LOR	---
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	---
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	93.4	95.2	1.92%	20%	---
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00014	0.00013	0.00001	Diff <2x LOR	---
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	---
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.015	0.015	0.0004	Diff <2x LOR	---
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0055	0.0054	0.00005	Diff <2x LOR	---
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	27.6	27.0	2.21%	20%	---
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.06	1.03	2.77%	20%	---
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000904	0.000913	0.934%	20%	---
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00082	0.00082	0.000002	Diff <2x LOR	---
		phosphorus, dissolved	7723-14-0	E421	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	---
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.03	2.00	1.57%	20%	---
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00177	0.00163	0.00014	Diff <2x LOR	---
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	9.35	9.27	0.802%	20%	---
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 133469) - continued											
KS2002946-001	Anonymous	sodium, dissolved	17341-25-2	E421	0.050	mg/L	7.95	7.72	3.00%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.471	0.470	0.294%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.1	19.0	0.663%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00618	0.00652	5.39%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 133470)											
KS2002946-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 134456)											
VA20C3685-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 133524)											
VA20C3819-001	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	1.16	1.39	0.23	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	7.36	7.85	6.42%	30%	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Volatile Organic Compounds (QC Lot: 133524) - continued											
VA20C3819-001	Anonymous	dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	---
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	---
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	---
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
Hydrocarbons (QC Lot: 133523)											
VA20C3819-001	Anonymous	F1 (C6-C10)	---	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	---
		VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 133829)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 133919)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Non-Chlorinated Phenolics (QCLot: 133407)						
dimethylphenol, 2,4-	105-67-9	E651A	0.2	µg/L	<0.20	---
methylphenol, 2-	95-48-7	E651A	0.5	µg/L	<0.50	---
methylphenol, 3-	108-39-4	E651A	0.2	µg/L	<0.20	---
methylphenol, 4-	106-44-5	E651A	0.2	µg/L	<0.20	---
phenol	108-95-2	E651A	0.2	µg/L	<0.20	---
Dissolved Metals (QCLot: 133469)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 133469) - continued						
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 133470)						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	---
Dissolved Metals (QCLot: 134456)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Volatile Organic Compounds (QCLot: 133524)						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	---
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	---
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	---
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	---
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	---
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	---
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	---
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	---
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 133524) - continued						
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	---
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	---
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	---
styrene	100-42-5	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	---
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	---
toluene	108-88-3	E611C	0.4	µg/L	<0.40	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
Hydrocarbons (QCLot: 133523)						
F1 (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
Hydrocarbons (QCLot: 133789)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Hydrocarbons (QCLot: 133791)						
F2 (C10-C16)	---	E601	100	µg/L	<100	---
F3 (C16-C34)	---	E601	250	µg/L	<250	---
F4 (C34-C50)	---	E601	250	µg/L	<250	---
Hydrocarbons (QCLot: 134337)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Polycyclic Aromatic Hydrocarbons (QCLot: 133790)						
acenaphthene	83-32-9	E641B	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641B	0.01	µg/L	<0.010	---
acridine	260-94-6	E641B	0.01	µg/L	<0.010	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 133790) - continued						
anthracene	120-12-7	E641B	0.01	µg/L	<0.010	---
anthraquinone, 9,10-	84-65-1	E641B	0.05	µg/L	<0.050	---
benz(a)anthracene	56-55-3	E641B	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641B	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641B	0.01	µg/L	<0.010	---
benzo(e)pyrene	192-97-2	E641B	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641B	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641B	0.01	µg/L	<0.010	---
chloronaphthalene, 2-	91-58-7	E641B	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641B	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641B	0.005	µg/L	<0.0050	---
dimethylbenz(a)anthracene, 7,12-	57-97-6	E641B	0.01	µg/L	<0.010	---
fluoranthene	206-44-0	E641B	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641B	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641B	0.01	µg/L	<0.010	---
methylcholanthrene, 3-	56-49-5	E641B	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641B	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641B	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641B	0.05	µg/L	<0.050	---
nitropyrene, 4-	57835-92-4	E641B	0.1	µg/L	<0.10	---
perylene	198-55-0	E641B	0.01	µg/L	<0.010	---
phenanthrene	85-01-8	E641B	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641B	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641B	0.05	µg/L	<0.050	---
Polycyclic Aromatic Hydrocarbons (QCLot: 134340)						
acenaphthene	83-32-9	E641B	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641B	0.01	µg/L	<0.010	---
acridine	260-94-6	E641B	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641B	0.01	µg/L	<0.010	---
anthraquinone, 9,10-	84-65-1	E641B	0.05	µg/L	<0.050	---
benz(a)anthracene	56-55-3	E641B	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641B	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641B	0.01	µg/L	<0.010	---
benzo(e)pyrene	192-97-2	E641B	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641B	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641B	0.01	µg/L	<0.010	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 134340) - continued						
chloronaphthalene, 2-	91-58-7	E641B	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641B	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641B	0.005	µg/L	<0.0050	---
dimethylbenz(a)anthracene, 7,12-	57-97-6	E641B	0.01	µg/L	<0.010	---
fluoranthene	206-44-0	E641B	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641B	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641B	0.01	µg/L	<0.010	---
methylcholanthrene, 3-	56-49-5	E641B	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641B	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641B	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641B	0.05	µg/L	<0.050	---
nitropyrene, 4-	57835-92-4	E641B	0.1	µg/L	<0.10	---
perylene	198-55-0	E641B	0.01	µg/L	<0.010	---
phenanthrene	85-01-8	E641B	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641B	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641B	0.05	µg/L	<0.050	---
Phenolics (QCLot: 133407)						
chlorophenol, 2-	95-57-8	E651A	0.05	µg/L	<0.050	---
chlorophenol, 3-	108-43-0	E651A	0.05	µg/L	<0.050	---
chlorophenol, 4-	106-48-9	E651A	0.05	µg/L	<0.050	---
dichlorophenol, 2,3-	576-24-9	E651A	0.05	µg/L	<0.050	---
dichlorophenol, 2,4- + 2,5-	---	E651A	0.05	µg/L	<0.050	---
dichlorophenol, 2,6-	87-65-0	E651A	0.05	µg/L	<0.050	---
dichlorophenol, 3,4-	95-77-2	E651A	0.05	µg/L	<0.050	---
dichlorophenol, 3,5-	591-35-5	E651A	0.05	µg/L	<0.050	---
methylphenol, 4-chloro-3-	59-50-7	E651A	0.1	µg/L	<0.10	---
pentachlorophenol [PCP]	87-86-5	E651A	0.1	µg/L	<0.10	---
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.1	µg/L	<0.10	---
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.1	µg/L	<0.10	---
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 2,3,5-	933-78-8	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 2,3,6-	933-75-5	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 2,4,5-	95-95-4	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 2,4,6-	88-06-2	E651A	0.1	µg/L	<0.10	---
trichlorophenol, 3,4,5-	609-19-8	E651A	0.1	µg/L	<0.10	---

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 133826)									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
Anions and Nutrients (QCLot: 133829)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	---
Anions and Nutrients (QCLot: 133919)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	---
Non-Chlorinated Phenolics (QCLot: 133407)									
dimethylphenol, 2,4-	105-67-9	E651A	0.2	µg/L	2 µg/L	98.0	50.0	130	---
methylphenol, 2-	95-48-7	E651A	0.5	µg/L	2 µg/L	64.3	50.0	130	---
methylphenol, 3-	108-39-4	E651A	0.2	µg/L	2 µg/L	71.5	50.0	130	---
methylphenol, 4-	106-44-5	E651A	0.2	µg/L	2 µg/L	98.1	50.0	130	---
phenol	108-95-2	E651A	0.2	µg/L	2 µg/L	106	50.0	130	---
Dissolved Metals (QCLot: 133469)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.0	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	108	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.9	80.0	120	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	111	80.0	120	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	102	80.0	120	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	94.4	80.0	120	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.9	80.0	120	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.5	80.0	120	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	105	80.0	120	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	93.7	80.0	120	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	112	80.0	120	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.7	80.0	120	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 133469) - continued									
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	102	80.0	120	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	99.4	80.0	120	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	111	80.0	120	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.2	80.0	120	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	90.3	80.0	120	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.5	80.0	120	---
Dissolved Metals (QCLot: 133470)									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	95.4	80.0	120	---
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	---
Volatile Organic Compounds (QCLot: 133524)									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	113	70.0	130	---
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	126	70.0	130	---
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	83.2	70.0	130	---
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	111	70.0	130	---
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	115	70.0	130	---
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	86.1	60.0	140	---
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	129	70.0	130	---
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	60.8	60.0	140	---
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	87.2	70.0	130	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	108	70.0	130	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	110	70.0	130	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	113	70.0	130	---
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	114	70.0	130	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Volatile Organic Compounds (QCLot: 133524) - continued									
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	114	70.0	130	---
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	116	70.0	130	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	121	70.0	130	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	124	70.0	130	---
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	117	70.0	130	---
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	119	70.0	130	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	95.3	70.0	130	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	# 62.6	70.0	130	LCS-ND
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	110	70.0	130	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	---
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	104	70.0	130	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	110	70.0	130	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	102	70.0	130	---
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	---
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	98.9	70.0	130	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	104	70.0	130	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	112	60.0	140	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	62.4	60.0	140	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	112	70.0	130	---
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	107	70.0	130	---
Hydrocarbons (QCLot: 133523)									
F1 (C6-C10)	---	E581.VH+F1	100	µg/L	6310 µg/L	94.2	70.0	130	---
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	6310 µg/L	88.8	70.0	130	---
Hydrocarbons (QCLot: 133789)									
EPH (C10-C19)	---	E601A	250	µg/L	6491 µg/L	118	70.0	130	---
EPH (C19-C32)	---	E601A	250	µg/L	3363 µg/L	116	70.0	130	---
Hydrocarbons (QCLot: 133791)									
F2 (C10-C16)	---	E601	100	µg/L	3538 µg/L	119	70.0	130	---
F3 (C16-C34)	---	E601	250	µg/L	7053 µg/L	115	70.0	130	---
F4 (C34-C50)	---	E601	250	µg/L	5051 µg/L	120	70.0	130	---
Hydrocarbons (QCLot: 134337)									
EPH (C10-C19)	---	E601A	250	µg/L	6491 µg/L	126	70.0	130	---
EPH (C19-C32)	---	E601A	250	µg/L	3363 µg/L	122	70.0	130	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 133790)									
acenaphthene	83-32-9	E641B	0.01	µg/L	0.5 µg/L	111	60.0	130	---
acenaphthylene	208-96-8	E641B	0.01	µg/L	0.5 µg/L	113	60.0	130	---
acridine	260-94-6	E641B	0.01	µg/L	0.5 µg/L	118	60.0	130	---
anthracene	120-12-7	E641B	0.01	µg/L	0.5 µg/L	123	60.0	130	---
anthraquinone, 9,10-	84-65-1	E641B	0.05	µg/L	0.5 µg/L	126	60.0	130	---
benz(a)anthracene	56-55-3	E641B	0.01	µg/L	0.5 µg/L	120	60.0	130	---
benzo(a)pyrene	50-32-8	E641B	0.005	µg/L	0.5 µg/L	114	60.0	130	---
benzo(b+j)fluoranthene	---	E641B	0.01	µg/L	0.5 µg/L	106	60.0	130	---
benzo(b+j+k)fluoranthene	---	E641B	---	µg/L	1 µg/L	110	60.0	130	---
benzo(e)pyrene	192-97-2	E641B	0.01	µg/L	0.5 µg/L	95.3	60.0	130	---
benzo(g,h,i)perylene	191-24-2	E641B	0.01	µg/L	0.5 µg/L	107	60.0	130	---
benzo(k)fluoranthene	207-08-9	E641B	0.01	µg/L	0.5 µg/L	115	60.0	130	---
chloronaphthalene, 2-	91-58-7	E641B	0.01	µg/L	0.5 µg/L	115	60.0	130	---
chrysene	218-01-9	E641B	0.01	µg/L	0.5 µg/L	113	60.0	130	---
dibenz(a,h)anthracene	53-70-3	E641B	0.005	µg/L	0.5 µg/L	116	60.0	130	---
dimethylbenz(a)anthracene, 7,12-	57-97-6	E641B	0.01	µg/L	0.5 µg/L	68.0	40.0	130	---
fluoranthene	206-44-0	E641B	0.01	µg/L	0.5 µg/L	118	60.0	130	---
fluorene	86-73-7	E641B	0.01	µg/L	0.5 µg/L	117	60.0	130	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641B	0.01	µg/L	0.5 µg/L	116	60.0	130	---
methylcholanthrene, 3-	56-49-5	E641B	0.01	µg/L	0.5 µg/L	128	50.0	130	---
methylnaphthalene, 1-	90-12-0	E641B	0.01	µg/L	0.5 µg/L	107	60.0	130	---
methylnaphthalene, 2-	91-57-6	E641B	0.01	µg/L	0.5 µg/L	104	60.0	130	---
naphthalene	91-20-3	E641B	0.05	µg/L	0.5 µg/L	103	50.0	130	---
nitropyrene, 4-	57835-92-4	E641B	0.1	µg/L	0.5 µg/L	# 154	50.0	140	LCS-ND
perylene	198-55-0	E641B	0.01	µg/L	0.5 µg/L	111	60.0	130	---
phenanthrene	85-01-8	E641B	0.02	µg/L	0.5 µg/L	118	60.0	130	---
pyrene	129-00-0	E641B	0.01	µg/L	0.5 µg/L	122	60.0	130	---
quinoline	6027-02-7	E641B	0.05	µg/L	0.5 µg/L	114	60.0	130	---
Polycyclic Aromatic Hydrocarbons (QCLot: 134340)									
acenaphthene	83-32-9	E641B	0.01	µg/L	0.5 µg/L	122	60.0	130	---
acenaphthylene	208-96-8	E641B	0.01	µg/L	0.5 µg/L	126	60.0	130	---
acridine	260-94-6	E641B	0.01	µg/L	0.5 µg/L	108	60.0	130	---
anthracene	120-12-7	E641B	0.01	µg/L	0.5 µg/L	113	60.0	130	---
anthraquinone, 9,10-	84-65-1	E641B	0.05	µg/L	0.5 µg/L	103	60.0	130	---
benz(a)anthracene	56-55-3	E641B	0.01	µg/L	0.5 µg/L	130	60.0	130	---
benzo(a)pyrene	50-32-8	E641B	0.005	µg/L	0.5 µg/L	112	60.0	130	---
benzo(b+j)fluoranthene	---	E641B	0.01	µg/L	0.5 µg/L	113	60.0	130	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 134340) - continued									
benzo(b+j+k)fluoranthene	---	E641B	---	µg/L	1 µg/L	114	60.0	130	---
benzo(e)pyrene	192-97-2	E641B	0.01	µg/L	0.5 µg/L	100	60.0	130	---
benzo(g,h,i)perylene	191-24-2	E641B	0.01	µg/L	0.5 µg/L	120	60.0	130	---
benzo(k)fluoranthene	207-08-9	E641B	0.01	µg/L	0.5 µg/L	116	60.0	130	---
chloronaphthalene, 2-	91-58-7	E641B	0.01	µg/L	0.5 µg/L	119	60.0	130	---
chrysene	218-01-9	E641B	0.01	µg/L	0.5 µg/L	123	60.0	130	---
dibenz(a,h)anthracene	53-70-3	E641B	0.005	µg/L	0.5 µg/L	127	60.0	130	---
dimethylbenz(a)anthracene, 7,12-	57-97-6	E641B	0.01	µg/L	0.5 µg/L	70.6	40.0	130	---
fluoranthene	206-44-0	E641B	0.01	µg/L	0.5 µg/L	128	60.0	130	---
fluorene	86-73-7	E641B	0.01	µg/L	0.5 µg/L	107	60.0	130	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641B	0.01	µg/L	0.5 µg/L	126	60.0	130	---
methylcholanthrene, 3-	56-49-5	E641B	0.01	µg/L	0.5 µg/L	110	50.0	130	---
methylnaphthalene, 1-	90-12-0	E641B	0.01	µg/L	0.5 µg/L	120	60.0	130	---
methylnaphthalene, 2-	91-57-6	E641B	0.01	µg/L	0.5 µg/L	117	60.0	130	---
naphthalene	91-20-3	E641B	0.05	µg/L	0.5 µg/L	115	50.0	130	---
nitropyrene, 4-	57835-92-4	E641B	0.1	µg/L	0.5 µg/L	74.5	50.0	140	---
perylene	198-55-0	E641B	0.01	µg/L	0.5 µg/L	111	60.0	130	---
phenanthrene	85-01-8	E641B	0.02	µg/L	0.5 µg/L	110	60.0	130	---
pyrene	129-00-0	E641B	0.01	µg/L	0.5 µg/L	130	60.0	130	---
quinoline	6027-02-7	E641B	0.05	µg/L	0.5 µg/L	120	60.0	130	---
Phenolics (QCLot: 133407)									
chlorophenol, 2-	95-57-8	E651A	0.05	µg/L	2 µg/L	87.6	50.0	130	---
chlorophenol, 3-	108-43-0	E651A	0.05	µg/L	2 µg/L	87.2	50.0	130	---
chlorophenol, 4-	106-48-9	E651A	0.05	µg/L	2 µg/L	91.7	50.0	130	---
dichlorophenol, 2,3-	576-24-9	E651A	0.05	µg/L	2 µg/L	91.0	50.0	130	---
dichlorophenol, 2,4- + 2,5-	---	E651A	0.05	µg/L	4 µg/L	90.5	50.0	130	---
dichlorophenol, 2,6-	87-65-0	E651A	0.05	µg/L	2 µg/L	89.9	50.0	130	---
dichlorophenol, 3,4-	95-77-2	E651A	0.05	µg/L	2 µg/L	88.4	50.0	130	---
dichlorophenol, 3,5-	591-35-5	E651A	0.05	µg/L	2 µg/L	90.8	50.0	130	---
methylphenol, 4-chloro-3-	59-50-7	E651A	0.1	µg/L	2 µg/L	91.9	60.0	130	---
pentachlorophenol [PCP]	87-86-5	E651A	0.1	µg/L	2 µg/L	93.9	60.0	130	---
tetrachlorophenol, 2,3,4,5-	4901-51-3	E651A	0.1	µg/L	2 µg/L	92.4	60.0	130	---
tetrachlorophenol, 2,3,4,6-	58-90-2	E651A	0.1	µg/L	2 µg/L	90.6	60.0	130	---
tetrachlorophenol, 2,3,5,6-	935-95-5	E651A	0.1	µg/L	2 µg/L	94.4	60.0	130	---
trichlorophenol, 2,3,4-	15950-66-0	E651A	0.1	µg/L	2 µg/L	91.0	50.0	130	---
trichlorophenol, 2,3,5-	933-78-8	E651A	0.1	µg/L	2 µg/L	89.4	50.0	130	---
trichlorophenol, 2,3,6-	933-75-5	E651A	0.1	µg/L	2 µg/L	92.2	50.0	130	---

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Phenolics (QCLot: 133407) - continued									
trichlorophenol, 2,4,5-	95-95-4	E651A	0.1	µg/L	2 µg/L	94.0	50.0	130	----
trichlorophenol, 2,4,6-	88-06-2	E651A	0.1	µg/L	2 µg/L	93.3	50.0	130	----
trichlorophenol, 3,4,5-	609-19-8	E651A	0.1	µg/L	2 µg/L	89.5	50.0	130	----

Qualifiers

Qualifier	Description
LCS-ND	*Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 133829)										
VA20C3273-001	Anonymous	chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	---
Anions and Nutrients (QCLot: 133919)										
VA20C3706-002	Anonymous	chloride	16887-00-6	E235.Cl	496 mg/L	500 mg/L	99.2	75.0	125	---
Dissolved Metals (QCLot: 133469)										
KS2002946-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.197 mg/L	0.2 mg/L	98.4	70.0	130	---
		antimony, dissolved	7440-36-0	E421	0.0223 mg/L	0.02 mg/L	111	70.0	130	---
		arsenic, dissolved	7440-38-2	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	---
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	---
		beryllium, dissolved	7440-41-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	---
		bismuth, dissolved	7440-69-9	E421	0.00863 mg/L	0.01 mg/L	86.3	70.0	130	---
		boron, dissolved	7440-42-8	E421	0.099 mg/L	0.1 mg/L	99.1	70.0	130	---
		cadmium, dissolved	7440-43-9	E421	0.00382 mg/L	0.004 mg/L	95.4	70.0	130	---
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	---
		cesium, dissolved	7440-46-2	E421	0.00997 mg/L	0.01 mg/L	99.7	70.0	130	---
		cobalt, dissolved	7440-48-4	E421	0.0179 mg/L	0.02 mg/L	89.6	70.0	130	---
		copper, dissolved	7440-50-8	E421	0.0179 mg/L	0.02 mg/L	89.6	70.0	130	---
		iron, dissolved	7439-89-6	E421	1.95 mg/L	2 mg/L	97.4	70.0	130	---
		lead, dissolved	7439-92-1	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	---
		lithium, dissolved	7439-93-2	E421	0.0898 mg/L	0.1 mg/L	89.8	70.0	130	---
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	---
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	---
		molybdenum, dissolved	7439-98-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	---
		nickel, dissolved	7440-02-0	E421	0.0353 mg/L	0.04 mg/L	88.3	70.0	130	---
		phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	---
		potassium, dissolved	7440-09-7	E421	3.84 mg/L	4 mg/L	95.9	70.0	130	---
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	---
		selenium, dissolved	7782-49-2	E421	0.0451 mg/L	0.04 mg/L	113	70.0	130	---
		silicon, dissolved	7440-21-3	E421	9.10 mg/L	10 mg/L	91.0	70.0	130	---
		silver, dissolved	7440-22-4	E421	0.00310 mg/L	0.004 mg/L	77.6	70.0	130	---
		sodium, dissolved	17341-25-2	E421	ND mg/L	2 mg/L	ND	70.0	130	---
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	---

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 133469) - continued										
KS2002946-002	Anonymous	sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00378 mg/L	0.004 mg/L	94.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.390 mg/L	0.4 mg/L	97.4	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0424 mg/L	0.04 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 133470)										
KS2002946-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
Dissolved Metals (QCLot: 134456)										
VA20C3685-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000970 mg/L	0.0001 mg/L	97.0	70.0	130	----
Volatile Organic Compounds (QCLot: 133524)										
VA20C3819-002	Anonymous	benzene	71-43-2	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		bromodichloromethane	75-27-4	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		bromoform	75-25-2	E611C	87.3 µg/L	100 µg/L	87.3	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		chlorobenzene	108-90-7	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		chloroethane	75-00-3	E611C	75.5 µg/L	100 µg/L	75.5	50.0	150	----
		chloroform	67-66-3	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		chloromethane	74-87-3	E611C	52.4 µg/L	100 µg/L	52.4	50.0	150	----
		dibromochloromethane	124-48-1	E611C	89.1 µg/L	100 µg/L	89.1	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		dichloromethane	75-09-2	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	87.1 µg/L	100 µg/L	87.1	60.0	140	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 133524) - continued										
VA20C3819-002	Anonymous	dichloropropylene, trans-1,3-	10061-02-6	E611C	60.7 µg/L	100 µg/L	60.7	60.0	140	----
		ethylbenzene	100-41-4	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		styrene	100-42-5	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		toluene	108-88-3	E611C	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		trichloroethylene	79-01-6	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	108 µg/L	100 µg/L	108	50.0	150	----
		vinyl chloride	75-01-4	E611C	53.8 µg/L	100 µg/L	53.8	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	206 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611C	104 µg/L	100 µg/L	104	60.0	140	----
Hydrocarbons (QCLot: 133523)										
VA20C3819-001	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5600 µg/L	6310 µg/L	88.8	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	5260 µg/L	6310 µg/L	83.4	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 865482

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	WSP Canada Inc.	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Marina Makovetski	Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days): 4 day [P4-20%] ; 3 day [P3-25%] ; 2 day [P2-50%]
Phone:	604-353-7077	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	100-20339 96 Ave.	Email 1 or Fax: Marina.Makovetski@WSP.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Langley, BC	Email 2: Tory.Chudley@WSP.com	
Postal Code:		Email 3	

Invoice To		Invoice Distribution
	Same as Report To YES NO	
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX
Company:		Email 1 or Fax
Contact:		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	20M-00758-00	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	3698	ALS Contact:	Sampler:

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOC/VPH	F1 - F4	LEPH/HEPH	PAH	Dissolved Metals	Chloride	Chlorinated & Non-Chlorinated Phenols	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	20-MW1	17 DEC 20		Water	9	X	X	X	X	X	X	X		
2	20-MW2				7	X		X	X	X	X			
3	20-MW3				7	X		X	X	X	X			
4	20-DUP1				7	X		X	X	X	X			

Environmental Division Vancouver
Work Order Reference
VA20C3698
Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below
Are samples taken from a Regulated DW System? YES NO	
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	X	Ice Cubes	Custody seal intact	Yes	No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			7		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Rory C.	Date: 17 DEC 2020	Time: 4:05 pm	Received by:	Date:	Time:	Received by: TL	Date: Dec 17	Time: 4:05

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A1296**	Page	: 1 of 5
Client	: **WSP Canada Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 22-Jan-2021 14:25
PO	: ----	Date Analysis Commenced	: 27-Jan-2021
C-O-C number	: 20-905316	Issue Date	: 29-Jan-2021 11:25
Sampler	: RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Production/Validation Manager	Organics, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Administration, Burnaby, British Columbia

General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/m³	micrograms per cubic metre
µg/sample	micrograms per sample
L	litres

<: less than.

>: greater than.

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

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

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

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

Analytical Results

Sub-Matrix: Air
(Matrix: Air)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-VP1	20-VP2	20-DUP1	----	----
					Client sampling date / time	22-Jan-2021	22-Jan-2021	22-Jan-2021	----	----
						VA21A1296-001	VA21A1296-002	VA21A1296-003	-------	-------
						Result	Result	Result	----	----
Field Tests										
air volume, field	----	EF003	0.010	L		2.09	2.05	1.57	----	----
Volatile Organic Compounds										
bromodichloromethane	75-27-4	EC620E	0.50	µg/m³		<0.50	<0.50	<0.50	----	----
bromodichloromethane	75-27-4	E620E	0.0002	µg/sample		<0.0002	<0.0002	<0.0002	----	----
bromoform	75-25-2	EC620E	6.0	µg/m³		<6.0	<6.0	<6.0	----	----
bromoform	75-25-2	E620E	0.0030	µg/sample		<0.0030	<0.0030	<0.0030	----	----
chlorobenzene	108-90-7	EC620E	5.0	µg/m³		<5.0	<5.0	<5.0	----	----
chlorobenzene	108-90-7	E620E	0.0025	µg/sample		<0.0025	<0.0025	<0.0025	----	----
chloromethane	74-87-3	EC620E	5.6	µg/m³		<5.6	<5.6	<5.6	----	----
chloromethane	74-87-3	E620E	0.0028	µg/sample		<0.0028	<0.0028	<0.0028	----	----
decane, n-	124-18-5	EC620E	50	µg/m³		<50	<50	<50	----	----
decane, n-	124-18-5	E620E	0.025	µg/sample		<0.025	<0.025	<0.025	----	----
dibromochloromethane	124-48-1	EC620E	20	µg/m³		<20	<20	<20	----	----
dibromochloromethane	124-48-1	E620E	0.010	µg/sample		<0.010	<0.010	<0.010	----	----
dichlorobenzene, 1,2-	95-50-1	EC620E	30	µg/m³		<30	<30	<30	----	----
dichlorobenzene, 1,2-	95-50-1	E620E	0.015	µg/sample		<0.015	<0.015	<0.015	----	----
dichlorobenzene, 1,3-	541-73-1	EC620E	10	µg/m³		<10	<10	<10	----	----
dichlorobenzene, 1,3-	541-73-1	E620E	0.0050	µg/sample		<0.0050	<0.0050	<0.0050	----	----
dichlorobenzene, 1,4-	106-46-7	EC620E	10	µg/m³		<10	<10	<10	----	----
dichlorobenzene, 1,4-	106-46-7	E620E	0.0050	µg/sample		<0.0050	<0.0050	<0.0050	----	----
dichloropropane, 1,2-	78-87-5	EC620E	0.50	µg/m³		<0.50	<0.50	<0.50	----	----
dichloropropane, 1,2-	78-87-5	E620E	0.00025	µg/sample		<0.00025	<0.00025	<0.00025	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	EC620E	1.5	µg/m³		<1.5	<1.5	<1.5	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E620E	0.00075	µg/sample		<0.00075	<0.00075	<0.00075	----	----
dichloropropylene, cis-1,3-	10061-01-5	EC620E	1.0	µg/m³		<1.0	<1.0	<1.0	----	----
dichloropropylene, cis-1,3-	10061-01-5	E620E	0.00050	µg/sample		<0.00050	<0.00050	<0.00050	----	----
dichloropropylene, trans-1,3-	10061-02-6	EC620E	1.0	µg/m³		<1.0	<1.0	<1.0	----	----
dichloropropylene, trans-1,3-	10061-02-6	E620E	0.00050	µg/sample		<0.00050	<0.00050	<0.00050	----	----
hexane, n-	110-54-3	EC620E	50	µg/m³		<50	<50	<50	----	----
hexane, n-	110-54-3	E620E	0.025	µg/sample		<0.025	<0.025	<0.025	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	EC620E	1.0	µg/m³		<1.0	<1.0	<1.0	----	----

Analytical Results

Sub-Matrix: Air
(Matrix: Air)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	20-VP1	20-VP2	20-DUP1	---	---
					Client sampling date / time	22-Jan-2021	22-Jan-2021	22-Jan-2021	---	---
						VA21A1296-001	VA21A1296-002	VA21A1296-003	------	------
						Result	Result	Result	---	---
Volatile Organic Compounds										
tetrachloroethane, 1,1,1,2-	630-20-6	E620E	0.00050	µg/sample		<0.00050	<0.00050	<0.00050	---	---
tetrachloroethane, 1,1,2,2-	79-34-5	EC620E	0.60	µg/m³		<0.60	<0.60	<0.60	---	---
tetrachloroethane, 1,1,2,2-	79-34-5	E620E	0.00030	µg/sample		<0.00030	<0.00030	<0.00030	---	---
trichlorofluoromethane	75-69-4	EC620E	50	µg/m³		<50	<50	<50	---	---
trichlorofluoromethane	75-69-4	E620E	0.025	µg/sample		<0.025	<0.025	<0.025	---	---
Volatile Organic Compounds [BTEXS+MTBE]										
benzene	71-43-2	EC620E	1.5	µg/m³		<1.5	<1.5	<1.5	---	---
benzene	71-43-2	E620E	0.00075	µg/sample		<0.00075	0.00138	0.00118	---	---
ethylbenzene	100-41-4	EC620E	5.0	µg/m³		<5.0	<5.0	<5.0	---	---
ethylbenzene	100-41-4	E620E	0.0025	µg/sample		<0.0025	<0.0025	<0.0025	---	---
methyl-tert-butyl ether [MTBE]	1634-04-4	EC620E	50	µg/m³		<50	<50	<50	---	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E620E	0.025	µg/sample		<0.025	<0.025	<0.025	---	---
styrene	100-42-5	EC620E	5.0	µg/m³		<5.0	<5.0	<5.0	---	---
styrene	100-42-5	E620E	0.0025	µg/sample		<0.0025	0.0037	0.0035	---	---
toluene	108-88-3	EC620E	40	µg/m³		<40	<40	<40	---	---
toluene	108-88-3	E620E	0.020	µg/sample		<0.020	<0.020	<0.020	---	---
xylene, m+p-	179601-23-1	EC620E	10	µg/m³		<10	<10	<10	---	---
xylene, m+p-	179601-23-1	E620E	0.0050	µg/sample		<0.0050	<0.0050	<0.0050	---	---
xylene, o-	95-47-6	EC620E	5.0	µg/m³		<5.0	<5.0	<5.0	---	---
xylene, o-	95-47-6	E620E	0.0025	µg/sample		<0.0025	<0.0025	<0.0025	---	---
xylenes, total	1330-20-7	EC620E	12	µg/m³		<12	<12	<12	---	---
xylenes, total	1330-20-7	E620E	0.0060	µg/sample		<0.0060	<0.0060	<0.0060	---	---
Volatile Organic Compounds [Drycleaning]										
carbon tetrachloride	56-23-5	EC620E	0.40	µg/m³		<0.40	<0.40	<0.40	---	---
carbon tetrachloride	56-23-5	E620E	0.00020	µg/sample		<0.00020	<0.00020	<0.00020	---	---
chloroethane	75-00-3	EC620E	100	µg/m³		<100	<100	<100	---	---
chloroethane	75-00-3	E620E	0.050	µg/sample		<0.050	<0.050	<0.050	---	---
chloroform	67-66-3	EC620E	0.60	µg/m³		<0.60	<0.60	<0.60	---	---
chloroform	67-66-3	E620E	0.00030	µg/sample		<0.00030	<0.00030	<0.00030	---	---
dichloroethane, 1,1-	75-34-3	EC620E	5.0	µg/m³		<5.0	<5.0	<5.0	---	---
dichloroethane, 1,1-	75-34-3	E620E	0.0025	µg/sample		<0.0025	<0.0025	<0.0025	---	---
dichloroethane, 1,2-	107-06-2	EC620E	0.40	µg/m³		<0.40	<0.40	<0.40	---	---

Analytical Results

Sub-Matrix: Air (Matrix: Air)				Client sample ID	20-VP1	20-VP2	20-DUP1	----	----
				Client sampling date / time	22-Jan-2021	22-Jan-2021	22-Jan-2021	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A1296-001	VA21A1296-002	VA21A1296-003	------	------
					Result	Result	Result	----	----
Volatile Organic Compounds [Drycleaning]									
dichloroethane, 1,2-	107-06-2	E620E	0.00020	µg/sample	<0.00020	<0.00020	<0.00020	----	----
dichloroethylene, 1,1-	75-35-4	EC620E	0.50	µg/m³	<0.50	<0.50	<0.50	----	----
dichloroethylene, 1,1-	75-35-4	E620E	0.00025	µg/sample	<0.00025	<0.00025	<0.00025	----	----
dichloroethylene, cis-1,2-	156-59-4	EC620E	10	µg/m³	<10	<10	<10	----	----
dichloroethylene, cis-1,2-	156-59-4	E620E	0.0050	µg/sample	<0.0050	<0.0050	<0.0050	----	----
dichloroethylene, trans-1,2-	156-60-5	EC620E	10	µg/m³	<10	<10	<10	----	----
dichloroethylene, trans-1,2-	156-60-5	E620E	0.0050	µg/sample	<0.0050	<0.0050	<0.0050	----	----
dichloromethane	75-09-2	EC620E	10	µg/m³	<10	<10	<10	----	----
dichloromethane	75-09-2	E620E	0.0050	µg/sample	<0.0050	<0.0050	<0.0050	----	----
tetrachloroethylene	127-18-4	EC620E	20	µg/m³	32	38	34	----	----
tetrachloroethylene	127-18-4	E620E	0.010	µg/sample	0.066	0.078	0.053	----	----
trichloroethane, 1,1,1-	71-55-6	EC620E	5.0	µg/m³	<5.0	<5.0	<5.0	----	----
trichloroethane, 1,1,1-	71-55-6	E620E	0.0025	µg/sample	<0.0025	<0.0025	<0.0025	----	----
trichloroethane, 1,1,2-	79-00-5	EC620E	0.40	µg/m³	<0.40	<0.40	<0.40	----	----
trichloroethane, 1,1,2-	79-00-5	E620E	0.00020	µg/sample	<0.00020	<0.00020	<0.00020	----	----
trichloroethylene	79-01-6	EC620E	0.40	µg/m³	<0.40	<0.40	<0.40	----	----
trichloroethylene	79-01-6	E620E	0.00020	µg/sample	<0.00020	0.00039	0.00031	----	----
vinyl chloride	75-01-4	EC620E	0.50	µg/m³	<0.50	<0.50	<0.50	----	----
vinyl chloride	75-01-4	E620E	0.00025	µg/sample	<0.00025	<0.00025	<0.00025	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E620E	0.00050	%	97.2	96.6	96.9	----	----
difluorobenzene, 1,4-	540-36-3	E620E	0.00050	%	93.7	93.7	93.5	----	----
Hydrocarbons									
VHv (C6-C13)	----	EC591B	1000	µg/m³	<1000	1000	<1000	----	----
VHv (C6-C13)	----	E591B	0.50	µg/sample	<0.50	2.06	1.52	----	----
VPHv	----	EC590B	1000	µg/m³	<1000	1000	<1000	----	----
VPHv	----	E590B	0.50	µg/sample	<0.50	2.06	1.52	----	----
Hydrocarbons Surrogates									
pentane, n-	109-66-0	E591B	1.0	%	104	104	104	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A1296**	Page	: 1 of 7
Client	: **WSP Canada Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 22-Jan-2021 14:25
PO	: ----	Issue Date	: 29-Jan-2021 11:25
C-O-C number	: 20-905316		
Sampler	: RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Air**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Field Tests : Air Sampling Volume										
Thermal desorption tube 20-DUP1	EF003	22-Jan-2021	---	---	---		27-Jan-2021	---	---	
Field Tests : Air Sampling Volume										
Thermal desorption tube 20-VP1	EF003	22-Jan-2021	---	---	---		27-Jan-2021	---	---	
Field Tests : Air Sampling Volume										
Thermal desorption tube 20-VP2	EF003	22-Jan-2021	---	---	---		27-Jan-2021	---	---	
Hydrocarbons : TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)										
Thermal desorption tube 20-DUP1	E591B	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Hydrocarbons : TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)										
Thermal desorption tube 20-VP1	E591B	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Hydrocarbons : TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)										
Thermal desorption tube 20-VP2	E591B	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Volatile Organic Compounds : VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)										
Thermal desorption tube 20-DUP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	

Matrix: **Air**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)										
Thermal desorption tube 20-VP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	
Volatile Organic Compounds : VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)										
Thermal desorption tube 20-VP2	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-DUP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-VP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-VP2	E620E	22-Jan-2021	---	---	---		28-Jan-2021	30 days	6 days	✓
Volatile Organic Compounds [Drycleaning] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-DUP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-VP1	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	
Volatile Organic Compounds [Drycleaning] : VOCs (BC CSR) by Active Thermal Desorption										
Thermal desorption tube 20-VP2	E620E	22-Jan-2021	---	---	---		28-Jan-2021	---	---	

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Air**

Evaluation: ✗ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS)							
TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)	E591B	145706	1	15	6.6	5.0	✓
VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)	E620E	145705	1	13	7.6	5.0	✓
Method Blanks (MB)							
TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)	E591B	145706	1	15	6.6	5.0	✓
VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)	E620E	145705	1	13	7.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VPHv in Tube by Thermal Desorption GC-MS/FID (ug/sample)	E590B Vancouver - Environmental	Air	BC MOE Lab Manual (Calculation of VPH)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHv = Volatile Hydrocarbons (VH6-13) minus benzene, toluene, ethylbenzene, xylenes, styrene, n-hexane, and n-decane.
TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/sample)	E591B Vancouver - Environmental	Air	EPA TO-17/BC MOE Lab Manual (VH in Air-Vapour by GC-FID/GC-MS) (mod)	Volatile Hydrocarbons (VH) in sample tubes are thermally desorbed prior to injection into a GC-FID system for analysis.
VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/sample)	E620E Vancouver - Environmental	Air	EPA TO-17/BC MOE Lab Manual (VOC in Air by Thermal Desorption Tube/GC-MS)	Volatile Organic Compounds (VOCs) in sample tubes are thermally desorbed prior to injection into a GC-MS system for analysis.
VPHv in Tube (ug/m3)	EC590B Vancouver - Environmental	Air	unit conversion	Result expressed in µg/m3 based on the sample volume.
TVOC (VHv) in Tube by Thermal Desorption GC-FID (ug/m3)	EC591B Vancouver - Environmental	Air	unit conversion	Result expressed in µg/m3 based on the sample volume.
VOCs (BC CSR) by Active Thermal Desorption GC-MS (ug/m3)	EC620E Vancouver - Environmental	Air	unit conversion	Convert ug/sample to ug/m3
Air Sampling Volume	EF003 Vancouver - Environmental	Air		Field measurement of sampling volume provided by client and recorded on ALS report may affect the validity of results.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: VA21A1296	Page	: 1 of 6
Client	: WSP Canada Inc.	Laboratory	: Vancouver - Environmental
Contact	: Marina Makovetski	Account Manager	: Carla Fuginski
Address	: Unit 100 - 20339 96 Avenue Langley BC Canada V1M 2L1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604-353-7077	Telephone	: +1 604 253 4188
Project	: 20M-00758-00	Date Samples Received	: 22-Jan-2021 14:25
PO	: ----	Date Analysis Commenced	: 27-Jan-2021
C-O-C number	: 20-905316	Issue Date	: 29-Jan-2021 11:25
Sampler	: RC		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Laboratory Department*
Brieanna Allen	Production/Validation Manager	Organics, Burnaby, British Columbia
Kaitlyn Gardner	Account Manager Assistant	Administration, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

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

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 145705)						
benzene	71-43-2	E620E	0.00075	µg/sample	<0.00075	—
bromodichloromethane	75-27-4	E620E	0.00025	µg/sample	<0.0002	—
bromoform	75-25-2	E620E	0.003	µg/sample	<0.0030	—
carbon tetrachloride	56-23-5	E620E	0.0002	µg/sample	<0.00020	—
chlorobenzene	108-90-7	E620E	0.0025	µg/sample	<0.0025	—
chloroethane	75-00-3	E620E	0.05	µg/sample	<0.050	—
chloroform	67-66-3	E620E	0.0003	µg/sample	<0.00030	—
chloromethane	74-87-3	E620E	0.0028	µg/sample	<0.0028	—
decane, n-	124-18-5	E620E	0.025	µg/sample	<0.025	—
dibromochloromethane	124-48-1	E620E	0.01	µg/sample	<0.010	—
dichlorobenzene, 1,2-	95-50-1	E620E	0.015	µg/sample	<0.015	—
dichlorobenzene, 1,3-	541-73-1	E620E	0.005	µg/sample	<0.0050	—
dichlorobenzene, 1,4-	106-46-7	E620E	0.005	µg/sample	<0.0050	—
dichloroethane, 1,1-	75-34-3	E620E	0.0025	µg/sample	<0.0025	—
dichloroethane, 1,2-	107-06-2	E620E	0.0002	µg/sample	<0.00020	—
dichloroethylene, 1,1-	75-35-4	E620E	0.00025	µg/sample	<0.00025	—
dichloroethylene, cis-1,2-	156-59-4	E620E	0.005	µg/sample	<0.0050	—
dichloroethylene, trans-1,2-	156-60-5	E620E	0.005	µg/sample	<0.0050	—
dichloromethane	75-09-2	E620E	0.005	µg/sample	<0.0050	—
dichloropropane, 1,2-	78-87-5	E620E	0.00025	µg/sample	<0.00025	—
dichloropropylene, cis+trans-1,3-	542-75-6	E620E	0.00075	µg/sample	<0.00075	—
dichloropropylene, cis-1,3-	10061-01-5	E620E	0.0005	µg/sample	<0.00050	—
dichloropropylene, trans-1,3-	10061-02-6	E620E	0.0005	µg/sample	<0.00050	—
ethylbenzene	100-41-4	E620E	0.0025	µg/sample	<0.0025	—
hexane, n-	110-54-3	E620E	0.025	µg/sample	<0.025	—
methyl-tert-butyl ether [MTBE]	1634-04-4	E620E	0.025	µg/sample	<0.025	—
styrene	100-42-5	E620E	0.0025	µg/sample	<0.0025	—
tetrachloroethane, 1,1,1,2-	630-20-6	E620E	0.0005	µg/sample	<0.00050	—
tetrachloroethane, 1,1,2,2-	79-34-5	E620E	0.0003	µg/sample	<0.00030	—
tetrachloroethylene	127-18-4	E620E	0.01	µg/sample	<0.010	—
toluene	108-88-3	E620E	0.02	µg/sample	<0.020	—
trichloroethane, 1,1,1-	71-55-6	E620E	0.0025	µg/sample	<0.0025	—
trichloroethane, 1,1,2-	79-00-5	E620E	0.0002	µg/sample	<0.00020	—

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 145705) - continued						
trichloroethylene	79-01-6	E620E	0.0002	µg/sample	<0.00020	---
trichlorofluoromethane	75-69-4	E620E	0.025	µg/sample	<0.025	---
vinyl chloride	75-01-4	E620E	0.00025	µg/sample	<0.00025	---
xylene, m+p-	179601-23-1	E620E	0.005	µg/sample	<0.0050	---
xylene, o-	95-47-6	E620E	0.0025	µg/sample	<0.0025	---
Hydrocarbons (QCLot: 145706)						
VHv (C6-C13)	---	E581B	0.5	µg/sample	<0.50	---

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Air**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 145705)									
benzene	71-43-2	E620E	0.00075	µg/sample	0.2 µg/sample	106	60.0	140	—
bromodichloromethane	75-27-4	E620E	0.00025	µg/sample	0.2 µg/sample	94.9	60.0	140	—
bromoform	75-25-2	E620E	0.003	µg/sample	0.2 µg/sample	92.8	60.0	140	—
carbon tetrachloride	56-23-5	E620E	0.0002	µg/sample	0.2 µg/sample	98.0	60.0	140	—
chlorobenzene	108-90-7	E620E	0.0025	µg/sample	0.2 µg/sample	104	60.0	140	—
chloroethane	75-00-3	E620E	0.05	µg/sample	0.2 µg/sample	112	60.0	140	—
chloroform	67-66-3	E620E	0.0003	µg/sample	0.2 µg/sample	100	60.0	140	—
chloromethane	74-87-3	E620E	0.0028	µg/sample	0.2 µg/sample	109	60.0	140	—
decane, n-	124-18-5	E620E	0.025	µg/sample	0.2 µg/sample	117	60.0	140	—
dibromochloromethane	124-48-1	E620E	0.01	µg/sample	0.2 µg/sample	94.4	60.0	140	—
dichlorobenzene, 1,2-	95-50-1	E620E	0.015	µg/sample	0.2 µg/sample	105	60.0	140	—
dichlorobenzene, 1,3-	541-73-1	E620E	0.005	µg/sample	0.2 µg/sample	107	60.0	140	—
dichlorobenzene, 1,4-	106-46-7	E620E	0.005	µg/sample	0.2 µg/sample	112	60.0	140	—
dichloroethane, 1,1-	75-34-3	E620E	0.0025	µg/sample	0.2 µg/sample	98.6	60.0	140	—
dichloroethane, 1,2-	107-06-2	E620E	0.0002	µg/sample	0.2 µg/sample	100	60.0	140	—
dichloroethylene, 1,1-	75-35-4	E620E	0.00025	µg/sample	0.2 µg/sample	116	60.0	140	—
dichloroethylene, cis-1,2-	156-59-4	E620E	0.005	µg/sample	0.2 µg/sample	98.3	60.0	140	—
dichloroethylene, trans-1,2-	156-60-5	E620E	0.005	µg/sample	0.2 µg/sample	104	60.0	140	—
dichloromethane	75-09-2	E620E	0.005	µg/sample	0.2 µg/sample	101	60.0	140	—
dichloropropane, 1,2-	78-87-5	E620E	0.00025	µg/sample	0.2 µg/sample	97.9	60.0	140	—
dichloropropylene, cis+trans-1,3-	542-75-6	E620E	0.00075	µg/sample	0.4 µg/sample	76.5	60.0	140	—
dichloropropylene, cis-1,3-	10061-01-5	E620E	0.0005	µg/sample	0.2 µg/sample	83.8	60.0	140	—
dichloropropylene, trans-1,3-	10061-02-6	E620E	0.0005	µg/sample	0.2 µg/sample	69.0	60.0	140	—
ethylbenzene	100-41-4	E620E	0.0025	µg/sample	0.2 µg/sample	107	60.0	140	—
hexane, n-	110-54-3	E620E	0.025	µg/sample	0.2 µg/sample	120	60.0	140	—
methyl-tert-butyl ether [MTBE]	1634-04-4	E620E	0.025	µg/sample	0.2 µg/sample	85.4	60.0	140	—
styrene	100-42-5	E620E	0.0025	µg/sample	0.2 µg/sample	120	60.0	140	—
tetrachloroethane, 1,1,1,2-	630-20-6	E620E	0.0005	µg/sample	0.2 µg/sample	99.5	60.0	140	—
tetrachloroethane, 1,1,2,2-	79-34-5	E620E	0.0003	µg/sample	0.2 µg/sample	101	60.0	140	—
tetrachloroethylene	127-18-4	E620E	0.01	µg/sample	0.2 µg/sample	100	60.0	140	—
toluene	108-88-3	E620E	0.02	µg/sample	0.2 µg/sample	107	60.0	140	—
trichloroethane, 1,1,1-	71-55-6	E620E	0.0025	µg/sample	0.2 µg/sample	103	60.0	140	—
trichloroethane, 1,1,2-	79-00-5	E620E	0.0002	µg/sample	0.2 µg/sample	103	60.0	140	—
trichloroethylene	79-01-6	E620E	0.0002	µg/sample	0.2 µg/sample	98.9	60.0	140	—

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 145705) - continued									
trichlorofluoromethane	75-69-4	E620E	0.025	µg/sample	0.2 µg/sample	119	60.0	140	---
vinyl chloride	75-01-4	E620E	0.00025	µg/sample	0.2 µg/sample	110	60.0	140	---
xylene, m+p-	179601-23-1	E620E	0.005	µg/sample	0.4 µg/sample	124	60.0	140	---
xylene, o-	95-47-6	E620E	0.0025	µg/sample	0.2 µg/sample	110	60.0	140	---
Hydrocarbons (QCLot: 145706)									
VHv (C6-C13)	---	E581B	0.5	µg/sample	30 µg/sample	90.0	70.0	130	---

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 905316

Page 1 of 1

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Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	WSP Canada Inc.
Contact:	Marina Makowetski
Phone:	604-355-7077
	Company address below will appear on the final report
Street:	100 - 20339 96 Ave
City/Province:	Langley BC
Postal Code:	

Invoice To		
	Same as Report To	☐ YES ☐ NO
	Copy of Invoice with Report	☐ YES ☐ NO
Company:		
Contact:		

Project Information	
ALS Account # / Quote #:	
Job #:	20M-00758-00
PO / AFE:	
LSD:	
ALS Lab Work Order # (ALS use only):	

Reports / Recipients	
Select Report Format:	☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☐ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Marina.makowetski@wsp.com
Email 2	Larry.chudley@wsp.com
Email 3	

Invoice Recipients	
Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Oil and Gas Required Fields (client use)		
AFE/Cost Center:		PO#
Major/Minor Code:		Routing Code:
Requisitioner:		
Location:		
ALS Contact:	Carla F.	Sampler: RC

Turnaround Time (TAT) Requested
☐ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

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

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOC/VPH	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	20-VP1	22 Jan 20			1	X			
	20-VP2	22 Jan 20			1	X			
	20-DUP1	22 Jan 20			1	X			

Environmental Division
Vancouver
Work Order Reference
VA21A1296

Telephone : +1 604 253 4188

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

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

* Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C			
						11

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Rory C.	Date: 22 Jan 2021	Time: 2:25	Received by:	Date:	Time:	Received by: HA	Date: 1/22	Time: 2:25 pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS use Only

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

APPENDIX

F

REGULATORY FRAMEWORK & ASSESSMENT STANDARDS

REGULATORY FRAMEWORK

Under the Canada's Constitution, provincial environmental laws do not generally apply to the federal land. Part 9 "Government Operations and Federal and Aboriginal Land" of the Canadian Environmental Protection Act, 1999 (CEPA, 1999) applies to all federal works and undertakings, federal departments and parties who occupy or use federal land. It states that specific regulations can be made to ensure that federal land is covered by the same types of environmental regulations as land regulated by the provinces for the protection of the environment, including "releases of substances" and "to correct damage to the environment".

The Canadian Council of Ministers of the Environment (CCME) task groups developed the Canadian Environmental Quality Guidelines (CEQG) and Canada Wide Standards (CWS) for petroleum hydrocarbons (PHC), which are nationally endorsed, science-based goals for the quality of atmospheric, aquatic, and terrestrial ecosystems. In addition, and where CEQG and CWS were not available for certain potential contaminants of concern (PCOCs), provincial standards were used for comparison of analytical results to provide a full regulatory perspective rather than a legal conclusion of their applicability to the Site. The compliance with the CCME guidelines is voluntary.

The CCME CWS is a remedial standard for contaminated soil and subsoil occurring in four land use categories: agricultural, residential, commercial and industrial. Land use activities at the Site were identified to be commercial. It is understood that the Site will be redeveloped as a commercial property. The PHC CWS can be applied at any of three tiers: Tier 1 – generic numerical levels, Tier 2 – adjustment to Tier 1 levels based on scientific information and Tier 3 – site-specific risk assessment. Environmental and human health protection goals do not change between the tiers. Tier 1 were used for comparison of the analytical results for Subject Site accepting the base assumptions and parameters in the Tier 1 exposure scenario[8].

Environment Canada developed the Federal Interim Groundwater Quality Guidelines (FIGQG) in 2010 (updated in 2012) which is advised to be used in conjunction with Health Canada Drinking Water Guidelines until CCME develops groundwater guidelines. The FIGQG for groundwater that are protective of aquatic habitat assume transport through unconsolidated soils.

While CSQG include consideration of the protection of indoor air for organic chemicals based on partitioning into soil vapour, soil vapour quality guidelines were not included on the CSQG. In 2014, CCME prepared a Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours. The protocol provides instructions on calculations of Soil Vapour Quality Guidelines (SVQG) that should be applied for a contaminated site considering site-specific factors and exposure scenarios.

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[8] CWS for PHC in Soil: Scientific Rationale Supporting Technical Document, January 2008.