Limited Phase II Environmental Site Assessment ð Parliament Hill Centre Block, Ottawa, Ontario

Final Report

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EXECUTIVE SUMMARY

Stantec Consulting Ltd. Environmental Services Team (Stantec ES) was retained by Public Works and Government Services Canada (PWGSC) to conduct a Limited Phase II Environmental Site Assessment (ESA) in conjunction with a preliminary geotechnical investigation for the Centre Block Project located at Parliament Hill in Ottawa, Ontario. The Limited Phase II ESA was conducted concurrently with the preliminary geotechnical investigation to assess possible impacts in the soil and groundwater that would require appropriate management during proposed construction at the Site. The Limited Phase II ESA activities at the Site were limited to the area identified for proposed construction. No other areas of the Site were assessed.

The applicable soil and groundwater quality guidelines/standards for the Centre Block are provided in the following documents:

- Canadian Council of the Ministers of Environment (CCME), *Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC)*, January 2008.
- CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health,* on-line summary accessed in December 2014.
- CCME, *Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites,* March 2014. (FIGQG)
- Ministry of the Environment and Climate Change (MOECC), *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act,* April 15, 2011.

The results of the groundwater analyses also were compared to the criteria provided by the City of Ottawa, in By-law No. 2003-514, Schedule A, Table 1 ð Limits for Combined Sanitary Sewer Discharge, January 2004, and By-law No. 2003-514, Schedule A, Table 2 ð Limits for Storm Sewer Discharge, January 2004, to determine management requirements during construction.

The Limited Phase II ESA consisted of soil sampling from seven of the boreholes drilled for the geotechnical investigation, and groundwater sampling from five monitoring wells installed (MW15-1 through MW15-5). Representative soil and groundwater samples were collected from each of the boreholes and monitoring wells and submitted for laboratory analysis of petroleum hydrocarbon fractions F1 to F4 (PHCs F1 to F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), metals, and general inorganics. Groundwater samples were also collected from two exterior wells and submitted for analysis of the parameters included in the City of Ottawa Combined Sewer Discharge criteria.

The overburden at the Site generally consisted of topsoil or fill underlain by silty sand to poorly graded sand. Bedrock encountered consisted of poor to excellent quality grey limestone with weathered and un-weathered joint surfaces.

Combustible soil vapour concentrations were measured during drilling activities when soil was present. Petroleum odours were not detected in any of the collected soil samples. Combustible soil vapour concentrations ranged from non-detect (< 5 parts per million by volume (ppmv)) in BH15-3 to 70 ppmv in two samples at BH15-8.

Eight soil samples were submitted for laboratory analysis of the contaminants of concern. The measured concentrations of the contaminants of concern were below the applicable guidelines/standards in the soil samples submitted for laboratory analysis, with the following exceptions:

- Federal guidelines exceedances in soil:
    - BH15-3 GS1: pH, arsenic, naphthalene, phenanthrene, Benzo(a)pyrene Total Potency Equivalents, and Index of Additive Cancer Risk;
    - BH15-4 SS3: naphthalene, phenanthrene, Index of Additive Cancer Risk, and sodium adsorption ratio;
    - BH15-4 SS5: naphthalene, phenanthrene, and Index of Additive Cancer Risk;
    - BH15-7 SS2: naphthalene, phenanthrene, and Index of Additive Cancer Risk; and
    - BH15-9 GS1: PHC F4, sodium adsorption ratio, and pH.
- Ontario Table 1 standards exceedances in soil:
    - BH15-3 GS1: PHC F2 to F4G, total xylenes, acenaphthylene, anthracene, fluoranthene, phenanthrene, pyrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, antimony, and molybdenum;
    - BH15-4 SS3: fluoranthene, electrical conductivity, and sodium adsorption ratio;
    - BH15-4 SS5: PHC F3, anthracene, fluoranthene, naphthalene, phenanthrene, and benzo(a)anthracene;
    - BH15-6 SS4: electrical conductivity and sodium adsorption ratio;

- BH15-7 SS2: acenaphthene, anthracene, fluoranthene, benzo(a)anthracene, benzo(a)pyrene, and phenanthrene; and

- BH15-9 GS1: hexane, PHC F3 and F4, electrical conductivity, and sodium adsorption ratio.

Based on the analytical results of the soil samples collected from the seven newly installed boreholes, the fill cannot be considered clean fill, as parameters exceed the Ontario Table 1 Standard. Therefore, any soil material generated as excess during construction and removed from the Site must be disposed in a MOECC licensed landfill.

Groundwater elevations were measured between January 15, and January 21, 2015, and ranged from 81.30 m AMSL in MW15-4 to 82.02 m AMSL in MW15-5. Shallow groundwater at the Site is generally trending north based on the proximity of the Ottawa River.

- The measured concentrations of the contaminants of concern were below the FIGQG guidelines in the groundwater samples submitted for laboratory analysis, with the exception of:

  - MW15-3: chloroform; and

  - MW15-4 original sample: chloroform, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene.

  - MW15-4 sewer use sample: phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, benzo(g,h,i)perylene

- Measured concentrations of the contaminants of concern were below the Sanitary and Combined Sewer Discharge criteria in the two groundwater samples submitted for laboratory analysis of sewer use parameters, with the exception of:

  - MW15-4 sewer use sample: Total PAHs.

- The measured concentrations of the contaminants of concern were below the Storm Sewer Discharge criteria in the groundwater samples submitted for laboratory analysis, with the exception of:

  - MW15-3: chloroform;

  - MW15-4 original sample: chloroform, toluene;

  - MW15-4 sewer use sample: Phenols ð 4AAP, total suspended solids, nonylphenol, Total PAHs;

- MW15-5 original sample: toluene; and
- MW15-5 sewer use sample: total suspended solids.

These soil and groundwater impacts have not been delineated. However, the purpose of this assessment was to identify soil and groundwater management concerns for the proposed construction. Based on the results of the Phase II ESA, Stantec makes the following recommendations:

- Any soil excavated during the construction that cannot be used on the property should be stockpiled and a sampling program completed to confirm that the excess soil meets the Ontario definition of clean fill (i.e., concentrations of potential contaminants of concern are less than the Ontario Table 1 standards) and to complete waste classification analyses. If one or more concentrations exceed the Table 1 standards, the soil should be taken to a landfill for disposal based on the waste classification results.
- Groundwater from dewatering activities could be discharged to the City of Ottawa sanitary/combined sewer system; however, a sewer discharge permit application should be obtained prior to commencement of the construction project.
- The groundwater monitoring wells should be decommissioned in accordance with O.Reg. 903, as amended, if they are no longer required.

The statements made in this Executive Summary text are subject to the limitations included in Section 6 and are to be read in conjunction with the remainder of this report.

1.0 INTRODUCTION

1.1 GENERAL

Stantec Consulting Ltd. Environmental Services Team (Stantec ES) was retained by Public Works and Government Services Canada (PWGSC) to conduct a Limited Phase II Environmental Site Assessment (ESA) in conjunction with a preliminary geotechnical investigation for the Centre Block Project located at Parliament Hill in Ottawa, Ontario. The Limited Phase II ESA was conducted concurrently with the preliminary geotechnical investigation to assess possible impacts in the soil and groundwater that would require appropriate management during proposed construction at the Site. The Limited Phase II ESA activities at the Site were limited to the area identified for proposed construction. No other areas of the Site were assessed. The A key plan, illustrating the Site location, is provided on Drawing No. 1, **Appendix A**.

1.1.1 Proposed Development

It is understood that the design stage of the Centre Block project will include construction of the following:

- A new full basement level beneath the entire Centre Block (likely about 4 m high); this will require blasting rock and underpinning of existing foundations and possibly new foundations;
- Seismic upgrade (retrofit) of the Centre Block which has three distinct structural systems;
- New Centre Block Visitor Welcome Centre (immediately south of Centre Block, full length beneath the entire paved area in front of the Peace Tower) ð excavation would be about 150 m by 40 m in plan area, extending 3 storeys below grade;
- New East Block Visitor Welcome Centre, north-northwest of the East Block Building, 3 storeys below grade;
- East Block Underground Services (EBUS) Building, 3 storeys below grade, north of East Block; and
- Tunnels and shafts to connect Visitor Welcome Centers, at the East, Centre and West Blocks ð tunnels to be about 20 m below grade.

1.2 SITE DESCRIPTION

1.2.1 Subject Property

The Site is the Centre Block located on a promontory overlooking the Ottawa River between the West Block and East Block on Parliament Hill. The Centre Block, built between 1916 and 1927 to replace the original Centre Block building destroyed by fire, is a symbol of Canadaõs highly regarded Parliamentary system. The Centre Block site and building in the Parliamentary Precinct are part of a designated National Historic Site and the building is a Classified Federal Heritage Building. As such, it is the intention of the Government of Canada to maintain the Centre Block in perpetuity.

1.2.2 Previous Reports

Stantec ES reviewed three reports provided by PWGSC for the entire Parliament Hill area in preparation of the scope of work for the Phase II ESA. The reports reviewed are listed below:

- *Phase I: Environmental Site Assessment, The Grounds of Parliament Hill, 111 Wellington Street, Ottawa, Ontario*, Viridis Environmental and Oakhill Environmental, March, 2000.
- *Phase I: Environmental Site Assessment, Centre Block, Parliament Hill, 111 Wellington Street, Ottawa, Ontario*, Viridis Environmental and Oakhill Environmental, March, 2000.
- *Phase I: Environmental Site Assessment, East Block, Parliament Hill, 111 Wellington Street, Ottawa, Ontario*, Viridis Environmental and Oakhill Environmental, March, 2000.

One concern was identified in the Phase I ESA of the Centre Block consisting of high voltage electrical cables that contain PCBs. No information was provided about the soil surrounding the cables, and so PCBs should be a contaminant of concern. No additional concerns were identified in the reports; however, the fire in 1916 at the Centre Block and construction activities on Parliament Hill could have impacted fill quality across the Site.

1.3 PHYSICAL SETTING

1.3.1 Surficial Geology

According to the Geological Survey of Canada's Map 1506A - Ottawa, scale 1:50,000, the native surficial soils in the area consist of a thin veneer of unconsolidated Quaternary sediments up to 1 m thick.

1.3.2 Bedrock Geology

According to the Geological Survey of Canada's Map 1508A – Ottawa/Hull, scale 1:125,000, the bedrock geology of the Site and surrounding properties consists of limestone with shaly partings of the Ordocivian Ottawa Formation.

1.3.3 Site Services

The Centre Block site and building in the Parliamentary Precinct are part of a designated National Historic Site and the building is a Classified Federal Heritage Building. The Centre Block houses the Canadian Parliamentary system. Based on the localized utility locates completed during this Phase II ESA, services to the Centre Block include municipal water and sewer, a natural gas main and natural gas service lines, Hydro Ottawa, Bell telephone, and underground tunnels. A PCB containing hydro cable was identified in the previous Phase I ESA conducted at the Site running between the Centre, East and West Block buildings. It is uncertain if the cables remain present at the Site.

1.3.4 Topography and Drainage

According to the Geological Survey of Canadaõs Map 31G/5 - Ottawa, scale 1:50,000 and site observations, the topography of the Site and surrounding properties to the south is generally flat with moderate changes in elevation and at a similar grade to adjoining properties to the south. However, to the north and east there is a sharp drop towards the Ottawa River and Rideau Canal, respectively.

The regional shallow groundwater flow direction is anticipated to be towards the Ottawa River to the north of the Site, or to the Rideau Canal to the northeast of the Site. It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground utility corridors and is not necessarily a reflection of local groundwater flow or a replica of the Site topography.

Storm water runoff is anticipated to leave the Site via infiltration or overland flow to the municipal storm sewer system.

1.4 REGULATORY FRAMEWORK

As the Site is a federal property and will remain a federal property, the federal guidelines would apply in evaluating the extent of impacted soil. However, as the Site is situated in Ontario, the Ontario soil standards were employed to determine if excess soil from the construction project could be disposed off-site as clean fill. The groundwater results were compared to the Federal Interim Quality Guidelines to assess groundwater impacts and the City of Ottawa Sewer Use by-law to determine if groundwater from dewatering activities could be disposed off-site via the municipal sewer management system.

1.4.1 Federal Criteria

Federal contaminated sites are generally evaluated using the *Canadian Environmental Quality Guidelines* (CEQG) developed by the Canadian Council of the Ministers of Environment (CCME). The CEQG provide science-based goals for the quality of atmospheric, aquatic, and terrestrial ecosystems. The CEQG are risk-based numerical concentrations set at levels at which it is believed that unacceptable adverse effects on environmental or human health will not occur. The applicable CEQG criteria, which can be used for the assessment and remediation of soil, sediment, and water, are selected based on generic site characterization data including land use (e.g., agricultural, residential, commercial, and industrial), soil texture (i.e., coarse or fine grained soils), presence and type (e.g., fresh or marine) of surface water, groundwater use (potable vs. non-potable) and water use (e.g., recreational or agricultural). Environmental soil, sediment, and water quality guidelines are derived using toxicological data to determine the threshold level to key receptors. The following numerical CEQGs are available on-line at the CCMEõs website (http://ceqg-rcqe.ccme.ca/en/index.html#void):

- Canadian Water Quality Guidelines for the Protection of Aquatic Life
- Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses
- Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health
- Canadian Sediment Quality Guidelines for the Protection of Aquatic Life
- Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota

While the CEQG include consideration of the protection of groundwater for organic chemicals, there are currently no CEQG for groundwater for the other parameters. In the absence of CEQGs for groundwater, the *Federal Interim Groundwater Quality Guidelines* (FIGQG) dated November 2012 and revised March 5, 2014, published under the Federal Contaminated Sites Action Plan (FCSAP), are intended for use as interim groundwater quality criteria. The FIGQG have been adopted from other jurisdictions, with some modifications, and are based on common risk assessment methods. The FIGQG are based on consideration of potential receptors and exposure pathways including groundwater migration to surface water (freshwater and marine life exposure and ingestion by wildlife), direct contact with contaminated groundwater, use of groundwater for livestock watering and irrigation water, and migration of vapors to indoor air. The applicable FIGQG are selected based on land use, water use/exposure pathway, and soil texture (i.e., coarse or fine grained soil).

The CEQG do not include criteria/guidelines for petroleum hydrocarbons (PHC). Canada-Wide Standards (CWS) for petroleum hydrocarbons in soil were established pursuant to the 1998 Canada-Wide Accord on Environmental Harmonization of the CCME (user guidance documents revised January 2008). The Tier 1 CWS for PHC in soil are generic remedial standards for contaminated soil and subsoil occurring in four land use categories for coarse and fine textured soil. The CWS provide criteria for PHC in four fractions (F1 to F4) that exclude benzene, toluene, ethylbenzene, xylenes (BTEX), and benzo(a)pyrene.

1.4.2 Provincial Standards

In the province of Ontario, environmental conditions at a potentially contaminated site are typically assessed in the context of Ontario Regulation (O.Reg.) 153/04, which provides guidance for the assessment and remediation of soil, sediment, and groundwater. Soil, sediment, and groundwater quality standards referenced under O.Reg.153/04 are referred to as the Site Condition Standards (SCS), and are provided in Table 1 to Table 9 in the Ministry of the Environment (MOE) document *Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act* dated April 15, 2011. The soil and groundwater SCS are generic risk-based standards derived for various land uses, groundwater use, site-sensitivity, proximity to surface water, and soil-texture. The generic SCS are generally selected as the lowest of the pathway specific exposure criteria developed in the MOE document *Rationale for the Development of soil and Groundwater Standards for Use at Contaminated Sites in Ontario* dated April 15, 2011.

1.4.3 Municipal Criteria

The analytical results were also compared to the City of Ottawaõs Sewer Use By-Law No.2003-514, Schedule A, Table 1, limits for combined/sanitary sewer use discharge and Table 2, limits for storm sewer use discharge. This was to identify if excess groundwater encountered during construction activities could be discharged to the municipal sewer system.

1.4.4 Site Characterization

The selection of applicable standards for comparison to soil and groundwater analytical data is based on a review of various site characteristics. The relevant site characteristics are reviewed in the following sections, and where necessary, reference is made to requirements specific to selection of the SCS under O.Reg. 153/04.

1.4.4.1 Land Use

Land use at the Centre Block building location was considered commercial. A commercial land use is defined by the CCME as land use where there is free access to all members of the public including children, and includes the cultivated lawns and flowerbeds that are part of a commercial property.

1.4.4.2 Soil Texture

Coarse textured soil is defined by the CCME as òsoils with a median grain size greater than 75 micronsó. Section 42(1) of O.Reg.153/04 defines coarse textured soil as òsoil that contains 50 percent or more by mass of particles that are larger than 75 micrometres in mean diameteró.

Based on a review of available subsurface information, the soil texture across the site is variable. As a conservative measure, the soils at the Site are to be considered coarse-grained soils.

1.4.4.3 Proximity to a Water Body

For the purposes of the selection of the appropriate FIGQG, there are two permanent water bodies (the Ottawa River to the north and the Rideau River to the northeast) within 500 metres of the sampling locations; therefore, the protection of freshwater aquatic life needs to be considered.

1.4.4.4 Groundwater Use

Potable water at the Centre Block is supplied by municipal water supply. Based on a search using the MOE Well Records Map[1], no potable wells are located within approximately 250 metres of the Site. Therefore, the Site is considered to have non-potable groundwater use.

1.4.5 Generic Criteria Selection

1.4.5.1 Soil Criteria

Based on the site characterization data presented above, the soil sample analytical results were compared to the following criteria/standards:

- CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health* – commercial land use and coarse textured soil. On-line summary tables viewed in February 2015.

- CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health – Polycyclic Aromatic Hydrocarbons (PAHs) Fact Sheet, 2010.* The most conservative of the pathways for each PAH parameter, including protection of freshwater aquatic life, was considered applicable.

- CCME, *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil* (2001, as revised in January 2008), Table 1, Tier 1 Levels for Surface Soil ð commercial land use, coarse-grained soil.

- MOECC, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* April 15, 2011. Ontario Table 1 Full-depth Background Site Condition Standards, residential/parkland/institutional/Industrial/commercial/community land use and coarse-textured soil (to determine off-site reuse as clean fill).

- MOECC, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* April 15, 2011. Ontario Table 3 Full-depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Industrial/commercial/community land use and coarse-textured soil (for the protection of human health from non-carcinogenic effects of PAHs for parameters that do not have federal criteria established).

[1] MOE, 2014. Map, Well Records. Available on-line at: http://www.ontario.ca/environment-and-energy/map-well-record-data. Viewed on February 2015.

1.4.5.2 Groundwater Criteria

The groundwater sample analytical results were compared to the following criteria/standards:

- Federal Contaminated Sites Action Plan (FCSAP), *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites* (November 2012, revised March 5, 2014). Table 3 Generic Guidelines for Commercial Land Use, coarse textured soil, and lowest value of all applicable pathways (inhalation, soil organisms direct contact, and freshwater life).

- City of Ottawa, By-law No. 2003-514, Schedule A, Table 1 – Limits for Sanitary and Combined Sewer Discharge, January 2004.

- City of Ottawa, By-law No. 2003-514, January 2004, Schedule A, Table 2, limits for storm sewer discharge.

1.5 SCOPE OF WORK

The following scope of work for the Phase II ESA was presented in Stantec ESõs proposal to PWGSC dated August 8, 2014. The scope is generally based on the requirements of the Canadian Standards Association (CSA) *Phase II Environmental Site Assessment* (A National Standard of Canada (reaffirmed 2008)), CAN/CSA-Z769-00, March 2000. The program was completed also in accordance with the MOE *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (December 1996).

The Phase II ESA program included the following scope of work:

- Collect soil samples from imported fill and native soil horizons in nine of the 16 boreholes drilled for geotechnical purposes. At a minimum, one soil sample from each of these boreholes will be submitted for analysis of the contaminants of concern: petroleum hydrocarbon four fractions (PHC F1-F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals, and polychlorinated biphenyls (PCBs). Where field visual or olfactory evidence of impacts or elevated combustible vapour readings are present, additional samples may be submitted for laboratory analysis of the potential contaminants of concern.

- Collect one groundwater sample from each of the five newly installed monitoring wells and submit for laboratory analysis of the contaminants of concern.

- One groundwater sample will be collected from each of the two exterior wells and submitted for laboratory analysis of the parameters in the City of Ottawa sewer use by-law.

- Submit one blind duplicate, trip blanks for VOCs and field blank for metals and inorganics, VOCs, PHC F1 to F4, PAHs, and PCBs as part of the field sampling QA/QC program.

- Survey the new monitoring wells to a local benchmark. Monitor the depth to groundwater table in the on-Site monitoring wells to confirm the expected direction of groundwater flow direction.

2.0 FIELD INVESTIGATION

2.1 METHODOLOGY

2.1.1 Service and Utility Locates

Prior to commencing any field activities, borehole locations were cleared of underground services through consultation with a private utility locate company as well as public utility locate services.

2.1.2 Drilling

The borehole drilling and logging of soil type, as well as the groundwater monitoring well installation, was undertaken by Stantec as part of the geotechnical investigation. Additional information on the soils encountered during drilling are presented under separate cover in the Stantec Geotechnical Investigation report. The borehole and monitoring well logs for locations sampled as part of this Limited Phase II ESA are provided in **Appendix B**.

The nine boreholes, considered in this environmental Phase II ESA, were advanced, to a maximum depth of 34.7 m below ground surface using a track mounted CME 750 drill with hollow auger sampling by OGS Drilling Inc. (OGS).

2.1.3 Borehole Logging

Stantec personnel visually classified and logged the subsurface conditions encountered within each of the boreholes at the time of the field work. The texture and composition of the materials, and the presence of combustible and volatile vapours or other indications of contamination were recorded.

2.1.4 Soil Sampling

Soil samples were collected from seven of the nine locations with the use of a split spoon sampler. Two interior locations (BH15-1 and BH15-2) did not contain soil as the concrete basement floor was on top of the bedrock.

Soil samples were collected continuously from the split spoon samplers. One half of the sample was field tested for vapours and the other half was placed in laboratory supplied containers for potential laboratory analyses.

The soil field tested for vapours was submitted for grain size analyses for the concurrent geotechnical investigation. The results of the grain size analysis are documented in the geotechnical report.

2.1.5 Monitoring Wells

A PVC monitoring well casing was installed at the boreholes that had soil present. The monitoring wells consisted of the open holes in the bedrock, for further testing as part of the geotechnical investigation after environmental sampling. The monitoring wells were fitted with caps and flushmount well casings to protect them from accidental damage and accidental or intentional contamination. Completion details for the wells are included on the Monitoring Well Records provided in **Appendix B**.

2.1.6 Borehole and Well Survey

2.1.6.1 Horizontal and Vertical Survey

The locations and elevations of the newly installed exterior monitoring wells were measured with a Trimble GeoExplorer 6000 (GeoXH) global positioning system (GPS). The GPS has a 10 cm horizontal and 10 cm vertical accuracy. The locations and elevations were also measured during the concurrent topographic survey. The interior borehole locations were not surveyed.

2.1.6.2 Establish Static Elevations and Gradients

The elevations of water were determined under conditions where no pumping or other activity, which would influence water levels, was being conducted. These measurements are necessary for the establishment of potential gradients, which are used in establishing the pattern of contaminant migration.

Water levels were measured using an interface probe. The interface probe was rinsed between monitoring wells using distilled water.

2.1.7 Groundwater Sampling

Prior to sampling, each monitoring well was developed using dedicated Waterra tubing. The purpose of well development is to remove drilling fluids, solids or other particulates that may have been introduced during drilling. Development restores the hydraulic conductivity of the aquifer material surrounding the well to as close to pre-boring conditions as possible. Where possible, at least ten well volumes of water were removed from each well for development

purposes or when three consecutive measurements of pH, temperature and conductivity were within 10%.

The monitoring wells were sampled using low-flow sampling techniques where the drawdown of the water column during sampling was less than 10 cm.

Low-flow groundwater sampling techniques were employed to collect representative samples by minimizing drawdown of groundwater and minimizing mixing/disturbance of the standing water within the well. Field measurements were made using a flow-through multi-meter cell, and low-flow purging at each monitoring well location continued until the water quality field parameters stabilized. A groundwater sample was collected from each well once three (3) successive measurements of temperature, pH and specific conductance indicated stability (i.e., measurements are within Ñ 10% of the previous measurement). Purge water from the interior wells was disposed into drainage basins and water collection areas within the basement. Purge water from the exterior wells was either disposed onto the adjacent grassy area for infiltration or disposed into a nearby storm sewer.

The soil and groundwater samples were collected in accordance with the protocols established by the Canadian Standards Associationõs Guideline *Z769-00 Phase II Environmental Site Assessments* and standard industry practices to ensure that all data collected was of high quality and was representative of site conditions.

The samples were collected following strict Stantec sampling procedures. Samples were uniquely labeled and control was maintained through use of chain of custody forms. The samples were collected in laboratory supplied containers and preserved in insulated coolers.

2.2 LABORATORY ANALYTICAL PROGRAM

The soil and groundwater samples were submitted to Maxxam Analytics (Maxxam) in Ottawa, Ontario, for laboratory analysis on a regular five day turnaround time of the contaminants of concern identified above. Maxxam Analytics is accredited by the Canadian Association for Laboratory Accreditation (CALA) and by the National Institute of Standards and Technology (NIST) for the specific environmental analytical methods listed in the scope of accreditation approved by the NIST and registered with CALA. Maxxam employs in-house quality assurance and quality control (QA/QC) programs to govern sample analysis, including the analyses of method blanks, spiked blanks, and the analyses of duplicates (10%) for each sample batch.

Eight soil samples were submitted for laboratory analysis of VOCs, PHCs F1 to F4, PAHs, PCBs, and metals/inorganics. One sample was submitted from each borehole with the exception of BH15-4 where two samples were submitted based on visual evidence of potential impacts on the sample BH15-4 SS5.

Six groundwater samples were collected from the Site and submitted for laboratory analysis of VOCs, PHCs F1 to F4, PAHs, PCBs, and metals/inorganics. One of the six groundwater samples

(BH14-2*DUP) was a field duplicate sample collected from BH14-2. Two trip blanks were also requested from the laboratory that accompanied the groundwater samples to the Site and back to the lab during two sampling events. The trip blanks were analysed for VOCs. Two additional groundwater samples were collected from the exterior monitoring wells and submitted for laboratory analysis of the parameters listed in the Sewer Use By-law.

A summary of the sample locations and the laboratory analyses are provided in Tables 2-1 and 2-2.

Table 2-1: Summary of Soil Sample Locations and Laboratory Analyses

Sample Location	Sample Name	Soil Laboratory Analyses
MW15-1	No soil sample	
MW15-2	No soil sample	
MW15-3	BH14-3	PHCs F1 to F4, VOCs, PAHs, general inorganics, metals, PCBs
MW15-4	BH15-4 SS3	PHCs F1 to F4, VOCs, PAHs, general inorganics, metals, PCBs
	BH15-4 SS5	PHCs F1 to F4, VOCs, PAHs, PCBs
MW15-5	BH15-5	PHCs F1 to F4, VOCs, PAHs, PCBs
BH15-6	BH15-6	PHCs F1 to F4, VOCs, PAHs, general inorganics, metals, PCBs
BH15-7	BH15-7	PHCs F1 to F4, VOCs, PAHs, general inorganics, metals, PCBs
BH15-8	BH15-8	PHCs F1 to F4, VOCs, PAHs, PCBs
BH15-9	BH15-9	PHCs F1 to F4, VOCs, PAHs, general inorganics, metals, PCBs

Table 2-2: Summary of Groundwater Sample Locations and Laboratory Analyses

Sample Location	Sample Name	Groundwater Laboratory Analyses
MW15-1	BH14-1	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs
MW15-2	BH14-2	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs
	BH14-2*DUP	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs
MW15-3	BH14-3	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs
MW15-4	BH-4	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs, City of Ottawa Storm Sewer By-law, City of Ottawa Sanitary Sewer By-Law
MW15-5	BH-5	PHCs F1 to F4, VOCs, PAHs, general inorganics, PCBs, City of Ottawa Storm Sewer By-law, City of Ottawa Sanitary Sewer By-Law
Trip Blank	Trip Blank	VOCs
	Trip Blank	VOCs

3.0 RESULTS

3.1 SOIL

Sixteen boreholes were drilled as part of the preliminary geotechnical investigation. Stantec collected soil samples from seven of the boreholes as part of the Phase II ESA. Samples could not be obtained from two interior locations, as proposed, as no soil was found between the building foundation and the bedrock surface. The borehole and monitoring well locations are presented on Drawing Nos. 2A and 2B in **Appendix A.**

3.1.1 Stratigraphy

The soil stratigraphy for the interior wells ranged from non-existent to a dark brown sandy fill with gravel under the concrete floor. The soil stratigraphy was not present at two interior monitoring well locations as the concrete floor and granular base were directly on the bedrock surface. The overburden in the exterior locations at the Site generally consisted of topsoil or fill underlain by silty sand to poorly graded sand. Bedrock was encountered at depths between 3.5 m below ground surface (m bgs) and 5.5 m bgs in the exterior locations and below the concrete floor in the interior locations. The bedrock consisted of poor to excellent quality grey limestone with weathered and un-weathered joint surfaces. Detailed descriptions of stratigraphy observed are provided in the preliminary geotechnical investigation report, under separate cover.

3.1.2 Combustible Soil Vapour Concentrations

The combustible soil vapour concentrations were measured during drilling activities when soil was present. Petroleum odours were not detected in any of the collected soil samples. Combustible soil vapour concentrations ranged from non-detect (< 5 parts per million by volume (ppmv)) in BH14-3 to 70 ppmv in two samples at BH15-8.

There are no regulatory criteria for soil vapours; however, elevated vapour concentrations are generally indicative of the presence of volatile parameters. Concentrations vary with parameter type, concentration and age, and it should be noted that the readings are only intended to be used as a field screening tool to provide a qualitative measure of hydrocarbon levels within the subsurface. The readings do not provide a quantitative measure of analytical soil results.

3.1.3 Soil Analytical Results

The analytical results collected from the on-site soil samples submitted for laboratory analysis of the contaminants of concern were compared to the CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, for commercial land use and coarse-grained soil (on-line summary table viewed on December 12, 2014), and the *Canada Wide Standards for PHC in Soil.* The analytical results were also compared to the Ontario Table 1 Full Depth Background Site Condition Standards residential/parkland/institutional/industrial/

commercial/community property use for soil management purposes during construction. As a conservative measure, analytical results were compared to the criteria/standards for coarse-grained soil texture based on the inconsistency of fill material across the Site.

No soil samples were submitted for laboratory analyses from the interior locations (BH15-1 and BH15-2) due to limited or no soil recovery beneath the concrete basement floor.

Soil and groundwater exceedances per sample location are presented on Drawings 3A and 3B in **Appendix A**. Summary analytical results are presented in Table 1 in **Appendix C.** Laboratory Certificates of Analysis are provided in **Appendix D**.

3.1.3.1 Petroleum Hydrocarbons (F1 to F4)

Measured concentrations of the PHCs analysed in the eight soil samples submitted for laboratory analysis were less than the federal standards (*Canada Wide Standards for PHC in Soil)* with the exception of the PHC F4 concentration found in BH15-9 GS1.

Measured concentrations of the PHCs analyzed in the eight soil samples submitted for laboratory analysis were less than the Ontario Table 1 standard, with the exception of the following:

- PHC F2 to F4G in BH15-3 GS1;
- PHC F3 in BH15-4 SS5; and
- PHC F3 and F4 in BH15-9 GS1.

3.1.3.2 Volatile Organic Compounds (VOCs)

Measured concentrations of the VOCs analysed in the eight soil samples submitted for laboratory analysis were less than the applicable federal standard.

Measured concentrations of the VOCs analysed in the eight soil samples submitted for laboratory analysis were less than the Ontario Table 1 Standards, with the exception of:

- hexane in BH15-9 GS1; and
- total xylenes in BH15-3 GS1.

3.1.3.3 Polycyclic Aromatic Hydrocarbons (PAHs)

The PAH analytical results were also compared to the Ontario *Soil, Groundwater and Sediment Standards for Use under Part XV.I of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition* for the protection of human health from the non-carcinogenic effects of the PAHs. However, this comparison was

undertaken solely for those parameters (i.e. methylnaphthalene, benzo(g,h,i)perylene, and chrysene) that do not have a federal criterion established.

Measured concentrations of the PAHs analysed in the eight soil samples submitted for laboratory analysis were less than the applicable guidelines/standards with the exceptions summarized in Table 3-1.

Table 3-1: PAH Exceedances in Soil

Location	Canadian Soil Quality Guideline		Ontario Table 1	Ontario Table 3
	Table 1	Table 2		
BH15-3 GS1	Naphthalene, phenanthrene, Benzo(a)pyrene Total Potency Equivalents*, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	Acenaphthylene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene	None
BH15-4 SS3	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	Fluoranthene	None
BH15-4 SS5	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	Anthracene, benzo(a)anthracene, fluoranthene, naphthalene, phenanthrene	None
BH15-7 SS2	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	Acenaphthene, anthracene, fluoranthene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene	None

Notes:

Table 1	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Environmental Health guidelines based on non-carcinogenic effects of PAHs
Table 2	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 2 Soil Quality Guideline for Protection of Freshwater Life
Ontario Table 1	Ontario *Soil, Groundwater and Sediment Standards for Use under Part XV.I of the Environmental Protection Act* Table 1: Full Depth Background Site Condition Standard.
Ontario Table 3	Ontario *Soil, Groundwater and Sediment Standards for Use under Part XV.I of the Environmental Protection Act* Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.
*	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Direct Contact
**	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Protection of Potable Water

3.1.3.4 Polychlorinated Biphenyls (PCBs)

The concentrations of the PCBs analysed in the eight soil samples submitted for laboratory analysis were less than the laboratory reportable detection limits and the federal guidelines.

The concentrations of the PCBs analysed in the eight soil samples submitted for laboratory analysis were less than the laboratory reportable detection limits and the Ontario Table 1 standards.

3.1.3.5 Metals and General Inorganics

Only five samples were submitted for metals and general inorganics analyses due to limited soil volume in BH15-4 SS5, BH15-5 SS6, and BH15-8 SS6. Measured concentrations of the metal and general inorganics parameters analysed in the five soil samples submitted for laboratory analysis were less than the applicable federal guidelines with the exception of:

- arsenic and pH in BH15-3 GS1;
- sodium adsorption ratio in BH15-4 SS3:, and
- sodium adsorption ratio and pH in BH15-9 GS1.

Measured concentrations of the metal and general inorganics parameters analysed in the five soil samples submitted for laboratory analysis were less than the Ontario Table 1 Standards with the following exceptions:

- antimony and molybdenum in BH15-3 GS1;
- electrical conductivity and sodium adsorption ratio in BH15-4 SS3;
- electrical conductivity and sodium adsorption ratio in BH15-6 SS4; and
- sodium adsorption ratio and electrical conductivity in BH15-9 GS1.

3.1.4 Summary of Results

Tables 3-2 and 3-3 summarize the federal and provincial soil exceedances identified in the Phase II ESA.

Table 3-2: Summary of Soil Exceedances of Federal Criteria/Guidelines

Location	Parameter	Federal Criteria/Guideline Exceedance			
		Canada Wide Standards for PHCs	Canadian Soil Quality Guideline		
			Table 1	Table 2	On-line Summary Table
BH15-3 GS1	Metals, Inorganics & PCBs	N/A	None	None	pH, arsenic
	PHC F1 to F4	None	None	None	None
	PAHs	N/A	Naphthalene, phenanthrene, benzo(a)pyrene Total Potency Equivalents*, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	None
	VOCs	N/A	None	None	None
BH15-4 SS3	Metals, Inorganics & PCBs	N/A	None	None	SAR
	PHC F1 to F4	None	None	None	None
	PAHs	N/A	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	None
	VOCs	N/A	None	None	None
BH15-4 SS5	Metals, Inorganics & PCBs	N/A	None	None	None
	PHC F1 to F4	None	None	None	None
	PAHs	N/A	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	None
	VOCs	N/A	None	None	None
BH15-7 SS2	Metals, Inorganics & PCBs	N/A	None	None	None
	PHC F1 to F4	None	None	None	None
	PAHs	N/A	Naphthalene, phenanthrene, Index of Additive Cancer Risk**	Naphthalene, phenanthrene	None
	VOCs	N/A	None	None	None
BH15-9 GS1	Metals, Inorganics & PCBs	N/A	None	None	SAR and pH
	PHC F1 to F4	None	None	None	None
	PAHs	N/A	None	None	None
	VOCs	N/A	None	None	None

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Table 1	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Environmental Health guidelines based on non-carcinogenic effects of PAHs
Table 2	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 2 Soil Quality Guideline for Protection of Freshwater Life
Online Table	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, on-line summary table, for commercial land use and coarse textured soil
*	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Direct Contact
**	Canadian Soil Quality Guideline for the Protection of Environment and Human Health, Table 1 Protection of Potable Water
N/A	Not applicable
SAR	Sodium Adsorption Ratio

Table 3-3: Summary of Soil Exceedances of Ontario Standards

Location	Parameter	Ontario Standards
		Table 1
BH15-3 GS1	Metals, Inorganics & PCBs	Antimony, molybdenum
	PHC F1 to F4	PHC F2 to F4
	PAHs	Acenaphthylene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene
	VOCs	Total xylenes
BH15-4 SS3	Metals, Inorganics & PCBs	Electrical conductivity, sodium adsorption ratio
	PHC F1 to F4	None
	PAHs	Fluoranthene
	VOCs	None
BH15-4 SS5	Metals, Inorganics & PCBs	None
	PHC F1 to F4	PHC F3
	PAHs	Anthracene, fluoranthene, benzo(a)anthracene, naphthalene, phenanthrene
	VOCs	None
BH15-6 SS4	Metals, Inorganics & PCBs	Electrical conductivity, sodium adsorption ratio
	PHC F1 to F4	None
	PAHs	None
	VOCs	None
BH15-7 SS2	Metals, Inorganics & PCBs	None
	PHC F1 to F4	None
	PAHs	Acenaphthene, anthracene, fluoranthene, benzo(a)anthracene, benzo(a)pyrene, phenanthrene
	VOCs	None

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Location	Parameter	Ontario Standards
		Table 1
BH15-9 GS1	Metals, Inorganics & PCBs	Electrical conductivity, sodium adsorption ratio
	PHC F1 to F4	PHC F3 and F4
	PAHs	None
	VOCs	hexane

Notes:

Ontario Table 1 Ontario *Soil, Groundwater and Sediment Standards for Use under Part XV.I of the Environmental Protection Act* Table 1: Full Depth Background Site Condition Standard.

3.2 GROUNDWATER

3.2.1 Groundwater Monitoring

Depth to groundwater was measured from the five newly-installed on-site monitoring wells prior to sampling between January 15 and 21, 2015. Groundwater elevations were calculated in the exterior monitoring wells. However, the elevations were not calculated for the interior wells as these were not surveyed. Table 3-2 below summarizes the monitoring results.

Table 3-4: On-Site Monitoring Summary

Location	Date	Top of casing elevation (m AMSL)	Groundwater Depth (m btoc)	Groundwater Elevation (m ASL)
MW14-1	January 15, 2015	nm	17.42	nm
MW14-2	January 15, 2015	nm	3.69	nm
MW14-3	January 16, 2015	nm	15.02	nm
MW15-4	January 21, 2015	87.07	5.05	82.02
MW15-5	January 21, 2015	86.77	5.47	81.30

Notes:

nm	not measured
m AMSL	metres above mean sea level
m btoc	metres below top of casing

Shallow groundwater at the Site is generally trending to the north towards the Ottawa River. The inferred shallow groundwater flow direction is shown on Drawing No.2B in **Appendix A**.

3.2.2 Groundwater Analytical Results

The analytical results of groundwater samples obtained from the five on-site monitoring wells and submitted for laboratory analysis were compared to the FIGQG, the City of Ottawa Sanitary and Combined Sewer and Storm Sewer discharge criteria, and the Ontario Table 3 Standards. Summary analytical results are presented in Table 2 in **Appendix C** and the Laboratory Certificates of Analysis are provided in **Appendix D**.

3.2.2.1 Petroleum Hydrocarbons (F1 to F4)

Measured concentrations of the PHCs analysed in the groundwater samples submitted for laboratory analysis were less than the FIGQG criteria.

Measured concentrations of the PHCs analysed in the groundwater samples submitted for laboratory analysis were less than both the Sanitary Sewer and Storm Sewer Use criteria.

3.2.2.2 Volatile Organic Compounds (VOCs)

Measured concentrations of the VOCs analysed in the groundwater samples submitted for laboratory analysis were less than the FIGQG criteria with the exception of chloroform exceeding criteria in MW15-3 and MW15-4.

Measured concentrations of the VOCs analysed in the groundwater samples submitted for laboratory analysis were less than the municipal sewer discharge criteria with the exception of the following parameters exceeding the Storm Sewer Use criteria:

- chloroform in MW15-3 (interior well)and MW15-4 (exterior well); and
- toluene in MW15-4 and MW15-5.

3.2.2.3 Polycyclic Aromatic Hydrocarbons (PAHs)

Measured concentrations of the PAHs analysed in the groundwater samples submitted for laboratory analysis were less than the FIGQG guidelines with the exception of the following in MW15-4:

- Benzo(a)anthracene
- Benzo(a)pyrene
- benzo(b/j)fluoranthene,
- benzo(g,h,i)perylene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- Phenanthrene
- Pyrene
- Anthracene

Measured concentrations of PAHs analysed in the groundwater samples submitted for laboratory analysis were less than both the Sanitary Sewer and Storm Sewer Discharge criteria.

3.2.2.4 Polychlorinated Biphenyls (PCBs)

Measured concentrations of the PCBs analysed in the three groundwater samples (MW15-1, MW15-2, MW15-3) submitted for laboratory analysis were less than the municipal sewer discharge criteria and FIGQG criteria.

3.2.2.5 General Inorganics and Miscellaneous Parameters

Measured concentrations of the general inorganics analysed in the groundwater samples submitted for laboratory analysis were less than the FIGQG criteria.

Measured concentrations of the general inorganics analysed in the groundwater samples submitted for laboratory analysis were less than the municipal sewer criteria.

3.2.3 Sewer Use Criteria Parameters

Two additional samples were collected from MW15-4 and MW15-5 and submitted for parameters identified in the sewer discharge criteria. Although some parameters are the same as in the other analytical packages, a separate sample was collected from MW15-4 and MW15-5 and submitted for the sewer discharge analytical package. The sewer discharge analytical results are presented in Table 3 in **Appendix C** and laboratory Certificates of Analysis are provided in **Appendix D**. The results are compared to the City of Ottawa Sanitary and Combined Sewer and Storm Sewer discharge criteria and also to the FIGQG criteria.

3.2.3.1 Petroleum Hydrocarbons

Measured concentrations of oil and grease (vegetable/animal and mineral/synthetic) in the groundwater samples from MW15-4 and MW15-5 submitted for laboratory analyses were less than the Sanitary Sewer and Storm Sewer Use criteria. There are no FIGQG criteria for these parameters.

3.2.3.2 Volatile Organic Compounds

Measured concentrations of VOCs in MW15-4 and MW15-5 were less than the Sewer Use Criteria and the FIGQG criteria for the three parameters that were unique to the Sewer Use analytical package.

3.2.3.3 PAHs

Measured concentrations of PAHs analysed in the groundwater samples from MW15-4 and MW15-5 submitted for laboratory analysis of sewer use parameters were less than the Sewer Discharge criteria with the exception of the concentrations of total PAHs found in MW15-4 which exceeded both the Sanitary/Combined and Storm Sewer Use criteria.

Measured concentrations of the PAHs analysed in the groundwater samples from MW15-4 and MW15-5 submitted for laboratory analysis of sewer use parameters were less than the FIGQG guidelines with the exception of the following in MW15-4:

- anthracene
- benzo(a)anthracene
- benzo(a)pyrene
- benzo(b/j)fluoranthene,
- benzo(k)fluoranthene
- benzo(g,h,i)perylene
- chrysene
- dibenz(a,h)anthracene
- fluoranthene
- indeno(1,2,3-cd)pyrene
- phenanthrene
- pyrene

A note was included on the laboratory certificate of analysis that sediment was noted in the groundwater samples of MW15-4 and MW15-5. The presence of sediment may have impacted the groundwater results as PAHs are known to adsorb to sediment particles.

3.2.3.4 General Inorganics and Miscellaneous Parameters

Measured concentrations of the general inorganics and miscellaneous parameters in the groundwater samples from MW15-4 and MW15-5 submitted for sewer use parameters were less than the municipal sewer criteria and FIGQG, with the exceptions of the following parameters that exceeded the Storm Sewer Use criteria:

- phenols ð 4AAP, total suspended solids and total nonylphenol in MW15-4; and
- total suspended solids in MW15-5.

3.2.3.5 Dioxins and Furans

Measured concentrations of the dioxins and furans in the groundwater samples from MW15-4 and MW15-5 submitted for laboratory analysis of the sewer use parameters were less than the Sanitary Sewer and Storm Sewer Discharge criteria and the FIGQG criteria.

3.2.4 Summary of Groundwater Exceedances

Table 3-3 summarizes the groundwater exceedances of the municipal sewer use criteria and FIGQG.

Table 3-5: Summary of Groundwater Exceedances

Location	Sample Type	City of Ottawa Combined Sewer Use Criteria[1]	City of Ottawa Storm Sewer Use Criteria[2]	FIGQG[3]
MW15-1	Original Sample	none	none	none
MW15-2	Original Sample	none	none	none
	Duplicate	none	none	none
MW15-3	Original Sample	none	Chloroform	Chloroform
MW15-4	Original Sample	none	Toluene, chloroform	Chloroform, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene,
	Sewer Use Sample	Total PAH	Phenols ð 4AAP, total suspended solids, total nonylphenol, Total PAHs	Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene
MW15-5	Original Sample	none	Toluene	None
	Sewer Use Sample	none	Total suspended solids	None

Notes:

1 City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 1 - Limits for Combined/Sanitary Sewer Discharge
2 City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 2 - Limits for Storm Sewer Discharge
3 Table 3 Federal Interim Groundwater Guidelines - Generic Guidelines for Commercial and Industrial Land Use - Water Use/Exposure Pathway - (Tier 2) Freshwater Life ð Coarse

3.3 QUALITY ASSURANCE/QUALITY CONTROL

Blind duplicates are submitted for laboratory analysis to evaluate both laboratory precision and the implemented field sampling and handling procedures, in addition to the sample homogeneity. The relative percent difference (RPD) is defined as the absolute value of the variation between a sample and its duplicate, when compared to the average concentration of the original and the duplicate. It is used to assess the validity of the field and laboratory analytical procedures.

$$RPD = ABS\left(\frac{S1 - S2}{S1 + S2}\right) \times 100\%$$

Trip blanks are laboratory prepared samples that are transported to the site in the same shipping containers used for the transport of the collected groundwater samples. The analysis of trip blanks is completed to determine if sample shipping or storage procedures have possibly influenced the analytical results.

Soil

No blind field duplicates were collected due to limited soil recovery during drilling activities.

Groundwater

RPDs were calculated for the groundwater sample and duplicate recovered from MW14-2. The samples were recovered simultaneously from the monitoring well. Several of the RPD values could not be calculated as the concentrations in the original sample and its duplicate were not both greater than five times the laboratory detection limit or the original or duplicate sample had concentrations less than the laboratory detection limit.

The RPD values calculated were within the acceptable limit for duplicate samples according to the Maxxam QA/QC Interpretation Guide (80% for groundwater). The RPD values calculated for these duplicate samples ranged from 0 to 7% for the groundwater sample pairing. Therefore, the calculated RPDs for the groundwater sample pairing do not suggest inconsistencies in the field collection, the laboratory analysis methods, or the sample homogeneity.

Groundwater Trip Blanks

The concentrations of VOC parameters were less than the laboratory detection limit in the trip blank samples. Therefore, the results are considered reliable.

4.0 CONCLUSIONS

Based on the results of the Phase II ESA, Stantec makes the following conclusions:

- Nine boreholes were advanced for environmental purposes and five were instrumented as groundwater monitoring wells.
- The soil stratigraphy consisted of topsoil or fill underlain by silty sand to poorly graded sand. Limestone bedrock was encountered in all of the boreholes investigated as part of the Phase II ESA.
- The applicable soil guidelines/standards for the Centre Block Project are found in the following documents:
  - Canadian Council of the Ministers of Environment (CCME), *Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC)*, January 2008.
  - CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health,* on-line summary accessed in December 2014.
  - Ministry of the Environment and Climate Change (MOECC), *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act,* April 15, 2011.
- The applicable groundwater guidelines/standards for the Centre Block Project are found in the following documents:
  - CCME, *Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites,* March 2014. (FIGQG)
  - City of Ottawa, By-law No. 2003-514, Schedule A, Table 1 – Limits for Combined Sanitary Sewer Discharge, January 2004.
  - City of Ottawa, By-law No. 2003-514, Schedule A, Table 2 – Limits for Storm Sewer Discharge, January 2004.
  - MOECC, *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act*, April 15, 2011, Table 3, Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.
- Combustible soil vapour concentrations were measured, where possible, in each of the soil samples collected during the Phase II ESA. Combustible vapour concentrations ranged between less than five parts per million by volume (ppmv) in MW14-3 to 70 ppmv in two samples at MW14-8.
- The measured concentrations of the contaminants of concern were below the applicable federal guidelines in the soil samples submitted for laboratory analysis, with the following exceptions:

- BH15-3 GS1: pH, arsenic, naphthalene, phenanthrene, Benzo(a)pyrene Total Potency Equivalents, and Index of Additive Cancer Risk;
- BH15-4 SS3: naphthalene, phenanthrene, Index of Additive Cancer Risk, and sodium adsorption ratio;
- BH15-4 SS5: naphthalene, phenanthrene, and Index of Additive Cancer Risk;
- BH15-7 SS2: naphthalene, phenanthrene, and Index of Additive Cancer Risk; and
- BH15-9 GS1: PHC F4, sodium adsorption ratio, and pH.

- The measured concentrations of the contaminants of concern were below the Ontario Table 1 standards in the soil samples submitted for laboratory analysis, with the following exceptions:
  - BH15-3 GS1: PHC F2 to F4G, total xylenes, acenaphthylene, anthracene, fluoranthene, phenanthrene, pyrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, antimony, and molybdenum;
  - BH15-4 SS3: fluoranthene, electrical conductivity, and sodium adsorption ratio;
  - BH15-4 SS5: PHC F3, anthracene, fluoranthene, naphthalene, phenanthrene, benzo(a)anthracene;
  - BH15-6 SS4: electrical conductivity and sodium adsorption ratio;
  - BH15-7 SS2: acenaphthene, anthracene, fluoranthene, benzo(a)anthracene, benzo(a)pyrene, and phenanthrene; and
  - BH15-9 GS1: hexane, PHC F3 and F4, electrical conductivity, and sodium adsorption ratio.
- Based on the analytical results of the soil samples collected from the seven newly installed boreholes, the fill cannot be considered clean fill, as parameters exceed the Ontario Table 1 Standard. Therefore, any soil material generated as excess during construction and removed from the Site must be disposed in a MOECC licensed landfill.
- Groundwater elevations were measured between January 15 and January 21, 2015, and ranged from 81.30 m AMSL in MW15-4 to 82.02 m AMSL in MW15-5.
- Shallow groundwater at the Center Block is generally trending north based on the proximity of the Ottawa River.

- Measured concentrations of the contaminants of concern were below the Sanitary and Combined Sewer Discharge criteria in the two groundwater samples submitted for laboratory analysis of sewer use parameters, with the exception of:
    - MW15-4 sewer use sample: Total PAHs.
- The measured concentrations of the contaminants of concern were below the Storm Sewer Discharge criteria in the groundwater samples submitted for laboratory analysis, with the exception of:
    - MW15-3: chloroform;
    - MW15-4 original sample: chloroform, toluene;
    - MW15-4 sewer use sample: Phenols ð 4AAP, total suspended solids, nonylphenol, Total PAHs;
    - MW15-5 original sample: toluene; and
    - MW15-5 sewer use sample: total suspended solids.
- The measured concentrations of the contaminants of concern were below the FIGQG guidelines in the groundwater samples submitted for laboratory analysis, with the exception of:
    - MW15-3: chloroform; and
    - MW15-4 original sample: chloroform, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene.
    - MW15-4 sewer use sample: phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, benzo(g,h,i)perylene

5.0 RECOMMENDATIONS

The results of the Phase II ESA indicate the presence of soil impacted by PAHs, metals, and petroleum hydrocarbons and groundwater impacted by PAHs and VOCs at concentrations exceeding the applicable federal quality guidelines. These impacts have not been delineated. Additional assessment of soil and groundwater at the Site would be required to provide delineation of the impacts identified by this assessment.

However, the purpose of this assessment was to identify soil and groundwater management concerns for the proposed construction. As a result, Stantec makes the following recommendations:

- Any soil excavated during the construction that cannot be used on the property should be stockpiled and a sampling program completed to confirm that the excess soil meets the Ontario definition of clean fill (i.e., concentrations of potential contaminants of concern are less than the Ontario Table 1 standards) and to complete waste classification analyses. If one or more concentrations exceed the Table 1 standards, the soil should be taken to a landfill for disposal based on the waste classification results.

- Groundwater from dewatering activities could be discharged to the City of Ottawa sanitary/combined sewer system; however, a sewer discharge permit application should be obtained prior to commencement of the construction project.

- The groundwater monitoring wells should be decommissioned in accordance with O.Reg. 903, as amended, if they are no longer required.

6.0 LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantecõs assessment may have significantly altered the propertyõs condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantecõs professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the propertyõs environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

1. Conditions observed on-site at the time of the 2015 field work.
2. Regulatory criteria in effect at the time the assessment was completed.
3. The area of the proposed construction program.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

LIMITATIONS
April 10, 2015

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

7.0 Signatures

This document entitled Limited Phase II Environmental Site Assessment ð Parliament Hill Centre Block, Ottawa, Ontario, was prepared by Stantec Consulting Ltd. (òStantecó) for the account of Public Works and Government Services Canada (the òClientó). This document was prepared by Brenda Thom, M.Sc.(Eng.), and reviewed by Jill Peters-Dechman, P.Eng.

Prepared by _____
(signature)

Brenda Thom, M.Sc.(Eng.)

Reviewed by _____
(signature)

Jill Peters-Dechman, P.Eng.

This Phase II ESA was conducted in general accordance with the requirements of the Canadian Standards Association (CSA) *Phase II Environmental Site Assessment* (A National Standard of Canada (reaffirmed 2013)), CAN/CSA-Z769-00, March 2000.

Distribution: (1) Addressee (PDF via email)

Appendix A

Figures

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1 : 15 000

FEBRUARY 2015
Project No. 122411046

T:\Autocad\Drawings\Project Drawings\2015\122411046\Centreblock\122411046_Keyplan.dwg
2015/02/23 10:49 AM By: Briones, Gliceria

Stantec

400 - 1331 Clyde Avenue
Ottawa, ON, Canada K2C 3G4
www.stantec.com

Notes

Baseplan from MapArt 2006.

Client/Project

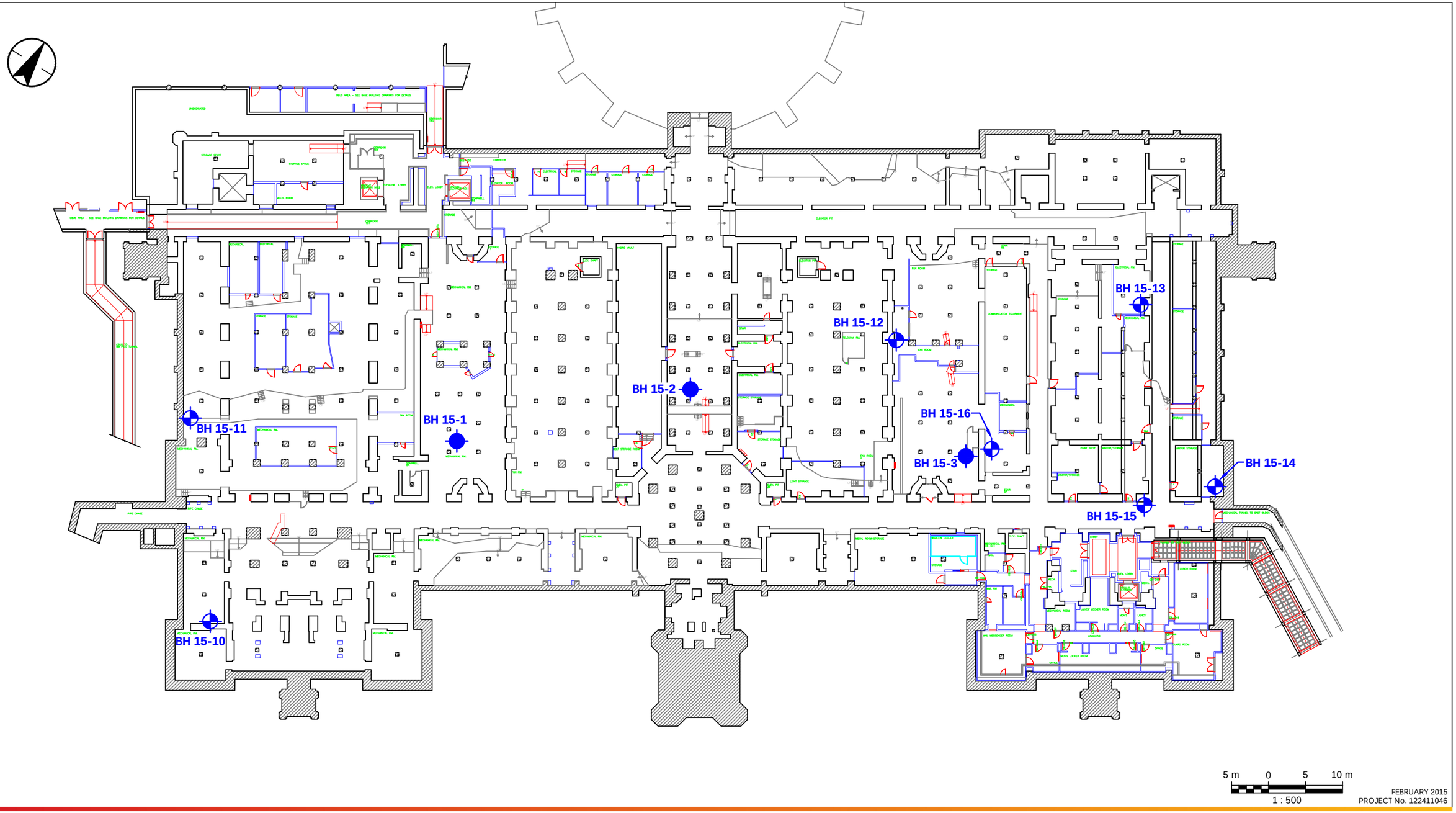
PWGSC
PHASE II ESA, CENTREBLOCK
111 WELLINGTON STREET, OTTAWA, ON

Drawing No.

1

Title

KEY PLAN



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2015/02/23 10:47 AM By: Briones, Gliceria

FEBRUARY 2015
PROJECT No. 122411046

Stantec
400 - 1331 CLYDE AVENUE
OTTAWA, ON, CANADA K2C 3G4
www.stantec.com

LEGEND

- BOREHOLE
- MONITORING WELL

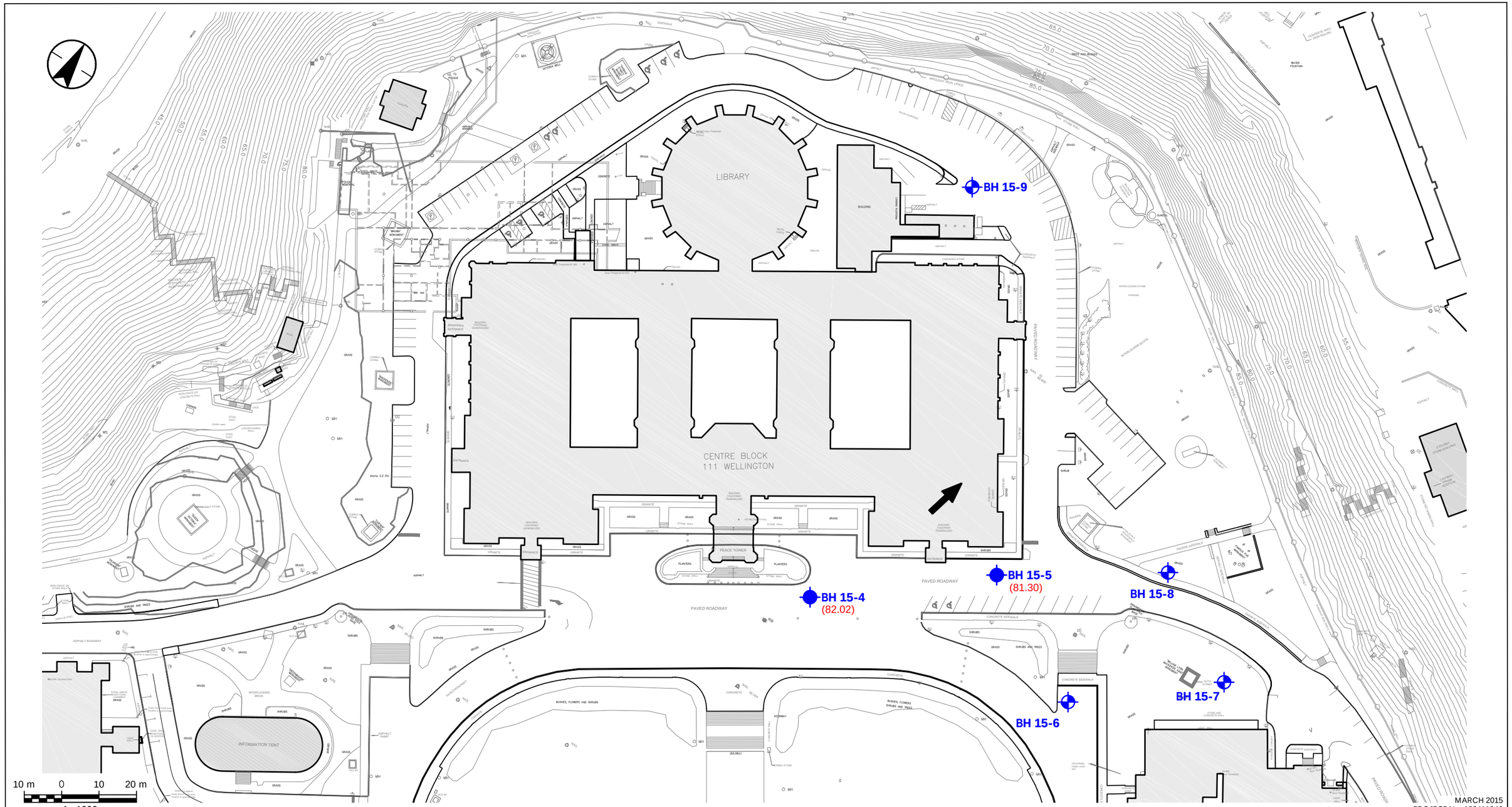
NOTES

1. COORDINATE SYTEM: NAD 1983 MTM ZONE 9.
2. BASEPLAN PROVIDED BY PWGSC.
3. DIMENSIONS IN METERS UNLESS OTHERWISE NOTED.

Client/Project
PWGSC
PHASE II ESA
CENTREBLOCK, 111 WELLINGTON STREET, OTTAWA, ON

Drawing No.
2A

Title
INTERIOR BOREHOLE LOCATION PLAN



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2015/03/03 1:35 PM By: Briones, Gliceria

MARCH 2015
PROJECT No. 122411046

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400 - 1331 CLYDE AVENUE
OTTAWA, ON, CANADA K2C 3G4
www.stantec.com

LEGEND

- BOREHOLE
- MONITORING WELL
- (82.02) GROUNDWATER ELEVATION - JANUARY 2015
- ANTICIPATED GROUNDAWATER FLOW DIRECTION

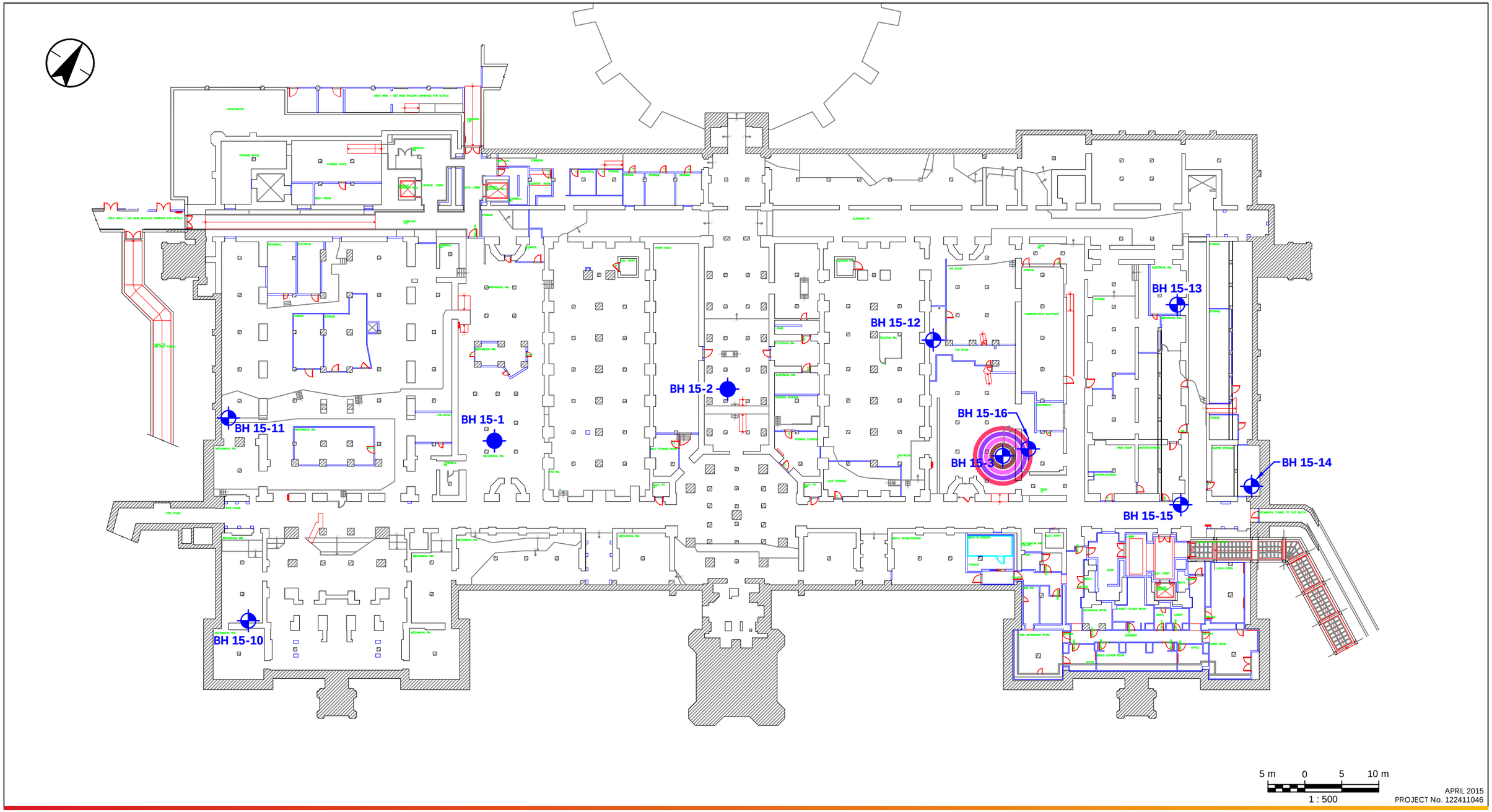
NOTES

1. COORDINATE SYTEM: NAD 1983 MTM ZONE 9.
2. BASEPLAN PROVIDED BY PWGSC.
3. DIMENSIONS IN METERS UNLESS OTHERWISE NOTED.

Client/Project
PWGSC
PHASE II ESA
CENTREBLOCK, 111 WELLINGTON STREET, OTTAWA, ON

Drawing No.
2B

Title
EXTERIOR BOREHOLE LOCATION AND GROUNDWATER ELEVATION PLAN



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2015/04/09 11:02 AM By: Briones, Gliceria

APRIL 2015
PROJECT No. 122411046

Stantec
400 - 1331 CLYDE AVENUE
OTTAWA, ON, CANADA K2C 3G4
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LEGEND

- BOREHOLE
- MONITORING WELL
- SOIL EXCEEDS FEDERAL CRITERIA
- SOIL EXCEEDS PROVINCIAL STANDARDS
- GROUNDWATER EXCEEDS SEWER USE CRITERIA
- GROUNDWATER EXCEEDS FEDERAL CRITERIA

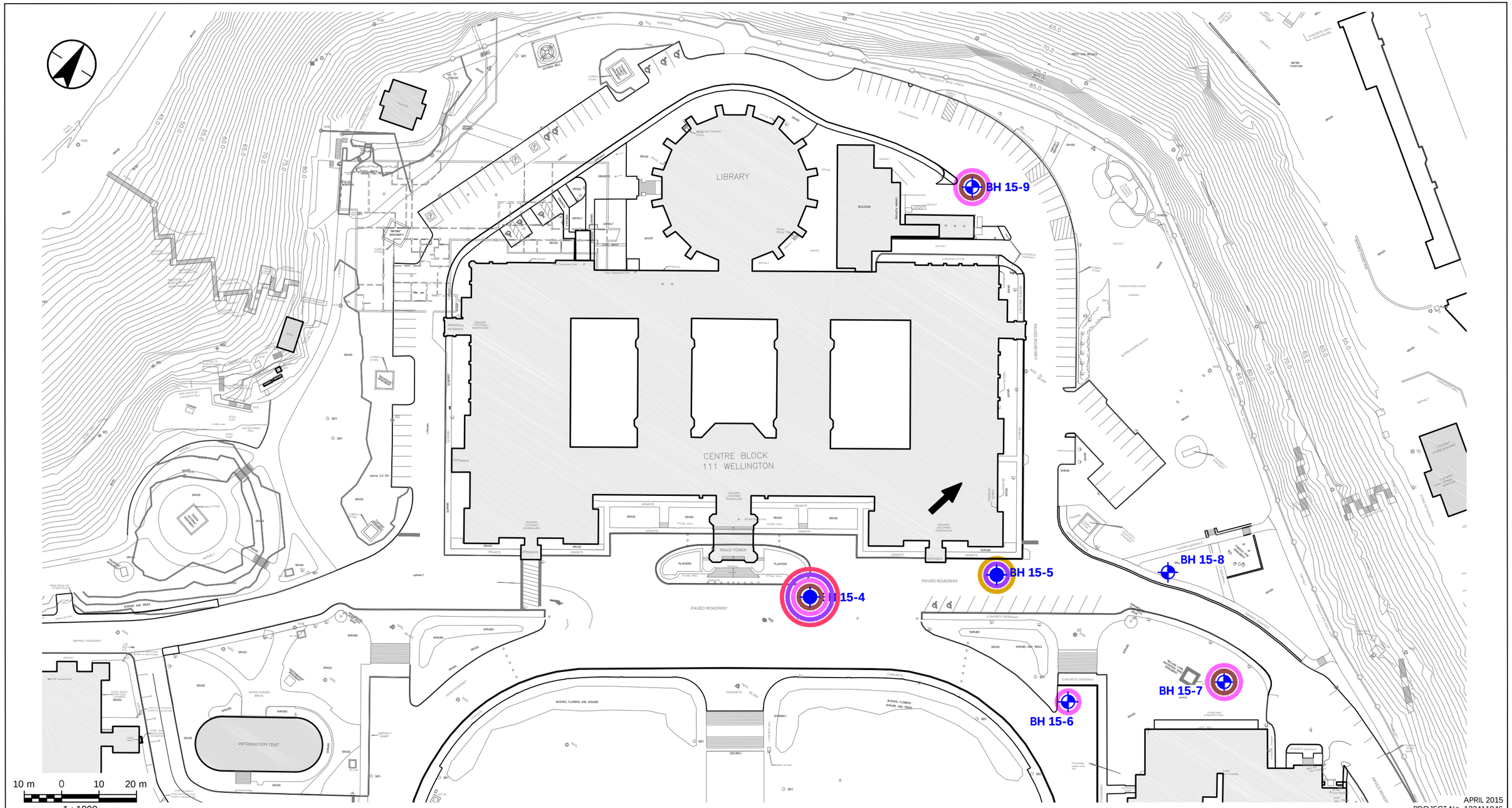
NOTES

1. COORDINATE SYTEM: NAD 1983 MTM ZONE 9.
2. BASEPLAN PROVIDED BY PWGSC.
3. DIMENSIONS IN METERS UNLESS OTHERWISE NOTED.

Client/Project
PWGSC
PHASE II ESA
CENTREBLOCK, 111 WELLINGTON STREET, OTTAWA, ON

Drawing No.
3A

Title
INTERIOR SOIL AND GROUNDWATER EXCEEDANCES



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2015/04/09 10:57 AM By: Briones, Gliceria

APRIL 2015
PROJECT No. 122411046

Stantec

400 - 1331 CLYDE AVENUE
OTTAWA, ON, CANADA K2C 3G4
www.stantec.com

LEGEND

- BOREHOLE
- MONITORING WELL
- ANTICIPATED GROUNDWATER FLOW DIRECTION
- SOIL EXCEEDS FEDERAL CRITERIA
- SOIL EXCEEDS PROVINCIAL STANDARDS
- GROUNDWATER EXCEEDS SEWER USE CRITERIA
- GROUNDWATER EXCEEDS FEDERAL CRITERIA

NOTES

1. COORDINATE SYTEM: NAD 1983 MTM ZONE 9.
2. BASEPLAN PROVIDED BY PWGSC.
3. DIMENSIONS IN METERS UNLESS OTHERWISE NOTED.

Client/Project
PWGSC
PHASE II ESA
CENTREBLOCK, 111 WELLINGTON STREET, OTTAWA, ON

Drawing No.
3B

Title
EXTERIOR SOIL AND GROUNDWATER EXCEEDANCES

Appendix B

Borehole and Monitoring Well Logs

Stantec

BOREHOLE RECORD

BH 15-1

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
0		200 mm CONCRETE								Protective Casing and Concrete Seal
		Limestone BEDROCK (Verulam Formation)			2		NQ	1	0	Open hole in bedrock.
1							NQ	2	0	
		- very poor to excellent rock quality			4		NQ	3	60	
		- grey colour								
2		- highly weathered to unweathered joint surfaces			6		NQ	4	41	
		- very close to close joint spacing			8		NQ	5	20	
3					10					
		(Refer to Field Bedrock Core Log)			12		NQ	6	36	
4					14					
					16		NQ	7	66	
5					18					
					20		NQ	8	80	
6					22					
							NQ	9	77	
7					24					
					26		NQ	10	83	
8					28					
							NQ	11	23	
9					30					
							NQ	12	96	
10					32					

LABORATORY ANALYSES: UCS = 115 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-1

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
10		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - highly weathered to unweathered joint surfaces - very close to close joint spacing (Refer to Field Bedrock Core Log)			34		NQ	13	80	
11					36					
					38		NQ	14	36	
12					40					
					42		NQ	15	80	
13					44					
					46		NQ	16	70	
14					48					
					50		NQ	17	54	
15					52					
					54		NQ	18	60	
16					56					
				▽	58		NQ	19	10	
17					60					
					62		NQ	20	31	
18					64		NQ	21	78	
19										
20										

LABORATORY ANALYSES: UCS = 115 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-1

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
20		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - highly weathered to unweathered joint surfaces - very close to close joint spacing (Refer to Field Bedrock Core Log)			66		NQ	22	67	
21					68					
22					70					
23					72					
24					74		NQ	23	75	
25		End of Borehole			76					
26					78					
27					80					
28					82					
29					84					
30					86					
					88					
					90					
					92					
					94					
					96					
					98					

LABORATORY ANALYSES: UCS = 115 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-2

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 6-12, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
0		660 mm CONCRETE								Protective Casing and Concrete Seal
		Limestone BEDROCK (Verulam Formation) - very poor to good rock quality - grey colour - slightly weathered to unweathered joint surfaces - very close to close joint spacing (Refer to Field Bedrock Core Log)		▽	2		NQ	1	52%	Open hole in bedrock.
1					4					
2					6		NQ	2	63%	
					8					
3					10		NQ	3	84%	
					12					
4					14		NQ	4	53%	
					16					
5					18		NQ	5	73%	
					20					
6					22		NQ	6	87%	
					24					
7					26		NQ	7	15%	
					28					
8					30		NQ	8	75%	
					32					
9							NQ	9	52%	
10										

LABORATORY ANALYSES: UCS = 170 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-2

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 6-12, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
10		Limestone BEDROCK (Verulam Formation) - very poor to good rock quality - grey colour - slightly weathered to unweathered joint surfaces - very close to close joint spacing (Refer to Field Bedrock Core Log)			34		NQ	10	60%	
11					36		NQ	11	62%	
12					38					
					40		NQ	12	62%	
13					42					
					44		NQ	13	33%	
14					46		NQ	14	85%	
					48					
15					50		NQ	15	62%	
					52					
16					54		NQ	16	77%	
					56					
17					58		NQ	17	78%	
					60		NQ	18	0%	
18					62		NQ	19	66%	
19					64					
20										

LABORATORY ANALYSES: UCS = 170 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-2

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 6-12, 2015 WATER LEVEL January 15, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
20		Limestone BEDROCK (Verulam Formation) - very poor to good rock quality - grey colour - slightly weathered to unweathered joint surfaces - very close to close joint spacing (Refer to Field Bedrock Core Log)			66		NQ	20	43%	
21					68					
					70		NQ	21	62%	
22					72					
					74					
23					76		NQ	22	44%	
24		End of Borehole Borehole left open and capped with a countersunk flushmount cover.			78					
					80					
25					82					
					84					
26					86					
					88					
27					90					
					92					
28					94					
29					96					
30					98					

LABORATORY ANALYSES: UCS = 170 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-3

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 12, 2015 WATER LEVEL January 16, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
0		100 mm CONCRETE			0		BS	1		Protective Casing and Concrete Seal
		FILL: dark brown sand and gravel with occasional cobbles					BS	2		
1		Limestone BEDROCK (Verulam Formation)			2		NQ	3	36%	Open hole in bedrock.
					4		NQ	4	58%	
2		- very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing			6					
					8		NQ	5	62%	
3					10					
		(Refer to Field Bedrock Core Log)			12					
4					14		NQ	6	100%	
5					16					
					18					
6					20					
					22		NQ	7	85%	
7					24					
					26					
8					28					
9					30		NQ	8	83%	
10					32					

LABORATORY ANALYSES: UCS = 125 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-3

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 12, 2015 WATER LEVEL January 16, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
10		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing (Refer to Field Bedrock Core Log)			34					
11					36					
					38		NQ	9	74%	
12					40					
					42		NQ	10	45%	
13					44					
					46		NQ	11	83%	
14					48					
15				▽	50		NQ	12	84%	
					52					
16					54					
					56		NQ	13	75%	
17					58					
18					60		NQ	14	57%	
					62					
19					64		NQ	15	52%	
20										

LABORATORY ANALYSES: UCS = 125 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-3

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 12, 2015 WATER LEVEL January 16, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
20		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing (Refer to Field Bedrock Core Log)			66		NQ	16	52%	
21					68		NQ	17	0%	
					70		NQ	18	0%	
22					72		NQ	19	0%	
23					74		NQ	20	0%	
					76		NQ	21	53%	
24		End of Borehole Borehole left open and capped with a countersunk flushmount cover.			78					
					80					
25					82					
					84					
26					86					
					88					
27					90					
					92					
28					94					
29					96					
					98					
30										

LABORATORY ANALYSES: UCS = 125 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-4

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10,11,17 & 18, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 / ▲ 100 200 300 400)	SAMPLES TYPE	NUMBER	N-VALUE	WELL CONSTRUCTION
0	87.10									
	87.0	100 mm ASPHALTIC CONCRETE								Protective Casing and Cold-pack Asphalt Seal
	86.8	FILL: very dense grey sand and gravel								Bentonite Seal
1		FILL: compact brown to grey silty sand, trace gravel and clay			2	▲	SS	1	65	
		- trace organics observed			4	▲	SS	2	10	
2					6	▲	SS	3	11	
		- brown oxidised stains between 3.0 and 3.4 m			8		SS	4	15	
3				▽	10	▲	SS	5	50/ 50 mm	
	83.7						HQ	6	0%	Open hole in bedrock.
		Limestone BEDROCK (Verulam Formation)			12		HQ	7	43%	
4					14		HQ	8	0%	
		- very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing			16		HQ	9	81%	
5					18					
		(Refer to Field Bedrock Core Log)			20		HQ	10	94%	
6					22					
					24					
7					26		HQ	11	86%	
8					28					
					30					
9					32		HQ	12	70%	
10	77.1									

LABORATORY ANALYSES: UCS = 120 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-4

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10,11,17 & 18, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
10		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing (Refer to Field Bedrock Core Log)			34					
11					36		HQ	13	99%	
12					38					
13					40		HQ	14	100%	
14					42					
15					44		HQ	15	99%	
16					46					
17					48		HQ	16	68%	
18					50					
19					52		HQ	17	90%	
20	67.1				54					
					56		HQ	18	82%	
					58					
					60					
					62					
					64					

LABORATORY ANALYSES: UCS = 120 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-4

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10,11,17 & 18, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
20		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing (Refer to Field Bedrock Core Log)			66		HQ	19	70%	
21					68					
22					70		HQ	20	74%	
23					72					
24					74		HQ	21	79%	
25					76					
26					78		HQ	22	74%	
27					80					
28					82		HQ	23	86%	
29					84					
30	57.1				86		HQ	24	94%	
					88					
					90		HQ	25	86%	
					92					
					94					
					96					
					98					

LABORATORY ANALYSES: UCS = 120 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-4

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10,11,17 & 18, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv (● 20 40 60 80 ▲ 100 200 300 400)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
30		Limestone BEDROCK (Verulam Formation) - very poor to excellent rock quality - grey colour - moderately weathered to unweathered joint surfaces - very close to moderate joint spacing (Refer to Field Bedrock Core Log)			100		HQ	26	98%	
31					102					
32					104					
33					106		HQ	27	96%	
34					108					
	52.4				110					
35		End of Borehole Borehole left open and capped with a flushmount cover.			112		HQ	28	86%	
36					114					
37					116					
38					118					
39					120					
40					122					
					124					
					126					
					128					
					130					

LABORATORY ANALYSES: UCS = 120 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-5

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10-11, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE	WELL CONSTRUCTION
	86.80					● 20 40 60 80 ▲ 100 200 300 400				
0	86.7	100 mm ASPHALTIC CONCRETE					SS	1	50/ 100 mm	Protective Casing and sand.
	86.2	FILL: grey sand and gravel								Bentonite Seal
1		FILL: compact grey to brown silty sand with gravel			2		SS	2	10	Protective Casing and Concrete Seal
2					4					
					6		SS	3	26	
					8		SS	4	15	
3	83.8				10					
		FILL: loose brown silty sand					SS	5	6	
4					12					
					14		SS	6	9	
	81.9						SS	7	1	
5		Limestone BEDROCK (Verulam Formation)		▽	16					Bentonite Seal
					18		HQ	8	72%	Backfill of Sandpack
		- fair to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -			20					Bentonite Seal
6					22		HQ	9	85%	Open hole in bedrock.
7					24					
		(Refer to Field Bedrock Core Log)								
8					26		HQ	10	91%	
					28					
9					30					
							HQ	11	96%	
10	76.8				32					

LABORATORY ANALYSES: UCS = 160 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-5

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10-11, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400			
10		Limestone BEDROCK (Verulam Formation)			34				
11		- fair to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -			36		HQ 12	88%	
12					38				
		(Refer to Field Bedrock Core Log)			40		HQ 13	95%	
13					42				
14					44		HQ 14	91%	
15					46				
16					48		HQ 15	95%	
17					50				
18					52		HQ 16	88%	
19					54				
20	66.8				56		HQ 17	99%	
					58				
					60				
					62				
					64				

LABORATORY ANALYSES: UCS = 160 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-5

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 10-11, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES N-VALUE	WELL CONSTRUCTION
						● 20 40 60 80 ▲ 100 200 300 400				
20		Limestone BEDROCK (Verulam Formation)			66		HQ	18	82%	
21		- fair to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -			68 70		HQ	19	95%	
22		(Refer to Field Bedrock Core Log)			72 74					
23					76		HQ	20	81%	
24	62.8	End of Borehole			78 80					
25		Borehole left open and capped with a flushmount cover			82					
26					84 86					
27					88					
28					90 92					
29					94					
30					96 98					

LABORATORY ANALYSES: UCS = 160 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-6

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	N-VALUE
	84.10					
0	84.0	100 mm ASPHALTIC CONCRETE				
		FILL: dark brown sand and gravel	2	BS	1	
	83.3					
1		FILL: loose to compact brown silty sand	4	SS	2	16
			6	SS	3	14
2	82.0					
		Loose to compact brown sandy silt (ML), TILL	8	SS	4	7
3			10	SS	5	12
	80.5					
	80.2	Very dense grey sandy gravel, TILL	12	SS	6	50/
4		Limestone BEDROCK (Verulam Formation)		NQ	7	75 mm 0%
		- very poor to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -	14	NQ	8	84%
5			16			
			18			
6		(Refer to Field Bedrock Core Log)	20	NQ	9	80%
			22			
7			24			
			26	NQ	10	73%
8			28			
			30			
9				NQ	11	90%
			32			
10	74.1					

VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv

● 20 40 60 80
▲ 100 200 300 400

LABORATORY ANALYSES: UCS = 140 MPa

Groundwater Level

STAN-MW 122411046 PARLIAMENT HILL CENTRE BLOCK-REV.GPJ SMART.GDT 3/30/15

Stantec

BOREHOLE RECORD

BH 15-6

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv ● 20 40 60 80 ▲ 100 200 300 400	SAMPLES TYPE	NUMBER	N-VALUE
10		Limestone BEDROCK (Verulam Formation)			34				
		- very poor to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -			36		NQ	12	91%
11					38				
12		(Refer to Field Bedrock Core Log)			40		NQ	13	91%
13					42				
					44				
14					46		NQ	14	90%
					48				
15					50		NQ	15	82%
16					52				
				▽	54				
17					56		NQ	16	89%
					58				
18					60		NQ	17	65%
19					62				
					64				
20	64.1								

LABORATORY ANALYSES: UCS = 140 MPa

▽ Groundwater Level

BOREHOLE RECORD

BH 15-6

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 5-9, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
						● 20 40 60 80 ▲ 100 200 300 400			
20		Limestone BEDROCK (Verulam Formation)			66		NQ	18	66%
		- very poor to excellent rock quality - grey colour - moderately weathered to slightly weathered joint surfaces -			68				
21					70				
					72		NQ	19	84%
22		(Refer to Field Bedrock Core Log)			74				
23					76		NQ	20	68%
	60.2				78				
24		End of Borehole			80				
		Monitoring Well Installed			82				
25					84				
26					86				
					88				
27					90				
28					92				
					94				
29					96				
30					98				

LABORATORY ANALYSES: UCS = 140 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-7

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 15-16, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
	84.40					● 20 40 60 80 ▲ 100 200 300 400			
0	84.2	200 mm TOPSOIL					SS	1	50/100 mm
		FILL: compact to very dense brown silty sand with gravel			2				
1		- 350 mm thick layer of sandy gravel obserevd at 1.0 m			4		SS	2	68
2	82.1				6		SS	3	14
		Compact grey sandy silt (ML), TILL			8		SS	4	16
3	81.1				10		SS	5	50/100 mm
		Limestone BEDROCK (Verulam Formation)			12		HQ	6	60%
4		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			14				
5		(Refer to Field Bedrock Core Log)			16		HQ	7	94%
					18				
6					20		HQ	8	90%
7					22				
					24				
8					26		HQ	9	99%
					28				
9					30				
10	74.4				32		HQ	10	100%

LABORATORY ANALYSES: UCS = 120 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-7

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 15-16, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv ● 20 40 60 80 ▲ 100 200 300 400	SAMPLES TYPE	NUMBER	N-VALUE
10		Limestone BEDROCK (Verulam Formation)			34				
		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			36		HQ	11	96%
11					38				
		(Refer to Field Bedrock Core Log)			40		HQ	12	90%
12					42				
13					44				
					46		HQ	13	95%
14					48				
15					50				
				▽	52		HQ	14	89%
16					54				
17					56		HQ	15	96%
					58				
18					60		HQ	16	79%
19					62				
					64				
20	64.4								

LABORATORY ANALYSES: UCS = 120 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-7

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 15-16, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
						● 20 40 60 80 ▲ 100 200 300 400			
20		Limestone BEDROCK (Verulam Formation)			66		HQ	17	69%
		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			68				
21					70				
		(Refer to Field Bedrock Core Log)			72		HQ	18	77%
22					74				
23					76		HQ	19	78%
24	60.4				78				
		End of Borehole			80				
		Borehole left open and capped with a flushmount cover			82				
25					84				
					86				
26					88				
27					90				
					92				
28					94				
29					96				
30					98				

LABORATORY ANALYSES: UCS = 120 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-8

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 9-13, 2015 WATER LEVEL TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	N-VALUE
	85.80					
0	85.7	150 mm TOPSOIL				
		FILL: compact to dark brown silty sand, some organics	2	SS	1	71
1			4	SS	2	13
	84.3					
		FILL: loose to compact brown silty sand with gravel	6	SS	3	30
2			8	SS	4	5
3			10	SS	5	21
	82.0		12			
4		Compact grey sandy silt, TILL	14	SS	6	17
	81.2					
		Limestone BEDROCK (Verulam Formation)	16	NQ	7	73%
5		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -	18			
			20	NQ	8	80%
6		(Refer to Field Bedrock Core Log)	22			
7			24			
			26	NQ	9	73%
8			28			
9			30	NQ	10	100%
	75.8		32			
10						

VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv

● 20 40 60 80
▲ 100 200 300 400

LABORATORY ANALYSES: UCS = 110 MPa

Stantec

BOREHOLE RECORD

BH 15-8

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 9-13, 2015 WATER LEVEL TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv ● 20 40 60 80 ▲ 100 200 300 400	SAMPLES TYPE	NUMBER	N-VALUE
10		Limestone BEDROCK (Verulam Formation)			34				
		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			36		NQ	11	95%
11					38				
		(Refer to Field Bedrock Core Log)			40		NQ	12	87%
12					42				
13					44				
					46		NQ	13	84%
14					48				
15					50				
					52		NQ	14	100%
16					54				
					56		NQ	15	74%
17					58				
18					60				
					62		NQ	16	94%
19					64				
20	65.8								

LABORATORY ANALYSES: UCS = 110 MPa

Stantec

BOREHOLE RECORD

BH 15-8

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 9-13, 2015 WATER LEVEL TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
						● 20 40 60 80 ▲ 100 200 300 400			
20		Limestone BEDROCK (Verulam Formation)			66		NQ	17	63%
		- fair to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			68				
21					70		NQ	18	78%
		(Refer to Field Bedrock Core Log)			72				
22					74				
23					76		NQ	19	88%
	62.2								
		End of Borehole			78				
24		Borehole backfilled with grout			80				
25					82				
					84				
26					86				
27					88				
					90				
28					92				
					94				
29					96				
					98				
30									

LABORATORY ANALYSES: UCS = 110 MPa

Stantec

BOREHOLE RECORD

BH 15-9

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 17, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
	87.10					● 20 40 60 80 ▲ 100 200 300 400			
0	87.0	100 mm ASPHALTIC CONCRETE							
		FILL: dark brown sand and gravel			2	▲	BS	1	
1	86.4	Limestone BEDROCK (Verulam Formation)			4		HQ	2	16%
		- very poor to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			6		HQ	3	79%
2		(Refer to Field Bedrock Core Log)			8				
3					10		HQ	4	93%
4					12				
					14				
5					16		HQ	5	98%
					18				
6					20				
					22		HQ	6	82%
7					24				
					26				
8					28		HQ	7	85%
9					30				
					32		HQ	8	98%
10	77.1								

LABORATORY ANALYSES: UCS = 145 MPa

Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-9

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 17, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
						● 20 40 60 80 ▲ 100 200 300 400			
10		Limestone BEDROCK (Verulam Formation)		▽	34				
		- very poor to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			36		HQ	9	100%
11					38				
		(Refer to Field Bedrock Core Log)			40				
12					42		HQ	10	83%
13					44				
					46		HQ	11	96%
14					48				
15					50				
					52		HQ	12	84%
16					54				
17					56		HQ	13	88%
					58				
18					60				
					62		HQ	14	69%
19					64				
20	67.1								

LABORATORY ANALYSES: UCS = 145 MPa

▽ Groundwater Level

Stantec

BOREHOLE RECORD

BH 15-9

CLIENT Public Works and Government Services Canada PROJECT No. 122411046 ORIGINATED BY AN/ZP/KP

LOCATION Centre Block, Parliament Hill, Ottawa, ON DATUM Geodetic COMPILED BY

DATES: BORING January 17, 2015 WATER LEVEL January 19, 2015 TPC ELEV. CHECKED BY RH

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS ● %LEL ▲ ppmv	SAMPLES TYPE	NUMBER	N-VALUE
						● 20 40 60 80 ▲ 100 200 300 400			
20		Limestone BEDROCK (Verulam Formation)			66		HQ	15	94%
		- very poor to excellent rock quality - grey colour - highly weathered to slightly weathered joint surfaces -			68				
21					70				
		(Refer to Field Bedrock Core Log)			72		HQ	16	83%
22					74				
23					76		HQ	17	76%
24	63.0				78				
		End of Borehole			80				
		Borehole left open and capped with a flushmount cover			82				
25					84				
					86				
26					88				
27					90				
					92				
28					94				
29					96				
30					98				

LABORATORY ANALYSES: UCS = 145 MPa

Groundwater Level

Appendix C

Summary Analytical Tables

Table 1
Summary of Soil Analytical Results
Centre Block Project
Public Works Government Services Canada

Sample Location				BH15-3	BH15-4		BH15-5	BH15-6	BH15-7	BH15-8	BH15-9
Sample Date				12-Jan-15	10-Jan-15	10-Jan-15	10-Jan-15	10-Jan-15	15-Jan-15	12-Jan-15	17-Jan-15
Sample ID				BH14-3 GS1	BH15-4 SS3	BH15-4 SS5	BH15-5 SS6	BH15-6 SS4	BH15-7 SS2	BH15-8 SS6	BH15-9 GS1
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM
Laboratory Work Order				B512379	B512379	B512379	B512379	B512379	B512379	B512379	B512379
Laboratory Sample ID	Units	CCME	Ontario SCS	ZG3193	ZG3194	ZG3195	ZG3196	ZG3197	ZG3198	ZG3199	ZG3200
General Chemistry											
Sodium Adsorption Ratio (SAR)	none	12[A]	2.4[L]	0.41	**23[AL]**	-	-	**7[L]**	0.25	-	**25[AL]**
Chromium (Hexavalent)	µg/g	1.4[A]	0.66[L]	<0.2	<0.2	-	-	<0.2	<0.2	-	<0.2
Electrical Conductivity, Lab	µS/cm	4000[A]	0.57[L]	0.22	**2.7[L]**	-	-	**0.76[L]**	0.2	-	**1.6[L]**
Fluoride	µg/g	2000[A]	n/v	<5	<5	-	-	<5	<5	-	<5
Cyanide (Free)	µg/g	8[A]	0.051[L]	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01
Moisture	%	n/v	n/v	16	12	13	17	9.7	3.3	19	6.5
pH	S.U.	6-8[A]	n/v	**8.14 [A]**	7.61	-	-	7.54	7.86	-	**8.62 [A]**
Petroleum Hydrocarbons											
PHC F1 (C6-C10 range)	µg/g	240[BC]	25[L]	<10	<10	<10	<10	<10	<10	<10	<10
PHC F2 (>C10-C16 range)	µg/g	260[BC]	10[L]	**12[L]**	<10	<10	<10	<10	<10	<10	<10
PHC F3 (>C16-C34 range)	µg/g	1700[BC]	240[L]	**350[L]**	54	**580[L]**	<50	<50	59	<50	**250[L]**
PHC F4 (>C34-C50 range)	µg/g	3300[BC]	120[L]	**750/2200 *[L]**	<50	<50	<50	<50	<50	<50	**1500/4800* [BL]**
Metals											
Boron	µg/g	n/v	36[L]	0.4	0.18	-	-	0.2	0.26	-	0.41
Sulphur	µg/g	n/v	n/v	630	99	-	-	72	930	-	1400
Antimony	µg/g	40[A]	1.3[L]	**2.2[L]**	<0.20	-	-	<0.20	<0.20	-	<0.20
Arsenic	µg/g	12[A]	18[L]	**14[A]**	<1.0	-	-	<1.0	2.5	-	2.4
Barium	µg/g	2000[A]	220[L]	110	58	-	-	14	200	-	63
Beryllium	µg/g	8[A]	2.5[L]	0.41	0.33	-	-	<0.20	0.26	-	0.25
Cadmium	µg/g	22[A]	1.2[L]	0.14	<0.10	-	-	<0.10	<0.10	-	<0.10
Chromium (Total)	µg/g	87[A]	70[L]	7.5	13	-	-	11	14	-	9.7
Cobalt	µg/g	300[A]	21[L]	8.9	4.3	-	-	2.5	3.7	-	3.5
Copper	µg/g	91[A]	92[L]	54	7.3	-	-	2.1	8.2	-	13
Lead	µg/g	260[A]	120[L]	92	5.1	-	-	2	16	-	55
Molybdenum	µg/g	40[A]	2[L]	**3.4[L]**	<0.50	-	-	<0.50	1.1	-	0.72
Nickel	µg/g	50[A]	82[L]	12	8.1	-	-	4.7	8.8	-	7.6
Selenium	µg/g	2.9[A]	1.5[L]	0.74	<0.50	-	-	<0.50	<0.50	-	<0.50
Silver	µg/g	40[A]	0.5[L]	<0.20	<0.20	-	-	<0.20	<0.20	-	<0.20
Thallium	µg/g	1[A]	1[L]	0.26	0.082	-	-	<0.050	0.11	-	0.099
Tin	µg/g	300[A]	n/v	<5.0	<5.0	-	-	<5.0	<5.0	-	<5.0
Uranium	µg/g	33[A]	2.5[L]	0.33	0.63	-	-	0.31	0.6	-	0.38
Vanadium	µg/g	130[A]	86[L]	12	21	-	-	14	15	-	13
Zinc	µg/g	360[A]	290[L]	72	23	-	-	16	25	-	33
Mercury	µg/g	24[A]	0.27[L]	0.14	<0.050	-	-	<0.050	0.15	-	0.20
Polychlorinated Biphenyls											
Total Polychlorinated Biphenyls (PCBs)	µg/g	33[A]	0.3[L]	<0.010	<0.010	-	-	<0.010	<0.010	-	<0.010
Non-Carcinogenic Polycyclic Aromatic Hydrocarbons											
Acenaphthene	µg/g	0.28[I]	0.072[L]	0.048	0.016	0.049	<0.0050	<0.0050	**0.13[L]**	<0.0050	<0.020
Acenaphthylene	µg/g	320[I]	0.093[L]	**0.31[L]**	0.017	0.022	<0.0050	<0.0050	0.025	<0.0050	<0.020
Anthracene	µg/g	32[EHK]	0.16[L]	**1[L]**	0.13	**0.43[L]**	<0.0050	<0.0050	**0.18[L]**	<0.0050	<0.020
Fluoranthene	µg/g	180[EHK]	0.56[L]	**9.6[L]**	**0.57[L]**	**0.78[L]**	<0.0050	<0.0050	**1.2[L]**	<0.0050	0.057
Fluorene	µg/g	0.25[I]	0.12[L]	0.039	0.028	0.1	<0.0050	<0.0050	0.12	<0.0050	<0.020
Methylnaphthalene, 1-	µg/g	n/v	n/v	0.027	0.0066	0.044	<0.0050	<0.0050	0.026	<0.0050	<0.020
Methylnaphthalene, 2-	µg/g	n/v	n/v	0.02	0.0066	0.064	<0.0050	<0.0050	0.034	<0.0050	<0.020
Methylnaphthalene (Total)	µg/g	n/v	0.59[L] 76[M]	0.048	0.013	0.11	<0.0071	<0.0071	0.06	<0.0071	<0.028
Naphthalene	µg/g	0.013$_e$[EI] 22[G]	0.09[L]	**0.032[EI]**	**0.015[EI]**	**0.13[EIL]**	<0.0050	<0.0050	**0.083[EI]**	<0.0050	<0.020
Phenanthrene	µg/g	0.046$_e$[EI] 50[G]	0.69[L]	**2.8[EIL]**	**0.33[EI]**	**0.76[EIL]**	<0.0050	<0.0050	**1.2[EIL]**	<0.0050	0.040
Pyrene	µg/g	100[EG]	1[L]	**7.7[L]**	0.46	0.61	<0.0050	<0.0050	0.98	<0.0050	0.049
Carcinogenic Polycyclic Aromatic Hydrocarbons											
Benzo(a)anthracene	µg/g	10[EG]	0.36[L]	**5[L]**	0.33	**0.41[L]**	<0.0050	<0.0050	**0.48[L]**	<0.0050	0.027
Benzo(a)pyrene	µg/g	72[EHK] 8800[I]	0.3[L]	**4.5[L]**	0.25	0.29	<0.0050	<0.0050	**0.38[L]**	<0.0050	0.029
Benzo(b)fluoranthene	µg/g	10[EG]	0.47[L]	**5.4[L]**	0.27	0.3	<0.0050	<0.0050	0.46	<0.0050	0.038
Benzo(g,h,i)perylene	µg/g	n/v	0.68[L] 9.6[M]	**2.4[L]**	0.12	0.12	<0.0050	<0.0050	0.19	<0.0050	0.026
Benzo(k)fluoranthene	µg/g	10[EG]	0.48[L]	**1.9[L]**	0.1	0.11	<0.0050	<0.0050	0.16	<0.0050	<0.020
Chrysene	µg/g	n/v	2.8[L] 9.6[M]	**4.4[L]**	0.24	0.31	<0.0050	<0.0050	0.46	<0.0050	0.042
Dibenzo(a,h)anthracene	µg/g	10[EG]	0.1[L]	**0.65[L]**	0.032	0.037	<0.0050	<0.0050	0.043	<0.0050	<0.020
Indeno(1,2,3-cd)pyrene	µg/g	10[EG]	0.23[L]	**2.8[L]**	0.14	0.16	<0.0050	<0.0050	0.20	<0.0050	0.020
Benzo(a)pyrene Total Potency Equivalents	µg/g	5.3$_{a,b,c}$[D]	n/a	**6.73**	0.37	0.43	n/v	n/v	0.56	n/v	n/v
Index of Additive Cancer Risk	none	≤1.0$_d$[F]	n/a	**79.25**	**4.31**	**4.97**	n/v	n/v	**6.86**	n/v	n/v

See notes on last page

Table 1
Summary of Soil Analytical Results
Centre Block Project
Public Works Government Services Canada

Sample Location				BH15-3	BH15-4		BH15-5	BH15-6	BH15-7	BH15-8	BH15-9
Sample Date				12-Jan-15	10-Jan-15	10-Jan-15	10-Jan-15	10-Jan-15	15-Jan-15	12-Jan-15	17-Jan-15
Sample ID				BH14-3 GS1	BH15-4 SS3	BH15-4 SS5	BH15-5 SS6	BH15-6 SS4	BH15-7 SS2	BH15-8 SS6	BH15-9 GS1
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM
Laboratory Work Order				B512379	B512379	B512379	B512379	B512379	B512379	B512379	B512379
Laboratory Sample ID	Units	CCME	Ontario SCS	ZG3193	ZG3194	ZG3195	ZG3196	ZG3197	ZG3198	ZG3199	ZG3200
Volatile Organic Compounds - CCME											
Acetone	µg/g	n/v	0.5[L]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	µg/g	0.03[A]	0.02[L]	0.0086	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0075
Bromodichloromethane	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform (Tribromomethane)	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane (Methyl bromide)	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride (Tetrachloromethane)	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene (Monochlorobenzene)	µg/g	10[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform (Trichloromethane)	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,2-	µg/g	10[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	10[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,4-	µg/g	10[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane (FREON 12)	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethene, 1,1-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethene, cis-1,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethene, trans-1,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloropropane, 1,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloropropene, cis-1,3-	µg/g	n/v	s11[L]	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Dichloropropene, trans-1,3-	µg/g	n/v	s11[L]	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	µg/g	0.082[A]	0.05[L]	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Hexane	µg/g	6.5	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**0.1[L]**
Methylene Chloride (Dichloromethane)	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Isobutyl Ketone	µg/g	n/v	0.5[L]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone (2-Butanone)	µg/g	n/v	0.5[L]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl t-butyl ether (MTBE)	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	n/v	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethene (PCE)	µg/g	0.5[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	µg/g	0.37[A]	0.2[L]	0.025	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.028
Trichloroethane, 1,1,1-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	50[A]	0.05[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethene (TCE)	µg/g	0.01[A]	0.05[L]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Vinyl chloride	µg/g	n/v	0.02[L]	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylene, m & p-	µg/g	n/v	s1[L]	0.042	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.032
Xylene, o-	µg/g	n/v	s1[L]	0.032	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Xylenes, Total	µg/g	11[A]	0.05[L]	**0.075[L]**	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.032
Trichlorofluoromethane (Freon 11)	µg/g	n/v	0.25[L]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020

Notes:

CCME	Canadian Council of Ministers of the Environment
A	Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, on-line summary table, for commercial land use and coarse grained soil
B	Canada Wide Standards for PHC in Soil - Commercial land use - Coarse-grained Soil, Tier 1 (Revised Jan 2008, Table 3), lowest guideline of all pathways
D	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 1 - Direct contact)
E	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 1 - Environmental health guidelines based on non-carcinogenic effects of PAHs)
F	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 1 - Protection of potable water)
G	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 2 - Interim/Provisional Soil Quality Critera, CCME 1991)
H	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 2 - Soil Quality Guideline for Environmental Health)
I	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 2 - Soil Quality Guideline for Protection of freshwater life)
J	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 2 - Soil Quality Guideline for Soil and food ingestion)
K	Canadian Soil Quality Guideline for the Protection of Environmental and Human Health, PAH, 2008. revised 2010, for an Commercial land use (Table 2 - Soil Quality Guideline for Soil Contact)
Ontario SCS	Soil, Ground Water and Sediment Standards for Use under Part XV.I of the Environmental Protection Act (MOE, 2011)
L	Table 1 - Industrial / Commercial / Community Property Use - Coarse Textured Soils
m	Table 3 - Industrial/Commercial/Community Property Use - Coarse Textured Soils
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration was less than the applicable standard.
<0.50	Laboratory reportable detection limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reportable detection limi
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
a,b,c	SQG based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10e-5). B[a]P TPE = Benzo[a]pyrene Total Potency Equivalents, which is the sum of estimated cancer potency relative to B[a]P for all potentially carcinogenic unsubstituted PAHs. The B[a]P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B[a]P Potency Equivalence Factor (PEF), given below, and summing the products: Benz[a]anthracene = 0.1, Benzo[a]pyrene = 1, Benzo[b+j+k]fluoranthene = 0.1, Benzo[g,h,i]perylene = 0.01, Chrysene = 0.01, Dibenz[a,h]anthracene =1, Indeno[1,2,3-cd]pyrene = 0.1.
d	The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater quality from leaching of carcinogenic PAH mixtures from soil. The IACR is calculated by dividing the soil concentration (numerator) of each carcinogenic PAH by its soil quality guideline for protection of potable water component value (denominator) to calculate a hazard index for each PAH, and then summing the hazard indices for the entire PAH mixture, as follows: IACR = (Benzo[a]anthracene/0.33)+(Benzo[b+j+k]fluoranthene/0.16)+(Benzo[g,h,i]perylene/6.8)+(Benzo[a]pyrene/0.37)+(Chrysene/2.1)+(Dibenzo[a,h])anthracene/0.23)+(Indeno[1,2,3-cd]pyrene/2.7)
e	This value is the Soil Quality Guideline for the Protection of Freshwater Life. Users may wish to consider the application, on a site-specific basis, of this value where potential impacts to nearby surface waters are a concern (the value may be less than the common limit of detection in some jurisdictions; and the 1991 Interim Soil Quality Criteria for phenanthrene).
s1	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
s3	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.
s7	Standard is applicable to PHC in the F1 range minus BTEX.
s8	Standard is applicable to PHC in the F3 range, minus PAHs (other than naphthalene). If PAHs were not analyzed, the standard is applied to F3.
s10	If baseline is not reached during F4 analysis, then gravimetric analysis is to be performed, and the standard is applied to the higher of the two results.
s11	Standard is applicable to 1,3-Dichloropropene, and the individual isomers (cis + trans) should be added for comparison.
s12	The criteria for pH in surface soils (0 to 1.5 m) is 5 - 9, whereas the criteria for pH in sub-surface soils (> 1.5 m depth) is 5 - 11.
s14	Standard is applicable to total PCBs, and the individual Aroclors should be added for comparison.
s15	Standard is applicable to PHC in the F2 range minus naphthalene. If naphthalene was not analyzed, the standard is applied to F2.
s16	For surface soil, the boron standard is for hot water soluble extract. For subsurface soil, the standard is for total boron (mixed strong acid digest), as ecological criteria are not considered.
LD	Elevated detection limits due to the nature of the sample matrix.
RPD	Relative Percent Difference
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.
*	Second result is a F4G gravimetric heavy hydrocarbon concentration after the sample did not reach baseline at C50

Table 2
Summary of Groundwater Analytical Results
Centre Block Project
Public Works Government Services Canada

Sample Location					MW15-1	MW15-2			MW15-3		MW15-4	MW15-5	
Sample Date					16-Jan-15	16-Jan-15	16-Jan-15		18-Jan-15	16-Jan-15	21-Jan-15	21-Jan-15	21-Jan-15
Sample ID					BH14-1	BH14-2	BH14-2*DUP		BH14-3	TRIP BLANK	BH-4	BH-5	TRIP BLANK
Sampling Company					STANTEC	STANTEC	STANTEC		STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory					MAXXAM	MAXXAM	MAXXAM		MAXXAM	MAXXAM	MAXXAM	MAXXAM	MAXXAM
Laboratory Work Order					B509476	B509476	B509476		B509476	B509476	B512126	B512126	B512126
Laboratory Sample ID		Ottawa	Ottawa		ZE9340	ZE9341	ZE9342	RPD	ZE9343	ZE9344	ZG2115	ZG2116	ZG2117
Sample Type	Units	Combined [A]	Storm [B]	FIGQG [C]			Field Duplicate	%		TRIP BLANK			TRIP BLANK
General Chemistry													
Ammonia (as N)	mg/L	n/v	n/v	2.68	0.36	0.37	0.39	2.63	0.28	-	0.58	0.091	-
Total Carbonaceous BOD	mg/L	300	25	n/v	-	-	-	-	-	-	16	6	-
Fluoride	mg/L	10	n/v	0.12	0.47	0.69	0.66	2.22	0.36	-	0.49	0.37	-
Total Kjeldhl Nitrogen (TKN)	mg/L	100	n/v	n/v	-	-	-	-	-	-	1.6	0.52	-
pH	S.U.	5.5-11	6-9	6.5-9	7.95	7.95	7.88	0.44	7.92	-	7.76	7.79	-
Sulfate	mg/L	1500	1500	100	110	70	75	3.45	150	-	70	190	-
Chloride	mg/L	n/v	n/v	120	120	130	130	0.00	250	-	890	490	-
Nitrite (as N)	mg/L	n/v	n/v	0.06	<0.010	0.018	0.029	NC	0.014	-	2.47	0.826	-
Nitrate (as N)	mg/L	n/v	n/v	2.93	<0.10	0.21	0.18	NC	<0.10	-	0.88	0.77	-
Nitrate + Nitrite	mg/L	n/v	n/v	n/v	<0.10	0.23	0.21	NC	<0.10	-	3.34	1.6	-
BTEX and Petroleum Hydrocarbons													
Benzene	Ôg/L	10	2	690	<0.20	<0.20	<0.20	NC	<0.20	-	1.1	<0.20	-
Toluene	Ôg/L	80	2	83	<0.20	<0.20	<0.20	NC	<0.20	-	**57[B]**	**7.4[B]**	-
Ethylbenzene	Ôg/L	57	2	14000	<0.20	<0.20	<0.20	NC	<0.20	-	0.52	<0.20	-
p+m-Xylene	Ôg/L	n/v	n/v	n/v	<0.40	<0.20	<0.20	NC	<0.20	-	1.7	<0.40	-
o-Xylene	Ôg/L	n/v	n/v	n/v	<0.40	<0.40	<0.40	NC	<0.40	-	1.7	<0.20	-
Total Xylenes	Ôg/L	320	4.4	18000	<0.40	<0.40	<0.40	NC	<0.40	-	3.5	<0.40	-
PHC F1 (C6-C10 range)	Ôg/L	NF	NF	9100	<25	<25	<25	NC	<25	-	<25	<25	-
PHC F2 (>C10-C16 range)	Ôg/L	NF	NF	1300	<100	<100	<100	NC	<100	-	<100	<100	-
PHC F3 (>C16-C34 range)	Ôg/L	NF	NF	n/v	<100	<100	<100	NC	<100	-	<100	<100	-
PHC F4 (>C34-C50 range)	Ôg/L	NF	NF	n/v	<100	<100	<100	NC	<100	-	<100	<100	-
Metals													
Mercury	Ôg/L	1	0.4	0.016	<0.01	<0.01	<0.01	NC	<0.01	-	<0.01	<0.01	-
Polychlorinated Biphenyls													
Polychlorinated Biphenyls (PCBs)	Ôg/L	n/v	0.4	n/v	<0.01	<0.01	<0.01	NC	<0.01	-	-	-	-
Semi - Volatile Organic Compounds													
Acenaphthene	Ôg/L	n/v	n/v	5.8	<0.010	<0.010	<0.010	NC	<0.010	-	0.99	<0.010	-
Acenaphthylene	Ôg/L	n/v	n/v	46	<0.010	<0.010	<0.010	NC	<0.010	-	0.11	<0.010	-
Anthracene	Ôg/L	n/v	n/v	0.012	<0.010	<0.010	<0.010	NC	<0.010	-	**0.93[C]**	<0.010	-
Benzo(a)anthracene	Ôg/L	n/v	n/v	0.018	<0.010	<0.010	<0.010	NC	<0.010	-	**1.1[C]**	<0.010	-
Benzo(a)pyrene	Ôg/L	n/v	n/v	0.015	<0.010	<0.010	<0.010	NC	<0.010	-	**0.85[C]**	<0.010	-
Benzo(b/j)fluoranthene	Ôg/L	n/v	n/v	0.48	<0.010	<0.010	<0.010	NC	<0.010	-	**0.98[C]**	<0.010	-
Benzo(g,h,i)perylene	Ôg/L	n/v	n/v	0.17	<0.010	<0.010	<0.010	NC	<0.010	-	**0.42[C]**	<0.010	-
Benzo(k)fluoranthene	Ôg/L	n/v	n/v	0.48	<0.010	<0.010	<0.010	NC	<0.010	-	0.39	<0.010	-
Chrysene	Ôg/L	n/v	n/v	1.4	<0.010	<0.010	<0.010	NC	<0.010	-	0.85	<0.010	-
Dibenzo(a,h)anthracene	Ôg/L	n/v	n/v	0.26	<0.010	<0.010	<0.010	NC	<0.010	-	0.12	<0.010	-
Fluoranthene	Ôg/L	n/v	n/v	0.04	<0.010	<0.010	<0.010	NC	<0.010	-	**2.4[C]**	0.013	-
Fluorene	Ôg/L	59	n/v	3	<0.010	<0.010	<0.010	NC	<0.010	-	1.2	<0.010	-
Indeno(1,2,3-cd)pyrene	Ôg/L	n/v	n/v	0.21	<0.010	<0.010	<0.010	NC	<0.010	-	**0.5[C]**	<0.010	-
Methylnaphthalene, 1-	Ôg/L	32	n/v	180	<0.010	<0.010	<0.010	NC	<0.010	-	1.7	<0.010	-
Methylnaphthalene, 2-	Ôg/L	22	n/v	180	<0.010	<0.010	<0.010	NC	<0.010	-	0.43	<0.010	-
Naphthalene	Ôg/L	59	6.4	1.1	<0.010	0.013	0.015	7.14	<0.010	-	0.66	<0.010	-
Phenanthrene	Ôg/L	n/v	n/v	0.4	<0.010	<0.010	<0.010	NC	<0.010	-	**3.7[C]**	0.014	-
Pyrene	Ôg/L	n/v	n/v	0.025	<0.010	<0.010	<0.010	NC	<0.010	-	**2[C]**	0.012	-

See notes on last page

Volatile Organic Compounds													
Acetone	Ôg/L	n/v	n/v	13000	<10	<10	<10	NC	<10	<10	-	-	-
Benzene	Ôg/L	n/v	2	690	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Bromodichloromethane	Ôg/L	350	n/v	8500	<0.10	<0.10	<0.10	NC	0.33	<0.10	<1.0	<0.10	<0.10
Bromoform (Tribromomethane)	Ôg/L	630	n/v	3700	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Bromomethane (Methyl bromide)	Ôg/L	110	n/v	33	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<5.0	<0.50	<0.50
Carbon Tetrachloride (Tetrachloromethane)	Ôg/L	57	n/v	6.8	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Chlorobenzene (Monochlorobenzene)	Ôg/L	57	n/v	1.3	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Chloroform (Trichloromethane)	Ôg/L	80	2	1.8	0.52	0.40	0.41	1.23	**3.6[BC]**	<0.10	**6.7[BC]**	0.38	<0.10
Dibromochloromethane	Ôg/L	57	n/v	10000	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichlorobenzene, 1,2-	Ôg/L	88	5.6	0.7	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichlorobenzene, 1,3-	Ôg/L	36	n/v	150	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichlorobenzene, 1,4-	Ôg/L	17	6.8	26	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichlorodifluoromethane (Freon 12)	Ôg/L	n/v	n/v	n/v	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<5.0	<0.50	<0.50
Dichloroethane, 1,1-	Ôg/L	200	n/v	6600	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Dichloroethane, 1,2-	Ôg/L	210	n/v	100	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichloroethene, 1,1-	Ôg/L	40	n/v	490	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Dichloroethene, cis-1,2-	Ôg/L	200	5.6	30	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Dichloroethene, trans-1,2-	Ôg/L	200	n/v	30	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Dichloropropane, 1,2-	Ôg/L	850	n/v	330	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Dichloropropene, cis-1,3-	Ôg/L	70	n/v	n/v	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichloropropene, trans-1,3-	Ôg/L	70	5.6	n/v	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Dichloropropene, 1,3- (sum of isomers cis + trans)	Ôg/L	n/v	n/v	100	<0.28	<0.28	<0.28	NC	<0.28	<0.28	<2.8	<0.28	<0.28
Ethylbenzene	Ôg/L	57	2	41000	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Ethylene Dibromide	Ôg/L	n/v	n/v	5.1	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Hexane	Ôg/L	n/v	n/v	n/v	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<5.0	<0.50	<0.50
Methylene Chloride(Dichloromethane)	Ôg/L	210	5.2	98	<0.50	<0.50	<0.50	NC	<0.50	<0.50	<5.0	<0.50	<0.50
Methyl Isobutyl Ketone	Ôg/L	n/v	n/v	58000	<5.0	<5.0	<5.0	NC	<5.0	<5.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	Ôg/L	n/v	n/v	150000	<5.0	<5.0	<5.0	NC	<5.0	<5.0	-	-	-
Methyl t-butyl ether (MTBE)	Ôg/L	n/v	n/v	4300	<0.20	<0.20	<0.20	NC	<0.20	<0.20	-	-	-
Styrene	Ôg/L	40	n/v	72	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
1,1,1,2-Tetrachloroethane	Ôg/L	n/v	n/v	66	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
1,1,2,2-Tetrachloroethane	Ôg/L	40	17	63	<0.20	<0.20	<0.20	NC	<0.20	<0.20	-	-	-
Tetrachloroethylene	Ôg/L	50	4.4	110	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Toluene	Ôg/L	80	2	83	<0.20	<0.20	<0.20	NC	<0.20	<0.20	**64[B]**	**9.3[B]**	<0.20
1,1,1-Trichloroethane	Ôg/L	54	n/v	1100	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
1,3,5-Trimethylbenzene	Ôg/L	3	n/v	n/v	-	-	-	-	-	-	<2.0	<0.20	-
1,1,2-Trichloroethane	Ôg/L	800	n/v	91	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
Trichloroethylene	Ôg/L	54	7.6	29	<0.10	<0.10	<0.10	NC	<0.10	<0.10	<1.0	<0.10	<0.10
Vinyl Chloride	Ôg/L	400	n/v	13	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20
p+m-Xylene	Ôg/L	n/v	n/v	n/v	<0.10	<0.10	<0.10	NC	<0.10	<0.10	1.5	<0.10	<0.10
o-Xylene	Ôg/L	n/v	n/v	n/v	<0.10	<0.10	<0.10	NC	<0.10	<0.10	1.8	<0.10	<0.10
Total Xylenes	Ôg/L	320	4.4	18000	<0.10	<0.10	<0.10	NC	<0.10	<0.10	3.3	<0.10	<0.10
Trichlorofluoromethane (FREON 11)	Ôg/L	20	n/v	n/v	<0.20	<0.20	<0.20	NC	<0.20	<0.20	<2.0	<0.20	<0.20

See notes on last page

Notes:

Ottawa	Ottawa
[A]	City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 1 - Limits for Combined/Sanitary Sewer Discharge
[B]	City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 2 - Limits for Storm Sewer Discharge
[C]	Table 3 Federal Interim Groundwater Guidelines - Generic Guidelines for Commercial and Industrial Land Use - Water Use/Exposure Pathway - (Tier 2) Freshwater Life - Coarse
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration was less than the applicable standard.
<0.50	Laboratory reportable detection limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reportable detection limit.
n/v	No standard/guideline value.
*	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.
-	Parameter not analyzed / not available.
EH	Exceeded recommended holding time prior to analysis.
LD	Elevated detection limits due to the nature of the sample matrix.
RPD	Relative Percent Difference
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.
NF	No fuel allowed discharged into the sewer.

Table 3
Summary of Groundwater Analytical Results - Sewer Use Parameters
Centre Block Project
Public Works Government Services Canada

Sample Location					MW15-4	MW15-5	
Sample Date					21-Jan-15	21-Jan-15	21-Jan-15
Sample ID					BH-4	BH-5	TRIP BLANK
Sampling Company					STANTEC	STANTEC	STANTEC
Laboratory					MAXXAM	MAXXAM	MAXXAM
Laboratory Work Order					B512126	B512126	B512126
Laboratory Sample ID					ZG2115	ZG2116	ZG2117
Sample Type	Units	Ottawa Combined [A]	Ottawa Storm [B]	FIGQG [C]			TRIP BLANK
General Chemistry							
Phenols - 4AAP	mg/L	1	0.008	n/v	**0.031[B]**	0.0011	-
Total Suspended Solids	mg/L	350	15	n/v	**290[B]**	**170[B]**	-
Miscellaneous Parameters							
Formaldehyde	ug/L	300	n/v	n/v	219	<10	-
Nonylphenol Ethoxylate (Total)	mg/L	25	0.01	0.7	<0.025	<0.025	-
Nonylphenol (Total)	mg/L	2.5	0.001		**0.005[B]**	<0.001	-
Calculated Parameters							
Total Trichlorobenzenes	Õg/L	n/v	n/v	n/v	<3	<0.5	-
Pesticides and Herbicides							
Hexachlorobenzene	Õg/L	0.1	n/v	0.014	<0.005	<0.005	-
Petroleum Hydrocarbons							
Total Oil & Grease	mg/L	n/v	n/v	n/v	2.8	1.0	-
Total Oil & Grease Mineral/Synthetic	mg/L	15	n/v	n/v	<0.50	<0.50	-
Total Animal/Vegetable Oil and Grease	mg/L	150	n/v	n/v	2.8	1.0	-
Semi - Volatile Organic Compounds							
Total PAHs	Õg/L	15	6	n/v	**38[AB]**	<1	-
1-Methylnaphthalene	Õg/L	32	n/v	180	1	<0.3	-
2-Methylnaphthalene	Õg/L	22	n/v	180	0.4	<0.3	-
Fluorene	Õg/L	59	n/v	3	1.1	<0.3	-
Naphthalene	Õg/L	59	6.4	1.1	0.7	<0.3	-
Di-N-butyl phthalate	Õg/L	57	n/v	19	<2	<2	-
Bis(2-ethylhexyl)phthalate	Õg/L	280	n/v	16	4	2	-
Phenanthrene	Õg/L	n/v	n/v	0.4	**5.9[C]**	<0.2	-
Anthracene	Õg/L	n/v	n/v	0.012	**1.7[C]**	<0.2	-
Fluoranthene	Õg/L	n/v	n/v	0.04	**5.3[C]**	<0.2	-
Pyrene	Õg/L	n/v	n/v	0.025	**4.7[C]**	<0.2	-
Benzo(a)anthracene	Õg/L	n/v	n/v	0.018	**3.5[C]**	<0.2	-
Chrysene	Õg/L	n/v	n/v	1.4	**3[C]**	<0.2	-
Benzo(b/j)fluoranthene	Õg/L	n/v	n/v	0.48	**3.4[C]**	<0.2	-
Benzo(k)fluoranthene	Õg/L	n/v	n/v	0.48	**1.1[C]**	<0.2	-
Benzo(a)pyrene	Õg/L	n/v	n/v	0.015	**2.8[C]**	<0.2	-
Indeno(1,2,3-cd)pyrene	Õg/L	n/v	n/v	0.21	**1.9[C]**	<0.2	-
Dibenz(a,h)anthracene	Õg/L	n/v	n/v	0.26	**0.5[C]**	<0.2	-
Benzo(g,h,i)perylene	Õg/L	n/v	n/v	0.17	**1.7[C]**	<0.2	-
Dibenzo(a,i)pyrene	Õg/L	n/v	n/v	0.26	0.2	<0.2	-
Benzo(e)pyrene	Õg/L	n/v	n/v	n/v	1.7	<0.2	-
Perylene	Õg/L	n/v	n/v	n/v	0.6	<0.2	-
Dibenzo(a,j) acridine	Õg/L	n/v	n/v	n/v	<0.4	<0.4	-
7H-Dibenzo(c,g) Carbazole	Õg/L	n/v	n/v	n/v	<0.4	<0.4	-
2,4-Dichlorophenol	Õg/L	44	n/v	0.2	***<1.5*** [C]	***<0.30*** [C]	-
Benzyl butyl phthalate	Õg/L	17	n/v	n/v	<2.5	<0.50	-
Bis(2-chloroethoxy)methane	Õg/L	36	n/v	n/v	<2.5	<0.50	-
Di-N-octyl phthalate	Õg/L	30	n/v	n/v	<4.0	<0.80	-
Diethyl phthalate	Õg/L	200	n/v	3.8	***<5.0*** [C]	<1.0	-
Indole	Õg/L	0.05	n/v	n/v	<5.0	<1.0	-
See notes on last page							
Volatile Organic Compounds							
1,3,5-Trimethylbenzene	Õg/L	3	n/v	n/v	<2.0	<0.20	-
Chloroethane	Õg/L	270	n/v	n/v	<2.0	<0.20	<0.20
Chloromethane	Õg/L	190	n/v	n/v	<5.0	<0.50	<0.50
Dioxins & Furans							
Total Toxic Equivalency	pg/L	720	n/v	n/v	4.48	4.08	-
NDMA/D/F/MIB/GEO							
N-Nitrosodimethylamine	Õg/L	400	n/v	n/v	<0.002	0.68	-

Notes:

Ottawa	Ottawa
A	City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 1 - Limits for Combined/Sanitary Sewer Discharge
B	City of Ottawa By-Law No. 2003-514, Schedule "A" Tables, Table 2 - Limits for Storm Sewer Discharge
C	Table 3 Federal Interim Groundwater Guidelines - Generic Guidelines for Commercial and Industrial Land Use - Water Use/Exposure Pathway - (Tier 2) Freshwater Life - Coarse
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration was less than the applicable standard.
<0.50	Laboratory reportable detection limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reportable detection limit.
n/v	No standard/guideline value.
*	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.
-	Parameter not analyzed / not available.
EH	Exceeded recommended holding time prior to analysis.
LD	Elevated detection limits due to the nature of the sample matrix.
RPD	Relative Percent Difference
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.
NF	No fuel allowed discharged into the sewer.

Appendix D

Laboratory Certificates of Analyses

Your P.O. #: 16300R-20
Your Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your C.O.C. #: 38531

Attention:Allen MacGarvie

Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2015/01/28
Report #: R3315254
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B512379
Received: 2015/01/21, 14:27

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	8	N/A	2015/01/26	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron (1)	5	2015/01/26	2015/01/26	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide (1)	5	2015/01/26	2015/01/27	CAM SOP-00457	OMOE E3015 m
Conductivity (1)	5	N/A	2015/01/27	CAM SOP-00414	OMOE E3138 v2 m
Hexavalent Chromium in Soil by IC (1, 2)	5	2015/01/26	2015/01/27	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	5	2015/01/23	2015/01/26	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	3	2015/01/23	2015/01/27	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1)	8	2015/01/24	2015/01/25	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric) (1)	2	2015/01/28	2015/01/28	CAM SOP-00316	CCME PHC-CWS m
Soluble Fluoride analysis in Soil (1)	5	2015/01/26	2015/01/27	CAM SOP-00449	SM 22 4500 F C m
Strong Acid Leachable Metals by ICPMS (1)	5	2015/01/26	2015/01/26	CAM SOP-00447	EPA 6020A m
Acid Extractable Metals Analysis by ICP (1)	5	2015/01/27	2015/01/27	CAM SOP-00408	EPA 6010C m
Moisture (1)	8	N/A	2015/01/23	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM) (1)	1	2015/01/23	2015/01/23	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM) (1)	7	2015/01/23	2015/01/24	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Soil (1)	3	2015/01/23	2015/01/23	CAM SOP-00309	EPA 8082A m
Polychlorinated Biphenyl in Soil (1)	2	2015/01/23	2015/01/24	CAM SOP-00309	EPA 8082A m
pH CaCl2 EXTRACT (1)	1	2015/01/23	2015/01/23	CAM SOP-00413	EPA 9045 D m
pH CaCl2 EXTRACT (1)	4	2015/01/26	2015/01/26	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR) (1)	5	2015/01/22	2015/01/28	CAM SOP-00102	EPA 6010
Volatile Organic Compounds in Soil (1)	8	2015/01/23	2015/01/24	CAM SOP-00228	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference

Your P.O. #: 16300R-20
Your Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your C.O.C. #: 38531

Attention:Allen MacGarvie

Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2015/01/28
Report #: R3315254
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B512379
Received: 2015/01/21, 14:27

benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

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

(1) This test was performed by Maxxam Analytics Mississauga
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Parnian Baber, Project Manager
Email: pbaber@maxxam.ca
Phone# (613) 274-0573

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

CCME SOIL INORGANICS PACKAGE (SOIL)

Maxxam ID		ZG3193	ZG3193		ZG3194	ZG3194		ZG3197		
Sampling Date		2015/01/12	2015/01/12		2015/01/10	2015/01/10		2015/01/10		
COC Number		38531	38531		38531	38531		38531		
	Units	BH 14-3 GS1	BH 14-3 GS1 Lab-Dup	QC Batch	BH 15-4 SS3	BH 15-4 SS3 Lab-Dup	QC Batch	BH 15-6 SS4	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A	0.41		3895711	23		3895711	7.0		3895711
Inorganics										
Chromium (VI)	ug/g	ND		3898185	ND	ND	3898185	ND	0.2	3898185
Conductivity	mS/cm	0.22		3899072	2.7	2.7	3899072	0.76	0.002	3899072
Fluoride (F-)	ug/g	ND	ND	3898141	ND		3898141	ND	5	3898141
Free Cyanide	ug/g	ND		3897989	ND	ND	3897989	ND	0.01	3897989
Moisture	%	16		3896468	12		3896468	9.7	1.0	3896468
Available (CaCl2) pH	pH	8.14		3896191	7.61	7.62	3897960	7.54	N/A	3897954
Metals										
Hot Water Ext. Boron (B)	ug/g	0.40		3897966	0.18		3897966	0.20	0.050	3897966
Acid Extractable Sulphur (S)	ug/g	630		3899304	99		3899304	72	50	3899304
Acid Extractable Antimony (Sb)	ug/g	2.2		3898177	ND		3898177	ND	0.20	3898177
Acid Extractable Arsenic (As)	ug/g	14		3898177	ND		3898177	ND	1.0	3898177
Acid Extractable Barium (Ba)	ug/g	110		3898177	58		3898177	14	0.50	3898177
Acid Extractable Beryllium (Be)	ug/g	0.41		3898177	0.33		3898177	ND	0.20	3898177
Acid Extractable Cadmium (Cd)	ug/g	0.14		3898177	ND		3898177	ND	0.10	3898177
Acid Extractable Chromium (Cr)	ug/g	7.5		3898177	13		3898177	11	1.0	3898177
Acid Extractable Cobalt (Co)	ug/g	8.9		3898177	4.3		3898177	2.5	0.10	3898177
Acid Extractable Copper (Cu)	ug/g	54		3898177	7.3		3898177	2.1	0.50	3898177
Acid Extractable Lead (Pb)	ug/g	92		3898177	5.1		3898177	2.0	1.0	3898177
Acid Extractable Molybdenum (Mo)	ug/g	3.4		3898177	ND		3898177	ND	0.50	3898177
Acid Extractable Nickel (Ni)	ug/g	12		3898177	8.1		3898177	4.7	0.50	3898177
Acid Extractable Selenium (Se)	ug/g	0.74		3898177	ND		3898177	ND	0.50	3898177
Acid Extractable Silver (Ag)	ug/g	ND		3898177	ND		3898177	ND	0.20	3898177
Acid Extractable Thallium (Tl)	ug/g	0.26		3898177	0.082		3898177	ND	0.050	3898177
Acid Extractable Tin (Sn)	ug/g	ND		3898177	ND		3898177	ND	5.0	3898177
Acid Extractable Uranium (U)	ug/g	0.33		3898177	0.63		3898177	0.31	0.050	3898177
Acid Extractable Vanadium (V)	ug/g	12		3898177	21		3898177	14	5.0	3898177
Acid Extractable Zinc (Zn)	ug/g	72		3898177	23		3898177	16	5.0	3898177

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

CCME SOIL INORGANICS PACKAGE (SOIL)

Maxxam ID		ZG3193	ZG3193		ZG3194	ZG3194		ZG3197		
Sampling Date		2015/01/12	2015/01/12		2015/01/10	2015/01/10		2015/01/10		
COC Number		38531	38531		38531	38531		38531		
	Units	**BH 14-3 GS1**	**BH 14-3 GS1 Lab-Dup**	**QC Batch**	**BH 15-4 SS3**	**BH 15-4 SS3 Lab-Dup**	**QC Batch**	**BH 15-6 SS4**	**RDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug/g	0.14		3898177	ND		3898177	ND	0.050	3898177

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

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Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

CCME SOIL INORGANICS PACKAGE (SOIL)

Maxxam ID		ZG3197		ZG3198	ZG3200		
Sampling Date		2015/01/10		2015/01/15	2015/01/17		
COC Number		38531		38531	38531		
	Units	BH 15-6 SS4 Lab-Dup	QC Batch	BH 15-7 SS2	BH 15-9 GS1	RDL	QC Batch
Calculated Parameters							
Sodium Adsorption Ratio	N/A		3895711	0.25	25		3895711
Inorganics							
Chromium (VI)	ug/g		3898185	ND	ND	0.2	3898185
Conductivity	mS/cm		3899072	0.20	1.6	0.002	3899072
Fluoride (F-)	ug/g		3898141	ND	ND	5	3898141
Free Cyanide	ug/g		3897989	ND	ND	0.01	3897989
Moisture	%		3896468	3.3		1.0	3896468
Available (CaCl2) pH	pH		3897954	7.86	8.62	N/A	3897960
Metals							
Hot Water Ext. Boron (B)	ug/g		3897966	0.26	0.41	0.050	3897966
Acid Extractable Sulphur (S)	ug/g	74	3899304	930	1400	50	3899304
Acid Extractable Antimony (Sb)	ug/g		3898177	ND	ND	0.20	3898177
Acid Extractable Arsenic (As)	ug/g		3898177	2.5	2.4	1.0	3898177
Acid Extractable Barium (Ba)	ug/g		3898177	200	63	0.50	3898177
Acid Extractable Beryllium (Be)	ug/g		3898177	0.26	0.25	0.20	3898177
Acid Extractable Cadmium (Cd)	ug/g		3898177	ND	ND	0.10	3898177
Acid Extractable Chromium (Cr)	ug/g		3898177	14	9.7	1.0	3898177
Acid Extractable Cobalt (Co)	ug/g		3898177	3.7	3.5	0.10	3898177
Acid Extractable Copper (Cu)	ug/g		3898177	8.2	13	0.50	3898177
Acid Extractable Lead (Pb)	ug/g		3898177	16	55	1.0	3898177
Acid Extractable Molybdenum (Mo)	ug/g		3898177	1.1	0.72	0.50	3898177
Acid Extractable Nickel (Ni)	ug/g		3898177	8.8	7.6	0.50	3898177
Acid Extractable Selenium (Se)	ug/g		3898177	ND	ND	0.50	3898177
Acid Extractable Silver (Ag)	ug/g		3898177	ND	ND	0.20	3898177
Acid Extractable Thallium (Tl)	ug/g		3898177	0.11	0.099	0.050	3898177
Acid Extractable Tin (Sn)	ug/g		3898177	ND	ND	5.0	3898177
Acid Extractable Uranium (U)	ug/g		3898177	0.60	0.38	0.050	3898177
Acid Extractable Vanadium (V)	ug/g		3898177	15	13	5.0	3898177
Acid Extractable Zinc (Zn)	ug/g		3898177	25	33	5.0	3898177

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected
N/A = Not Applicable

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Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

CCME SOIL INORGANICS PACKAGE (SOIL)

Maxxam ID		ZG3197		ZG3198	ZG3200		
Sampling Date		2015/01/10		2015/01/15	2015/01/17		
COC Number		38531		38531	38531		
	Units	**BH 15-6 SS4 Lab-Dup**	**QC Batch**	**BH 15-7 SS2**	**BH 15-9 GS1**	**RDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug/g		3898177	0.15	0.20	0.050	3898177

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

O.REG 153 PAHS (SOIL)

Maxxam ID		ZG3193		ZG3194	ZG3195	ZG3196	ZG3197		ZG3198		
Sampling Date		2015/01/12		2015/01/10	2015/01/10	2015/01/10	2015/01/10		2015/01/15		
COC Number		38531		38531	38531	38531	38531		38531		
	Units	BH 14-3 GS1	RDL	BH 15-4 SS3	BH 15-4 SS5	BH 15-5 SS6	BH 15-6 SS4	RDL	BH 15-7 SS2	RDL	QC Batch
Calculated Parameters											
Methylnaphthalene, 2-(1-)	ug/g	0.048	0.028	0.013	0.11	ND	ND	0.0071	0.060	0.014	3894405
Polyaromatic Hydrocarbons											
Acenaphthene	ug/g	0.048	0.020	0.016	0.049	ND	ND	0.0050	0.13	0.010	3896475
Acenaphthylene	ug/g	0.31	0.020	0.017	0.022	ND	ND	0.0050	0.025	0.010	3896475
Anthracene	ug/g	1.0	0.020	0.13	0.43	ND	ND	0.0050	0.18	0.010	3896475
Benzo(a)anthracene	ug/g	5.0	0.020	0.33	0.41	ND	ND	0.0050	0.48	0.010	3896475
Benzo(a)pyrene	ug/g	4.5	0.020	0.25	0.29	ND	ND	0.0050	0.38	0.010	3896475
Benzo(b/j)fluoranthene	ug/g	5.4	0.020	0.27	0.30	ND	ND	0.0050	0.46	0.010	3896475
Benzo(g,h,i)perylene	ug/g	2.4	0.020	0.12	0.12	ND	ND	0.0050	0.19	0.010	3896475
Benzo(k)fluoranthene	ug/g	1.9	0.020	0.10	0.11	ND	ND	0.0050	0.16	0.010	3896475
Chrysene	ug/g	4.4	0.020	0.24	0.31	ND	ND	0.0050	0.46	0.010	3896475
Dibenz(a,h)anthracene	ug/g	0.65	0.020	0.032	0.037	ND	ND	0.0050	0.043	0.010	3896475
Fluoranthene	ug/g	9.6	0.020	0.57	0.78	ND	ND	0.0050	1.2	0.010	3896475
Fluorene	ug/g	0.039	0.020	0.028	0.10	ND	ND	0.0050	0.12	0.010	3896475
Indeno(1,2,3-cd)pyrene	ug/g	2.8	0.020	0.14	0.16	ND	ND	0.0050	0.20	0.010	3896475
1-Methylnaphthalene	ug/g	0.027	0.020	0.0066	0.044	ND	ND	0.0050	0.026	0.010	3896475
2-Methylnaphthalene	ug/g	0.020	0.020	0.0066	0.064	ND	ND	0.0050	0.034	0.010	3896475
Naphthalene	ug/g	0.032	0.020	0.015	0.13	ND	ND	0.0050	0.083	0.010	3896475
Phenanthrene	ug/g	2.8	0.020	0.33	0.76	ND	ND	0.0050	1.2	0.010	3896475
Pyrene	ug/g	7.7	0.020	0.46	0.61	ND	ND	0.0050	0.98	0.010	3896475
Surrogate Recovery (%)											
D10-Anthracene	%	84		92	101	92	84		92		3896475
D14-Terphenyl (FS)	%	74		74	74	77	73		73		3896475
D8-Acenaphthylene	%	69		76	78	79	76		75		3896475

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

O.REG 153 PAHS (SOIL)

Maxxam ID		ZG3199		ZG3200		
Sampling Date		2015/01/12		2015/01/17		
COC Number		38531		38531		
	Units	BH 15-8 SS6	RDL	BH 15-9 GS1	RDL	QC Batch
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/g	ND	0.0071	ND	0.028	3894405
Polyaromatic Hydrocarbons						
Acenaphthene	ug/g	ND	0.0050	ND	0.020	3896475
Acenaphthylene	ug/g	ND	0.0050	ND	0.020	3896475
Anthracene	ug/g	ND	0.0050	ND	0.020	3896475
Benzo(a)anthracene	ug/g	ND	0.0050	0.027	0.020	3896475
Benzo(a)pyrene	ug/g	ND	0.0050	0.029	0.020	3896475
Benzo(b/j)fluoranthene	ug/g	ND	0.0050	0.038	0.020	3896475
Benzo(g,h,i)perylene	ug/g	ND	0.0050	0.026	0.020	3896475
Benzo(k)fluoranthene	ug/g	ND	0.0050	ND	0.020	3896475
Chrysene	ug/g	ND	0.0050	0.042	0.020	3896475
Dibenz(a,h)anthracene	ug/g	ND	0.0050	ND	0.020	3896475
Fluoranthene	ug/g	ND	0.0050	0.057	0.020	3896475
Fluorene	ug/g	ND	0.0050	ND	0.020	3896475
Indeno(1,2,3-cd)pyrene	ug/g	ND	0.0050	0.020	0.020	3896475
1-Methylnaphthalene	ug/g	ND	0.0050	ND	0.020	3896475
2-Methylnaphthalene	ug/g	ND	0.0050	ND	0.020	3896475
Naphthalene	ug/g	ND	0.0050	ND	0.020	3896475
Phenanthrene	ug/g	ND	0.0050	0.040	0.020	3896475
Pyrene	ug/g	ND	0.0050	0.049	0.020	3896475
Surrogate Recovery (%)						
D10-Anthracene	%	92		89		3896475
D14-Terphenyl (FS)	%	79		71		3896475
D8-Acenaphthylene	%	77		74		3896475

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

O.REG 153 PCBS (SOIL)

Maxxam ID		ZG3193	ZG3194	ZG3197	ZG3198	ZG3200		
Sampling Date		2015/01/12	2015/01/10	2015/01/10	2015/01/15	2015/01/17		
COC Number		38531	38531	38531	38531	38531		
	Units	BH 14-3 GS1	BH 15-4 SS3	BH 15-6 SS4	BH 15-7 SS2	BH 15-9 GS1	RDL	QC Batch
PCBs								
Aroclor 1242	ug/g	ND	ND	ND	ND	ND	0.010	3896612
Aroclor 1248	ug/g	ND	ND	ND	ND	ND	0.010	3896612
Aroclor 1254	ug/g	ND	ND	ND	ND	ND	0.010	3896612
Aroclor 1260	ug/g	ND	ND	ND	ND	ND	0.010	3896612
Total PCB	ug/g	ND	ND	ND	ND	ND	0.010	3896612
Surrogate Recovery (%)								
Decachlorobiphenyl	%	64	65	67	69	60		3896612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		ZG3193		ZG3194	ZG3195	ZG3196	ZG3197		
Sampling Date		2015/01/12		2015/01/10	2015/01/10	2015/01/10	2015/01/10		
COC Number		38531		38531	38531	38531	38531		
	Units	BH 14-3 GS1	QC Batch	BH 15-4 SS3	BH 15-4 SS5	BH 15-5 SS6	BH 15-6 SS4	RDL	QC Batch
BTEX & F1 Hydrocarbons									
F1 (C6-C10)	ug/g	ND	3897973	ND	ND	ND	ND	10	3897345
F1 (C6-C10) - BTEX	ug/g	ND	3897973	ND	ND	ND	ND	10	3897345
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	12	3897343	ND	ND	ND	ND	10	3897343
F3 (C16-C34 Hydrocarbons)	ug/g	350	3897343	54	580	ND	ND	50	3897343
F4 (C34-C50 Hydrocarbons)	ug/g	750	3897343	ND	ND	ND	ND	50	3897343
Reached Baseline at C50	ug/g	No	3897343	Yes	Yes	Yes	Yes		3897343
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	99	3897973	99	101	100	100		3897345
4-Bromofluorobenzene	%	107	3897973	97	95	91	97		3897345
D10-Ethylbenzene	%	92	3897973	75	85	80	69		3897345
D4-1,2-Dichloroethane	%	89	3897973	95	94	96	94		3897345
o-Terphenyl	%	90	3897343	90	92	92	95		3897343

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Report Date: 2015/01/28

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Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		ZG3198	ZG3199	ZG3200		
Sampling Date		2015/01/15	2015/01/12	2015/01/17		
COC Number		38531	38531	38531		
	Units	BH 15-7 SS2	BH 15-8 SS6	BH 15-9 GS1	RDL	QC Batch
BTEX & F1 Hydrocarbons						
F1 (C6-C10)	ug/g	ND	ND	ND	10	3897973
F1 (C6-C10) - BTEX	ug/g	ND	ND	ND	10	3897973
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	ND	10	3897343
F3 (C16-C34 Hydrocarbons)	ug/g	59	ND	250	50	3897343
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	1500	50	3897343
Reached Baseline at C50	ug/g	Yes	Yes	No		3897343
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	99	99	98		3897973
4-Bromofluorobenzene	%	100	98	108		3897973
D10-Ethylbenzene	%	88	97	93		3897973
D4-1,2-Dichloroethane	%	89	90	88		3897973
o-Terphenyl	%	93	95	94		3897343

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Sampler Initials: AN

RESULTS OF ANALYSES OF SOIL

Maxxam ID		ZG3195	ZG3196	ZG3199	ZG3200		
Sampling Date		2015/01/10	2015/01/10	2015/01/12	2015/01/17		
COC Number		38531	38531	38531	38531		
	Units	**BH 15-4 SS5**	**BH 15-5 SS6**	**BH 15-8 SS6**	**BH 15-9 GS1**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	13	17	19	6.5	1.0	3896468

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		ZG3193	ZG3194	ZG3195	ZG3196	ZG3197	ZG3198		
Sampling Date		2015/01/12	2015/01/10	2015/01/10	2015/01/10	2015/01/10	2015/01/15		
COC Number		38531	38531	38531	38531	38531	38531		
	Units	BH 14-3 GS1	BH 15-4 SS3	BH 15-4 SS5	BH 15-5 SS6	BH 15-6 SS4	BH 15-7 SS2	RDL	QC Batch
Volatile Organics									
Acetone (2-Propanone)	ug/g	ND	ND	ND	ND	ND	ND	0.50	3896066
Benzene	ug/g	0.0086	ND	ND	ND	ND	ND	0.0060	3896066
Bromodichloromethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Bromoform	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Bromomethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Carbon Tetrachloride	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Chlorobenzene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Chloroform	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Dibromochloromethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,2-Dichlorobenzene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,3-Dichlorobenzene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,4-Dichlorobenzene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Dichlorodifluoromethane (FREON 12)	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,1-Dichloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,2-Dichloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,1-Dichloroethylene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
cis-1,2-Dichloroethylene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
trans-1,2-Dichloroethylene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,2-Dichloropropane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
cis-1,3-Dichloropropene	ug/g	ND	ND	ND	ND	ND	ND	0.030	3896066
trans-1,3-Dichloropropene	ug/g	ND	ND	ND	ND	ND	ND	0.040	3896066
Ethylbenzene	ug/g	0.011	ND	ND	ND	ND	ND	0.010	3896066
Ethylene Dibromide	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Hexane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Methylene Chloride(Dichloromethane)	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Methyl Isobutyl Ketone	ug/g	ND	ND	ND	ND	ND	ND	0.50	3896066
Methyl Ethyl Ketone (2-Butanone)	ug/g	ND	ND	ND	ND	ND	ND	0.50	3896066
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Styrene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Tetrachloroethylene	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		ZG3193	ZG3194	ZG3195	ZG3196	ZG3197	ZG3198		
Sampling Date		2015/01/12	2015/01/10	2015/01/10	2015/01/10	2015/01/10	2015/01/15		
COC Number		38531	38531	38531	38531	38531	38531		
	Units	BH 14-3 GS1	BH 15-4 SS3	BH 15-4 SS5	BH 15-5 SS6	BH 15-6 SS4	BH 15-7 SS2	RDL	QC Batch
Toluene	ug/g	0.025	ND	ND	ND	ND	ND	0.020	3896066
1,1,1-Trichloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
1,1,2-Trichloroethane	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Trichloroethylene	ug/g	ND	ND	ND	ND	ND	ND	0.010	3896066
Vinyl Chloride	ug/g	ND	ND	ND	ND	ND	ND	0.020	3896066
p+m-Xylene	ug/g	0.042	ND	ND	ND	ND	ND	0.020	3896066
o-Xylene	ug/g	0.032	ND	ND	ND	ND	ND	0.020	3896066
Total Xylenes	ug/g	0.075	ND	ND	ND	ND	ND	0.020	3896066
Trichlorofluoromethane (FREON 11)	ug/g	ND	ND	ND	ND	ND	ND	0.050	3896066
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	94	95	95	95	94	95		3896066
D10-o-Xylene	%	106	102	100	107	102	96		3896066
D4-1,2-Dichloroethane	%	98	99	99	98	98	98		3896066
D8-Toluene	%	103	102	102	101	103	102		3896066

RDL = Reportable Detection Limit
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VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		ZG3199	ZG3200		
Sampling Date		2015/01/12	2015/01/17		
COC Number		38531	38531		
	Units	BH 15-8 SS6	BH 15-9 GS1	RDL	QC Batch
Volatile Organics					
Acetone (2-Propanone)	ug/g	ND	ND	0.50	3896066
Benzene	ug/g	ND	0.0075	0.0060	3896066
Bromodichloromethane	ug/g	ND	ND	0.050	3896066
Bromoform	ug/g	ND	ND	0.050	3896066
Bromomethane	ug/g	ND	ND	0.050	3896066
Carbon Tetrachloride	ug/g	ND	ND	0.050	3896066
Chlorobenzene	ug/g	ND	ND	0.050	3896066
Chloroform	ug/g	ND	ND	0.050	3896066
Dibromochloromethane	ug/g	ND	ND	0.050	3896066
1,2-Dichlorobenzene	ug/g	ND	ND	0.050	3896066
1,3-Dichlorobenzene	ug/g	ND	ND	0.050	3896066
1,4-Dichlorobenzene	ug/g	ND	ND	0.050	3896066
Dichlorodifluoromethane (FREON 12)	ug/g	ND	ND	0.050	3896066
1,1-Dichloroethane	ug/g	ND	ND	0.050	3896066
1,2-Dichloroethane	ug/g	ND	ND	0.050	3896066
1,1-Dichloroethylene	ug/g	ND	ND	0.050	3896066
cis-1,2-Dichloroethylene	ug/g	ND	ND	0.050	3896066
trans-1,2-Dichloroethylene	ug/g	ND	ND	0.050	3896066
1,2-Dichloropropane	ug/g	ND	ND	0.050	3896066
cis-1,3-Dichloropropene	ug/g	ND	ND	0.030	3896066
trans-1,3-Dichloropropene	ug/g	ND	ND	0.040	3896066
Ethylbenzene	ug/g	ND	ND	0.010	3896066
Ethylene Dibromide	ug/g	ND	ND	0.050	3896066
Hexane	ug/g	ND	0.10	0.050	3896066
Methylene Chloride(Dichloromethane)	ug/g	ND	ND	0.050	3896066
Methyl Isobutyl Ketone	ug/g	ND	ND	0.50	3896066
Methyl Ethyl Ketone (2-Butanone)	ug/g	ND	ND	0.50	3896066
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	0.050	3896066
Styrene	ug/g	ND	ND	0.050	3896066
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	0.050	3896066
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	0.050	3896066
Tetrachloroethylene	ug/g	ND	ND	0.050	3896066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		ZG3199	ZG3200		
Sampling Date		2015/01/12	2015/01/17		
COC Number		38531	38531		
	Units	BH 15-8 SS6	BH 15-9 GS1	RDL	QC Batch
Toluene	ug/g	ND	0.028	0.020	3896066
1,1,1-Trichloroethane	ug/g	ND	ND	0.050	3896066
1,1,2-Trichloroethane	ug/g	ND	ND	0.050	3896066
Trichloroethylene	ug/g	ND	ND	0.010	3896066
Vinyl Chloride	ug/g	ND	ND	0.020	3896066
p+m-Xylene	ug/g	ND	0.032	0.020	3896066
o-Xylene	ug/g	ND	ND	0.020	3896066
Total Xylenes	ug/g	ND	0.032	0.020	3896066
Trichlorofluoromethane (FREON 11)	ug/g	ND	ND	0.050	3896066
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	94	94		3896066
D10-o-Xylene	%	107	101		3896066
D4-1,2-Dichloroethane	%	97	98		3896066
D8-Toluene	%	100	101		3896066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		ZG3193	ZG3200		
Sampling Date		2015/01/12	2015/01/17		
COC Number		38531	38531		
	Units	BH 14-3 GS1	BH 15-9 GS1	RDL	QC Batch
F2-F4 Hydrocarbons					
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	2200	4800	100	3900428

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Maxxam ID: ZG3193
Sample ID: BH 14-3 GS1
Matrix: Soil

Collected: 2015/01/12
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Hot Water Extractable Boron	ICP	3897966	2015/01/26	2015/01/26	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897973	2015/01/23	2015/01/27	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
F4G (CCME Hydrocarbons Gravimetric)	BAL	3900428	2015/01/28	2015/01/28	Raheela Usmani
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai
Strong Acid Leachable Metals by ICPMS	ICP/MS	3898177	2015/01/26	2015/01/26	Grace Bu
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/23	Darryl Tiller
Polychlorinated Biphenyl in Soil	GC/ECD	3896612	2015/01/23	2015/01/23	Li Peng
pH CaCl2 EXTRACT		3896191	2015/01/23	2015/01/23	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	3895711	2015/01/28	2015/01/28	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3193 Dup
Sample ID: BH 14-3 GS1
Matrix: Soil

Collected: 2015/01/12
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai

Maxxam ID: ZG3194
Sample ID: BH 15-4 SS3
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Hot Water Extractable Boron	ICP	3897966	2015/01/26	2015/01/26	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897345	2015/01/23	2015/01/26	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai
Strong Acid Leachable Metals by ICPMS	ICP/MS	3898177	2015/01/26	2015/01/26	Grace Bu
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Polychlorinated Biphenyl in Soil	GC/ECD	3896612	2015/01/23	2015/01/23	Li Peng

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TEST SUMMARY

Maxxam ID: ZG3194
Sample ID: BH 15-4 SS3
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT		3897960	2015/01/26	2015/01/26	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	3895711	2015/01/28	2015/01/28	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3194 Dup
Sample ID: BH 15-4 SS3
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
pH CaCl2 EXTRACT		3897960	2015/01/26	2015/01/26	Surinder Rai

Maxxam ID: ZG3195
Sample ID: BH 15-4 SS5
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897345	2015/01/23	2015/01/26	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3196
Sample ID: BH 15-5 SS6
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897345	2015/01/23	2015/01/26	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3197
Sample ID: BH 15-6 SS4
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk

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TEST SUMMARY

Maxxam ID: ZG3197
Sample ID: BH 15-6 SS4
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	3897966	2015/01/26	2015/01/26	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897345	2015/01/23	2015/01/26	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai
Strong Acid Leachable Metals by ICPMS	ICP/MS	3898177	2015/01/26	2015/01/26	Grace Bu
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Polychlorinated Biphenyl in Soil	GC/ECD	3896612	2015/01/23	2015/01/23	Li Peng
pH CaCl2 EXTRACT		3897954	2015/01/26	2015/01/26	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	3895711	2015/01/28	2015/01/28	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3197 Dup
Sample ID: BH 15-6 SS4
Matrix: Soil

Collected: 2015/01/10
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli

Maxxam ID: ZG3198
Sample ID: BH 15-7 SS2
Matrix: Soil

Collected: 2015/01/15
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Hot Water Extractable Boron	ICP	3897966	2015/01/26	2015/01/26	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897973	2015/01/23	2015/01/27	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai
Strong Acid Leachable Metals by ICPMS	ICP/MS	3898177	2015/01/26	2015/01/26	Grace Bu
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Polychlorinated Biphenyl in Soil	GC/ECD	3896612	2015/01/23	2015/01/24	Li Peng
pH CaCl2 EXTRACT		3897960	2015/01/26	2015/01/26	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	3895711	2015/01/28	2015/01/28	Automated Statchk

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Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

TEST SUMMARY

Maxxam ID: ZG3198
Sample ID: BH 15-7 SS2
Matrix: Soil

Collected: 2015/01/15
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3199
Sample ID: BH 15-8 SS6
Matrix: Soil

Collected: 2015/01/12
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897973	2015/01/23	2015/01/27	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

Maxxam ID: ZG3200
Sample ID: BH 15-9 GS1
Matrix: Soil

Collected: 2015/01/17
Shipped:
Received: 2015/01/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	3894405	N/A	2015/01/26	Automated Statchk
Hot Water Extractable Boron	ICP	3897966	2015/01/26	2015/01/26	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	3897989	2015/01/26	2015/01/27	Xuanhong Qiu
Conductivity	COND	3899072	N/A	2015/01/27	Yogesh Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3898185	2015/01/26	2015/01/27	Manoj Gera
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3897973	2015/01/23	2015/01/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3897343	2015/01/24	2015/01/25	Biljana Lazovic
F4G (CCME Hydrocarbons Gravimetric)	BAL	3900428	2015/01/28	2015/01/28	Raheela Usmani
Soluble Fluoride analysis in Soil	F	3898141	2015/01/26	2015/01/27	Surinder Rai
Strong Acid Leachable Metals by ICPMS	ICP/MS	3898177	2015/01/26	2015/01/26	Grace Bu
Acid Extractable Metals Analysis by ICP	ICP	3899304	2015/01/27	2015/01/27	Azita Fazaeli
Moisture	BAL	3896468	N/A	2015/01/23	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	3896475	2015/01/23	2015/01/24	Darryl Tiller
Polychlorinated Biphenyl in Soil	GC/ECD	3896612	2015/01/23	2015/01/24	Li Peng
pH CaCl2 EXTRACT		3897960	2015/01/26	2015/01/26	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	3895711	2015/01/28	2015/01/28	Automated Statchk
Volatile Organic Compounds in Soil	GC/MS	3896066	2015/01/23	2015/01/24	Denis Reid

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Sample ZG3193-01 : PAH Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample ZG3195-01 : F24 FID Analysis:The contamination in the F3 range is mainly due to a single peak eluted at 5.020 min, not a hydrocarbon mix.

Sample ZG3198-01 : PAH Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly. SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample ZG3200-01 : PAH Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3896066	DR1	Matrix Spike	4-Bromofluorobenzene	2015/01/24		95	%	60 - 140
			D10-o-Xylene	2015/01/24		99	%	60 - 130
			D4-1,2-Dichloroethane	2015/01/24		98	%	60 - 140
			D8-Toluene	2015/01/24		104	%	60 - 140
			Acetone (2-Propanone)	2015/01/24		89	%	60 - 140
			Benzene	2015/01/24		95	%	60 - 140
			Bromodichloromethane	2015/01/24		90	%	60 - 140
			Bromoform	2015/01/24		82	%	60 - 140
			Bromomethane	2015/01/24		86	%	60 - 140
			Carbon Tetrachloride	2015/01/24		94	%	60 - 140
			Chlorobenzene	2015/01/24		95	%	60 - 140
			Chloroform	2015/01/24		97	%	60 - 140
			Dibromochloromethane	2015/01/24		91	%	60 - 140
			1,2-Dichlorobenzene	2015/01/24		92	%	60 - 140
			1,3-Dichlorobenzene	2015/01/24		92	%	60 - 140
			1,4-Dichlorobenzene	2015/01/24		90	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2015/01/24		79	%	60 - 140
			1,1-Dichloroethane	2015/01/24		103	%	60 - 140
			1,2-Dichloroethane	2015/01/24		96	%	60 - 140
			1,1-Dichloroethylene	2015/01/24		108	%	60 - 140
			cis-1,2-Dichloroethylene	2015/01/24		97	%	60 - 140
			trans-1,2-Dichloroethylene	2015/01/24		97	%	60 - 140
			1,2-Dichloropropane	2015/01/24		98	%	60 - 140
			cis-1,3-Dichloropropene	2015/01/24		75	%	60 - 140
			trans-1,3-Dichloropropene	2015/01/24		75	%	60 - 140
			Ethylbenzene	2015/01/24		94	%	60 - 140
			Ethylene Dibromide	2015/01/24		91	%	60 - 140
			Hexane	2015/01/24		104	%	60 - 140
			Methylene Chloride(Dichloromethane)	2015/01/24		107	%	60 - 140
			Methyl Isobutyl Ketone	2015/01/24		97	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2015/01/24		94	%	60 - 140
			Methyl t-butyl ether (MTBE)	2015/01/24		95	%	60 - 140
			Styrene	2015/01/24		89	%	60 - 140
			1,1,1,2-Tetrachloroethane	2015/01/24		93	%	60 - 140
			1,1,2,2-Tetrachloroethane	2015/01/24		89	%	60 - 140
			Tetrachloroethylene	2015/01/24		98	%	60 - 140
			Toluene	2015/01/24		95	%	60 - 140
			1,1,1-Trichloroethane	2015/01/24		95	%	60 - 140
			1,1,2-Trichloroethane	2015/01/24		98	%	60 - 140
			Trichloroethylene	2015/01/24		93	%	60 - 140
			Vinyl Chloride	2015/01/24		98	%	60 - 140
			p+m-Xylene	2015/01/24		93	%	60 - 140
			o-Xylene	2015/01/24		91	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2015/01/24		93	%	60 - 140
3896066	DR1	Spiked Blank	4-Bromofluorobenzene	2015/01/23		95	%	60 - 140
			D10-o-Xylene	2015/01/23		98	%	60 - 130
			D4-1,2-Dichloroethane	2015/01/23		104	%	60 - 140
			D8-Toluene	2015/01/23		103	%	60 - 140
			Acetone (2-Propanone)	2015/01/23		108	%	60 - 140
			Benzene	2015/01/23		95	%	60 - 130
			Bromodichloromethane	2015/01/23		92	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Bromoform	2015/01/23		89	%	60 - 130
			Bromomethane	2015/01/23		90	%	60 - 140
			Carbon Tetrachloride	2015/01/23		91	%	60 - 130
			Chlorobenzene	2015/01/23		94	%	60 - 130
			Chloroform	2015/01/23		97	%	60 - 130
			Dibromochloromethane	2015/01/23		95	%	60 - 130
			1,2-Dichlorobenzene	2015/01/23		93	%	60 - 130
			1,3-Dichlorobenzene	2015/01/23		90	%	60 - 130
			1,4-Dichlorobenzene	2015/01/23		89	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2015/01/23		77	%	60 - 140
			1,1-Dichloroethane	2015/01/23		102	%	60 - 130
			1,2-Dichloroethane	2015/01/23		100	%	60 - 130
			1,1-Dichloroethylene	2015/01/23		105	%	60 - 130
			cis-1,2-Dichloroethylene	2015/01/23		97	%	60 - 130
			trans-1,2-Dichloroethylene	2015/01/23		96	%	60 - 130
			1,2-Dichloropropane	2015/01/23		99	%	60 - 130
			cis-1,3-Dichloropropene	2015/01/23		82	%	60 - 130
			trans-1,3-Dichloropropene	2015/01/23		84	%	60 - 130
			Ethylbenzene	2015/01/23		90	%	60 - 130
			Ethylene Dibromide	2015/01/23		96	%	60 - 130
			Hexane	2015/01/23		100	%	60 - 130
			Methylene Chloride(Dichloromethane)	2015/01/23		109	%	60 - 130
			Methyl Isobutyl Ketone	2015/01/23		111	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2015/01/23		114	%	60 - 140
			Methyl t-butyl ether (MTBE)	2015/01/23		96	%	60 - 130
			Styrene	2015/01/23		89	%	60 - 130
			1,1,1,2-Tetrachloroethane	2015/01/23		93	%	60 - 130
			1,1,2,2-Tetrachloroethane	2015/01/23		97	%	60 - 130
			Tetrachloroethylene	2015/01/23		94	%	60 - 130
			Toluene	2015/01/23		93	%	60 - 130
			1,1,1-Trichloroethane	2015/01/23		93	%	60 - 130
			1,1,2-Trichloroethane	2015/01/23		101	%	60 - 130
			Trichloroethylene	2015/01/23		92	%	60 - 130
			Vinyl Chloride	2015/01/23		96	%	60 - 130
			p+m-Xylene	2015/01/23		90	%	60 - 130
			o-Xylene	2015/01/23		89	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2015/01/23		90	%	60 - 130
3896066	DR1	Method Blank	4-Bromofluorobenzene	2015/01/23		95	%	60 - 140
			D10-o-Xylene	2015/01/23		96	%	60 - 130
			D4-1,2-Dichloroethane	2015/01/23		103	%	60 - 140
			D8-Toluene	2015/01/23		99	%	60 - 140
			Acetone (2-Propanone)	2015/01/23	ND, RDL=0.50		ug/g	
			Benzene	2015/01/23	ND, RDL=0.0060		ug/g	
			Bromodichloromethane	2015/01/23	ND, RDL=0.050		ug/g	
			Bromoform	2015/01/23	ND, RDL=0.050		ug/g	
			Bromomethane	2015/01/23	ND, RDL=0.050		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Carbon Tetrachloride	2015/01/23	ND, RDL=0.050		ug/g	
			Chlorobenzene	2015/01/23	ND, RDL=0.050		ug/g	
			Chloroform	2015/01/23	ND, RDL=0.050		ug/g	
			Dibromochloromethane	2015/01/23	ND, RDL=0.050		ug/g	
			1,2-Dichlorobenzene	2015/01/23	ND, RDL=0.050		ug/g	
			1,3-Dichlorobenzene	2015/01/23	ND, RDL=0.050		ug/g	
			1,4-Dichlorobenzene	2015/01/23	ND, RDL=0.050		ug/g	
			Dichlorodifluoromethane (FREON 12)	2015/01/23	ND, RDL=0.050		ug/g	
			1,1-Dichloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			1,2-Dichloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			1,1-Dichloroethylene	2015/01/23	ND, RDL=0.050		ug/g	
			cis-1,2-Dichloroethylene	2015/01/23	ND, RDL=0.050		ug/g	
			trans-1,2-Dichloroethylene	2015/01/23	ND, RDL=0.050		ug/g	
			1,2-Dichloropropane	2015/01/23	ND, RDL=0.050		ug/g	
			cis-1,3-Dichloropropene	2015/01/23	ND, RDL=0.030		ug/g	
			trans-1,3-Dichloropropene	2015/01/23	ND, RDL=0.040		ug/g	
			Ethylbenzene	2015/01/23	ND, RDL=0.010		ug/g	
			Ethylene Dibromide	2015/01/23	ND, RDL=0.050		ug/g	
			Hexane	2015/01/23	ND, RDL=0.050		ug/g	
			Methylene Chloride(Dichloromethane)	2015/01/23	ND, RDL=0.050		ug/g	
			Methyl Isobutyl Ketone	2015/01/23	ND, RDL=0.50		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2015/01/23	ND, RDL=0.50		ug/g	
			Methyl t-butyl ether (MTBE)	2015/01/23	ND, RDL=0.050		ug/g	
			Styrene	2015/01/23	ND, RDL=0.050		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			1,1,1,2-Tetrachloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			1,1,2,2-Tetrachloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			Tetrachloroethylene	2015/01/23	ND, RDL=0.050		ug/g	
			Toluene	2015/01/23	ND, RDL=0.020		ug/g	
			1,1,1-Trichloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			1,1,2-Trichloroethane	2015/01/23	ND, RDL=0.050		ug/g	
			Trichloroethylene	2015/01/23	ND, RDL=0.010		ug/g	
			Vinyl Chloride	2015/01/23	ND, RDL=0.020		ug/g	
			p+m-Xylene	2015/01/23	ND, RDL=0.020		ug/g	
			o-Xylene	2015/01/23	ND, RDL=0.020		ug/g	
			Total Xylenes	2015/01/23	ND, RDL=0.020		ug/g	
			Trichlorofluoromethane (FREON 11)	2015/01/23	ND, RDL=0.050		ug/g	
3896066	DR1	RPD	Acetone (2-Propanone)	2015/01/24	NC		%	50
			Benzene	2015/01/24	NC		%	50
			Bromodichloromethane	2015/01/24	NC		%	50
			Bromoform	2015/01/24	NC		%	50
			Bromomethane	2015/01/24	NC		%	50
			Carbon Tetrachloride	2015/01/24	NC		%	50
			Chlorobenzene	2015/01/24	NC		%	50
			Chloroform	2015/01/24	NC		%	50
			Dibromochloromethane	2015/01/24	NC		%	50
			1,2-Dichlorobenzene	2015/01/24	NC		%	50
			1,3-Dichlorobenzene	2015/01/24	NC		%	50
			1,4-Dichlorobenzene	2015/01/24	NC		%	50
			Dichlorodifluoromethane (FREON 12)	2015/01/24	NC		%	50
			1,1-Dichloroethane	2015/01/24	NC		%	50
			1,2-Dichloroethane	2015/01/24	NC		%	50
			1,1-Dichloroethylene	2015/01/24	NC		%	50
			cis-1,2-Dichloroethylene	2015/01/24	NC		%	50
			trans-1,2-Dichloroethylene	2015/01/24	NC		%	50
			1,2-Dichloropropane	2015/01/24	NC		%	50
			cis-1,3-Dichloropropene	2015/01/24	NC		%	50
			trans-1,3-Dichloropropene	2015/01/24	NC		%	50
			Ethylbenzene	2015/01/24	NC		%	50
			Ethylene Dibromide	2015/01/24	NC		%	50
			Hexane	2015/01/24	NC		%	50
			Methylene Chloride(Dichloromethane)	2015/01/24	NC		%	50
			Methyl Isobutyl Ketone	2015/01/24	NC		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Methyl Ethyl Ketone (2-Butanone)	2015/01/24	NC		%	50
			Methyl t-butyl ether (MTBE)	2015/01/24	NC		%	50
			Styrene	2015/01/24	NC		%	50
			1,1,1,2-Tetrachloroethane	2015/01/24	NC		%	50
			1,1,2,2-Tetrachloroethane	2015/01/24	NC		%	50
			Tetrachloroethylene	2015/01/24	NC		%	50
			Toluene	2015/01/24	NC		%	50
			1,1,1-Trichloroethane	2015/01/24	NC		%	50
			1,1,2-Trichloroethane	2015/01/24	NC		%	50
			Trichloroethylene	2015/01/24	NC		%	50
			Vinyl Chloride	2015/01/24	NC		%	50
			p+m-Xylene	2015/01/24	NC		%	50
			o-Xylene	2015/01/24	NC		%	50
			Total Xylenes	2015/01/24	NC		%	50
			Trichlorofluoromethane (FREON 11)	2015/01/24	NC		%	50
3896191	NYS	Spiked Blank	Available (CaCl2) pH	2015/01/23		99	%	97 - 103
3896191	NYS	RPD	Available (CaCl2) pH	2015/01/23	0.20		%	N/A
3896468	BOP	RPD	Moisture	2015/01/23	1.4		%	20
3896475	DTI	Matrix Spike	D10-Anthracene	2015/01/23		80	%	50 - 130
			D14-Terphenyl (FS)	2015/01/23		70	%	50 - 130
			D8-Acenaphthylene	2015/01/23		65	%	50 - 130
			Acenaphthene	2015/01/23		73	%	50 - 130
			Acenaphthylene	2015/01/23		67	%	50 - 130
			Anthracene	2015/01/23		73	%	50 - 130
			Benzo(a)anthracene	2015/01/23		76	%	50 - 130
			Benzo(a)pyrene	2015/01/23		73	%	50 - 130
			Benzo(b/j)fluoranthene	2015/01/23		76	%	50 - 130
			Benzo(g,h,i)perylene	2015/01/23		69	%	50 - 130
			Benzo(k)fluoranthene	2015/01/23		68	%	50 - 130
			Chrysene	2015/01/23		78	%	50 - 130
			Dibenz(a,h)anthracene	2015/01/23		68	%	50 - 130
			Fluoranthene	2015/01/23		78	%	50 - 130
			Fluorene	2015/01/23		70	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2015/01/23		75	%	50 - 130
			1-Methylnaphthalene	2015/01/23		79	%	50 - 130
			2-Methylnaphthalene	2015/01/23		73	%	50 - 130
			Naphthalene	2015/01/23		81	%	50 - 130
			Phenanthrene	2015/01/23		71	%	50 - 130
			Pyrene	2015/01/23		79	%	50 - 130
3896475	DTI	Spiked Blank	D10-Anthracene	2015/01/23		81	%	50 - 130
			D14-Terphenyl (FS)	2015/01/23		78	%	50 - 130
			D8-Acenaphthylene	2015/01/23		72	%	50 - 130
			Acenaphthene	2015/01/23		82	%	50 - 130
			Acenaphthylene	2015/01/23		73	%	50 - 130
			Anthracene	2015/01/23		83	%	50 - 130
			Benzo(a)anthracene	2015/01/23		85	%	50 - 130
			Benzo(a)pyrene	2015/01/23		88	%	50 - 130
			Benzo(b/j)fluoranthene	2015/01/23		86	%	50 - 130
			Benzo(g,h,i)perylene	2015/01/23		75	%	50 - 130
			Benzo(k)fluoranthene	2015/01/23		76	%	50 - 130
			Chrysene	2015/01/23		86	%	50 - 130

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			Dibenz(a,h)anthracene	2015/01/23		73	%	50 - 130
			Fluoranthene	2015/01/23		85	%	50 - 130
			Fluorene	2015/01/23		79	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2015/01/23		82	%	50 - 130
			1-Methylnaphthalene	2015/01/23		82	%	50 - 130
			2-Methylnaphthalene	2015/01/23		77	%	50 - 130
			Naphthalene	2015/01/23		73	%	50 - 130
			Phenanthrene	2015/01/23		77	%	50 - 130
			Pyrene	2015/01/23		86	%	50 - 130
3896475	DTI	Method Blank	D10-Anthracene	2015/01/23		84	%	50 - 130
			D14-Terphenyl (FS)	2015/01/23		75	%	50 - 130
			D8-Acenaphthylene	2015/01/23		69	%	50 - 130
			Acenaphthene	2015/01/23	ND, RDL=0.0050		ug/g	
			Acenaphthylene	2015/01/23	ND, RDL=0.0050		ug/g	
			Anthracene	2015/01/23	ND, RDL=0.0050		ug/g	
			Benzo(a)anthracene	2015/01/23	ND, RDL=0.0050		ug/g	
			Benzo(a)pyrene	2015/01/23	ND, RDL=0.0050		ug/g	
			Benzo(b/j)fluoranthene	2015/01/23	ND, RDL=0.0050		ug/g	
			Benzo(g,h,i)perylene	2015/01/23	ND, RDL=0.0050		ug/g	
			Benzo(k)fluoranthene	2015/01/23	ND, RDL=0.0050		ug/g	
			Chrysene	2015/01/23	ND, RDL=0.0050		ug/g	
			Dibenz(a,h)anthracene	2015/01/23	ND, RDL=0.0050		ug/g	
			Fluoranthene	2015/01/23	ND, RDL=0.0050		ug/g	
			Fluorene	2015/01/23	ND, RDL=0.0050		ug/g	
			Indeno(1,2,3-cd)pyrene	2015/01/23	ND, RDL=0.0050		ug/g	
			1-Methylnaphthalene	2015/01/23	ND, RDL=0.0050		ug/g	
			2-Methylnaphthalene	2015/01/23	ND, RDL=0.0050		ug/g	
			Naphthalene	2015/01/23	ND, RDL=0.0050		ug/g	
			Phenanthrene	2015/01/23	ND, RDL=0.0050		ug/g	
			Pyrene	2015/01/23	ND, RDL=0.0050		ug/g	
3896475	DTI	RPD	Acenaphthene	2015/01/23	NC		%	40

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			Acenaphthylene	2015/01/23	NC		%	40
			Anthracene	2015/01/23	NC		%	40
			Benzo(a)anthracene	2015/01/23	NC		%	40
			Benzo(a)pyrene	2015/01/23	NC		%	40
			Benzo(b/j)fluoranthene	2015/01/23	NC		%	40
			Benzo(g,h,i)perylene	2015/01/23	NC		%	40
			Benzo(k)fluoranthene	2015/01/23	NC		%	40
			Chrysene	2015/01/23	NC		%	40
			Dibenz(a,h)anthracene	2015/01/23	NC		%	40
			Fluoranthene	2015/01/23	NC		%	40
			Fluorene	2015/01/23	NC		%	40
			Indeno(1,2,3-cd)pyrene	2015/01/23	NC		%	40
			1-Methylnaphthalene	2015/01/23	NC		%	40
			2-Methylnaphthalene	2015/01/23	NC		%	40
			Naphthalene	2015/01/23	NC		%	40
			Phenanthrene	2015/01/23	NC		%	40
			Pyrene	2015/01/23	NC		%	40
3896612	LPG	Matrix Spike	Decachlorobiphenyl	2015/01/23		87	%	60 - 130
			Aroclor 1260	2015/01/23		99	%	60 - 130
			Total PCB	2015/01/23		99	%	60 - 130
3896612	LPG	Spiked Blank	Decachlorobiphenyl	2015/01/24		74	%	60 - 130
			Aroclor 1260	2015/01/24		93	%	60 - 130
			Total PCB	2015/01/24		93	%	60 - 130
3896612	LPG	Method Blank	Decachlorobiphenyl	2015/01/23		82	%	60 - 130
			Aroclor 1242	2015/01/23	ND, RDL=0.010		ug/g	
			Aroclor 1248	2015/01/23	ND, RDL=0.010		ug/g	
			Aroclor 1254	2015/01/23	ND, RDL=0.010		ug/g	
			Aroclor 1260	2015/01/23	ND, RDL=0.010		ug/g	
			Total PCB	2015/01/23	ND, RDL=0.010		ug/g	
3896612	LPG	RPD	Aroclor 1242	2015/01/23	NC		%	50
			Aroclor 1248	2015/01/23	NC		%	50
			Aroclor 1254	2015/01/23	NC		%	50
			Aroclor 1260	2015/01/23	NC		%	50
			Total PCB	2015/01/23	NC		%	50
3897343	BLZ	Matrix Spike	o-Terphenyl	2015/01/25		91	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/25		99	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2015/01/25		106	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2015/01/25		114	%	50 - 130
3897343	BLZ	Spiked Blank	o-Terphenyl	2015/01/25		90	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/25		100	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2015/01/25		106	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2015/01/25		114	%	80 - 120
3897343	BLZ	Method Blank	o-Terphenyl	2015/01/25		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/25	ND, RDL=10		ug/g	

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			F3 (C16-C34 Hydrocarbons)	2015/01/25	ND, RDL=50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2015/01/25	ND, RDL=50		ug/g	
3897343	BLZ	RPD	F2 (C10-C16 Hydrocarbons)	2015/01/25	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2015/01/25	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2015/01/25	NC		%	30
3897345	SHK	Spiked Blank	1,4-Difluorobenzene	2015/01/26		99	%	60 - 140
			4-Bromofluorobenzene	2015/01/26		101	%	60 - 140
			D10-Ethylbenzene	2015/01/26		86	%	60 - 140
			D4-1,2-Dichloroethane	2015/01/26		94	%	60 - 140
			F1 (C6-C10)	2015/01/26		88	%	80 - 120
3897345	SHK	RPD	F1 (C6-C10)	2015/01/26	7.9		%	30
			F1 (C6-C10)	2015/01/26	NC		%	30
			F1 (C6-C10) - BTEX	2015/01/26	NC		%	30
3897345	SHK	Method Blank	1,4-Difluorobenzene	2015/01/26		100	%	60 - 140
			4-Bromofluorobenzene	2015/01/26		94	%	60 - 140
			D10-Ethylbenzene	2015/01/26		87	%	60 - 140
			D4-1,2-Dichloroethane	2015/01/26		94	%	60 - 140
			F1 (C6-C10)	2015/01/26	ND, RDL=10		ug/g	
			F1 (C6-C10) - BTEX	2015/01/26	ND, RDL=10		ug/g	
3897954	SAU	Spiked Blank	Available (CaCl2) pH	2015/01/26		100	%	97 - 103
3897954	SAU	RPD	Available (CaCl2) pH	2015/01/26	0.47		%	N/A
3897960	SAU	Spiked Blank	Available (CaCl2) pH	2015/01/26		100	%	97 - 103
3897960	SAU	RPD [ZG3194-01]	Available (CaCl2) pH	2015/01/26	0.22		%	N/A
3897966	SUK	Matrix Spike	Hot Water Ext. Boron (B)	2015/01/26		95	%	75 - 125
3897966	SUK	Spiked Blank	Hot Water Ext. Boron (B)	2015/01/26		98	%	75 - 125
3897966	SUK	Method Blank	Hot Water Ext. Boron (B)	2015/01/26	ND, RDL=0.050		ug/g	
3897966	SUK	RPD	Hot Water Ext. Boron (B)	2015/01/26	6.2		%	40
3897973	JXI	Matrix Spike	1,4-Difluorobenzene	2015/01/26		99	%	60 - 140
			4-Bromofluorobenzene	2015/01/26		104	%	60 - 140
			D10-Ethylbenzene	2015/01/26		96	%	60 - 140
			D4-1,2-Dichloroethane	2015/01/26		89	%	60 - 140
			F1 (C6-C10)	2015/01/26		100	%	60 - 140
3897973	JXI	Spiked Blank	1,4-Difluorobenzene	2015/01/26		99	%	60 - 140
			4-Bromofluorobenzene	2015/01/26		107	%	60 - 140
			D10-Ethylbenzene	2015/01/26		98	%	60 - 140
			D4-1,2-Dichloroethane	2015/01/26		91	%	60 - 140
			F1 (C6-C10)	2015/01/26		98	%	80 - 120
3897973	JXI	Method Blank	1,4-Difluorobenzene	2015/01/26		100	%	60 - 140
			4-Bromofluorobenzene	2015/01/26		99	%	60 - 140
			D10-Ethylbenzene	2015/01/26		89	%	60 - 140
			D4-1,2-Dichloroethane	2015/01/26		90	%	60 - 140
			F1 (C6-C10)	2015/01/26	ND, RDL=10		ug/g	
			F1 (C6-C10) - BTEX	2015/01/26	ND, RDL=10		ug/g	

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3897973	JXI	RPD	F1 (C6-C10)	2015/01/26	NC		%	30
			F1 (C6-C10) - BTEX	2015/01/26	NC		%	30
3897989	XQI	Matrix Spike [ZG3194-01]	Free Cyanide	2015/01/27		93	%	75 - 125
3897989	XQI	Spiked Blank	Free Cyanide	2015/01/27		99	%	80 - 120
3897989	XQI	Method Blank	Free Cyanide	2015/01/27	ND, RDL=0.01		ug/g	
3897989	XQI	RPD [ZG3194-01]	Free Cyanide	2015/01/27	NC		%	35
3898141	SAU	Matrix Spike [ZG3193-01]	Fluoride (F-)	2015/01/27		101	%	80 - 120
3898141	SAU	Spiked Blank	Fluoride (F-)	2015/01/27		102	%	80 - 120
3898141	SAU	Method Blank	Fluoride (F-)	2015/01/27	ND,RDL=5		ug/g	
3898141	SAU	RPD [ZG3193-01]	Fluoride (F-)	2015/01/27	NC		%	25
3898177	GBU	Matrix Spike	Acid Extractable Antimony (Sb)	2015/01/26		91	%	75 - 125
			Acid Extractable Arsenic (As)	2015/01/26		99	%	75 - 125
			Acid Extractable Barium (Ba)	2015/01/26		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2015/01/26		101	%	75 - 125
			Acid Extractable Cadmium (Cd)	2015/01/26		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2015/01/26		NC	%	75 - 125
			Acid Extractable Cobalt (Co)	2015/01/26		97	%	75 - 125
			Acid Extractable Copper (Cu)	2015/01/26		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2015/01/26		97	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2015/01/26		99	%	75 - 125
			Acid Extractable Nickel (Ni)	2015/01/26		NC	%	75 - 125
			Acid Extractable Selenium (Se)	2015/01/26		95	%	75 - 125
			Acid Extractable Silver (Ag)	2015/01/26		98	%	75 - 125
			Acid Extractable Thallium (Tl)	2015/01/26		95	%	75 - 125
			Acid Extractable Tin (Sn)	2015/01/26		99	%	75 - 125
			Acid Extractable Uranium (U)	2015/01/26		94	%	75 - 125
			Acid Extractable Vanadium (V)	2015/01/26		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2015/01/26		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2015/01/26		100	%	75 - 125
3898177	GBU	Spiked Blank	Acid Extractable Antimony (Sb)	2015/01/26		105	%	80 - 120
			Acid Extractable Arsenic (As)	2015/01/26		101	%	80 - 120
			Acid Extractable Barium (Ba)	2015/01/26		104	%	80 - 120
			Acid Extractable Beryllium (Be)	2015/01/26		103	%	80 - 120
			Acid Extractable Cadmium (Cd)	2015/01/26		102	%	80 - 120
			Acid Extractable Chromium (Cr)	2015/01/26		100	%	80 - 120
			Acid Extractable Cobalt (Co)	2015/01/26		100	%	80 - 120
			Acid Extractable Copper (Cu)	2015/01/26		102	%	80 - 120
			Acid Extractable Lead (Pb)	2015/01/26		101	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2015/01/26		101	%	80 - 120
			Acid Extractable Nickel (Ni)	2015/01/26		102	%	80 - 120
			Acid Extractable Selenium (Se)	2015/01/26		99	%	80 - 120
			Acid Extractable Silver (Ag)	2015/01/26		100	%	80 - 120
			Acid Extractable Thallium (Tl)	2015/01/26		98	%	80 - 120
			Acid Extractable Tin (Sn)	2015/01/26		100	%	80 - 120
			Acid Extractable Uranium (U)	2015/01/26		97	%	80 - 120
			Acid Extractable Vanadium (V)	2015/01/26		100	%	80 - 120
			Acid Extractable Zinc (Zn)	2015/01/26		104	%	80 - 120
			Acid Extractable Mercury (Hg)	2015/01/26		111	%	80 - 120
3898177	GBU	Method Blank	Acid Extractable Antimony (Sb)	2015/01/26	ND, RDL=0.20		ug/g	

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			Acid Extractable Arsenic (As)	2015/01/26	ND, RDL=1.0		ug/g	
			Acid Extractable Barium (Ba)	2015/01/26	ND, RDL=0.50		ug/g	
			Acid Extractable Beryllium (Be)	2015/01/26	ND, RDL=0.20		ug/g	
			Acid Extractable Cadmium (Cd)	2015/01/26	ND, RDL=0.10		ug/g	
			Acid Extractable Chromium (Cr)	2015/01/26	ND, RDL=1.0		ug/g	
			Acid Extractable Cobalt (Co)	2015/01/26	ND, RDL=0.10		ug/g	
			Acid Extractable Copper (Cu)	2015/01/26	ND, RDL=0.50		ug/g	
			Acid Extractable Lead (Pb)	2015/01/26	ND, RDL=1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2015/01/26	ND, RDL=0.50		ug/g	
			Acid Extractable Nickel (Ni)	2015/01/26	ND, RDL=0.50		ug/g	
			Acid Extractable Selenium (Se)	2015/01/26	ND, RDL=0.50		ug/g	
			Acid Extractable Silver (Ag)	2015/01/26	ND, RDL=0.20		ug/g	
			Acid Extractable Thallium (Tl)	2015/01/26	ND, RDL=0.050		ug/g	
			Acid Extractable Tin (Sn)	2015/01/26	ND, RDL=5.0		ug/g	
			Acid Extractable Uranium (U)	2015/01/26	ND, RDL=0.050		ug/g	
			Acid Extractable Vanadium (V)	2015/01/26	ND, RDL=5.0		ug/g	
			Acid Extractable Zinc (Zn)	2015/01/26	ND, RDL=5.0		ug/g	
			Acid Extractable Mercury (Hg)	2015/01/26	ND, RDL=0.050		ug/g	
3898177	GBU	RPD	Acid Extractable Antimony (Sb)	2015/01/26	NC		%	30
			Acid Extractable Arsenic (As)	2015/01/26	NC		%	30
			Acid Extractable Barium (Ba)	2015/01/26	3.3		%	30
			Acid Extractable Beryllium (Be)	2015/01/26	NC		%	30
			Acid Extractable Cadmium (Cd)	2015/01/26	NC		%	30
			Acid Extractable Chromium (Cr)	2015/01/26	2.6		%	30
			Acid Extractable Cobalt (Co)	2015/01/26	2.1		%	30
			Acid Extractable Copper (Cu)	2015/01/26	0.31		%	30
			Acid Extractable Lead (Pb)	2015/01/26	1.1		%	30
			Acid Extractable Molybdenum (Mo)	2015/01/26	NC		%	30
			Acid Extractable Nickel (Ni)	2015/01/26	0.53		%	30
			Acid Extractable Selenium (Se)	2015/01/26	NC		%	30
			Acid Extractable Silver (Ag)	2015/01/26	NC		%	30

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Acid Extractable Thallium (Tl)	2015/01/26	NC		%	30
			Acid Extractable Uranium (U)	2015/01/26	9.4		%	30
			Acid Extractable Vanadium (V)	2015/01/26	0.24		%	30
			Acid Extractable Zinc (Zn)	2015/01/26	2.5		%	30
3898185	MGE	Matrix Spike [ZG3194-01]	Chromium (VI)	2015/01/27		90	%	75 - 125
3898185	MGE	QC Standard	Chromium (VI)	2015/01/27		105	%	80 - 120
3898185	MGE	Spiked Blank	Chromium (VI)	2015/01/27		95	%	80 - 120
3898185	MGE	Method Blank	Chromium (VI)	2015/01/27	ND, RDL=0.2		ug/g	
3898185	MGE	RPD [ZG3194-01]	Chromium (VI)	2015/01/27	NC		%	35
3899072	YPA	Spiked Blank	Conductivity	2015/01/27		100	%	90 - 110
3899072	YPA	Method Blank	Conductivity	2015/01/27	ND, RDL=0.002		mS/cm	
3899072	YPA	RPD [ZG3194-01]	Conductivity	2015/01/27	0.38		%	10
3899304	AFZ	Matrix Spike [ZG3197-01]	Acid Extractable Sulphur (S)	2015/01/27		NC	%	75 - 125
3899304	AFZ	Spiked Blank	Acid Extractable Sulphur (S)	2015/01/27		101	%	80 - 120
3899304	AFZ	Method Blank	Acid Extractable Sulphur (S)	2015/01/27	ND, RDL=50		ug/g	
3899304	AFZ	RPD [ZG3197-01]	Acid Extractable Sulphur (S)	2015/01/27	NC		%	30
3900428	RUS	Matrix Spike	F4G-sg (Grav. Heavy Hydrocarbons)	2015/01/28		104	%	65 - 135
3900428	RUS	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2015/01/28		104	%	65 - 135
3900428	RUS	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2015/01/28	ND, RDL=100		ug/g	
3900428	RUS	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2015/01/28	NC		%	50

N/A = Not Applicable

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

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

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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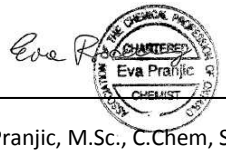
Maxxam Job #: B512379
Report Date: 2015/01/28

Stantec Consulting Ltd
Client Project #: 122411046.300
Site Location: CENTRE BLOCK OTTAWA
Your P.O. #: 16300R-20
Sampler Initials: AN

VALIDATION SIGNATURE PAGE

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Medhat Riskallah, Manager, Hydrocarbon Department

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: MB509476
Your C.O.C. #: 1 of 1

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2015/01/26
Report #: R1793194
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B504365
Received: 2015/01/20, 08:40

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME - Dissolved	1	N/A	2015/01/23	AB SOP-00043	Auto Calc
Cadmium - low level CCME - Dissolved	3	N/A	2015/01/24	AB SOP-00043	Auto Calc
Cyanide (weak acid dissociable)	4	N/A	2015/01/21	CAL SOP-00051	EPA 335.4 R1 m
Sulphide (as H2S)	4	N/A	2015/01/26	CAL SOP-00062	SM 4500-S2 D
Elements by ICP - Dissolved	4	N/A	2015/01/21	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	4	N/A	2015/01/22	AB SOP-00043	EPA 200.8 R5.4 m
Sulphide	4	N/A	2015/01/22	CAL SOP-00062	SM 22 4500 S2-D m

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

Encryption Key

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

Cynny Hagen, Project Manager Assistant
Email: CHagen@maxxam.ca
Phone# (403) 735-2273

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B504365
Report Date: 2015/01/26

MAXXAM ANALYTICS
Client Project #: MB509476

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Low Level Elements							
Dissolved Cadmium (Cd)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	7782837
Elements							
Dissolved Aluminum (Al)	mg/L	0.030	0.061	1.4	0.012	0.0030	7785566
Dissolved Antimony (Sb)	mg/L	<0.00060	<0.00060	<0.00060	<0.00060	0.00060	7785566
Dissolved Arsenic (As)	mg/L	<0.00020	<0.00020	0.00026	<0.00020	0.00020	7785566
Dissolved Barium (Ba)	mg/L	0.34	0.71	0.64	0.24	0.010	7784286
Dissolved Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7785566
Dissolved Boron (B)	mg/L	0.51	0.21	0.21	0.064	0.020	7784286
Dissolved Calcium (Ca)	mg/L	64	78	120	130	0.30	7784286
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	0.0018	<0.0010	0.0010	7785566
Dissolved Cobalt (Co)	mg/L	0.0037	0.00078	0.0010	0.00072	0.00030	7785566
Dissolved Copper (Cu)	mg/L	0.0020	0.00038	0.0013	0.00031	0.00020	7785566
Dissolved Iron (Fe)	mg/L	<0.060	0.070	1.7	<0.060	0.060	7784286
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	0.0012	<0.00020	0.00020	7785566
Dissolved Lithium (Li)	mg/L	0.029	0.026	0.030	<0.020	0.020	7784286
Dissolved Magnesium (Mg)	mg/L	16	17	18	16	0.20	7784286
Dissolved Manganese (Mn)	mg/L	0.021	0.024	0.062	0.018	0.0040	7784286
Dissolved Molybdenum (Mo)	mg/L	0.19	0.0080	0.0064	0.0055	0.00020	7785566
Dissolved Nickel (Ni)	mg/L	0.0017	0.0011	0.0024	0.00076	0.00050	7785566
Dissolved Phosphorus (P)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	7784286
Dissolved Potassium (K)	mg/L	9.9	8.2	8.6	5.4	0.30	7784286
Dissolved Selenium (Se)	mg/L	0.00022	<0.00020	0.00027	0.00097	0.00020	7785566
Dissolved Silicon (Si)	mg/L	4.8	5.3	5.9	3.0	0.10	7784286
Dissolved Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7785566
Dissolved Sodium (Na)	mg/L	83	50	50	110	0.50	7784286
Dissolved Strontium (Sr)	mg/L	3.3	3.2	3.2	2.2	0.020	7784286
Dissolved Sulphur (S)	mg/L	35	24	25	48	0.20	7784286
Dissolved Thallium (Tl)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7785566
Dissolved Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7785566
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0017	0.046	<0.0010	0.0010	7785566
Dissolved Uranium (U)	mg/L	0.00034	<0.00010	0.00024	0.00049	0.00010	7785566
Dissolved Vanadium (V)	mg/L	<0.0010	<0.0010	0.0015	<0.0010	0.0010	7785566

RDL = Reportable Detection Limit

MAXXAM ANALYTICS
Maxxam Job #: B504365
Client Project #: MB509476
Report Date: 2015/01/26

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	mg/L	0.0044	<0.0030	<0.0030	0.0063	0.0030	7785566

RDL = Reportable Detection Limit

Maxxam Job #: B504365
Report Date: 2015/01/26

MAXXAM ANALYTICS
Client Project #: MB509476

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Calculated Parameters							
Hydrogen Sulphide (H2S)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7782789
Misc. Inorganics							
Weak Acid Dissoc. Cyanide (CN)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7782878
Anions							
Sulphide	mg/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	7785847

RDL = Reportable Detection Limit

MAXXAM ANALYTICS
Client Project #: MB509476

Maxxam Job #: B504365
Report Date: 2015/01/26

Package 1	1.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB504365

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7782878	AP1	Matrix Spike	Weak Acid Dissoc. Cyanide (CN)	2015/01/21		90	%	80 - 120
		Spiked Blank	Weak Acid Dissoc. Cyanide (CN)	2015/01/21		96	%	80 - 120
		Method Blank	Weak Acid Dissoc. Cyanide (CN)	2015/01/21	<0.0010		mg/L	
		RPD	Weak Acid Dissoc. Cyanide (CN)	2015/01/21	NC		%	20
7784286	SRT	Matrix Spike	Dissolved Barium (Ba)	2015/01/21		96	%	80 - 120
			Dissolved Boron (B)	2015/01/21		96	%	80 - 120
			Dissolved Calcium (Ca)	2015/01/21		NC	%	80 - 120
			Dissolved Iron (Fe)	2015/01/21		99	%	80 - 120
			Dissolved Lithium (Li)	2015/01/21		96	%	80 - 120
			Dissolved Magnesium (Mg)	2015/01/21		96	%	80 - 120
			Dissolved Manganese (Mn)	2015/01/21		98	%	80 - 120
			Dissolved Phosphorus (P)	2015/01/21		102	%	80 - 120
			Dissolved Potassium (K)	2015/01/21		93	%	80 - 120
			Dissolved Silicon (Si)	2015/01/21		NC	%	80 - 120
			Dissolved Sodium (Na)	2015/01/21		93	%	80 - 120
			Dissolved Strontium (Sr)	2015/01/21		96	%	80 - 120
		Spiked Blank	Dissolved Barium (Ba)	2015/01/21		95	%	80 - 120
			Dissolved Boron (B)	2015/01/21		96	%	80 - 120
			Dissolved Calcium (Ca)	2015/01/21		102	%	80 - 120
			Dissolved Iron (Fe)	2015/01/21		99	%	80 - 120
			Dissolved Lithium (Li)	2015/01/21		93	%	80 - 120
			Dissolved Magnesium (Mg)	2015/01/21		99	%	80 - 120
			Dissolved Manganese (Mn)	2015/01/21		98	%	80 - 120
			Dissolved Phosphorus (P)	2015/01/21		97	%	80 - 120
			Dissolved Potassium (K)	2015/01/21		93	%	80 - 120
			Dissolved Silicon (Si)	2015/01/21		97	%	80 - 120
			Dissolved Sodium (Na)	2015/01/21		92	%	80 - 120
			Dissolved Strontium (Sr)	2015/01/21		94	%	80 - 120
		Method Blank	Dissolved Barium (Ba)	2015/01/21	<0.010		mg/L	
			Dissolved Boron (B)	2015/01/21	<0.020		mg/L	
			Dissolved Calcium (Ca)	2015/01/21	<0.30		mg/L	
			Dissolved Iron (Fe)	2015/01/21	<0.060		mg/L	
			Dissolved Lithium (Li)	2015/01/21	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2015/01/21	<0.20		mg/L	
			Dissolved Manganese (Mn)	2015/01/21	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2015/01/21	<0.10		mg/L	
			Dissolved Potassium (K)	2015/01/21	<0.30		mg/L	
			Dissolved Silicon (Si)	2015/01/21	<0.10		mg/L	
			Dissolved Sodium (Na)	2015/01/21	<0.50		mg/L	
			Dissolved Strontium (Sr)	2015/01/21	<0.020		mg/L	
			Dissolved Sulphur (S)	2015/01/21	<0.20		mg/L	
		RPD	Dissolved Barium (Ba)	2015/01/21	0.07		%	20
			Dissolved Boron (B)	2015/01/21	NC		%	20
			Dissolved Calcium (Ca)	2015/01/21	0.7		%	20
			Dissolved Iron (Fe)	2015/01/21	1.5		%	20
			Dissolved Lithium (Li)	2015/01/21	NC		%	20
			Dissolved Magnesium (Mg)	2015/01/21	0.04		%	20
			Dissolved Manganese (Mn)	2015/01/21	0.6		%	20
			Dissolved Phosphorus (P)	2015/01/21	NC		%	20
			Dissolved Potassium (K)	2015/01/21	0.6		%	20
			Dissolved Silicon (Si)	2015/01/21	0.6		%	20
			Dissolved Sodium (Na)	2015/01/21	0.01		%	20
			Dissolved Strontium (Sr)	2015/01/21	NC		%	20
			Dissolved Sulphur (S)	2015/01/21	0.4		%	20
7785566	TDB	Matrix Spike	Dissolved Aluminum (Al)	2015/01/22		100	%	80 - 120

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB504365

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7785566	TDB	Matrix Spike	Dissolved Antimony (Sb)	2015/01/22		73 (1)	%	80 - 120
			Dissolved Arsenic (As)	2015/01/22		93	%	80 - 120
			Dissolved Beryllium (Be)	2015/01/22		93	%	80 - 120
			Dissolved Chromium (Cr)	2015/01/22		90	%	80 - 120
			Dissolved Cobalt (Co)	2015/01/22		87	%	80 - 120
			Dissolved Copper (Cu)	2015/01/22		85	%	80 - 120
			Dissolved Lead (Pb)	2015/01/22		88	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/01/22		94	%	80 - 120
			Dissolved Nickel (Ni)	2015/01/22		88	%	80 - 120
			Dissolved Selenium (Se)	2015/01/22		94	%	80 - 120
			Dissolved Silver (Ag)	2015/01/22		90	%	80 - 120
			Dissolved Thallium (Tl)	2015/01/22		90	%	80 - 120
			Dissolved Tin (Sn)	2015/01/22		87	%	80 - 120
			Dissolved Titanium (Ti)	2015/01/22		91	%	80 - 120
			Dissolved Uranium (U)	2015/01/22		88	%	80 - 120
			Dissolved Vanadium (V)	2015/01/22		94	%	80 - 120
			Dissolved Zinc (Zn)	2015/01/22		93	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2015/01/22		104	%	80 - 120
			Dissolved Antimony (Sb)	2015/01/22		93	%	80 - 120
			Dissolved Arsenic (As)	2015/01/22		93	%	80 - 120
			Dissolved Beryllium (Be)	2015/01/22		94	%	80 - 120
			Dissolved Chromium (Cr)	2015/01/22		94	%	80 - 120
			Dissolved Cobalt (Co)	2015/01/22		94	%	80 - 120
			Dissolved Copper (Cu)	2015/01/22		94	%	80 - 120
			Dissolved Lead (Pb)	2015/01/22		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/01/22		91	%	80 - 120
			Dissolved Nickel (Ni)	2015/01/22		94	%	80 - 120
			Dissolved Selenium (Se)	2015/01/22		92	%	80 - 120
			Dissolved Silver (Ag)	2015/01/22		92	%	80 - 120
			Dissolved Thallium (Tl)	2015/01/22		92	%	80 - 120
			Dissolved Tin (Sn)	2015/01/22		87	%	80 - 120
			Dissolved Titanium (Ti)	2015/01/22		87	%	80 - 120
			Dissolved Uranium (U)	2015/01/22		90	%	80 - 120
			Dissolved Vanadium (V)	2015/01/22		98	%	80 - 120
			Dissolved Zinc (Zn)	2015/01/22		98	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2015/01/22	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2015/01/22	<0.00060		mg/L	
			Dissolved Arsenic (As)	2015/01/22	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2015/01/22	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2015/01/22	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2015/01/22	<0.00030		mg/L	
			Dissolved Copper (Cu)	2015/01/22	<0.00020		mg/L	
			Dissolved Lead (Pb)	2015/01/22	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2015/01/22	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2015/01/22	<0.00050		mg/L	
			Dissolved Selenium (Se)	2015/01/22	<0.00020		mg/L	
			Dissolved Silver (Ag)	2015/01/22	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2015/01/22	<0.00020		mg/L	
			Dissolved Tin (Sn)	2015/01/22	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2015/01/22	<0.0010		mg/L	
			Dissolved Uranium (U)	2015/01/22	<0.00010		mg/L	
			Dissolved Vanadium (V)	2015/01/22	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2015/01/22	<0.0030		mg/L	
		RPD	Dissolved Aluminum (Al)	2015/01/22	NC		%	20
			Dissolved Antimony (Sb)	2015/01/22	NC		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB504365

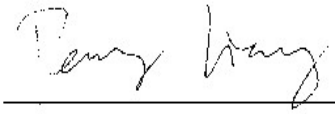
QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7785566	TDB	RPD	Dissolved Arsenic (As)	2015/01/22	NC		%	20
			Dissolved Beryllium (Be)	2015/01/22	NC		%	20
			Dissolved Chromium (Cr)	2015/01/22	NC		%	20
			Dissolved Cobalt (Co)	2015/01/22	NC		%	20
			Dissolved Copper (Cu)	2015/01/22	NC		%	20
			Dissolved Lead (Pb)	2015/01/22	NC		%	20
			Dissolved Molybdenum (Mo)	2015/01/22	NC		%	20
			Dissolved Nickel (Ni)	2015/01/22	NC		%	20
			Dissolved Selenium (Se)	2015/01/22	NC		%	20
			Dissolved Silver (Ag)	2015/01/22	NC		%	20
			Dissolved Thallium (Tl)	2015/01/22	NC		%	20
			Dissolved Tin (Sn)	2015/01/22	NC		%	20
			Dissolved Titanium (Ti)	2015/01/22	NC		%	20
			Dissolved Uranium (U)	2015/01/22	5.5		%	20
			Dissolved Vanadium (V)	2015/01/22	NC		%	20
			Dissolved Zinc (Zn)	2015/01/22	NC		%	20
7785847	ARB	Spiked Blank	Sulphide	2015/01/22		97	%	80 - 120
		Method Blank	Sulphide	2015/01/22	<0.0019		mg/L	
		RPD	Sulphide	2015/01/22	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B504365

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



Peng Liang, Senior Analyst

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Your P.O. #: 16400NR
Your Project #: 122411046
Your C.O.C. #: 497860-01-01

Attention:Allen MacGarvie

Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2015/01/27
Report #: R3313642
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B509476
Received: 2015/01/19, 11:45

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
1,3-Dichloropropene Sum (1)	5	N/A	2015/01/23	CAM SOP-00226	EPA 8260
Chloride by Automated Colourimetry (1)	3	N/A	2015/01/21	CAM SOP-00463	EPA 325.2 m
Chloride by Automated Colourimetry (1)	1	N/A	2015/01/22	CAM SOP-00463	EPA 325.2 m
Petroleum Hydro. CCME F1 & BTEX in Water	4	N/A	2015/01/21	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	4	2015/01/21	2015/01/21	OTT SOP-00001	CCME Hydrocarbons
Fluoride (1)	4	2015/01/20	2015/01/21	CAM SOP-00449	SM 22 4500-F C m
Mercury (low level) (1)	4	2015/01/21	2015/01/21	CAM SOP-00453	EPA 7470 m
Total Ammonia-N (1)	4	N/A	2015/01/23	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1, 2)	4	N/A	2015/01/21	CAM SOP-00440	SM 22 4500-NO3I/NO2B
PAH Compounds in Water by GC/MS (SIM) (1)	4	2015/01/21	2015/01/22	CAM SOP-00318	EPA 8270 m
Polychlorinated Biphenyl (PCB) (1)	4	2015/01/22	2015/01/22	CAM SOP-00309	EPA 8082A m
pH (1)	4	N/A	2015/01/21	CAM SOP-00413	SM 4500H+ B
Sulphate by Automated Colourimetry (1)	3	N/A	2015/01/21	CAM SOP-00464	EPA 375.4 m
Sulphate by Automated Colourimetry (1)	1	N/A	2015/01/22	CAM SOP-00464	EPA 375.4 m
Volatile Organic Compounds in Water (1)	5	N/A	2015/01/22	CAM SOP-00226	EPA 8260 m
Non-Routine Volatile Organic Compounds (1)	5	N/A	2015/01/22	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

Your P.O. #: 16400NR
Your Project #: 122411046
Your C.O.C. #: 497860-01-01

Attention:Allen MacGarvie

Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2015/01/27
Report #: R3313642
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B509476
Received: 2015/01/19, 11:45

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

(1) This test was performed by Maxxam Analytics Mississauga
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Parnian Baber, Project Manager
Email: pbaber@maxxam.ca
Phone# (613) 274-0573

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

CCME GROUNDWATER INORGANICS PACKAGE (WATER)

Maxxam ID		ZE9340	ZE9340		ZE9341		ZE9342		
Sampling Date		2015/01/16 20:35	2015/01/16 20:35		2015/01/16 19:30		2015/01/16 19:40		
COC Number		497860-01-01	497860-01-01		497860-01-01		497860-01-01		
	Units	BH14-1	BH14-1 Lab-Dup	QC Batch	BH14-2	QC Batch	BH14-2*DUP*	RDL	QC Batch
Inorganics									
Total Ammonia-N	mg/L	0.36		3895295	0.37	3895295	0.39	0.050	3895295
Fluoride (F-)	mg/L	0.47		3892211	0.69	3892211	0.66	0.10	3892211
pH	pH	7.95		3892216	7.95	3892216	7.88	N/A	3892216
Dissolved Sulphate (SO4)	mg/L	110		3892758	70	3893380	75	1	3892758
Dissolved Chloride (Cl)	mg/L	120		3892749	130	3893371	130	1	3892749
Nitrite (N)	mg/L	<0.010		3892500	0.018	3892500	0.029	0.010	3892500
Nitrate (N)	mg/L	<0.10		3892500	0.21	3892500	0.18	0.10	3892500
Nitrate + Nitrite	mg/L	<0.10		3892500	0.23	3892500	0.21	0.10	3892500
Metals									
Mercury (Hg)	ug/L	<0.01	<0.01	3892941	<0.01	3892941	<0.01	0.01	3892941

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam ID		ZE9343		
Sampling Date		2015/01/18 19:30		
COC Number		497860-01-01		
	Units	BH14-3	RDL	QC Batch
Inorganics				
Total Ammonia-N	mg/L	0.28	0.050	3895295
Fluoride (F-)	mg/L	0.36	0.10	3892211
pH	pH	7.92	N/A	3892216
Dissolved Sulphate (SO4)	mg/L	150	1	3892758
Dissolved Chloride (Cl)	mg/L	250	3	3892749
Nitrite (N)	mg/L	0.014	0.010	3892500
Nitrate (N)	mg/L	<0.10	0.10	3892500
Nitrate + Nitrite	mg/L	<0.10	0.10	3892500
Metals				
Mercury (Hg)	ug/L	<0.01	0.01	3892941

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		ZE9340	ZE9341	ZE9342	ZE9343		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	BH14-1	BH14-2	BH14-2*DUP*	BH14-3	RDL	QC Batch
Polyaromatic Hydrocarbons							
Acenaphthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Benzo(b/j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Fluorene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
1-Methylnaphthalene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
2-Methylnaphthalene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Naphthalene	ug/L	<0.010	0.013	0.015	<0.010	0.010	3893628
Phenanthrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	3893628
Surrogate Recovery (%)							
D10-Anthracene	%	101	94	108	103		3893628
D14-Terphenyl (FS)	%	100	93	104	100		3893628
D8-Acenaphthylene	%	100	94	103	99		3893628

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		ZE9340	ZE9340	ZE9341	ZE9342	ZE9343	ZE9344		
Sampling Date		2015/01/16 20:35	2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30	2015/01/16		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	**BH14-1**	**BH14-1 Lab-Dup**	**BH14-2**	**BH14-2*DUP***	**BH14-3**	**TRIP BLANK**	**RDL**	**QC Batch**
Volatile Organics									
1,3,5-Trimethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892806

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		ZE9340	ZE9341	ZE9341	ZE9342	ZE9343		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	BH14-1	BH14-2	BH14-2 Lab-Dup	BH14-2*DUP*	BH14-3	RDL	QC Batch
PCBs								
Aroclor 1016	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1221	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1232	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1262	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1268	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1242	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1248	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1254	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Aroclor 1260	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Total PCB	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	3894488
Surrogate Recovery (%)								
Decachlorobiphenyl	%	96	98	97	95	99		3894488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Report Date: 2015/01/27

Stantec Consulting Ltd
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Your P.O. #: 16400NR
Sampler Initials: JM

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		ZE9340	ZE9340	ZE9341	ZE9341	ZE9342	ZE9343		
Sampling Date		2015/01/16 20:35	2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	BH14-1	BH14-1 Lab-Dup	BH14-2	BH14-2 Lab-Dup	BH14-2*DUP*	BH14-3	RDL	QC Batch
BTEX & F1 Hydrocarbons									
Benzene	ug/L	<0.20	<0.20	<0.20		<0.20	<0.20	0.20	3891418
Toluene	ug/L	<0.20	<0.20	<0.20		<0.20	<0.20	0.20	3891418
Ethylbenzene	ug/L	<0.20	<0.20	<0.20		<0.20	<0.20	0.20	3891418
o-Xylene	ug/L	<0.20	<0.20	<0.20		<0.20	<0.20	0.20	3891418
p+m-Xylene	ug/L	<0.40	<0.40	<0.40		<0.40	<0.40	0.40	3891418
Total Xylenes	ug/L	<0.40	<0.40	<0.40		<0.40	<0.40	0.40	3891418
F1 (C6-C10)	ug/L	<25	<25	<25		<25	<25	25	3891418
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25		<25	<25	25	3891418
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	<100		<100	<100	<100	<100	100	3893091
F3 (C16-C34 Hydrocarbons)	ug/L	<100		<100	<100	<100	<100	100	3893091
F4 (C34-C50 Hydrocarbons)	ug/L	<100		<100	<100	<100	<100	100	3893091
Reached Baseline at C50	ug/L	Yes		Yes	Yes	Yes	Yes		3893091
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	96	96	100		98	97		3891418
4-Bromofluorobenzene	%	105	101	102		104	106		3891418
D10-Ethylbenzene	%	77	126	129		121	81		3891418
D4-1,2-Dichloroethane	%	80	81	81		83	81		3891418
o-Terphenyl	%	104		106	104	105	105		3893091

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		ZE9340	ZE9340	ZE9341	ZE9342	ZE9343		
Sampling Date		2015/01/16 20:35	2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	BH14-1	BH14-1 Lab-Dup	BH14-2	BH14-2*DUP*	BH14-3	RDL	QC Batch
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	<0.28		<0.28	<0.28	<0.28	0.28	3890387
Volatile Organics								
Acetone (2-Propanone)	ug/L	<10	<10	<10	<10	<10	10	3892804
Benzene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Bromodichloromethane	ug/L	<0.10	<0.10	<0.10	<0.10	0.33	0.10	3892804
Bromoform	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Bromomethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	3892804
Carbon Tetrachloride	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Chlorobenzene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Chloroform	ug/L	0.52	0.51	0.40	0.41	3.6	0.10	3892804
Dibromochloromethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,2-Dichlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,3-Dichlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,4-Dichlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Dichlorodifluoromethane (FREON 12)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	3892804
1,1-Dichloroethane	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
1,2-Dichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,1-Dichloroethylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
cis-1,2-Dichloroethylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
trans-1,2-Dichloroethylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
1,2-Dichloropropane	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
cis-1,3-Dichloropropene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
trans-1,3-Dichloropropene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Hexane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	3892804
Methylene Chloride(Dichloromethane)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	3892804
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	3892804
Methyl Ethyl Ketone (2-Butanone)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	3892804
Methyl t-butyl ether (MTBE)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Styrene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,1,1,2-Tetrachloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,1,2,2-Tetrachloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		ZE9340	ZE9340	ZE9341	ZE9342	ZE9343		
Sampling Date		2015/01/16 20:35	2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		497860-01-01	497860-01-01	497860-01-01	497860-01-01	497860-01-01		
	Units	BH14-1	BH14-1 Lab-Dup	BH14-2	BH14-2*DUP*	BH14-3	RDL	QC Batch
Tetrachloroethylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
1,1,1-Trichloroethane	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
1,1,2-Trichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Trichloroethylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
o-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Total Xylenes	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3892804
Trichlorofluoromethane (FREON 11)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	3892804
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	101	100	102	101	100		3892804
D4-1,2-Dichloroethane	%	104	104	106	105	106		3892804
D8-Toluene	%	99	98	99	98	98		3892804

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Sampler Initials: JM

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		ZE9344		
Sampling Date		2015/01/16		
COC Number		497860-01-01		
	Units	TRIP BLANK	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.28	0.28	3890387
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	3892804
Benzene	ug/L	<0.10	0.10	3892804
Bromodichloromethane	ug/L	<0.10	0.10	3892804
Bromoform	ug/L	<0.20	0.20	3892804
Bromomethane	ug/L	<0.50	0.50	3892804
Carbon Tetrachloride	ug/L	<0.10	0.10	3892804
Chlorobenzene	ug/L	<0.10	0.10	3892804
Chloroform	ug/L	<0.10	0.10	3892804
Dibromochloromethane	ug/L	<0.20	0.20	3892804
1,2-Dichlorobenzene	ug/L	<0.20	0.20	3892804
1,3-Dichlorobenzene	ug/L	<0.20	0.20	3892804
1,4-Dichlorobenzene	ug/L	<0.20	0.20	3892804
Dichlorodifluoromethane (FREON 12)	ug/L	<0.50	0.50	3892804
1,1-Dichloroethane	ug/L	<0.10	0.10	3892804
1,2-Dichloroethane	ug/L	<0.20	0.20	3892804
1,1-Dichloroethylene	ug/L	<0.10	0.10	3892804
cis-1,2-Dichloroethylene	ug/L	<0.10	0.10	3892804
trans-1,2-Dichloroethylene	ug/L	<0.10	0.10	3892804
1,2-Dichloropropane	ug/L	<0.10	0.10	3892804
cis-1,3-Dichloropropene	ug/L	<0.20	0.20	3892804
trans-1,3-Dichloropropene	ug/L	<0.20	0.20	3892804
Ethylbenzene	ug/L	<0.10	0.10	3892804
Ethylene Dibromide	ug/L	<0.20	0.20	3892804
Hexane	ug/L	<0.50	0.50	3892804
Methylene Chloride(Dichloromethane)	ug/L	<0.50	0.50	3892804
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	3892804
Methyl Ethyl Ketone (2-Butanone)	ug/L	<5.0	5.0	3892804
Methyl t-butyl ether (MTBE)	ug/L	<0.20	0.20	3892804
Styrene	ug/L	<0.20	0.20	3892804
1,1,1,2-Tetrachloroethane	ug/L	<0.20	0.20	3892804
1,1,2,2-Tetrachloroethane	ug/L	<0.20	0.20	3892804
Tetrachloroethylene	ug/L	<0.10	0.10	3892804

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		ZE9344		
Sampling Date		2015/01/16		
COC Number		497860-01-01		
	Units	**TRIP BLANK**	**RDL**	**QC Batch**
Toluene	ug/L	<0.20	0.20	3892804
1,1,1-Trichloroethane	ug/L	<0.10	0.10	3892804
1,1,2-Trichloroethane	ug/L	<0.20	0.20	3892804
Trichloroethylene	ug/L	<0.10	0.10	3892804
Vinyl Chloride	ug/L	<0.20	0.20	3892804
p+m-Xylene	ug/L	<0.10	0.10	3892804
o-Xylene	ug/L	<0.10	0.10	3892804
Total Xylenes	ug/L	<0.10	0.10	3892804
Trichlorofluoromethane (FREON 11)	ug/L	<0.20	0.20	3892804
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	100		3892804
D4-1,2-Dichloroethane	%	103		3892804
D8-Toluene	%	98		3892804

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Maxxam ID: ZE9340
Sample ID: BH14-1
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3890387	N/A	2015/01/23	Automated Statchk
Chloride by Automated Colourimetry	AC	3892749	N/A	2015/01/21	Alina Dobreanu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3891418	N/A	2015/01/21	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3893091	2015/01/21	2015/01/21	Arezoo Habibagahi
Fluoride	F	3892211	2015/01/20	2015/01/21	Surinder Rai
Mercury (low level)	CVAA	3892941	2015/01/21	2015/01/21	Magdalena Carlos
Total Ammonia-N	LACH/NH4	3895295	N/A	2015/01/23	Sarabjit Raina
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	3892500	N/A	2015/01/21	Chandra Nandlal
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3893628	2015/01/21	2015/01/22	Darryl Tiller
Polychlorinated Biphenyl (PCB)	GC/ECD	3894488	2015/01/22	2015/01/22	Li Peng
pH	PH	3892216	N/A	2015/01/21	Surinder Rai
Sulphate by Automated Colourimetry	AC	3892758	N/A	2015/01/21	Alina Dobreanu
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

Maxxam ID: ZE9340 Dup
Sample ID: BH14-1
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3891418	N/A	2015/01/21	Lyndsey Hart
Mercury (low level)	CVAA	3892941	2015/01/21	2015/01/21	Magdalena Carlos
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

Maxxam ID: ZE9341
Sample ID: BH14-2
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3890387	N/A	2015/01/23	Automated Statchk
Chloride by Automated Colourimetry	AC	3893371	N/A	2015/01/22	Alina Dobreanu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3891418	N/A	2015/01/21	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3893091	2015/01/21	2015/01/21	Arezoo Habibagahi
Fluoride	F	3892211	2015/01/20	2015/01/21	Surinder Rai
Mercury (low level)	CVAA	3892941	2015/01/21	2015/01/21	Magdalena Carlos
Total Ammonia-N	LACH/NH4	3895295	N/A	2015/01/23	Sarabjit Raina
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	3892500	N/A	2015/01/21	Chandra Nandlal
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3893628	2015/01/21	2015/01/22	Darryl Tiller
Polychlorinated Biphenyl (PCB)	GC/ECD	3894488	2015/01/22	2015/01/22	Li Peng
pH	PH	3892216	N/A	2015/01/21	Surinder Rai
Sulphate by Automated Colourimetry	AC	3893380	N/A	2015/01/22	Alina Dobreanu
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

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Report Date: 2015/01/27

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Sampler Initials: JM

TEST SUMMARY

Maxxam ID: ZE9341 Dup
Sample ID: BH14-2
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3893091	2015/01/21	2015/01/21	Arezoo Habibagahi
Polychlorinated Biphenyl (PCB)	GC/ECD	3894488	2015/01/22	2015/01/22	Li Peng

Maxxam ID: ZE9342
Sample ID: BH14-2*DUP*
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3890387	N/A	2015/01/23	Automated Statchk
Chloride by Automated Colourimetry	AC	3892749	N/A	2015/01/21	Alina Dobreanu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3891418	N/A	2015/01/21	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3893091	2015/01/21	2015/01/21	Arezoo Habibagahi
Fluoride	F	3892211	2015/01/20	2015/01/21	Surinder Rai
Mercury (low level)	CVAA	3892941	2015/01/21	2015/01/21	Magdalena Carlos
Total Ammonia-N	LACH/NH4	3895295	N/A	2015/01/23	Sarabjit Raina
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	3892500	N/A	2015/01/21	Chandra Nandlal
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3893628	2015/01/21	2015/01/22	Darryl Tiller
Polychlorinated Biphenyl (PCB)	GC/ECD	3894488	2015/01/22	2015/01/22	Li Peng
pH	PH	3892216	N/A	2015/01/21	Surinder Rai
Sulphate by Automated Colourimetry	AC	3892758	N/A	2015/01/21	Alina Dobreanu
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

Maxxam ID: ZE9343
Sample ID: BH14-3
Matrix: Water

Collected: 2015/01/18
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3890387	N/A	2015/01/23	Automated Statchk
Chloride by Automated Colourimetry	AC	3892749	N/A	2015/01/21	Alina Dobreanu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3891418	N/A	2015/01/21	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3893091	2015/01/21	2015/01/21	Arezoo Habibagahi
Fluoride	F	3892211	2015/01/20	2015/01/21	Surinder Rai
Mercury (low level)	CVAA	3892941	2015/01/21	2015/01/21	Magdalena Carlos
Total Ammonia-N	LACH/NH4	3895295	N/A	2015/01/23	Sarabjit Raina
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	3892500	N/A	2015/01/21	Chandra Nandlal
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3893628	2015/01/21	2015/01/22	Darryl Tiller
Polychlorinated Biphenyl (PCB)	GC/ECD	3894488	2015/01/22	2015/01/22	Li Peng
pH	PH	3892216	N/A	2015/01/21	Surinder Rai
Sulphate by Automated Colourimetry	AC	3892758	N/A	2015/01/21	Alina Dobreanu
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

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Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

TEST SUMMARY

Maxxam ID: ZE9344
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2015/01/16
Shipped:
Received: 2015/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3890387	N/A	2015/01/23	Automated Statchk
Volatile Organic Compounds in Water	P&T/MS	3892804	N/A	2015/01/22	Edwin Ayala
Non-Routine Volatile Organic Compounds	P&T/MS	3892806	N/A	2015/01/22	Edwin Ayala

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.3°C
Package 2	3.3°C

Cooler custody seal was present and intact.

The following bottles contained visible sediment.
BH14-1: 3 X 40 ml clear glass vials for F1/BTEX, and 3 X 40 ml clear glass vials for VOCs.
BH14-2: 3 X 40 ml clear glass vials for F1/BTEX, and 3 X 40 ml clear glass vials for VOCs.
BH14-2*DUP*: 1 X 500 ml plastic bottle for generals, 1 X 125 ml clear glass bottle for mercury, 1 X 3 X 40 ml clear glass vials for F1/BTEX, and 3 X 40 ml clear glass vials for VOCs.
BH14-3: 3 X 40 ml clear glass vials for F1/BTEX, and 3 X 40 ml clear glass vials for VOCs.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3891418	LHR	Matrix Spike [ZE9341-09]	1,4-Difluorobenzene	2015/01/20		99	%	70 - 130
			4-Bromofluorobenzene	2015/01/20		89	%	70 - 130
			D10-Ethylbenzene	2015/01/20		130	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/20		79	%	70 - 130
			Benzene	2015/01/20		82	%	70 - 130
			Toluene	2015/01/20		85	%	70 - 130
			Ethylbenzene	2015/01/20		95	%	70 - 130
			o-Xylene	2015/01/20		101	%	70 - 130
			p+m-Xylene	2015/01/20		103	%	70 - 130
			F1 (C6-C10)	2015/01/20		93	%	70 - 130
3891418	LHR	Spiked Blank	1,4-Difluorobenzene	2015/01/20		97	%	70 - 130
			4-Bromofluorobenzene	2015/01/20		102	%	70 - 130
			D10-Ethylbenzene	2015/01/20		125	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/20		79	%	70 - 130
			Benzene	2015/01/20		78	%	70 - 130
			Toluene	2015/01/20		79	%	70 - 130
			Ethylbenzene	2015/01/20		95	%	70 - 130
			o-Xylene	2015/01/20		87	%	70 - 130
			p+m-Xylene	2015/01/20		96	%	70 - 130
			F1 (C6-C10)	2015/01/20		84	%	70 - 130
3891418	LHR	Method Blank	1,4-Difluorobenzene	2015/01/21		98	%	70 - 130
			4-Bromofluorobenzene	2015/01/21		102	%	70 - 130
			D10-Ethylbenzene	2015/01/21		115	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/21		81	%	70 - 130
			Benzene	2015/01/21	<0.20		ug/L	
			Toluene	2015/01/21	<0.20		ug/L	
			Ethylbenzene	2015/01/21	<0.20		ug/L	
			o-Xylene	2015/01/21	<0.20		ug/L	
			p+m-Xylene	2015/01/21	<0.40		ug/L	
			Total Xylenes	2015/01/21	<0.40		ug/L	
			F1 (C6-C10)	2015/01/21	<25		ug/L	
			F1 (C6-C10) - BTEX	2015/01/21	<25		ug/L	
3891418	LHR	RPD [ZE9340-09]	Benzene	2015/01/21	NC		%	40
			Toluene	2015/01/21	NC		%	40
			Ethylbenzene	2015/01/21	NC		%	40
			o-Xylene	2015/01/21	NC		%	40
			p+m-Xylene	2015/01/21	NC		%	40
			Total Xylenes	2015/01/21	NC		%	40
			F1 (C6-C10)	2015/01/21	NC		%	40
			F1 (C6-C10) - BTEX	2015/01/21	NC		%	40
3892211	SAU	Matrix Spike	Fluoride (F-)	2015/01/21		103	%	80 - 120
3892211	SAU	Spiked Blank	Fluoride (F-)	2015/01/21		97	%	80 - 120
3892211	SAU	Method Blank	Fluoride (F-)	2015/01/21	<0.10		mg/L	
3892211	SAU	RPD	Fluoride (F-)	2015/01/21	1.9		%	20
3892216	SAU	Spiked Blank	pH	2015/01/21		102	%	98 - 103
3892216	SAU	RPD	pH	2015/01/21	0.27		%	N/A
3892500	C_N	Matrix Spike	Nitrite (N)	2015/01/21		96	%	80 - 120
			Nitrate (N)	2015/01/21		95	%	80 - 120
3892500	C_N	Spiked Blank	Nitrite (N)	2015/01/21		97	%	80 - 120
			Nitrate (N)	2015/01/21		96	%	80 - 120
3892500	C_N	Method Blank	Nitrite (N)	2015/01/21	<0.010		mg/L	
			Nitrate (N)	2015/01/21	<0.10		mg/L	

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Stantec Consulting Ltd
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Your P.O. #: 16400NR
Sampler Initials: JM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3892500	C_N	RPD	Nitrite (N)	2015/01/21	NC		%	25
			Nitrate (N)	2015/01/21	NC		%	25
3892749	ADB	Matrix Spike	Dissolved Chloride (Cl)	2015/01/21		NC	%	80 - 120
3892749	ADB	Spiked Blank	Dissolved Chloride (Cl)	2015/01/21		101	%	80 - 120
3892749	ADB	Method Blank	Dissolved Chloride (Cl)	2015/01/21	<1		mg/L	
3892749	ADB	RPD	Dissolved Chloride (Cl)	2015/01/21	0.12		%	20
3892758	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2015/01/21		NC	%	75 - 125
3892758	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2015/01/21		106	%	80 - 120
3892758	ADB	Method Blank	Dissolved Sulphate (SO4)	2015/01/21	<1		mg/L	
3892758	ADB	RPD	Dissolved Sulphate (SO4)	2015/01/21	1.4		%	20
3892804	EAY	Matrix Spike	4-Bromofluorobenzene	2015/01/22		102	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/22		104	%	70 - 130
			D8-Toluene	2015/01/22		99	%	70 - 130
			Acetone (2-Propanone)	2015/01/22		103	%	60 - 140
			Benzene	2015/01/22		96	%	70 - 130
			Bromodichloromethane	2015/01/22		98	%	70 - 130
			Bromoform	2015/01/22		109	%	70 - 130
			Bromomethane	2015/01/22		88	%	60 - 140
			Carbon Tetrachloride	2015/01/22		97	%	70 - 130
			Chlorobenzene	2015/01/22		95	%	70 - 130
			Chloroform	2015/01/22		97	%	70 - 130
			Dibromochloromethane	2015/01/22		104	%	70 - 130
			1,2-Dichlorobenzene	2015/01/22		97	%	70 - 130
			1,3-Dichlorobenzene	2015/01/22		93	%	70 - 130
			1,4-Dichlorobenzene	2015/01/22		94	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2015/01/22		90	%	60 - 140
			1,1-Dichloroethane	2015/01/22		96	%	70 - 130
			1,2-Dichloroethane	2015/01/22		100	%	70 - 130
			1,1-Dichloroethylene	2015/01/22		101	%	70 - 130
			cis-1,2-Dichloroethylene	2015/01/22		95	%	70 - 130
			trans-1,2-Dichloroethylene	2015/01/22		96	%	70 - 130
			1,2-Dichloropropane	2015/01/22		97	%	70 - 130
			cis-1,3-Dichloropropene	2015/01/22		96	%	70 - 130
			trans-1,3-Dichloropropene	2015/01/22		92	%	70 - 130
			Ethylbenzene	2015/01/22		92	%	70 - 130
			Ethylene Dibromide	2015/01/22		101	%	70 - 130
			Hexane	2015/01/22		96	%	70 - 130
			Methylene Chloride(Dichloromethane)	2015/01/22		99	%	70 - 130
			Methyl Isobutyl Ketone	2015/01/22		112	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2015/01/22		107	%	60 - 140
			Methyl t-butyl ether (MTBE)	2015/01/22		104	%	70 - 130
			Styrene	2015/01/22		103	%	70 - 130
			1,1,1,2-Tetrachloroethane	2015/01/22		98	%	70 - 130
			1,1,2,2-Tetrachloroethane	2015/01/22		105	%	70 - 130
			Tetrachloroethylene	2015/01/22		94	%	70 - 130
			Toluene	2015/01/22		92	%	70 - 130
			1,1,1-Trichloroethane	2015/01/22		95	%	70 - 130
			1,1,2-Trichloroethane	2015/01/22		98	%	70 - 130
			Trichloroethylene	2015/01/22		94	%	70 - 130
			Vinyl Chloride	2015/01/22		92	%	70 - 130
			p+m-Xylene	2015/01/22		94	%	70 - 130
			o-Xylene	2015/01/22		94	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Trichlorofluoromethane (FREON 11)	2015/01/22		92	%	70 - 130
3892804	EAY	Spiked Blank	4-Bromofluorobenzene	2015/01/22		102	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/22		103	%	70 - 130
			D8-Toluene	2015/01/22		100	%	70 - 130
			Acetone (2-Propanone)	2015/01/22		103	%	60 - 140
			Benzene	2015/01/22		98	%	70 - 130
			Bromodichloromethane	2015/01/22		100	%	70 - 130
			Bromoform	2015/01/22		110	%	70 - 130
			Bromomethane	2015/01/22		91	%	60 - 140
			Carbon Tetrachloride	2015/01/22		100	%	70 - 130
			Chlorobenzene	2015/01/22		100	%	70 - 130
			Chloroform	2015/01/22		101	%	70 - 130
			Dibromochloromethane	2015/01/22		107	%	70 - 130
			1,2-Dichlorobenzene	2015/01/22		103	%	70 - 130
			1,3-Dichlorobenzene	2015/01/22		100	%	70 - 130
			1,4-Dichlorobenzene	2015/01/22		99	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2015/01/22		94	%	60 - 140
			1,1-Dichloroethane	2015/01/22		99	%	70 - 130
			1,2-Dichloroethane	2015/01/22		103	%	70 - 130
			1,1-Dichloroethylene	2015/01/22		106	%	70 - 130
			cis-1,2-Dichloroethylene	2015/01/22		99	%	70 - 130
			trans-1,2-Dichloroethylene	2015/01/22		100	%	70 - 130
			1,2-Dichloropropane	2015/01/22		100	%	70 - 130
			cis-1,3-Dichloropropene	2015/01/22		98	%	70 - 130
			trans-1,3-Dichloropropene	2015/01/22		96	%	70 - 130
			Ethylbenzene	2015/01/22		96	%	70 - 130
			Ethylene Dibromide	2015/01/22		105	%	70 - 130
			Hexane	2015/01/22		95	%	70 - 130
			Methylene Chloride(Dichloromethane)	2015/01/22		101	%	70 - 130
			Methyl Isobutyl Ketone	2015/01/22		109	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2015/01/22		108	%	60 - 140
			Methyl t-butyl ether (MTBE)	2015/01/22		105	%	70 - 130
			Styrene	2015/01/22		110	%	70 - 130
			1,1,1,2-Tetrachloroethane	2015/01/22		101	%	70 - 130
			1,1,2,2-Tetrachloroethane	2015/01/22		106	%	70 - 130
			Tetrachloroethylene	2015/01/22		98	%	70 - 130
			Toluene	2015/01/22		94	%	70 - 130
			1,1,1-Trichloroethane	2015/01/22		98	%	70 - 130
			1,1,2-Trichloroethane	2015/01/22		100	%	70 - 130
			Trichloroethylene	2015/01/22		97	%	70 - 130
			Vinyl Chloride	2015/01/22		96	%	70 - 130
			p+m-Xylene	2015/01/22		98	%	70 - 130
			o-Xylene	2015/01/22		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2015/01/22		96	%	70 - 130
3892804	EAY	Method Blank	4-Bromofluorobenzene	2015/01/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2015/01/22		103	%	70 - 130
			D8-Toluene	2015/01/22		98	%	70 - 130
			Acetone (2-Propanone)	2015/01/22	<10		ug/L	
			Benzene	2015/01/22	<0.10		ug/L	
			Bromodichloromethane	2015/01/22	<0.10		ug/L	
			Bromoform	2015/01/22	<0.20		ug/L	
			Bromomethane	2015/01/22	<0.50		ug/L	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Carbon Tetrachloride	2015/01/22	<0.10		ug/L	
			Chlorobenzene	2015/01/22	<0.10		ug/L	
			Chloroform	2015/01/22	<0.10		ug/L	
			Dibromochloromethane	2015/01/22	<0.20		ug/L	
			1,2-Dichlorobenzene	2015/01/22	<0.20		ug/L	
			1,3-Dichlorobenzene	2015/01/22	<0.20		ug/L	
			1,4-Dichlorobenzene	2015/01/22	<0.20		ug/L	
			Dichlorodifluoromethane (FREON 12)	2015/01/22	<0.50		ug/L	
			1,1-Dichloroethane	2015/01/22	<0.10		ug/L	
			1,2-Dichloroethane	2015/01/22	<0.20		ug/L	
			1,1-Dichloroethylene	2015/01/22	<0.10		ug/L	
			cis-1,2-Dichloroethylene	2015/01/22	<0.10		ug/L	
			trans-1,2-Dichloroethylene	2015/01/22	<0.10		ug/L	
			1,2-Dichloropropane	2015/01/22	<0.10		ug/L	
			cis-1,3-Dichloropropene	2015/01/22	<0.20		ug/L	
			trans-1,3-Dichloropropene	2015/01/22	<0.20		ug/L	
			Ethylbenzene	2015/01/22	<0.10		ug/L	
			Ethylene Dibromide	2015/01/22	<0.20		ug/L	
			Hexane	2015/01/22	<0.50		ug/L	
			Methylene Chloride(Dichloromethane)	2015/01/22	<0.50		ug/L	
			Methyl Isobutyl Ketone	2015/01/22	<5.0		ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2015/01/22	<5.0		ug/L	
			Methyl t-butyl ether (MTBE)	2015/01/22	<0.20		ug/L	
			Styrene	2015/01/22	<0.20		ug/L	
			1,1,1,2-Tetrachloroethane	2015/01/22	<0.20		ug/L	
			1,1,2,2-Tetrachloroethane	2015/01/22	<0.20		ug/L	
			Tetrachloroethylene	2015/01/22	<0.10		ug/L	
			Toluene	2015/01/22	<0.20		ug/L	
			1,1,1-Trichloroethane	2015/01/22	<0.10		ug/L	
			1,1,2-Trichloroethane	2015/01/22	<0.20		ug/L	
			Trichloroethylene	2015/01/22	<0.10		ug/L	
			Vinyl Chloride	2015/01/22	<0.20		ug/L	
			p+m-Xylene	2015/01/22	<0.10		ug/L	
			o-Xylene	2015/01/22	<0.10		ug/L	
			Total Xylenes	2015/01/22	<0.10		ug/L	
			Trichlorofluoromethane (FREON 11)	2015/01/22	<0.20		ug/L	
3892804	EAY	RPD [ZE9340-07]	Acetone (2-Propanone)	2015/01/22	NC		%	30
			Benzene	2015/01/22	NC		%	30
			Bromodichloromethane	2015/01/22	NC		%	30
			Bromoform	2015/01/22	NC		%	30
			Bromomethane	2015/01/22	NC		%	30
			Carbon Tetrachloride	2015/01/22	NC		%	30
			Chlorobenzene	2015/01/22	NC		%	30
			Chloroform	2015/01/22	0.78		%	30
			Dibromochloromethane	2015/01/22	NC		%	30
			1,2-Dichlorobenzene	2015/01/22	NC		%	30
			1,3-Dichlorobenzene	2015/01/22	NC		%	30
			1,4-Dichlorobenzene	2015/01/22	NC		%	30
			Dichlorodifluoromethane (FREON 12)	2015/01/22	NC		%	30
			1,1-Dichloroethane	2015/01/22	NC		%	30
			1,2-Dichloroethane	2015/01/22	NC		%	30
			1,1-Dichloroethylene	2015/01/22	NC		%	30

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			cis-1,2-Dichloroethylene	2015/01/22	NC		%	30
			trans-1,2-Dichloroethylene	2015/01/22	NC		%	30
			1,2-Dichloropropane	2015/01/22	NC		%	30
			cis-1,3-Dichloropropene	2015/01/22	NC		%	30
			trans-1,3-Dichloropropene	2015/01/22	NC		%	30
			Ethylbenzene	2015/01/22	NC		%	30
			Ethylene Dibromide	2015/01/22	NC		%	30
			Hexane	2015/01/22	NC		%	30
			Methylene Chloride(Dichloromethane)	2015/01/22	NC		%	30
			Methyl Isobutyl Ketone	2015/01/22	NC		%	30
			Methyl Ethyl Ketone (2-Butanone)	2015/01/22	NC		%	30
			Methyl t-butyl ether (MTBE)	2015/01/22	NC		%	30
			Styrene	2015/01/22	NC		%	30
			1,1,1,2-Tetrachloroethane	2015/01/22	NC		%	30
			1,1,2,2-Tetrachloroethane	2015/01/22	NC		%	30
			Tetrachloroethylene	2015/01/22	NC		%	30
			Toluene	2015/01/22	NC		%	30
			1,1,1-Trichloroethane	2015/01/22	NC		%	30
			1,1,2-Trichloroethane	2015/01/22	NC		%	30
			Trichloroethylene	2015/01/22	NC		%	30
			Vinyl Chloride	2015/01/22	NC		%	30
			p+m-Xylene	2015/01/22	NC		%	30
			o-Xylene	2015/01/22	NC		%	30
			Total Xylenes	2015/01/22	NC		%	30
			Trichlorofluoromethane (FREON 11)	2015/01/22	NC		%	30
3892806	EAY	Matrix Spike	1,3,5-Trimethylbenzene	2015/01/22		97	%	60 - 140
3892806	EAY	Spiked Blank	1,3,5-Trimethylbenzene	2015/01/22		112	%	60 - 140
3892806	EAY	Method Blank	1,3,5-Trimethylbenzene	2015/01/22	<0.20		ug/L	
3892806	EAY	RPD [ZE9340-07]	1,3,5-Trimethylbenzene	2015/01/22	NC		%	30
3892941	MC	Matrix Spike [ZE9340-04]	Mercury (Hg)	2015/01/21		95	%	75 - 125
3892941	MC	Spiked Blank	Mercury (Hg)	2015/01/21		98	%	80 - 120
3892941	MC	Method Blank	Mercury (Hg)	2015/01/21	<0.01		ug/L	
3892941	MC	RPD [ZE9340-04]	Mercury (Hg)	2015/01/21	NC		%	20
3893091	AH1	Matrix Spike [ZE9340-08]	o-Terphenyl	2015/01/21		110	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/21		75	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2015/01/21		75	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2015/01/21		75	%	50 - 130
3893091	AH1	Spiked Blank	o-Terphenyl	2015/01/21		107	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/21		75	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2015/01/21		75	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2015/01/21		75	%	60 - 130
3893091	AH1	Method Blank	o-Terphenyl	2015/01/21		104	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2015/01/21	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2015/01/21	<100		ug/L	
			F4 (C34-C50 Hydrocarbons)	2015/01/21	<100		ug/L	
3893091	AH1	RPD [ZE9341-08]	F2 (C10-C16 Hydrocarbons)	2015/01/21	NC		%	50
			F3 (C16-C34 Hydrocarbons)	2015/01/21	NC		%	50
			F4 (C34-C50 Hydrocarbons)	2015/01/21	NC		%	50
3893371	ADB	Matrix Spike	Dissolved Chloride (Cl)	2015/01/22		NC	%	80 - 120
3893371	ADB	Spiked Blank	Dissolved Chloride (Cl)	2015/01/22		103	%	80 - 120
3893371	ADB	Method Blank	Dissolved Chloride (Cl)	2015/01/22	<1		mg/L	
3893371	ADB	RPD	Dissolved Chloride (Cl)	2015/01/22	0.47		%	20

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3893380	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2015/01/22		NC	%	75 - 125
3893380	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2015/01/22		101	%	80 - 120
3893380	ADB	Method Blank	Dissolved Sulphate (SO4)	2015/01/22	<1		mg/L	
3893380	ADB	RPD	Dissolved Sulphate (SO4)	2015/01/22	2.4		%	20
3893628	DTI	Matrix Spike	D10-Anthracene	2015/01/22		95	%	50 - 130
			D14-Terphenyl (FS)	2015/01/22		94	%	50 - 130
			D8-Acenaphthylene	2015/01/22		94	%	50 - 130
			Acenaphthene	2015/01/22		93	%	50 - 130
			Acenaphthylene	2015/01/22		94	%	50 - 130
			Anthracene	2015/01/22		97	%	50 - 130
			Benzo(a)anthracene	2015/01/22		98	%	50 - 130
			Benzo(a)pyrene	2015/01/22		101	%	50 - 130
			Benzo(b/j)fluoranthene	2015/01/22		104	%	50 - 130
			Benzo(g,h,i)perylene	2015/01/22		88	%	50 - 130
			Benzo(k)fluoranthene	2015/01/22		99	%	50 - 130
			Chrysene	2015/01/22		103	%	50 - 130
			Dibenz(a,h)anthracene	2015/01/22		60	%	50 - 130
			Fluoranthene	2015/01/22		101	%	50 - 130
			Fluorene	2015/01/22		94	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2015/01/22		108	%	50 - 130
			1-Methylnaphthalene	2015/01/22		94	%	50 - 130
			2-Methylnaphthalene	2015/01/22		91	%	50 - 130
			Naphthalene	2015/01/22		86	%	50 - 130
			Phenanthrene	2015/01/22		93	%	50 - 130
			Pyrene	2015/01/22		103	%	50 - 130
3893628	DTI	Spiked Blank	D10-Anthracene	2015/01/22		95	%	50 - 130
			D14-Terphenyl (FS)	2015/01/22		91	%	50 - 130
			D8-Acenaphthylene	2015/01/22		93	%	50 - 130
			Acenaphthene	2015/01/22		93	%	50 - 130
			Acenaphthylene	2015/01/22		94	%	50 - 130
			Anthracene	2015/01/22		99	%	50 - 130
			Benzo(a)anthracene	2015/01/22		94	%	50 - 130
			Benzo(a)pyrene	2015/01/22		95	%	50 - 130
			Benzo(b/j)fluoranthene	2015/01/22		101	%	50 - 130
			Benzo(g,h,i)perylene	2015/01/22		76	%	50 - 130
			Benzo(k)fluoranthene	2015/01/22		89	%	50 - 130
			Chrysene	2015/01/22		100	%	50 - 130
			Dibenz(a,h)anthracene	2015/01/22		44 (1)	%	50 - 130
			Fluoranthene	2015/01/22		100	%	50 - 130
			Fluorene	2015/01/22		94	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2015/01/22		97	%	50 - 130
			1-Methylnaphthalene	2015/01/22		94	%	50 - 130
			2-Methylnaphthalene	2015/01/22		91	%	50 - 130
			Naphthalene	2015/01/22		86	%	50 - 130
			Phenanthrene	2015/01/22		95	%	50 - 130
			Pyrene	2015/01/22		103	%	50 - 130
3893628	DTI	Method Blank	D10-Anthracene	2015/01/21		96	%	50 - 130
			D14-Terphenyl (FS)	2015/01/21		90	%	50 - 130
			D8-Acenaphthylene	2015/01/21		95	%	50 - 130
			Acenaphthene	2015/01/21	<0.010		ug/L	
			Acenaphthylene	2015/01/21	<0.010		ug/L	
			Anthracene	2015/01/21	<0.010		ug/L	

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Sampler Initials: JM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Benzo(a)anthracene	2015/01/21	<0.010		ug/L	
			Benzo(a)pyrene	2015/01/21	<0.010		ug/L	
			Benzo(b/j)fluoranthene	2015/01/21	<0.010		ug/L	
			Benzo(g,h,i)perylene	2015/01/21	<0.010		ug/L	
			Benzo(k)fluoranthene	2015/01/21	<0.010		ug/L	
			Chrysene	2015/01/21	<0.010		ug/L	
			Dibenz(a,h)anthracene	2015/01/21	<0.010		ug/L	
			Fluoranthene	2015/01/21	<0.010		ug/L	
			Fluorene	2015/01/21	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2015/01/21	<0.010		ug/L	
			1-Methylnaphthalene	2015/01/21	<0.010		ug/L	
			2-Methylnaphthalene	2015/01/21	<0.010		ug/L	
			Naphthalene	2015/01/21	<0.010		ug/L	
			Phenanthrene	2015/01/21	<0.010		ug/L	
			Pyrene	2015/01/21	<0.010		ug/L	
3893628	DTI	RPD	Acenaphthene	2015/01/22	NC		%	30
			Acenaphthylene	2015/01/22	NC		%	30
			Anthracene	2015/01/22	NC		%	30
			Benzo(a)anthracene	2015/01/22	NC		%	30
			Benzo(a)pyrene	2015/01/22	NC		%	30
			Benzo(b/j)fluoranthene	2015/01/22	NC		%	30
			Benzo(g,h,i)perylene	2015/01/22	NC		%	30
			Benzo(k)fluoranthene	2015/01/22	NC		%	30
			Chrysene	2015/01/22	NC		%	30
			Dibenz(a,h)anthracene	2015/01/22	NC		%	30
			Fluoranthene	2015/01/22	NC		%	30
			Fluorene	2015/01/22	NC		%	30
			Indeno(1,2,3-cd)pyrene	2015/01/22	NC		%	30
			1-Methylnaphthalene	2015/01/22	NC		%	30
			2-Methylnaphthalene	2015/01/22	NC		%	30
			Naphthalene	2015/01/22	NC		%	30
			Phenanthrene	2015/01/22	NC		%	30
			Pyrene	2015/01/22	NC		%	30
3894488	LPG	Matrix Spike [ZE9340-11]	Decachlorobiphenyl	2015/01/22		98	%	60 - 130
			Aroclor 1260	2015/01/22		95	%	60 - 130
			Total PCB	2015/01/22		95	%	60 - 130
3894488	LPG	Spiked Blank	Decachlorobiphenyl	2015/01/22		92	%	60 - 130
			Aroclor 1260	2015/01/22		78	%	60 - 130
			Total PCB	2015/01/22		78	%	60 - 130
3894488	LPG	Method Blank	Aroclor 1016	2015/01/22	<0.01		ug/L	
			Aroclor 1221	2015/01/22	<0.01		ug/L	
			Aroclor 1232	2015/01/22	<0.01		ug/L	
			Aroclor 1262	2015/01/22	<0.01		ug/L	
			Aroclor 1268	2015/01/22	<0.01		ug/L	
			Decachlorobiphenyl	2015/01/22		94	%	60 - 130
			Aroclor 1242	2015/01/22	<0.01		ug/L	
			Aroclor 1248	2015/01/22	<0.01		ug/L	
			Aroclor 1254	2015/01/22	<0.01		ug/L	
			Aroclor 1260	2015/01/22	<0.01		ug/L	
			Total PCB	2015/01/22	<0.01		ug/L	
3894488	LPG	RPD [ZE9341-11]	Aroclor 1016	2015/01/22	NC		%	40
			Aroclor 1221	2015/01/22	NC		%	40

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Aroclor 1232	2015/01/22	NC		%	40
			Aroclor 1262	2015/01/22	NC		%	40
			Aroclor 1268	2015/01/22	NC		%	40
			Aroclor 1242	2015/01/22	NC		%	40
			Aroclor 1248	2015/01/22	NC		%	40
			Aroclor 1254	2015/01/22	NC		%	40
			Aroclor 1260	2015/01/22	NC		%	40
			Total PCB	2015/01/22	NC		%	40
3895295	SNR	Matrix Spike	Total Ammonia-N	2015/01/23		NC	%	80 - 120
3895295	SNR	Spiked Blank	Total Ammonia-N	2015/01/23		97	%	85 - 115
3895295	SNR	Method Blank	Total Ammonia-N	2015/01/23	<0.050		mg/L	
3895295	SNR	RPD	Total Ammonia-N	2015/01/23	0.58 (2)		%	20

N/A = Not Applicable

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

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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

(2) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

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Maxxam Job #: B509476
Report Date: 2015/01/27

Stantec Consulting Ltd
Client Project #: 122411046
Your P.O. #: 16400NR
Sampler Initials: JM

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Scientific Services

Paul Rubinato, Analyst, Maxxam Analytics

Steve Roberts, Ottawa Lab Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: MB509476
Your C.O.C. #: 1 of 1

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2015/01/26
Report #: R1793194
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B504365
Received: 2015/01/20, 08:40

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME - Dissolved	1	N/A	2015/01/23	AB SOP-00043	Auto Calc
Cadmium - low level CCME - Dissolved	3	N/A	2015/01/24	AB SOP-00043	Auto Calc
Cyanide (weak acid dissociable)	4	N/A	2015/01/21	CAL SOP-00051	EPA 335.4 R1 m
Sulphide (as H2S)	4	N/A	2015/01/26	CAL SOP-00062	SM 4500-S2 D
Elements by ICP - Dissolved	4	N/A	2015/01/21	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	4	N/A	2015/01/22	AB SOP-00043	EPA 200.8 R5.4 m
Sulphide	4	N/A	2015/01/22	CAL SOP-00062	SM 22 4500 S2-D m

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

Encryption Key

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

Cynny Hagen, Project Manager Assistant
Email: CHagen@maxxam.ca
Phone# (403) 735-2273

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B504365
Report Date: 2015/01/26

MAXXAM ANALYTICS
Client Project #: MB509476

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Low Level Elements							
Dissolved Cadmium (Cd)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	7782837
Elements							
Dissolved Aluminum (Al)	mg/L	0.030	0.061	1.4	0.012	0.0030	7785566
Dissolved Antimony (Sb)	mg/L	<0.00060	<0.00060	<0.00060	<0.00060	0.00060	7785566
Dissolved Arsenic (As)	mg/L	<0.00020	<0.00020	0.00026	<0.00020	0.00020	7785566
Dissolved Barium (Ba)	mg/L	0.34	0.71	0.64	0.24	0.010	7784286
Dissolved Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7785566
Dissolved Boron (B)	mg/L	0.51	0.21	0.21	0.064	0.020	7784286
Dissolved Calcium (Ca)	mg/L	64	78	120	130	0.30	7784286
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	0.0018	<0.0010	0.0010	7785566
Dissolved Cobalt (Co)	mg/L	0.0037	0.00078	0.0010	0.00072	0.00030	7785566
Dissolved Copper (Cu)	mg/L	0.0020	0.00038	0.0013	0.00031	0.00020	7785566
Dissolved Iron (Fe)	mg/L	<0.060	0.070	1.7	<0.060	0.060	7784286
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	0.0012	<0.00020	0.00020	7785566
Dissolved Lithium (Li)	mg/L	0.029	0.026	0.030	<0.020	0.020	7784286
Dissolved Magnesium (Mg)	mg/L	16	17	18	16	0.20	7784286
Dissolved Manganese (Mn)	mg/L	0.021	0.024	0.062	0.018	0.0040	7784286
Dissolved Molybdenum (Mo)	mg/L	0.19	0.0080	0.0064	0.0055	0.00020	7785566
Dissolved Nickel (Ni)	mg/L	0.0017	0.0011	0.0024	0.00076	0.00050	7785566
Dissolved Phosphorus (P)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	7784286
Dissolved Potassium (K)	mg/L	9.9	8.2	8.6	5.4	0.30	7784286
Dissolved Selenium (Se)	mg/L	0.00022	<0.00020	0.00027	0.00097	0.00020	7785566
Dissolved Silicon (Si)	mg/L	4.8	5.3	5.9	3.0	0.10	7784286
Dissolved Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7785566
Dissolved Sodium (Na)	mg/L	83	50	50	110	0.50	7784286
Dissolved Strontium (Sr)	mg/L	3.3	3.2	3.2	2.2	0.020	7784286
Dissolved Sulphur (S)	mg/L	35	24	25	48	0.20	7784286
Dissolved Thallium (Tl)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7785566
Dissolved Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7785566
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0017	0.046	<0.0010	0.0010	7785566
Dissolved Uranium (U)	mg/L	0.00034	<0.00010	0.00024	0.00049	0.00010	7785566
Dissolved Vanadium (V)	mg/L	<0.0010	<0.0010	0.0015	<0.0010	0.0010	7785566

RDL = Reportable Detection Limit

MAXXAM ANALYTICS
Maxxam Job #: B504365
Client Project #: MB509476
Report Date: 2015/01/26

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	mg/L	0.0044	<0.0030	<0.0030	0.0063	0.0030	7785566

RDL = Reportable Detection Limit

Maxxam Job #: B504365
Report Date: 2015/01/26

MAXXAM ANALYTICS
Client Project #: MB509476

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		LN5738	LN5739	LN5740	LN5741		
Sampling Date		2015/01/16 20:35	2015/01/16 19:30	2015/01/16 19:40	2015/01/18 19:30		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**BH14-1 (ZE9340)**	**BH14-2 (ZE9341)**	**BH14-2 *DUP* (ZE9342)**	**BH14-3 (ZE9343)**	**RDL**	**QC Batch**
Calculated Parameters							
Hydrogen Sulphide (H2S)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	7782789
Misc. Inorganics							
Weak Acid Dissoc. Cyanide (CN)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7782878
Anions							
Sulphide	mg/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	7785847

RDL = Reportable Detection Limit

MAXXAM ANALYTICS
Client Project #: MB509476

Maxxam Job #: B504365
Report Date: 2015/01/26

Package 1	1.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB504365

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7782878	AP1	Matrix Spike	Weak Acid Dissoc. Cyanide (CN)	2015/01/21		90	%	80 - 120
		Spiked Blank	Weak Acid Dissoc. Cyanide (CN)	2015/01/21		96	%	80 - 120
		Method Blank	Weak Acid Dissoc. Cyanide (CN)	2015/01/21	<0.0010		mg/L	
		RPD	Weak Acid Dissoc. Cyanide (CN)	2015/01/21	NC		%	20
7784286	SRT	Matrix Spike	Dissolved Barium (Ba)	2015/01/21		96	%	80 - 120
			Dissolved Boron (B)	2015/01/21		96	%	80 - 120
			Dissolved Calcium (Ca)	2015/01/21		NC	%	80 - 120
			Dissolved Iron (Fe)	2015/01/21		99	%	80 - 120
			Dissolved Lithium (Li)	2015/01/21		96	%	80 - 120
			Dissolved Magnesium (Mg)	2015/01/21		96	%	80 - 120
			Dissolved Manganese (Mn)	2015/01/21		98	%	80 - 120
			Dissolved Phosphorus (P)	2015/01/21		102	%	80 - 120
			Dissolved Potassium (K)	2015/01/21		93	%	80 - 120
			Dissolved Silicon (Si)	2015/01/21		NC	%	80 - 120
			Dissolved Sodium (Na)	2015/01/21		93	%	80 - 120
			Dissolved Strontium (Sr)	2015/01/21		96	%	80 - 120
		Spiked Blank	Dissolved Barium (Ba)	2015/01/21		95	%	80 - 120
			Dissolved Boron (B)	2015/01/21		96	%	80 - 120
			Dissolved Calcium (Ca)	2015/01/21		102	%	80 - 120
			Dissolved Iron (Fe)	2015/01/21		99	%	80 - 120
			Dissolved Lithium (Li)	2015/01/21		93	%	80 - 120
			Dissolved Magnesium (Mg)	2015/01/21		99	%	80 - 120
			Dissolved Manganese (Mn)	2015/01/21		98	%	80 - 120
			Dissolved Phosphorus (P)	2015/01/21		97	%	80 - 120
			Dissolved Potassium (K)	2015/01/21		93	%	80 - 120
			Dissolved Silicon (Si)	2015/01/21		97	%	80 - 120
			Dissolved Sodium (Na)	2015/01/21		92	%	80 - 120
			Dissolved Strontium (Sr)	2015/01/21		94	%	80 - 120
		Method Blank	Dissolved Barium (Ba)	2015/01/21	<0.010		mg/L	
			Dissolved Boron (B)	2015/01/21	<0.020		mg/L	
			Dissolved Calcium (Ca)	2015/01/21	<0.30		mg/L	
			Dissolved Iron (Fe)	2015/01/21	<0.060		mg/L	
			Dissolved Lithium (Li)	2015/01/21	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2015/01/21	<0.20		mg/L	
			Dissolved Manganese (Mn)	2015/01/21	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2015/01/21	<0.10		mg/L	
			Dissolved Potassium (K)	2015/01/21	<0.30		mg/L	
			Dissolved Silicon (Si)	2015/01/21	<0.10		mg/L	
			Dissolved Sodium (Na)	2015/01/21	<0.50		mg/L	
			Dissolved Strontium (Sr)	2015/01/21	<0.020		mg/L	
			Dissolved Sulphur (S)	2015/01/21	<0.20		mg/L	
		RPD	Dissolved Barium (Ba)	2015/01/21	0.07		%	20
			Dissolved Boron (B)	2015/01/21	NC		%	20
			Dissolved Calcium (Ca)	2015/01/21	0.7		%	20
			Dissolved Iron (Fe)	2015/01/21	1.5		%	20
			Dissolved Lithium (Li)	2015/01/21	NC		%	20
			Dissolved Magnesium (Mg)	2015/01/21	0.04		%	20
			Dissolved Manganese (Mn)	2015/01/21	0.6		%	20
			Dissolved Phosphorus (P)	2015/01/21	NC		%	20
			Dissolved Potassium (K)	2015/01/21	0.6		%	20
			Dissolved Silicon (Si)	2015/01/21	0.6		%	20
			Dissolved Sodium (Na)	2015/01/21	0.01		%	20
			Dissolved Strontium (Sr)	2015/01/21	NC		%	20
			Dissolved Sulphur (S)	2015/01/21	0.4		%	20
7785566	TDB	Matrix Spike	Dissolved Aluminum (Al)	2015/01/22		100	%	80 - 120

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB504365

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7785566	TDB	Matrix Spike	Dissolved Antimony (Sb)	2015/01/22		73 (1)	%	80 - 120
			Dissolved Arsenic (As)	2015/01/22		93	%	80 - 120
			Dissolved Beryllium (Be)	2015/01/22		93	%	80 - 120
			Dissolved Chromium (Cr)	2015/01/22		90	%	80 - 120
			Dissolved Cobalt (Co)	2015/01/22		87	%	80 - 120
			Dissolved Copper (Cu)	2015/01/22		85	%	80 - 120
			Dissolved Lead (Pb)	2015/01/22		88	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/01/22		94	%	80 - 120
			Dissolved Nickel (Ni)	2015/01/22		88	%	80 - 120
			Dissolved Selenium (Se)	2015/01/22		94	%	80 - 120
			Dissolved Silver (Ag)	2015/01/22		90	%	80 - 120
			Dissolved Thallium (Tl)	2015/01/22		90	%	80 - 120
			Dissolved Tin (Sn)	2015/01/22		87	%	80 - 120
			Dissolved Titanium (Ti)	2015/01/22		91	%	80 - 120
			Dissolved Uranium (U)	2015/01/22		88	%	80 - 120
			Dissolved Vanadium (V)	2015/01/22		94	%	80 - 120
			Dissolved Zinc (Zn)	2015/01/22		93	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2015/01/22		104	%	80 - 120
			Dissolved Antimony (Sb)	2015/01/22		93	%	80 - 120
			Dissolved Arsenic (As)	2015/01/22		93	%	80 - 120
			Dissolved Beryllium (Be)	2015/01/22		94	%	80 - 120
			Dissolved Chromium (Cr)	2015/01/22		94	%	80 - 120
			Dissolved Cobalt (Co)	2015/01/22		94	%	80 - 120
			Dissolved Copper (Cu)	2015/01/22		94	%	80 - 120
			Dissolved Lead (Pb)	2015/01/22		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/01/22		91	%	80 - 120
			Dissolved Nickel (Ni)	2015/01/22		94	%	80 - 120
			Dissolved Selenium (Se)	2015/01/22		92	%	80 - 120
			Dissolved Silver (Ag)	2015/01/22		92	%	80 - 120
			Dissolved Thallium (Tl)	2015/01/22		92	%	80 - 120
			Dissolved Tin (Sn)	2015/01/22		87	%	80 - 120
			Dissolved Titanium (Ti)	2015/01/22		87	%	80 - 120
			Dissolved Uranium (U)	2015/01/22		90	%	80 - 120
			Dissolved Vanadium (V)	2015/01/22		98	%	80 - 120
			Dissolved Zinc (Zn)	2015/01/22		98	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2015/01/22	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2015/01/22	<0.00060		mg/L	
			Dissolved Arsenic (As)	2015/01/22	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2015/01/22	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2015/01/22	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2015/01/22	<0.00030		mg/L	
			Dissolved Copper (Cu)	2015/01/22	<0.00020		mg/L	
			Dissolved Lead (Pb)	2015/01/22	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2015/01/22	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2015/01/22	<0.00050		mg/L	
			Dissolved Selenium (Se)	2015/01/22	<0.00020		mg/L	
			Dissolved Silver (Ag)	2015/01/22	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2015/01/22	<0.00020		mg/L	
			Dissolved Tin (Sn)	2015/01/22	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2015/01/22	<0.0010		mg/L	
			Dissolved Uranium (U)	2015/01/22	<0.00010		mg/L	
			Dissolved Vanadium (V)	2015/01/22	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2015/01/22	<0.0030		mg/L	
		RPD	Dissolved Aluminum (Al)	2015/01/22	NC		%	20
			Dissolved Antimony (Sb)	2015/01/22	NC		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB509476
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB504365

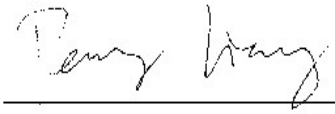
QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7785566	TDB	RPD	Dissolved Arsenic (As)	2015/01/22	NC		%	20
			Dissolved Beryllium (Be)	2015/01/22	NC		%	20
			Dissolved Chromium (Cr)	2015/01/22	NC		%	20
			Dissolved Cobalt (Co)	2015/01/22	NC		%	20
			Dissolved Copper (Cu)	2015/01/22	NC		%	20
			Dissolved Lead (Pb)	2015/01/22	NC		%	20
			Dissolved Molybdenum (Mo)	2015/01/22	NC		%	20
			Dissolved Nickel (Ni)	2015/01/22	NC		%	20
			Dissolved Selenium (Se)	2015/01/22	NC		%	20
			Dissolved Silver (Ag)	2015/01/22	NC		%	20
			Dissolved Thallium (Tl)	2015/01/22	NC		%	20
			Dissolved Tin (Sn)	2015/01/22	NC		%	20
			Dissolved Titanium (Ti)	2015/01/22	NC		%	20
			Dissolved Uranium (U)	2015/01/22	5.5		%	20
			Dissolved Vanadium (V)	2015/01/22	NC		%	20
			Dissolved Zinc (Zn)	2015/01/22	NC		%	20
7785847	ARB	Spiked Blank	Sulphide	2015/01/22		97	%	80 - 120
		Method Blank	Sulphide	2015/01/22	<0.0019		mg/L	
		RPD	Sulphide	2015/01/22	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B504365

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



Peng Liang, Senior Analyst

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.