Limited Phase II Environmental Site Assessment, 27-31 Robinson Avenue, Ottawa, Ontario

November 30, 2018

Prepared for:

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Project No.: 160401428

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Executive Summary

At the request of TC United Group (TC United), Stantec Consulting Ltd. (Stantec) conducted a Limited Phase II Environmental Site Assessment (ESA) of the three properties located at 27-31 Robinson Avenue in Ottawa, Ontario, herein referred to as the "Site".

The purpose of the Limited Phase II ESA was to support the Site Plan Control application being prepared by TC United for the City of Ottawa, and to assess the presence/absence of groundwater impacts at the Site as a result of two areas of potential environmental concern (APECs) identified by Stantec in the Phase One ESA dated October 2, 2018. The contaminants of potential concern (COPCs) associated with the APECs are volatile organic compounds (VOCs), benzene, toluene, ethylbenzene and xylene (BTEX), petroleum hydrocarbons four fractions (PHC F1 to F4), polycyclic aromatic hydrocarbons (PAHs) and metals. The identified APECs were associated with former on-site heating oil storage tanks and rail lines.

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

- Laboratory analysis determined that concentrations of COPCs in groundwater did not exceed the applicable provincial standards.

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

- If soil is to be removed from the Site for construction purposes, laboratory analyses of the identified COPCs should be completed to assess disposal options for soil.

The statements made in this Executive Summary are subject to the same limitations included in the Closure 6.0 and are to be read in conjunction with the remainder of this report.

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by TC United to conduct a Limited Phase II ESA of the three properties located at 27-31 Robinson Avenue in Ottawa, Ontario (ON), hereinafter referred to as the "Site". Refer to Figure No. 1 in **Appendix A** for the site location.

The objective of the Limited Phase II ESA was to support the Site Plan Control application being prepared by TC United for the City of Ottawa and to assess the presence/absence of groundwater impacts at the Site as a result of two areas of potential environmental concern (APECs) identified by Stantec in the Phase One ESA dated October 2, 2018. The contaminants of potential concern (COPCs) associated with the APECs are volatile organic compounds (VOCs), benzene, toluene, ethylbenzene and xylene (BTEX), petroleum hydrocarbons four fractions (PHC F1 to F4), polycyclic aromatic hydrocarbons (PAHs) and metals (Reg. 153/04 full list). The Limited Phase II ESA assessed the COPCs in groundwater associated with the two APECs identified associated with the former on-site aboveground storage tanks (ASTs) for heating oil and former rail lines.

1.1 SITE DESCRIPTION

1.1.1 Subject Property

The Site at 27-31 Robinson Avenue, Ottawa, Ontario, is located on the north side of Robinson Avenue between two residential properties to the east and west. The property is zoned residential. Aerial photographs from 1928 to 2017 indicate the property was residential throughout that period.

The Site is approximately 0.13 hectares in area and is currently occupied by residential buildings. No chemical or fuel aboveground storage tanks (ASTs) or underground storage tanks (USTs) were identified or reported to be present at the Site at the time of the Phase One ESA site visit. The residence at 29 Robinson Avenue was reported to have a heating oil AST located in the basement, removed in approximately 1990 when the heating source was switched to natural gas. The previous heating source at 27 Robinson Avenue is unknown, therefore there may have also been a heating oil AST located on this portion of the Site in the past. Based on historical aerial photographs, a railroad right of way was located to the north of the Site, crossing over the Rideau River. The residences are surrounded by trees, landscaped areas, asphalt-paved and gravel roadways, and exterior storage sheds. The Site is bounded by Robinson Avenue to the south and Robinson Field, a grass covered recreational area, to the north. The Site is relatively flat and generally at grade with the adjacent properties. Drainage at the Site occurs through overland flow and infiltration.

A key plan is provided on Figure No. 1, **Appendix A**. A more detailed site plan is provided on Figure No. 2, **Appendix A**.

1.1.2 Surficial and Bedrock Geology

Based on information obtained from the Surficial Geology of Ontario - Google Earth Layer, the native surficial soils of the Site consist of silt and clay with minor sand and gravel. Based on information obtained from the bedrock geology map, bedrock in the area of the Site consists of shale, limestone, dolostone and siltstone. The reported depth to bedrock is approximately 10 m.

A site-specific determination would be required in order to obtain detailed soil profile and permeability information.

1.1.3 Site Services

The properties are serviced with water and sewer services by the City of Ottawa, electricity services by Hydro Ottawa (via overhead lines) and natural gas by Enbridge Gas.

1.1.4 Topography and Drainage

Regional topography slopes to the northeasterly direction and the likely principal direction of local groundwater flow is towards the Rideau River located approximately 130 m northeast of the Site. The topography of the Site and adjacent properties is generally flat.

1.2 PREVIOUS WORK

The following report was reviewed prior to the completion of the Limited Phase II ESA:

- Phase One Environmental Site Assessment 27-31 Robinson Avenue, Ottawa, Ontario, dated October 2, 2018, prepared for TC United Group by Stantec Consulting Ltd.
- Geotechnical Investigation Report, Proposed Residential Development, 27-31 Robinson Avenue, Ottawa, Ontario, dated July 27, 2018, prepared for TC United Group by Stantec Consulting Ltd.

1.3 OBJECTIVE AND SCOPE OF WORK

The objective of the Limited Phase II ESA was to support the Site Plan Control application being prepared by TC United and to assess the presence/absence of groundwater impacts at the Site as a result of two areas of potential environmental concern (APECs) identified by Stantec in the Phase One ESA dated October 2, 2018.

The following scope of work for the Phase II Environmental Site Assessment program was presented in Stantec's Proposal No. 160401428 to TC United dated November 7, 2018. The scope is generally based on the requirements of the CSA Group (CSA) *Phase II Environmental Site Assessment* (A National Standard of Canada), CAN/CSA-Z769-00, reaffirmed 2013. The program was completed also in accordance with the Ontario Ministry of the Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Energy (MOEE), *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (December 1996) (MOEE, 1996).

The Phase II ESA scope of work consisted of the following activities as specified below.

- Monitor the on-site groundwater monitoring well that was installed by Stantec's geotechnical group for combustible and organic vapours, depth to water table, and visual and olfactory evidence of impacts.
- Collect one representative groundwater sample from the previously installed monitoring well using low-flow sampling techniques and submit for laboratory analysis of the COPCs.
- Compare the laboratory results against the applicable provincial standards.
- Provide the results and recommendations of the Limited Phase II ESA in a written report (this report).

1.4 REGULATORY FRAMEWORK

In the Province of Ontario, Ontario Regulation (O.Reg.) 153/04 – Records of Site Condition Part XV.1 of the *Environmental Protection Act*, as amended, provides advice and information to property owners and consultants to use when assessing the environmental condition of a property, when determining whether or not restoration is required and in determining the kind of restoration needed to allow continued use or reuse of the Site. Although O.Reg.153/04 applies only to situations in which a Record of Site Condition will be filed, Stantec referred to it for general guidance on how to evaluate soil and groundwater conditions on the Site.

The *Soil, Ground Water, and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act*, dated April 15, 2011 (Ontario 2011 standards), provide generic numerical standards for soil and groundwater quality presented as a function of land use, soil texture (medium to fine or coarse) groundwater usage (potable or non-potable), and remediation approach (full depth or stratified).

To determine the applicable soil and groundwater quality standards for the Site, the following site conditions were considered:

- The land use is residential;
- Groundwater at, and in the vicinity of the Site, is not currently used or expected to be used as a source of potable water (the Site and surrounding areas are supplied by the City of Ottawa water and sewer services);
- The soils on Site are considered fine-grained native subsurface soils.
- Results of borehole drilling during the geotechnical investigation undertaken by Stantec in July 2018 encountered inferred bedrock at 7.5 m below ground surface (BGS).
- The Site is not within 30 m of the water body;
- The Site, or any other property in the immediate area, is not considered environmentally sensitive, or provincially/locally significant; and

Based on the site classification, the applicable site condition standards (SCS) are as follows:

- Ontario SCS, Table 3 – Generic Site Condition Standards in a Non-Potable Ground Water Condition – Residential/Parkland/Institutional Property Use – Coarse Textured Soils (Table 3 SCS). 2011.

2.0 FIELD INVESTIGATION

2.1 METHODOLOGY

The previously installed monitoring well (MW18-3B) was monitored to determine the depth to groundwater, presence/absence of light non-aqueous phase liquid (LNAPL) within the monitoring well, using an interface probe, and subsurface combustible vapour concentrations, using a RKI Eagle 2 Sample Draw Gas Monitor equipped with a combustible vapour detector. The interface probe was cleaned with detergent and rinsed using distilled water before field measurements were taken. Monitoring results are summarized in Table 1 in Section 3.1.1.

Low-flow groundwater sampling techniques were used to collect representative groundwater samples. This technique reduced the drawdown of groundwater and mixing/disturbance of the standing water within the well to the extent practicable. Field parameters were measured using a flow-through multi-meter cell, and low-flow purging of each monitoring well location continued until the water quality field parameters stabilized. Groundwater samples were collected from MW18-3B once three successive measurements of temperature, pH and specific conductance indicated stability (i.e., measurements are within ± 10% of the previous measurement).

The groundwater sample was collected in accordance with the protocols established by the Ministry of the Environment, Conservation and Parks (MECP) in Ontario Regulation 153/04, as amended, the Canadian Standards Association's *Guideline Z769-00 Phase II Environmental Site Assessments (R2013)*, and standard industry practices to ensure that all data collected is of high quality and is representative of site conditions.

The laboratory analytical results of the groundwater sample were compared to the MECP, Ontario 2011 Standards.

2.2 QUALITY ASSURANCE/QUALITY CONTROL

The sample was collected following strict sampling procedures. The sample was uniquely labeled, and control was maintained through use of chain of custody forms. The sample was collected in laboratory supplied containers and preserved by packing with ice in insulated coolers.

As part of the QA/QC evaluation, Stantec reviewed the analytical laboratory's quality assurance report, which documented the laboratory's internal QA/QC protocols, including internal replicates, process blanks, and process recovery and matrix spike analyses.

2.3 LABORATORY ANALYTICAL PROGRAM

The groundwater sample was submitted to Maxxam in Ottawa, Ontario, for laboratory analysis. Maxxam is accredited by the Standards Council of Canada (SCC) to the ISO/IEC 17025 standard and employs in-

house quality assurance and quality control programs to govern sample analysis including the analysis of the duplicate.

A groundwater sample was collected from the newly-installed monitoring wells and submitted for laboratory analysis of the following parameters: VOCs, BTEX, PHCs F1 – F4 and metals.

3.0 RESULTS

3.1 SUBSURFACE CONDITIONS

3.1.1 Groundwater Monitoring

Depth to groundwater, vapour concentrations, and thickness of free product, if applicable, were measured in the previously installed monitoring well MW18-3B on November 15, 2018. Monitoring well MW18-3B was the only available well monitored at the time of the assessment; therefore, local shallow groundwater flow direction could not be determined based on a single well elevation measurement. Table 1 below summarizes the monitoring results.

Table 1 Groundwater Monitoring Data

Monitoring Location	Date (dd-mmm-yy)	Ground Surface Elevation (m ASL)	Water Level Depth (m BTOP)	Liquid-Phase Petroleum Hydrocarbon Apparent Thickness (mm)	Well Headspace Combustible Vapour Concentration (ppmv)	Well Headspace Total Organic Vapour Concentration (ppmv)
MW18-3B	15-Nov-18	60.11	4.02	0	<5	<0.02

Notes:
m ASL metres above sea level
m BTOP metres below top of pipe
mm millimetres
ppmv parts per million by volume

Groundwater at the Site appears to flow northeasterly based on topography and surface drainage. The inferred shallow groundwater flow direction is shown on Figure No.3, **Appendix A**.

Groundwater combustible vapour concentrations measured on November 15, 2018, were non-detect (<5 ppmv). No measureable thickness of free product or sheen was observed in the monitoring well. Monitoring well MW18-3B had a slight sulphurous odour.

3.2 GROUNDWATER ANALYTICAL RESULTS

Results of the laboratory analysis of groundwater samples for VOCs, BTEX, PHCs F1 – F4 and metals are presented in Table 2 in **Appendix B**. The corresponding certificate of analysis from Maxxam is presented in **Appendix C**.

3.2.1 Volatile Organic Compounds (VOCs)

Concentrations of VOCs were not detected in the groundwater sample submitted for laboratory analysis and therefore did not exceed the applicable provincial standards (Table 3 SCS).

3.2.2 Petroleum Hydrocarbons (PHCs) F1 – F4 and BTEX

Concentrations of BTEX and PHCs F1 – F4 were not detected in the groundwater sample submitted for laboratory analysis and therefore did not exceed the applicable provincial standards (Table 3 SCS).

3.2.3 Metals

Concentrations of metals were not detected above the applicable provincial standards (Table 3 SCS) in the groundwater sample submitted for laboratory analysis.

3.3 QUALITY ASSURANCE/QUALITY CONTROL

The data quality objective (DQO) for the Limited Phase II ESA was to collect data that were precise, accurate, representative, complete and comparable, and suitable for comparison with the Table 3 SCS.

Results of quality control calculations (*i.e.*, matrix spike, spiked blank, method blank and RPD calculations) for the laboratory QA/QC samples are presented in the laboratory analytical report provided in **Appendix C**.

Based on the review of the laboratory QA/QC programs, it was concluded that the DQO was met.

4.0 CONCLUSIONS

The Limited Phase II ESA was undertaken in support of the Site Plan Control application being prepared by TC United and to assess the presence/absence of groundwater impacts at the Site as a result of two areas of potential environmental concern (APECs) identified by Stantec in the Phase One ESA dated October 3, 2018. The conclusions of this assessment are summarized below:

- Combustible vapour concentrations were not detected.
- No measureable thickness of free product or sheen was observed in the monitoring well.
- The depth to groundwater in the monitoring well, as measured on November 15, 2018, was 4.02 m BGS in MW18-3B.
- Laboratory analysis determined that concentrations of contaminants of concern in groundwater did not exceed the applicable provincial criteria.

5.0 RECOMMENDATIONS

Based on the results of this Limited Phase II ESA, Stantec recommends the following:

- If soil is to be removed from the Site for construction purposes, laboratory analyses of the identified COPCs should be completed to assess disposal options for soil.

6.0 CLOSURE

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 Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's 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 property's 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:

- The presence of one monitoring well on Site limits the delineation of potential groundwater and soil impacts associated with the discussed APECs.
- The soil quality at the Site is unknown since soil sampling and analysis was not completed.

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 subsurface 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.

CLOSURE
November 30, 2018

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. This report was prepared by Tait van Wyk and reviewed by Jill Peters-Dechman, P.Eng.

Respectfully submitted,

STANTEC CONSULTING LTD.

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TVW/JPD/cb

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7.0 REFERENCES

Canadian Standards Association (CSA), 2000. Phase II Environmental Site Assessment (A National Standard of Canada), CAN/CSA-Z769-00, reaffirmed 2013.

Maxxam Analytics International Corporation (Maxxam), undated. Ontario QA/QC Interpretation Guide Reference COR-FCD-0097. Released July 18, 2016.

Ontario Ministry of the Environment (MOE), 2011. Soil, Ground Water, and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act, dated April 15, 2011

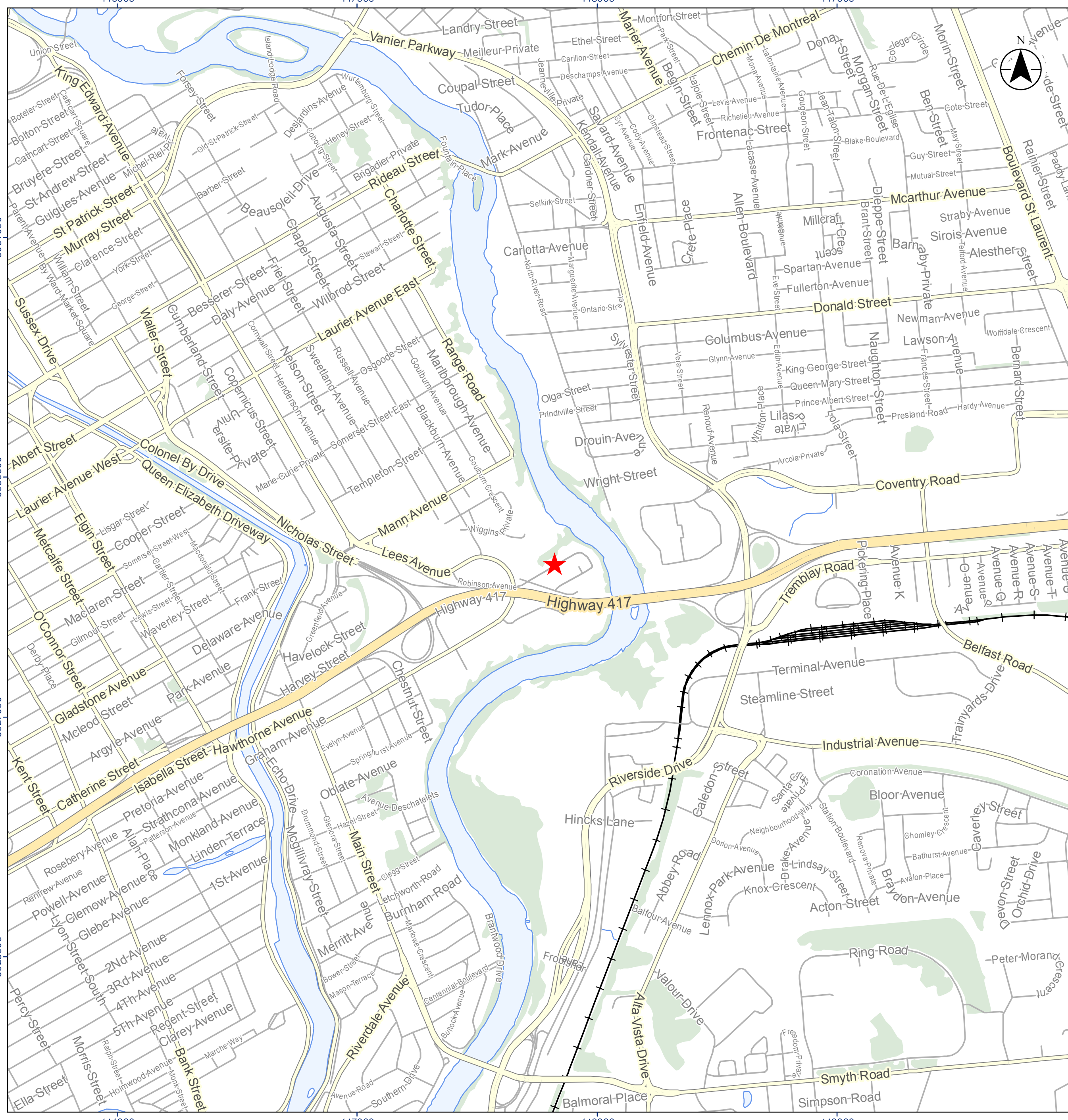
Ontario SCS, Table 3 – Generic Site Condition Standards in a Non-Potable Ground Water Condition – Residential/Parkland/Institutional Property Use – Coarse Textured Soils (Table 3 SCS). 2011

Phase One Environmental Site Assessment 27-31 Robinson Avenue, Ottawa, Ontario, dated October 2, 2018, prepared for TC United Group by Stantec Consulting Ltd.

Geotechnical Investigation Report, Proposed Residential Development, 27-31 Robinson Avenue, Ottawa, Ontario, dated July 27, 2018, prepared for TC United Group by Stantec Consulting Ltd.

APPENDICES

Appendix A FIGURES



Legend

- Site Location
- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Wooded Area

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

0 250 500 metres

1:25,000 (at original document size of 8.5x11)

Stantec

Project Location: Ottawa, ON

160401428 REVA

Prepared by CL on 2018-11-30

Technical Review by JPD on 2018-11-28

Client/Project

TC UNITED GROUP

LIMITED PHASE II ESA - 27-31 ROBINSON AVENUE

Figure No.

1

Title

Key Plan

Legend

- Approximate Site Boundary
- Monitoring Well

0 20 40 metres

1:1,000 (at original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery: City of Ottawa, 2018. Imagery Date: 2017.

Stantec

Project Location
Ottawa, ON

160401428 REVA
Prepared by CL on 2018-11-30
Technical Review by JPD on 2018-11-28

Client/Project
TC UNITED GROUP
LIMITED PHASE II ESA - 27-31 ROBINSON AVENUE

Figure No.
2

Title
Site Plan

Appendix B SUMMARY ANALYTICAL TABLES

Table 2
Summary of Groundwater Analytical Results
Limited Phase II Environmental Site Assessment
27-31 Robinson Avenue, Ottawa, ON
TC United

Sample Location			MW18-3B	
Sample Date			15-Nov-18	15-Nov-18
Sample ID			MW18-3B	MW18-3B Lab-Dup
Sampling Company			STANTEC	STANTEC
Laboratory			MAXX	MAXX
Laboratory Work Order			B8U5109	B8U5109
Laboratory Sample ID			IHM890	IHM890
Sample Type	Units	Ontario SCS		Lab Replicate
Petroleum Hydrocarbons				
PHC F1 (C6-C10 range)	µg/L	$_{s7}^{A}$	<25	-
PHC F1 (C6-C10 range) minus BTEX	µg/L	750_{s7}^{A}	<25	-
PHC F2 (>C10-C16 range)	µg/L	150_{s15}^{A}	<100	-
PHC F3 (>C16-C34 range)	µg/L	500_{s8}^{A}	<200	-
PHC F4 (>C34-C50 range)	µg/L	500_{s10}^{A}	<200	-
Chromatogram to baseline at C50	none	n/v	YES	-
Metals				
Antimony	µg/L	$20{,}000^{A}$	<0.50	-
Arsenic	µg/L	$1{,}900^{A}$	1.6	-
Barium	µg/L	$29{,}000^{A}$	110	-
Beryllium	µg/L	67^{A}	<0.50	-
Boron	µg/L	$45{,}000^{A}$	180	-
Cadmium	µg/L	2.7^{A}	<0.10	-
Chromium	µg/L	810^{A}	<5.0	-
Chromium (Hexavalent)	µg/L	140^{A}	<0.50	-
Cobalt	µg/L	66^{A}	<0.50	-
Copper	µg/L	87^{A}	<1.0	-
Lead	µg/L	25^{A}	<0.50	-
Mercury	µg/L	0.29^{A}	<0.1	<0.1
Molybdenum	µg/L	$9{,}200^{A}$	2.3	-
Nickel	µg/L	490^{A}	<1.0	-
Selenium	µg/L	63^{A}	<2.0	-
Silver	µg/L	1.5^{A}	<0.10	-
Sodium	µg/L	$2{,}300{,}000^{A}$	150,000	-
Thallium	µg/L	510^{A}	<0.050	-
Uranium	µg/L	420^{A}	0.51	-
Vanadium	µg/L	250^{A}	<0.50	-
Zinc	µg/L	$1{,}100^{A}$	<5.0	-
Polycyclic Aromatic Hydrocarbon				
Acenaphthene	µg/L	600^{A}	<0.050	-
Acenaphthylene	µg/L	1.8^{A}	<0.050	-
Anthracene	µg/L	2.4^{A}	<0.050	-
Benzo(a)anthracene	µg/L	4.7^{A}	<0.050	-
Benzo(a)pyrene	µg/L	0.81^{A}	<0.010	-
Benzo(b/j)fluoranthene	µg/L	0.75_{s2}^{A}	<0.050	-
Benzo(g,h,i)perylene	µg/L	0.2^{A}	<0.050	-
Benzo(k)fluoranthene	µg/L	0.4^{A}	<0.050	-
Chrysene	µg/L	1^{A}	<0.050	-
Dibenzo(a,h)anthracene	µg/L	0.52^{A}	<0.050	-
Fluoranthene	µg/L	130^{A}	<0.050	-
Fluorene	µg/L	400^{A}	<0.050	-
Indeno(1,2,3-cd)pyrene	µg/L	0.2^{A}	<0.050	-
Methylnaphthalene (Total)	µg/L	$1{,}800_{s3}^{A}$	<0.071	-
Methylnaphthalene, 1-	µg/L	$_{s3}^{A}$	<0.050	-
Methylnaphthalene, 2-	µg/L	$_{s3}^{A}$	<0.050	-
Naphthalene	µg/L	$1{,}400^{A}$	<0.050	-
Phenanthrene	µg/L	580^{A}	<0.030	-
Pyrene	µg/L	68^{A}	<0.050	-
Volatile Organic Compounds				
Acetone	µg/L	$130{,}000^{A}$	<10	-
Benzene	µg/L	44^{A}	<0.20	-
Bromodichloromethane	µg/L	$85{,}000^{A}$	<0.50	-
Bromoform (Tribromomethane)	µg/L	380^{A}	<1.0	-
Bromomethane (Methyl bromide)	µg/L	5.6^{A}	<0.50	-
Carbon Tetrachloride (Tetrachloromethane)	µg/L	0.79^{A}	<0.20	-
Chlorobenzene (Monochlorobenzene)	µg/L	630^{A}	<0.20	-
Chloroform (Trichloromethane)	µg/L	2.4^{A}	<0.20	-
Dibromochloromethane	µg/L	$82{,}000^{A}$	<0.50	-
Dichlorobenzene, 1,2-	µg/L	$4{,}600^{A}$	<0.50	-
Dichlorobenzene, 1,3-	µg/L	$9{,}600^{A}$	<0.50	-

Table 2
Summary of Groundwater Analytical Results
Limited Phase II Environmental Site Assessment
27-31 Robinson Avenue, Ottawa, ON
TC United

Sample Location			MW18-3B	
Sample Date			15-Nov-18	15-Nov-18
Sample ID			MW18-3B	MW18-3B Lab-Dup
Sampling Company			STANTEC	STANTEC
Laboratory			MAXX	MAXX
Laboratory Work Order			B8U5109	B8U5109
Laboratory Sample ID			IHM890	IHM890
Sample Type	Units	Ontario SCS		Lab Replicate
Dichlorobenzene, 1,4-	µg/L	8[A]	<0.50	-
Dichlorodifluoromethane (Freon 12)	µg/L	4,400[A]	<1.0	-
Dichloroethane, 1,1-	µg/L	320[A]	<0.20	-
Dichloroethane, 1,2-	µg/L	1.6[A]	<0.50	-
Dichloroethene, 1,1-	µg/L	1.6[A]	<0.20	-
Dichloroethene, cis-1,2-	µg/L	1.6[A]	<0.50	-
Dichloroethene, trans-1,2-	µg/L	1.6[A]	<0.50	-
Dichloropropane, 1,2-	µg/L	16[A]	<0.20	-
Dichloropropene, 1,3- (sum of isomers cis + trans)	µg/L	5.2[s11,A]	<0.50	-
Dichloropropene, cis-1,3-	µg/L	[s11,A]	<0.30	-
Dichloropropene, trans-1,3-	µg/L	[s11,A]	<0.40	-
Ethylbenzene	µg/L	2,300[A]	<0.20	-
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/L	0.25[A]	<0.20	-
Hexane (n-Hexane)	µg/L	51[A]	<1.0	-
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/L	470,000[A]	<10	-
Methyl Isobutyl Ketone (MIBK)	µg/L	140,000[A]	<5.0	-
Methyl tert-butyl ether (MTBE)	µg/L	190[A]	<0.50	-
Methylene Chloride (Dichloromethane)	µg/L	610[A]	<2.0	-
Styrene	µg/L	1,300[A]	<0.50	-
Tetrachloroethane, 1,1,1,2-	µg/L	3.3[A]	<0.50	-
Tetrachloroethane, 1,1,2,2-	µg/L	3.2[A]	<0.50	-
Tetrachloroethene (PCE)	µg/L	1.6[A]	<0.20	-
Toluene	µg/L	18,000[A]	<0.20	-
Trichloroethane, 1,1,1-	µg/L	640[A]	<0.20	-
Trichloroethane, 1,1,2-	µg/L	4.7[A]	<0.50	-
Trichloroethene (TCE)	µg/L	1.6[A]	<0.20	-
Trichlorofluoromethane (Freon 11)	µg/L	2,500[A]	<0.50	-
Vinyl Chloride	µg/L	0.5[A]	<0.20	-
Xylene, m & p-	µg/L	[s1,A]	<0.20	-
Xylene, o-	µg/L	[s1,A]	<0.20	-
Xylenes, Total	µg/L	4,200[s1,A]	<0.20	-

Notes:

Ontario SCS	Soil, Ground Water and Sediment Standards for Use under Part XV.I of the Environmental Protection Act (MOE, 2011) Site Condition
A	Table 3 - All Types of Property Use - Coarse Textured Soils
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
s1	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
s2	Standard is for benzo(b)fluoranthene; however, the analytical laboratory can not distinguish between benzo(b)fluoranthene and benzo(j the result is a combination of the two isomers, against which the standard has been compared.
s3	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of th
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 appli
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
s11	Standard is applicable to 1,3-Dichloropropene, and the individual isomers (cis + trans) 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.

Appendix C LABORATORY CERTIFICATE OF ANALYSIS

Maxxam
A Bureau Veritas Group Company

Your Project #: 160401428
Site#: 1604
Your C.O.C. #: 692592-01-01

Attention: Jill Peters-Dechman

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

Report Date: 2018/11/22
Report #: R5495057
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8U5109
Received: 2018/11/15, 11:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	1	N/A	2018/11/21	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	1	N/A	2018/11/20		EPA 8260C m
Chromium (VI) in Water (1)	1	N/A	2018/11/20	CAM SOP-00436	EPA 7199 m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	1	2018/11/20	2018/11/22	CAM SOP-00316	CCME PHC-CWS m
Mercury (1)	1	2018/11/21	2018/11/21	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS (1)	1	N/A	2018/11/19	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM) (1)	1	2018/11/20	2018/11/21	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2018/11/19	CAM SOP-00230	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

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

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

Your Project #: 160401428
Site#: 1604
Your C.O.C. #: 692592-01-01

Attention: Jill Peters-Dechman

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

Report Date: 2018/11/22
Report #: R5495057
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8U5109
Received: 2018/11/15, 11:30

(1) This test was performed by Maxxam Analytics Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. 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 "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Jonathan Urben, Senior Project Manager
Email: jurben@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 #: B8U5109
Report Date: 2018/11/22

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

O.REG 153 METALS PACKAGE (WATER)

Maxxam ID		IHM890			IHM890		
Sampling Date		2018/11/15 09:20			2018/11/15 09:20		
COC Number		692592-01-01			692592-01-01		
	UNITS	MW18-3B	RDL	QC Batch	MW18-3B Lab-Dup	RDL	QC Batch
Metals							
Chromium (VI)	ug/L	<0.50	0.50	5840022			
Mercury (Hg)	ug/L	<0.1	0.1	5848749	<0.1	0.1	5848749
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	5843201			
Dissolved Arsenic (As)	ug/L	1.6	1.0	5843201			
Dissolved Barium (Ba)	ug/L	110	2.0	5843201			
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	5843201			
Dissolved Boron (B)	ug/L	180	10	5843201			
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	5843201			
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	5843201			
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	5843201			
Dissolved Copper (Cu)	ug/L	<1.0	1.0	5843201			
Dissolved Lead (Pb)	ug/L	<0.50	0.50	5843201			
Dissolved Molybdenum (Mo)	ug/L	2.3	0.50	5843201			
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	5843201			
Dissolved Selenium (Se)	ug/L	<2.0	2.0	5843201			
Dissolved Silver (Ag)	ug/L	<0.10	0.10	5843201			
Dissolved Sodium (Na)	ug/L	150000	100	5843201			
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	5843201			
Dissolved Uranium (U)	ug/L	0.51	0.10	5843201			
Dissolved Vanadium (V)	ug/L	<0.50	0.50	5843201			
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	5843201			

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

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O.REG 153 PAHS (WATER)

Maxxam ID		IHM890		
Sampling Date		2018/11/15 09:20		
COC Number		692592-01-01		
	UNITS	MW18-3B	RDL	QC Batch
Calculated Parameters				
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.071	5838815
Polyaromatic Hydrocarbons				
Acenaphthene	ug/L	<0.050	0.050	5847202
Acenaphthylene	ug/L	<0.050	0.050	5847202
Anthracene	ug/L	<0.050	0.050	5847202
Benzo(a)anthracene	ug/L	<0.050	0.050	5847202
Benzo(a)pyrene	ug/L	<0.010	0.010	5847202
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	5847202
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	5847202
Benzo(k)fluoranthene	ug/L	<0.050	0.050	5847202
Chrysene	ug/L	<0.050	0.050	5847202
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	5847202
Fluoranthene	ug/L	<0.050	0.050	5847202
Fluorene	ug/L	<0.050	0.050	5847202
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	5847202
1-Methylnaphthalene	ug/L	<0.050	0.050	5847202
2-Methylnaphthalene	ug/L	<0.050	0.050	5847202
Naphthalene	ug/L	<0.050	0.050	5847202
Phenanthrene	ug/L	<0.030	0.030	5847202
Pyrene	ug/L	<0.050	0.050	5847202
Surrogate Recovery (%)				
D10-Anthracene	%	100		5847202
D14-Terphenyl (FS)	%	93		5847202
D8-Acenaphthylene	%	97		5847202

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8U5109
Report Date: 2018/11/22

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID		IHM890		
Sampling Date		2018/11/15 09:20		
COC Number		692592-01-01		
	UNITS	MW18-3B	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	5838816
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	5843145
Benzene	ug/L	<0.20	0.20	5843145
Bromodichloromethane	ug/L	<0.50	0.50	5843145
Bromoform	ug/L	<1.0	1.0	5843145
Bromomethane	ug/L	<0.50	0.50	5843145
Carbon Tetrachloride	ug/L	<0.20	0.20	5843145
Chlorobenzene	ug/L	<0.20	0.20	5843145
Chloroform	ug/L	<0.20	0.20	5843145
Dibromochloromethane	ug/L	<0.50	0.50	5843145
1,2-Dichlorobenzene	ug/L	<0.50	0.50	5843145
1,3-Dichlorobenzene	ug/L	<0.50	0.50	5843145
1,4-Dichlorobenzene	ug/L	<0.50	0.50	5843145
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	5843145
1,1-Dichloroethane	ug/L	<0.20	0.20	5843145
1,2-Dichloroethane	ug/L	<0.50	0.50	5843145
1,1-Dichloroethylene	ug/L	<0.20	0.20	5843145
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	5843145
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	5843145
1,2-Dichloropropane	ug/L	<0.20	0.20	5843145
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	5843145
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	5843145
Ethylbenzene	ug/L	<0.20	0.20	5843145
Ethylene Dibromide	ug/L	<0.20	0.20	5843145
Hexane	ug/L	<1.0	1.0	5843145
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	5843145
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	5843145
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	5843145
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	5843145
Styrene	ug/L	<0.50	0.50	5843145

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8U5109
Report Date: 2018/11/22

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID		IHM890		
Sampling Date		2018/11/15 09:20		
COC Number		692592-01-01		
	UNITS	MW18-3B	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	5843145
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	5843145
Tetrachloroethylene	ug/L	<0.20	0.20	5843145
Toluene	ug/L	<0.20	0.20	5843145
1,1,1-Trichloroethane	ug/L	<0.20	0.20	5843145
1,1,2-Trichloroethane	ug/L	<0.50	0.50	5843145
Trichloroethylene	ug/L	<0.20	0.20	5843145
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	5843145
Vinyl Chloride	ug/L	<0.20	0.20	5843145
p+m-Xylene	ug/L	<0.20	0.20	5843145
o-Xylene	ug/L	<0.20	0.20	5843145
Total Xylenes	ug/L	<0.20	0.20	5843145
F1 (C6-C10)	ug/L	<25	25	5843145
F1 (C6-C10) - BTEX	ug/L	<25	25	5843145
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5847204
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5847204
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5847204
Reached Baseline at C50	ug/L	Yes		5847204
Surrogate Recovery (%)				
o-Terphenyl	%	103		5847204
4-Bromofluorobenzene	%	81		5843145
D4-1,2-Dichloroethane	%	112		5843145
D8-Toluene	%	93		5843145

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8U5109
Report Date: 2018/11/22

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

TEST SUMMARY

Maxxam ID: IHM890
Sample ID: MW18-3B
Matrix: Water

Collected: 2018/11/15
Shipped:
Received: 2018/11/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5838815	N/A	2018/11/21	Automated Statchk
1,3-Dichloropropene Sum	CALC	5838816	N/A	2018/11/20	Automated Statchk
Chromium (VI) in Water	IC	5840022	N/A	2018/11/20	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5847204	2018/11/20	2018/11/22	Atoosa Keshavarz
Mercury	CV/AA	5848749	2018/11/21	2018/11/21	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5843201	N/A	2018/11/19	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5847202	2018/11/20	2018/11/21	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5843145	N/A	2018/11/19	Denis Reid

Maxxam ID: IHM890 Dup
Sample ID: MW18-3B
Matrix: Water

Collected: 2018/11/15
Shipped:
Received: 2018/11/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5848749	2018/11/21	2018/11/21	Ron Morrison

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Maxxam Job #: B8U5109
Report Date: 2018/11/22

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

GENERAL COMMENTS

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

Package 1	2.7°C

Results relate only to the items tested.

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8U5109
Report Date: 2018/11/22

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5843145	4-Bromofluorobenzene	2018/11/19	96	70 - 130	95	70 - 130	84	%		
5843145	D4-1,2-Dichloroethane	2018/11/19	108	70 - 130	104	70 - 130	110	%		
5843145	D8-Toluene	2018/11/19	103	70 - 130	105	70 - 130	94	%		
5847202	D10-Anthracene	2018/11/21	100	50 - 130	104	50 - 130	101	%		
5847202	D14-Terphenyl (FS)	2018/11/21	99	50 - 130	103	50 - 130	99	%		
5847202	D8-Acenaphthylene	2018/11/21	99	50 - 130	99	50 - 130	97	%		
5847204	o-Terphenyl	2018/11/22	106	60 - 130	107	60 - 130	102	%		
5840022	Chromium (VI)	2018/11/20	100	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
5843145	1,1,1,2-Tetrachloroethane	2018/11/19	90	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
5843145	1,1,1-Trichloroethane	2018/11/19	96	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
5843145	1,1,2,2-Tetrachloroethane	2018/11/19	91	70 - 130	87	70 - 130	<0.50	ug/L	NC	30
5843145	1,1,2-Trichloroethane	2018/11/19	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
5843145	1,1-Dichloroethane	2018/11/19	100	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5843145	1,1-Dichloroethylene	2018/11/19	99	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5843145	1,2-Dichlorobenzene	2018/11/19	92	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5843145	1,2-Dichloroethane	2018/11/19	102	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
5843145	1,2-Dichloropropane	2018/11/19	98	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5843145	1,3-Dichlorobenzene	2018/11/19	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
5843145	1,4-Dichlorobenzene	2018/11/19	92	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5843145	Acetone (2-Propanone)	2018/11/19	NC	60 - 140	66	60 - 140	<10	ug/L	NC	30
5843145	Benzene	2018/11/19	94	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
5843145	Bromodichloromethane	2018/11/19	98	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5843145	Bromoform	2018/11/19	88	70 - 130	84	70 - 130	<1.0	ug/L	NC	30
5843145	Bromomethane	2018/11/19	97	60 - 140	97	60 - 140	<0.50	ug/L	NC	30
5843145	Carbon Tetrachloride	2018/11/19	93	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5843145	Chlorobenzene	2018/11/19	92	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5843145	Chloroform	2018/11/19	98	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
5843145	cis-1,2-Dichloroethylene	2018/11/19	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5843145	cis-1,3-Dichloropropene	2018/11/19	100	70 - 130	94	70 - 130	<0.30	ug/L	NC	30
5843145	Dibromochloromethane	2018/11/19	92	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5843145	Dichlorodifluoromethane (FREON 12)	2018/11/19	73	60 - 140	78	60 - 140	<1.0	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5843145	Ethylbenzene	2018/11/19	95	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
5843145	Ethylene Dibromide	2018/11/19	93	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
5843145	F1 (C6-C10) - BTEX	2018/11/19					<25	ug/L	NC	30
5843145	F1 (C6-C10)	2018/11/19	114	60 - 140	96	60 - 140	<25	ug/L	NC	30
5843145	Hexane	2018/11/19	98	70 - 130	101	70 - 130	<1.0	ug/L	NC	30
5843145	Methyl Ethyl Ketone (2-Butanone)	2018/11/19	78	60 - 140	71	60 - 140	<10	ug/L	NC	30
5843145	Methyl Isobutyl Ketone	2018/11/19	79	70 - 130	71	70 - 130	<5.0	ug/L	NC	30
5843145	Methyl t-butyl ether (MTBE)	2018/11/19	92	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
5843145	Methylene Chloride(Dichloromethane)	2018/11/19	90	70 - 130	88	70 - 130	<2.0	ug/L	NC	30
5843145	o-Xylene	2018/11/19	94	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5843145	p+m-Xylene	2018/11/19	94	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5843145	Styrene	2018/11/19	97	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5843145	Tetrachloroethylene	2018/11/19	89	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5843145	Toluene	2018/11/19	96	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5843145	Total Xylenes	2018/11/19					<0.20	ug/L	NC	30
5843145	trans-1,2-Dichloroethylene	2018/11/19	91	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
5843145	trans-1,3-Dichloropropene	2018/11/19	109	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
5843145	Trichloroethylene	2018/11/19	93	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5843145	Trichlorofluoromethane (FREON 11)	2018/11/19	98	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
5843145	Vinyl Chloride	2018/11/19	94	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5843201	Dissolved Antimony (Sb)	2018/11/19	115	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
5843201	Dissolved Arsenic (As)	2018/11/19	105	80 - 120	100	80 - 120	<1.0	ug/L	3.5	20
5843201	Dissolved Barium (Ba)	2018/11/19	108	80 - 120	101	80 - 120	<2.0	ug/L	4.7	20
5843201	Dissolved Beryllium (Be)	2018/11/19	105	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
5843201	Dissolved Boron (B)	2018/11/19	100	80 - 120	98	80 - 120	<10	ug/L	2.3	20
5843201	Dissolved Cadmium (Cd)	2018/11/19	112	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
5843201	Dissolved Chromium (Cr)	2018/11/19	98	80 - 120	94	80 - 120	<5.0	ug/L	NC	20
5843201	Dissolved Cobalt (Co)	2018/11/19	107	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
5843201	Dissolved Copper (Cu)	2018/11/19	108	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
5843201	Dissolved Lead (Pb)	2018/11/19	100	80 - 120	95	80 - 120	<0.50	ug/L	NC	20
5843201	Dissolved Molybdenum (Mo)	2018/11/19	132 (1)	80 - 120	102	80 - 120	<0.50	ug/L	1.9	20

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5843201	Dissolved Nickel (Ni)	2018/11/19	100	80 - 120	98	80 - 120	<1.0	ug/L	6.0	20
5843201	Dissolved Selenium (Se)	2018/11/19	105	80 - 120	104	80 - 120	<2.0	ug/L	NC	20
5843201	Dissolved Silver (Ag)	2018/11/19	85	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
5843201	Dissolved Sodium (Na)	2018/11/19	NC	80 - 120	103	80 - 120	<100	ug/L	2.3	20
5843201	Dissolved Thallium (Tl)	2018/11/19	101	80 - 120	95	80 - 120	<0.050	ug/L	NC	20
5843201	Dissolved Uranium (U)	2018/11/19	107	80 - 120	101	80 - 120	<0.10	ug/L	1.5	20
5843201	Dissolved Vanadium (V)	2018/11/19	103	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
5843201	Dissolved Zinc (Zn)	2018/11/19	101	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
5847202	1-Methylnaphthalene	2018/11/21	109	50 - 130	110	50 - 130	<0.050	ug/L	NC	30
5847202	2-Methylnaphthalene	2018/11/21	100	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
5847202	Acenaphthene	2018/11/21	100	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
5847202	Acenaphthylene	2018/11/21	103	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
5847202	Anthracene	2018/11/21	99	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5847202	Benzo(a)anthracene	2018/11/21	105	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
5847202	Benzo(a)pyrene	2018/11/21	103	50 - 130	103	50 - 130	<0.010	ug/L	NC	30
5847202	Benzo(b/j)fluoranthene	2018/11/21	106	50 - 130	108	50 - 130	<0.050	ug/L	NC	30
5847202	Benzo(g,h,i)perylene	2018/11/21	104	50 - 130	106	50 - 130	<0.050	ug/L	NC	30
5847202	Benzo(k)fluoranthene	2018/11/21	101	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5847202	Chrysene	2018/11/21	102	50 - 130	103	50 - 130	<0.050	ug/L	NC	30
5847202	Dibenz(a,h)anthracene	2018/11/21	99	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
5847202	Fluoranthene	2018/11/21	106	50 - 130	107	50 - 130	<0.050	ug/L	NC	30
5847202	Fluorene	2018/11/21	99	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5847202	Indeno(1,2,3-cd)pyrene	2018/11/21	103	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5847202	Naphthalene	2018/11/21	98	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5847202	Phenanthrene	2018/11/21	103	50 - 130	104	50 - 130	<0.030	ug/L	NC	30
5847202	Pyrene	2018/11/21	105	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5847204	F2 (C10-C16 Hydrocarbons)	2018/11/22	100	50 - 130	100	60 - 130	<100	ug/L	NC	30
5847204	F3 (C16-C34 Hydrocarbons)	2018/11/22	100	50 - 130	101	60 - 130	<200	ug/L	NC	30
5847204	F4 (C34-C50 Hydrocarbons)	2018/11/22	96	50 - 130	99	60 - 130	<200	ug/L	NC	30

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Maxxam Job #: B8U5109
Report Date: 2018/11/22

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5848749	Mercury (Hg)	2018/11/21	91	75 - 125	95	80 - 120	<0.1	ug/L	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.

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

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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

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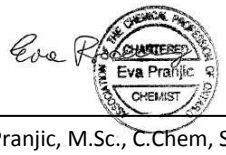
Stantec Consulting Ltd
Client Project #: 160401428
Sampler Initials: CS

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

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.

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