



January 24, 2017

160861

Urban Structure Properties Ltd.  
3926 Leitrim Road  
Ottawa, Ontario  
K1G 3N4

RE: SOIL SAMPLING AND TESTING  
PROPOSED RESIDENTIAL DEVELOPMENT  
351 CROYDON AVENUE  
CITY OF OTTAWA, ONTARIO

Dear Sir:

This letter presents the results of some soil sampling and laboratory testing carried out at the subject site based on the identification of former underground fuel storage tanks at the neighbouring property from the Phase I ESA historical research. The purpose of the soil sampling and testing was to test soil samples obtained from boreholes put down in conjunction with a geotechnical investigation at the site for the presence of hydrocarbons and metals. Based on the results of the testing, comments were to be provided as to whether or not the soil samples obtained meet the applicable Ministry of the Environment and Climate Change (MOECC) Standards for acceptable levels of petroleum hydrocarbons (PHCs) and metals.

The field work for this investigation consisted of the placement of three boreholes for the purpose of obtaining soil samples for laboratory testing. The number of boreholes was limited due to site access and winter conditions. The site is currently being used for the storage of two chip trucks and associated outdoor seating areas.

The location of the subject site is shown on the attached Key Plan, Figure 1.

## **FIELD INVESTIGATION PROCEDURE**

On January 9, 2017, three boreholes, numbered BH1 to BH3, were put down to depths ranging between 5.5 to 6.7 metres below the existing ground surface. The boreholes were put down using a truck mounted drill rig owned and operated by a local drilling contractor. Kollaard Associates obtained six soil samples (two from each borehole) for laboratory testing. Three soil samples were obtained from fill materials observed within the upper 1.7 to 1.9 metres below the existing ground surface. Three other soil samples were obtained from depths ranging between 3.8 to 5.2 metres below the existing ground surface. The subsurface soil conditions at the boreholes were identified based on visual examination of the samples recovered from the boreholes. Groundwater conditions in the boreholes, if any, were noted at the time of sampling. The three samples obtained from the upper 1.7 to 1.9 metres consisted, in general, of sand and gravel fill materials mixed with a trace of



silt and organics. The three samples obtained from about 3.8 to 5.2 metres depth consisted of native grey brown to grey silty sand with some gravel, cobbles and boulders and a trace of clay (Glacial Till). The approximate location of the boreholes are shown on the attached Site Plan, Figure 2.

## **SOIL AND GROUNDWATER SAMPLING**

The six samples were collected and prepared/preserved in the field using appropriate techniques and submitted to Eurofins Environment Testing in Nepean, Ontario to be analyzed for metals (Schedule IV inorganics), petroleum hydrocarbons (PHCs) and benzene, toluene, ethylbenzene, and xylenes (BTEX). The three soil samples submitted to the laboratory for testing of metals consisted of soil from BH1 (0.75 to 1.37 metres), BH2 (0.75 to 1.37 metres) and BH3 (0.75 to 1.37 metres). The three samples submitted to the laboratory for testing of petroleum hydrocarbons (PHCs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) consisted of soil from BH1 (3.8 to 4.4 metres), BH2 (4.6 to 5.2 metres) and BH3 (4.6 to 5.2 metres). The results were then compared to the Ministry of the Environment and Climate Change (MOECC) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 3, dated April 15, 2011 for coarse textured soils relating to residential/parkland/institutional property use with a non-potable groundwater condition*. The results of the laboratory testing of the soil samples are provided in Attachment A.

Soil samples were collected manually using black nitrile gloves and were placed in laboratory prepared glass jars, and immediately placed in coolers. For samples considered for volatile organic compounds (VOC) or BTEX-F1 (benzene, toluene, ethylbenzene, xylenes and petroleum hydrocarbon fraction 1) testing, samples were collected using a core sampler and placed in a laboratory prepared vial containing a methanol preservative. In general, the upper overburden materials encountered at the site are indicated to consist of fill materials including asphaltic concrete overlying grey brown sand and gravel with a trace of silt and organics followed by native grey brown to grey glacial till.

At the time of the sampling, no olfactory or visual evidence of hydrocarbon staining was observed in the samples recovered from the boreholes.

Based on a review and interpretation of the soils mapping and borehole information for the site area, the site is not considered a shallow soil property as the soil maps indicate one-third or more of the area of the site consists of soil equal to or more than 2 metres in depth beneath the soil surface, excluding any non-soil surface treatment greater than 0.5 metres thick.

The applicable soil texture for the site is based on the soil recovered from the boreholes and geological maps which collectively indicate that at least one-third of the soil at the property, measured by volume, consisted of more than 50 percent of particles that are larger than 75µm in diameter (i.e. coarse grained soils).



## **RESULTS**

The laboratory results indicated the following:

### **Soil Analytical Results**

The results of the laboratory PHC and BTEX testing of the soil samples indicates all the samples meet the MOE standards for PHCs and BTEX. All of the soil samples analyzed for PHCs and BTEX during this investigation were either below the laboratory detection limits or had concentrations below the respective standard.

The results of the laboratory metals testing Regulation 153/04 - Decommissioning Inorganics - Metals Only for the soil samples indicates all of the soil samples analyzed were either below the laboratory detection limits or had concentrations below the respective standard.

### **Conclusions**

Based on the results of soil and sampling and testing carried out, all of the samples meet the applicable standards for hydrocarbon or metals impacts within the three boreholes placed at the site. No further soil testing is warranted at this site.

### **Limitations**

This letter should in no way be construed as a warranty that the subject property is free from any and all contaminants other than those noted in this letter, nor that all compliance issues have been addressed. This letter was prepared for the exclusive use of Urban Structure Properties Ltd. and is based on data and information collected by Kollaard Associates Inc. This letter may not be relied upon by any other person or entity without the express written consent of Urban Structure Properties Ltd. and Kollaard Associates Inc. Any use of this letter by a third party is the responsibility of the third party. Kollaard Associates Inc. accepts no responsibility for damages, if any, sustained by any third party as a result of decisions made or action based on this letter. Kollaard Associates Inc. has relied in good faith on information provided by others. We accept no responsibility for any deficiencies, or inaccuracies in this letter as a result of omissions, misinterpretations, or fraudulent acts of others.

The material in this letter reflects Kollaard Associates Inc. best judgement in view of the scope of work, and information available at the time of preparation. Due to the nature of the investigation and the limited data available, we cannot warrant against undiscovered environmental liabilities. If new information is discovered during future work, including excavations, borings or other studies, Kollaard Associates Inc. should be requested to re-evaluate the conclusions presented in this report and provide amendments as required.



We trust that this letter is sufficient for your present requirements. If you have any questions concerning this letter, please do not hesitate to contact our office.

Yours truly,

KOLLAARD ASSOCIATES, INC.

Dean Tataryn, B.E.S., EP.



Reviewed by Colleen Vermeersch, P. Eng

Attachment: Table I, Record of Boreholes  
Key Plan, Figure 1  
Site Plan, Figure 2  
Appendix A - Results of Laboratory Testing

DMT/CV

Project No: 160861

# Record of Borehole: BH1

Project: Proposed Residential Development

Client: Urban Structure Properties Ltd.

Contractor: OGS Inc.

Location: 351 Croydon Road, Ottawa, Ontario

Engineer: Dean Tataryn

SUBSURFACE PROFILE			SAMPLE				VOC Concentration ppm 100 200 300 400 %LEL 20 40 60 80	Piezometer or Standpipe Installation
Depth (Metres)	Strata Plot	Description	Elevation	Number	Type	Recovery		
0		Ground Surface	0.00				Borehole dry at time of drilling, January 9, 2017.	
		ASPHALTIC CONCRETE						
1		Grey brown sand and gravel, trace silt and organics (FILL)		SA1				
2		Grey brown silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	1.72					
3								
4				SA2				
5								
6		Grey silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	5.48					
7		End of Borehole	6.70					

Drill Method: Power Auger

Datum: N/A

Drill Date: January 9, 2017

210 Prescott Street  
Kemptville, Ontario  
K0G 1J0

Checked by: DT

Hole Size: 200 mm Hollow Stem

Sheet: 1 of 1

Project No: 160861

# Record of Borehole: BH2

Project: Proposed Residential Development

Client: Urban Structure Properties Ltd.

Contractor: OGS Inc.

Location: 351 Croydon Road, Ottawa, Ontario

Engineer: Dean Tataryn

SUBSURFACE PROFILE			SAMPLE				VOC Concentration ppm 100 200 300 400 %LEL 20 40 60 80	Piezometer or Standpipe Installation
Depth (Metres)	Strata Plot	Description	Elevation	Number	Type	Recovery		
0		Ground Surface	0.00					
		ASPHALTIC CONCRETE						
1		Grey brown sand and gravel, trace silt and organics (FILL)			SA1			
2		Grey brown silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	1.70					
3								
4		Grey silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	3.40					
5					SA2			
6	End of Borehole	5.97						
7								

Borehole dry at time of drilling, January 9, 2017.

Drill Method: Power Auger

Datum: N/A

Drill Date: January 9, 2017

210 Prescott Street  
Kemptville, Ontario  
K0G 1J0

Checked by: DT

Hole Size: 200 mm Hollow Stem

Sheet: 1 of 1

Project No: 160861

# Record of Borehole: BH3

Project: Proposed Residential Development

Client: Urban Structure Properties Ltd.

Contractor: OGS Inc.

Location: 351 Croydon Road, Ottawa, Ontario

Engineer: Dean Tataryn

SUBSURFACE PROFILE			SAMPLE				VOC Concentration ppm 100 200 300 400 %LEL 20 40 60 80	Piezometer or Standpipe Installation
Depth (Metres)	Strata Plot	Description	Elevation	Number	Type	Recovery		
0		Ground Surface ASPHALTIC CONCRETE	0.00				Borehole dry at time of drilling, January 9, 2017.	
1		Grey brown sand and gravel, trace silt and organics (FILL)		SA1				
2		Grey brown silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	1.87					
3								
4		Grey silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	4.32		SA2			
5	End of Borehole	5.49						
6								
7								

Drill Method: Power Auger

Datum: N/A

Drill Date: January 9, 2017

210 Prescott Street  
Kemptville, Ontario  
K0G 1J0

Checked by: DT

Hole Size: 200 mm Hollow Stem

Sheet: 1 of 1



## **ATTACHMENT A**

### **Results of Chemical Laboratory Testing for Soils**



Client: Kollaard Associates Inc.  
210 Prescott St., Box 189  
Kemptville, ON  
K0G 1J0  
Attention: Mr. Dean Tataryn  
PO#:  
Invoice to: Kollaard Associates Inc.

Report Number: 1700366  
Date Submitted: 2017-01-10  
Date Reported: 2017-01-17  
Project: 160861  
COC #: 185144

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Temperature: 2

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**Dear Dean Tataryn:**

**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

APPROVAL: \_\_\_\_\_

Shyla Monette  
Team Leader, Inorganics

APPROVAL: \_\_\_\_\_

Charlie (Long) Qu  
Laboratory Supervisor, Organics

All analysis is completed in Ottawa, Ontario (unless otherwise indicated).

Eurofins Ottawa is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on our CALA scope of accreditation. It can be found at <http://www.cala.ca/scopes/2602.pdf>.

Eurofins (Ottawa) is certified and accredited for specific parameters by OMAFRA, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Eurofins (Mississauga) is accredited for specific parameters by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required.

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 210 Prescott St., Box 189  
 Kemptville, ON  
 K0G 1J0  
 Attention: Mr. Dean Tataryn  
 PO#:  
 Invoice to: Kollaard Associates Inc.

Report Number: 1700366  
 Date Submitted: 2017-01-10  
 Date Reported: 2017-01-17  
 Project: 160861  
 COC #: 185144

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1276804 Soil Reg153	1276805 Soil Reg153	1276806 Soil Reg153	1276807 Soil Reg153	
Inorganics	Antimony	1	ug/g	STD-40	2017-01-09	BH1 SS5	12.5-14.5		
	Arsenic	1	ug/g	STD-18					<1
	Barium	1	ug/g	STD-670					3
	Beryllium	1	ug/g	STD-8					49
	Boron (total)	10	ug/g	STD-120					<1
	Cadmium	0.5	ug/g	STD-1.9					20
	Chromium Total	1	ug/g	STD-160					<0.5
	Cobalt	1	ug/g	STD-80					13
	Copper	1	ug/g	STD-230					5
	Lead	1	ug/g	STD-120					12
	Molybdenum	1	ug/g	STD-40					18
	Nickel	1	ug/g	STD-270					<1
	Selenium	1	ug/g	STD-5.5					11
	Silver	0.2	ug/g	STD-40					<1
	Thallium	1	ug/g	STD-3.3					<0.2
	Uranium	0.5	ug/g	STD-33					<1
	Vanadium	2	ug/g	STD-86					<0.5
Zinc	2	ug/g	STD-340					18	
Moisture	Moisture-Humidite	0.1	%		12.3	11.3	8.3		22
Petroleum Hydrocarbons	Alpha-androstrane	0	%		74	82	78		
	Petroleum Hydrocarbons F1	10	ug/g	STD-55	<10	<10	<10		
	Petroleum Hydrocarbons F1-BTEX	10	ug/g		<10	<10	<10		
	Petroleum Hydrocarbons F2	10	ug/g	STD-230	<10	<10	<10		
	Petroleum Hydrocarbons F3	20	ug/g	STD-1700	<20	<20	<20		
	Petroleum Hydrocarbons F4	20	ug/g	STD-3300	<20	<20	<20		
Subcontracted	Sodium	10.0	ug/g	STD-NA					366

Guideline = O.Reg 153-T3-Ind/Com-Coarse \* = Guideline Exceedence

\*All analysis completed in Ottawa, Ontario (unless otherwise indicated by \*\* which indicates analysis was completed in Mississauga, Ontario).  
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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1276804 Soil Reg153  2017-01-09 BH1 SS5 12.5-14.5	1276805 Soil Reg153  2017-01-09 BH2 SS5 15-17	1276806 Soil Reg153  2017-01-09 BH3 SS6 15-17	1276807 Soil Reg153  2017-01-09 BH1 SS1 2.5-4.5
VOC Surrogates Rec	Toluene-d8	0	%			98	98	97	
VOCs	Benzene	0.02	ug/g	STD-0.32		<0.02	<0.02	<0.02	
	Ethylbenzene	0.05	ug/g	STD-9.5		<0.05	<0.05	<0.05	
	Toluene	0.20	ug/g	STD-68		<0.20	<0.20	<0.20	
	Xylene Mixture	0.05	ug/g	STD-26		<0.05	<0.05	<0.05	
	Xylene, m/p-	0.05	ug/g			<0.05	<0.05	<0.05	
	Xylene, o-	0.05	ug/g			<0.05	<0.05	<0.05	

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1276808 Soil Reg153  2017-01-09 BH2 SS1 2.5-4.5	1276809 Soil Reg153  2017-01-09 BH3 SS1 2.5-4.5
Inorganics	Antimony	1	ug/g	STD-40		<1	<1
	Arsenic	1	ug/g	STD-18		3	2
	Barium	1	ug/g	STD-670		64	51
	Beryllium	1	ug/g	STD-8		<1	<1
	Boron (total)	10	ug/g	STD-120		20	20
	Cadmium	0.5	ug/g	STD-1.9		<0.5	<0.5
	Chromium Total	1	ug/g	STD-160		16	13
	Cobalt	1	ug/g	STD-80		6	5
	Copper	1	ug/g	STD-230		19	13
	Lead	1	ug/g	STD-120		10	6
	Molybdenum	1	ug/g	STD-40		<1	<1
	Nickel	1	ug/g	STD-270		14	11

**Guideline = O.Reg 153-T3-Ind/Com-Coarse** \* = **Guideline Exceedence**

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Group	Analyte	MRL	Units	Guideline	Lab I.D.	
					Sample Matrix	Sample Type
Inorganics	Selenium	1	ug/g	STD-5.5	1276808 Soil Reg153 2017-01-09 BH2 SS1 2.5-4.5	1276809 Soil Reg153 2017-01-09 BH3 SS1 2.5-4.5
	Silver	0.2	ug/g	STD-40	<1	<1
	Thallium	1	ug/g	STD-3.3	<0.2	<0.2
	Uranium	0.5	ug/g	STD-33	<1	<1
	Vanadium	2	ug/g	STD-86	0.5	<0.5
	Zinc	2	ug/g	STD-340	21	18
Subcontracted	Sodium	10.0	ug/g	STD-NA	21	14
					450	307

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**QC Summary**

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 290004 <b>Analysis/Extraction Date</b> 2017-01-12 <b>Instrument</b> GC/FID			
<b>Method</b> CCME		<b>Analyst</b> TJB	
Petroleum Hydrocarbons F1	<10 ug/g	90	80-120
Petroleum Hydrocarbons F1-BTEX			
<b>Run No</b> 320382 <b>Analysis/Extraction Date</b> 2017-01-11 <b>Instrument</b> ICP/MS			
<b>Method</b> M SM3120B-3050B		<b>Analyst</b> SKH	
Boron (total)	<10 ug/g	100	80-120
<b>Run No</b> 320391 <b>Analysis/Extraction Date</b> 2017-01-12 <b>Instrument</b> Oven			
<b>Method</b> C SM2540B		<b>Analyst</b> JLD	
Moisture-Humidite		100	80-120
<b>Method</b> CCME		<b>Analyst</b> JLD	
Petroleum Hydrocarbons F2	<10 ug/g	108	80-120
Petroleum Hydrocarbons F3	<20 ug/g	108	80-120
Petroleum Hydrocarbons F4	<20 ug/g	108	80-120
<b>Run No</b> 320406 <b>Analysis/Extraction Date</b> 2017-01-12 <b>Instrument</b>			

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**QC Summary**

Analyte	Blank	QC % Rec	QC Limits
<b>Method</b> EPA 200.8	<b>Analyst</b> SCM		
Silver	<0.2 ug/g	101	70-130
Arsenic	<1 ug/g	104	70-130
Barium	<1 ug/g	99	70-130
Beryllium	<1 ug/g	110	70-130
Cadmium	<0.5 ug/g	104	70-130
Cobalt	<1 ug/g	104	70-130
Chromium Total	<1 ug/g	105	70-130
Copper	<1 ug/g	110	70-130
Molybdenum	<1 ug/g	99	70-130
Nickel	<1 ug/g	108	70-130
Lead	<1 ug/g	104	70-130
Antimony	<1 ug/g	86	70-130
Selenium	<1 ug/g	107	70-130
Thallium	<1 ug/g	104	70-130
Uranium	<0.5 ug/g	102	70-130
Vanadium	<2 ug/g	101	70-130
Zinc	<2 ug/g	105	70-130

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**QC Summary**

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 320427 <b>Analysis/Extraction Date</b> 2017-01-11 <b>Instrument</b> GC/MS			
<b>Method</b> V 8260B <b>Analyst</b> TJB			
Benzene	<0.02 ug/g	96	60-130
Ethylbenzene	<0.05 ug/g	106	60-130
m/p-xylene	<0.05 ug/g	106	60-130
o-xylene	<0.05 ug/g	103	60-130
Toluene	<0.20 ug/g	112	60-130
<b>Run No</b> 320429 <b>Analysis/Extraction Date</b> 2017-01-12 <b>Instrument</b> GC/MS			
<b>Method</b> V 8260B <b>Analyst</b> TJB			
Xylene Mixture			
<b>Run No</b> 320568 <b>Analysis/Extraction Date</b> 2017-01-13 <b>Instrument</b>			
<b>Method</b> SUBCONTRACT P <b>Analyst</b> SDC			
Sodium	<10.0 ug/g	91	

**Guideline = O.Reg 153-T3-Ind/Com-Coarse**

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 COC #: 185144

**Petroleum Hydrocarbons - CCME Checklist**

Samples were analysed by Eurofins Ottawa Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH" or Eurofins Mississauga Method 11-09-SP-2322, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH". These methods comply with the reference method for the CCME CWS PHC and are validated for use in the laboratory. Eurofins Ottawa is accredited by CALA (ISO 17025) for all CCME F1-F4 fractions as listed in this report. Eurofins Mississauga is accredited by SCC (ISO 17025) for all CCME F1-F4 fractions as listed in this report. Data for QC samples (blank, duplicate, spike) are available on request

Holding/Analysis Times	Yes/No	If NO, then reasons
All fractions analyzed within recommended hold times/analysis times?	Yes	
<b>F1</b>		
nC6 and nC10 response factors within 30% of toluene	Yes	
BTEX was subtracted from F1 fraction	Yes	
If YES, was F1-BTEX (C6-C10) reported	Yes	
<b>F2</b>		
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	Yes	
Linearity within 15% (F2-F4)	Yes	
Napthalene was subtracted from F2 fraction		Napthalene (PAH) not requested/analysed
If YES was F2-Napthalene reported		
<b>F3</b>		
PAH (selected compounds) subtracted from F3 fraction		PAH not requested/analysed
If YES was F3-PAH reported		
<b>F4</b>		
C50 response factor within 70% of nC10+nC16+nC34 average	Yes	
Chromatogram descended to baseline by retention time of C50	Yes	
if NO was F4 (C34-C50) gravimetric reported		

Guideline = O.Reg 153-T3-Ind/Com-Coarse

\* = Guideline Exceedence

\*All analysis completed in Ottawa, Ontario (unless otherwise indicated by \*\* which indicates analysis was completed in Mississauga, Ontario). Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



# KEY PLAN

# FIGURE 1



NOT TO SCALE



**Kollaard Associates**  
Engineers

Project No. 160861  
Date January 2017



DRAWING NUMBER:  
SITE PLAN, FIGURE 2

LEGEND:  
  
 ⊕ BH1 APPROXIMATE BOREHOLE LOCATION

REFERENCE: PLAN SUPPLIED BY  
CITY OF OTTAWA EMAPS.

SPECIAL NOTE: THIS DRAWING TO  
BE READ IN CONJUNCTION WITH  
THE ACCOMPANYING REPORT.

REV.	NAME	DATE	DESCRIPTION

**K** Kollaard Associates  
Engineers

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CLIENT:  
URBAN STRUCTURE  
PROPERTIES LTD.

PROJECT:  
SOIL SAMPLING AND TESTING FOR  
RESIDENTIAL BUILDING

LOCATION:  
351 CROYDON ROAD  
CITY OF OTTAWA, ONTARIO

DESIGNED BY: -- DATE: JAN. 19, 2017

DRAWN BY: DT SCALE: N.T.S.

KOLLAARD FILE NUMBER:  
160861