Servicing and Stormwater Management Report – 2829 Dumaurier Avenue

Stantec Project No. 160401596

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Prepared for:

Brigil Homes

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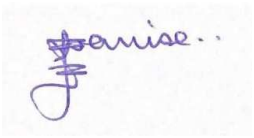

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1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Brigil Homes to prepare the following site servicing and stormwater management (SWM) report in support of an application for rezoning and site plan control approval for a proposed development located at 2829 Dumaurier Avenue situated off Pinecrest Road in the City of Ottawa. There is an existing commercial building on the southern end of the property which will be torn down to allow for the proposed development (see key plan in **Figure 1**).

The proposed development area (0.42 ha) consists of a 30-storey residential high-rise building with commercial space on the first floor. The building is to contain 330 units in total consisting of 194 one-bedroom units and 136 two-bedroom units, 440m^2 of commercial area and 990m^2 of communal amenity areas. Parking is to be provided via 11 surface parking spots and two underground parking levels (P1 and P2). The site plan has been provided in **Appendix B**.

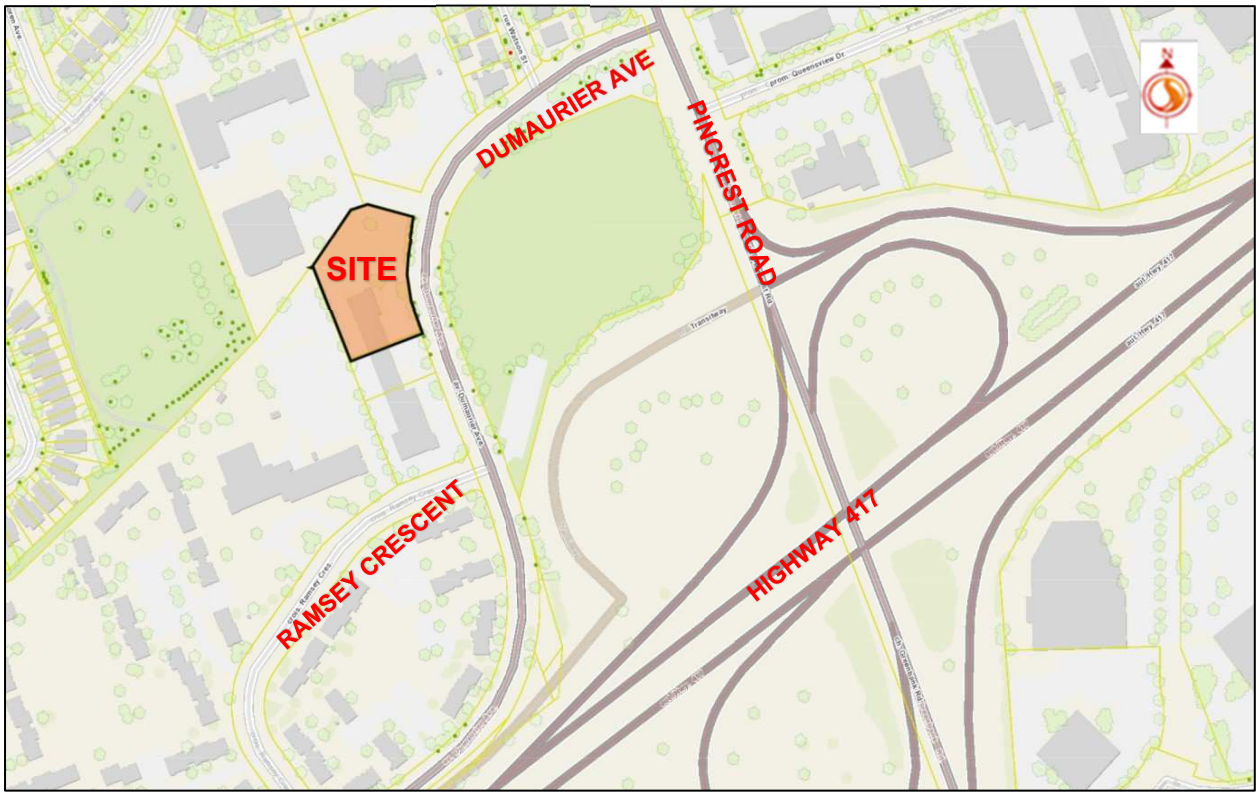


Figure 1: Key Plan (2829 Dumaurier Ave. Site highlighted in Orange)

1.1 OBJECTIVE

This Site Servicing and Stormwater Management Brief has been prepared to present a servicing scheme that is free of conflicts and presents the most suitable servicing approach that complies with the relevant City design guidelines. The use of the existing infrastructure as obtained from available as-built drawings has been determined in consultation with RLA Architecture, Brigil Homes, City of Ottawa staff, and the adjoining property owners. Infrastructure requirements for water supply, sanitary sewer, and storm sewer services are presented in this report.

Criteria and constraints provided by the City of Ottawa have been used as a basis for the servicing design of the proposed development. Specific elements and potential development constraints to be addressed are as follows:

- Potable Water Servicing
    - Estimate water demands to characterize the feed for the proposed development which will be serviced by an existing 305mm diameter ductile iron watermain fronting the site along Dumaurier Avenue.
    - Watermain servicing for the development is to be able to provide average day and maximum day and peak hour demands (i.e., non-emergency conditions) at pressures within the allowable range of 40 to 80 psi (276 to 552 kPa).
    - Under fire flow (emergency) conditions with maximum day demands, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa).
    - Relocation of the existing 150 mm private watermain running through the north end of the site, servicing 1085 Grenon Ave as well as Ruth Wildgen Park (1099 Grenon Ave) is required as part of the site development.
- Prepare a grading plan in accordance with the proposed site plan and existing grades.
- Stormwater Management and Servicing
    - Define major and minor conveyance systems in conjunction with the proposed grading plan.
    - Post development peak 100-year flows controlled to the predevelopment peak 5-year release rate with a runoff coefficient of C=0.5 and a time of concentration of 10 minutes as estimated based on the existing storm sewer infrastructure servicing the existing site.
    - Excess stormwater to be detained on-site to meet the 5-year pre-development target release rate.
    - Coordinate with the Mechanical Engineer to convey drainage from roof tops, parking areas, amenity areas, private terrace areas, and the canopy to the internal stormwater cistern and discharge to the proposed storm service lateral at the allowable release rate.

  - Connect to the existing 375mm diameter concrete storm sewer within the Dumaurier Ave right-of-way.
  - Provide an oil/grit separator unit to intercept and treat storm run-off from the site to meet RVCA water quality control requirements (80% TSS removal).
  - Define and size the proposed storm sewer system that will be connected to the existing 375 mm diameter storm sewer on Dumaurier Avenue.

- Wastewater Servicing
  - Estimate wastewater flows generated by the development and size sanitary sewers which will outlet to the existing 250mm diameter sanitary sewer located on Dumaurier Avenue.
  - Design the sanitary sewer extension within the Dumaurier Avenue right-of-way.

The accompanying **Drawing SSP-1** included in **Appendix F** illustrates the proposed internal servicing scheme for the site.

2.0 REFERENCES

Documents referenced in preparation of this Servicing and Stormwater Management Report include:

- *2829 Dumaurier Ave. pre-consultation comments,* City of Ottawa, May 2020
- *2858 Dumaurier Ave. Site plan*, RLA Architecture, February 2021
- *City of Ottawa Design Guidelines - Water Distribution*, City of Ottawa, July 2010 (including all subsequent technical bulletins).
- *City of Ottawa Sewer Design Guidelines (SDG)*, City of Ottawa, October 2012 (including all subsequent technical bulletins).
- *Geotechnical Investigation Proposed Hi-rise Building 2929 DuMaurier Avenue Ottawa Ontario*, Paterson Group Inc., December 2019
- *Phase I Environmental Site Assessment,* GHD, August 2018
- *Phase One Environmental Site Assessment,* Lopers & Associates, January 2021
- *Phase Two Environmental Site Assessment,* GHD, April 2019

3.0 POTABLE WATER SERVICING

The proposed site is located within Pressure Zone 1W of the City of Ottawa's water distribution system. The proposed development will be serviced by the existing 300mm diameter watermain on Dumaurier Avenue. In order to create a suitable water service connection for the property, a section of the existing 300mm dia. watermain will be modified to include: replacement of about 19m of pipe length with new deflected 19m 300mm diameter pipe, new valves, tees, bends and two 150mm watermain stubs to provide potable water and fire flow water supply to the development as shown on **Drawings SSP-1 & PP-1** in **Appendix F** respectively. The location of the water services has been coordinated with the building's architect to accommodate the underground parking structure on Level P1 and P2.

The proposed 30-storey residential high-rise building includes commercial space on the first floor. The building is to contain 330 units in total consisting of 194 one-bedroom units and 136 two-bedroom units, 440m^2 of commercial area and 990m^2 of communal amenity areas. Parking is to be provided via 14 surface parking spots and two underground parking levels (P1 and P2).

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (2010) to determine the typical operating pressures to be expected at the building (see detailed calculations in **Appendix A.1**). A demand rate of 350 L/cap/day was applied for the residential population of the proposed site. The average daily (AVDY) residential demand was estimated with population densities as per City of Ottawa Guidelines; 2.1 persons per two-bedroom apartments, and 3.1 persons per three-bedroom apartments.

An estimated demand of 28,000 L/ha/day was applied to the 1,430m^2 communal amenities and commercial space. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas and by a factor of 1.5 for commercial/amenity/lobby areas. Peak hourly (PKHR) demands were determined by multiplying the MXDY demands by a factor of 2.2 for residential areas and by a factor of 1.8 for commercial areas. The estimated demands are summarized in **Table 3-1** below.

Table 3-1: Estimated Water Demands

	Population or Area	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Residential	558 persons	2.26	5.65	12.43
Commercial space	440 m^2	0.01	0.02	0.04
Communal Amenity space	990 m^2	0.03	0.05	0.09
Total Site:		**2.30**	**5.72**	**12.56**

The fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) and determined to be approximately 7,000 L/min (116.7 L/s). The FUS estimate is based on a building of non-combustible construction with a two-hour fire separation provided between each floor per Ontario Building Code (OBC) requirements for buildings over six storeys, and vertical openings and external vertical

communications properly protected (one-hour fire rating). As a result, the 'gross construction area' of the second floor (floor with the largest footprint, 1593 m^2) + 25% of the gross construction area of the two immediately adjoining floors (the ground floor and third floor) were used for the purpose of the FUS calculation, as per Page 17 of the Fire Underwriters Survey's Water Supply for Public Fire Protection, 1999.

Additionally, it is anticipated that the building will be sprinklered, with final sprinkler design to conform to the NFPA 13 standard. Detailed fire flow calculations per the FUS methodology are provided in **Appendix A.2**.

Table 3-2 shows the hydraulic boundary conditions provided by the City of Ottawa on February 2, 2021 based on the estimated domestic and fire flow demands described above. The boundary conditions are also included in **Appendix A.2**.

Table 3-2: Boundary Conditions

	Connection @ 2829 Dumaurier Ave
Min. HGL (m)	107.4
Max. HGL (m)	114.3
Max. Day + Fire Flow (116.7 L/s) (m)	105.2

The desired normal operating objective pressure range as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa (50 psi) to 552 kPa (80 psi) and no less than 276 kPa (40 psi) at ground elevation. Furthermore, the maximum pressure at any point in the water distribution should not exceed 100 psi as per the Ontario Building/Plumbing Code; pressure reducing measures are required to service areas where pressures greater than 552 kPa (80 psi) are anticipated.

The building's proposed finished floor elevation of 74.21 m will serve as the ground elevation for the calculation of residual pressures at ground level. At the peak hour flow conditions (i.e., minimum HGL), the resulting boundary condition HGL of 107.4 m corresponds to a peak hour pressure of 325.4 kPa (47.2 psi). Since the proposed building is a 30-storey building with an average storey height of 3.1 m, an additional 30 kPa (4.4 psi) of head loss is incurred for every additional storey over ground level. Given that the lowest pressure is expected to be 325.4 kPa (47.2 psi) at ground level, there will be insufficient pressure to reach the top floors. Therefore, a booster pump inside the building will be required to maintain an acceptable level of service on the higher floors. This booster pump is to be sized and designed by the building's mechanical engineer.

A maximum pressure check can be conducted using the building's finished floor elevation (74.21 m) and the maximum boundary condition HGL of 114.30 m. This results in a pressure of 393 kPa (57 psi). Since this value is below 80 psi, pressure reducing valves will not be required.

Regarding available fire flow, boundary conditions provided by the City confirm that a fire flow rate of 7,000 L/min (116.7 L/s) would have a residual pressure of 303.8 kPa (44.1 psi) on Dumaurier Avenue.

The proposed development has a basic day demand of 138.4 L/min (199.3 m^3/day). Because the basic day demand exceeds 50 m^3/day, two service laterals will need to be provided per the City's Water Distribution Guidelines. Two 150 mm diameter water services will be connected to the existing 300 mm diameter watermain on Dumaurier Avenue separated by a new isolation valve on the main. The building's mechanical engineer is to ensure that the 150 mm diameter service size is sufficient for the proposed sprinkler system.

A fire department connection has been provided on the Eastern face of the building (main entry); this fire department connection is located approximately 42.55m from the existing fire hydrant on Dumaurier Avenue.

In conclusion, based on the boundary conditions available, the 300 mm diameter watermain on Dumaurier Avenue provides adequate fire flow capacity as per the requirements of the Fire Underwriters Survey while respecting City of Ottawa design guidelines. Two 150 mm diameter service laterals connected to the 300 mm diameter watermain on Dumaurier Avenue will be capable of providing the anticipated water demands to the lower storeys. A booster pump, to be designed by the building's mechanical engineer, will be required to maintain minimum required pressures for the upper storeys.

3.1 RELOCATION OF EXISITNG WATERMAIN

As shown on **Drawing EX-1** and **Drawing SSP-1**, the existing 150 mm diameter private watermain running through the north end of the site, currently servicing the Ottawa Boys & Girls club (1085 Grenon Avenue), as well as the Ruth Wildgen Park (1099 Grenon Avenue) will be relocated outside the proposed site's property line to allow for the development of structures and services within the subject site.

A 150mm diameter watermain, 45^o horizontal bends, tees and isolation valves will be introduced to achieve the level of service required by the adjoining properties. The existing fire hydrant will be reconnected to the proposed relocated watermain. The relocation will be coordinated with the property owners and City staff.

4.0 WASTEWATER SERVICING

As illustrated on **Drawing SSP-1**, sanitary servicing for the proposed development will be provided through a single proposed 200 mm diameter service lateral connecting to a new 250mm sanitary sewer that will discharge into an extension of the existing 250 mm diameter concrete sanitary sewer flowing southwards on Dumaurier Avenue. The existing as-built sanitary sewer drawings indicate that the location of the most suitable connection for the site sanitary sewer system is about 40m south from the site on Dumaurier avenue. As a result, an extension of the sanitary sewer network along Dumaurier Avenue will be required.

Due to the municipal sanitary sewer extension, a Ministry of Environment, Conservation and Parks Environmental Compliance Approval (MECP ECA) will be required. Consultation with the MECP Ottawa District Office confirmed that this sanitary sewer extension within the Dumaurier Avenue right-of-way is eligible for the standard Transfer of Review program with the City of Ottawa. Refer to **Appendix C.2** for a record of correspondence with the MECP.

The proposed 30-storey residential high-rise building is to contain 330 units in total consisting of 194 one-bedroom units and 136 two-bedroom units, 440m^2 of commercial area and 990m^2 of communal amenity areas with a total estimated population of 557 people using the City of Ottawa's recommended population densities. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 4-1** while the sanitary sewer design sheet is included in **Appendix C.1**.

Table 4-1: Estimated Wastewater Peak Flow

Residential/Commercial Peak Flows					Infiltration Flow (L/s)	Total Peak Flow (L/s)
	# of Units/Area	Population	Peak Factor	Peak Flow (L/s)		
Residential	330 units	557	3.36	6.07	0.14	6.28
Commercial	0.14 ha	N/A	1.50	0.07		

1. Average residential sanitary flow = 280 L/p/day per City of Ottawa Sewer Design Guidelines.
2. Peak factor for residential units calculated using Harmon's formula. Used a Harmon correction factor of 0.8.
3. Apartment population estimated based on 1.4 persons/unit for one-bedroom apartments, 2.1 persons/unit for two-bedroom apartments.
4. Estimated commercial/amenity area/lobby peak flows = 28,000 L/ha/day.
5. Infiltration flow = 0.33 L/s/ha.

The City has verified that the 250 mm diameter sanitary sewer on Dumaurier Avenue has sufficient capacity to service the proposed development (see **Appendix C.3** for a record of correspondence).

The drains within the underground parking garage will need to be pumped and ultimately outlet to the proposed sanitary sewer system. The design of these drains, internal plumbing, and associated pumping system is to be completed by the building's mechanical engineer.

A backflow preventer will be required for the proposed building in accordance with the City of Ottawa Sewer Design Guidelines. This requirement will be coordinated with the building's mechanical engineer.

4.1 RELOCATION OF EXISTING SANITARY SEWER

As shown on **Drawing EX-1** and **Drawing SSP-1**, the existing 225 mm sanitary sewer running through the north end of the site, currently servicing the Ottawa Boys & Girls club (1085 Grenon Avenue), as well as the Ruth Wildgen Park (1099 Grenon Avenue) will be relocated outside of the property line to allow for the development of new building structures and services within the subject site.

The sanitary sewer will be realigned within the adjacent property and reconnected to the existing 225mm diameter sanitary sewer on 1099 Grenon Avenue. To achieve this end, 53 m of 225mm diameter PVC sanitary sewer at 0.4% slope and 1200mm diameter maintenance holes will be provided.

The relocation will be coordinated with the property owners and the relevant authorities.

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The goal of this stormwater servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development to meet the criteria established during the consultation process with City of Ottawa and Rideau Valley Conservation Authority (RVCA), and to provide sufficient details required for approval and construction.

5.2 EXISTING CONDITIONS AND SWM CRITERIA

The proposed re-development area (0.42 ha) currently consists of an existing commercial building down on the southern edge of the property, paved parking lots and some green landscaped area. The existing structures on the site will be removed to allow for the proposed development.

The Stormwater Management (SWM) criteria for the subject site is based on pre-application consultation comments in **Appendix D.1** as provided by the City of Ottawa in May 2020 as follows:

i. Post-development peak flows up to 100-year event are to be controlled to the pre-development peak 5-year release rate. Excess stormwater is to be detained on-site.
ii. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
iii. Use the pre-development runoff coefficient or a maximum equivalent 'C' of 0.50, whichever is less.
iv. A calculated time of concentration (cannot be less than 10 minutes).

Other criteria considered in the SWM design are described in Section 5 of the Ottawa Sewer Design Guidelines (October 2012) including all subsequent technical bulletins.

Pre-development (i.e., current) site conditions have been classified into impervious (hard) and pervious (soft) areas, with impervious areas accounting for 85.71% (0.36 ha) while pervious areas cover up to 14.29% (0.06 ha) of the site. Based on these statistics, the overall pre-development runoff coefficient (C) for the site was calculated as C=0.80. As a result, a C value of 0.50 will be used to estimate the allowable release rate from the site.

The allowable peak stormwater flow rate for the site was calculated as follows using the Modified Rational Method:

$$Q = 2.78\,(C)(I)(A)$$

Where:

$Q = peak\ flow\ rate, L/s$

$C = site\ runoff\ coefficient$
$I = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ IDF\ curves)$
$A = drainage\ area, ha$

$$5 - year\ Intensity\ (mm/hr) = \frac{998.071}{(10 + 6.053)^{0.814}} = 104.19\ mm/hr$$

$$Q = 2.78(0.50)(104.19 mm/hr)(0.42\ ha) = \mathbf{60.8 L/s}$$

Therefore, the post-development peak flows up to the 100-year storm event must be controlled to **60.8 L/s**. The pre-development time of concentration was assumed to be 10 minutes given that the existing site is serviced through two existing catchbasins connected to the existing adjacent storm sewer system with an inlet time of 10 minutes as per City guidelines.

The RVCA confirmed that enhanced water quality protection (80% TSS removal) is required for the site based on the number of surface parking spaces (>5 spaces). Other Best management practices were also encouraged to be integrated where possible, correspondence with the RVCA is included in **Appendix D.3.**

5.3 STORMWATER MANAGEMENT DESIGN

The proposed 0.42 ha re-development area will be serviced by the existing 375mm diameter concrete storm sewer running north to south on Dumaurier Avenue, as shown on **Drawing SD-1** in **Appendix F**.

A stormwater cistern will attenuate peak flows from the building's roof, outdoor amenity areas, surface parking lot, and landscaped areas west of the building to ensure that the overall site release rate meets the target peak outflow. The proposed stormwater cistern will be serviced by the internal plumbing of the building. As shown on **Drawing SD-1** in **Appendix F**, peak flows from the proposed cistern will be discharged into the 300 mm diameter storm service lateral and ultimately into the site storm system that will also convey uncontrolled runoff from the proposed access road areas prior to discharging into the existing 375 mm diameter storm sewer on Dumaurier Avenue. A Stormceptor unit or approved equivalent will provide the required 80% TSS removal for site runoff.

Catch-basins and landscape drains for the areas tributary to the stormwater cistern will connect to the cistern via internal plumbing (designed by the building's mechanical engineer). The stormwater cistern will be pumped at a controlled rate into the existing 375 mm diameter concrete storm sewer on Dumaurier Avenue via a 300 mm diameter PVC storm service (see **Drawing SD-1** in **Appendix F)**. The stormwater cistern's controlled release rate will be set by a pump to be designed by a mechanical engineer.

The stormwater cistern location will be coordinated with the building's architect and structural engineer. Current plans will be provided, and peak flows will be identified to the building's mechanical engineer to help size the internal plumbing system appropriately.

The proposed site plan, drainage areas and proposed storm sewer infrastructure are shown on **Drawing SD-1**.

5.3.1 Water Quantity Control

The Modified Rational Method (MRM) was used to assess the flow rate and volume of runoff generated under post-development conditions. The site was subdivided into sub-catchments tributary to separate storm outlets and subject to different controls. **Drawing SD-1** delineates the appropriate sub-catchment areas. The MRM spreadsheet is included in **Appendix D.2.**

The following assumptions were made in the creation of the storm drainage plan and accompanying MRM spreadsheet:

1) No rooftop storage will be provided for the proposed site.
2) The stormwater runoff on the site (including parking & green areas that start with R) will be collected using a combination of Watts area drains, catch-basins, subdrains and internal building plumbing for detention in a stormwater cistern.
3) Some pedestrian access and landscaping areas on the east end of the site will sheet drain uncontrolled to Dumaurier avenue (UNC-1).
4) The storm runoff within the access road area of the site will be captured into the site storm sewer system and directed to the proposed oil/grit separator unit.

In order to meet the target release rate for stormwater of 60.8 L/s up to the 100-year storm, on-site storage is required.

5.3.1.1 Access Road Areas

The access road access consist of a flexible pavement providing access and exits to the parking lots. SWM in the proposed access road areas will be achieved using proposed catchbasins equipped with inlet control devices (ICDs) to restrict minor system peak flows to the 100-year storm given that there is no ponding provided on the access road. **Table 5-1** below shows the characteristics of the proposed ICDs (see **Appendix D.2** for detailed calculations).

Table 5-1: Schedule of Inlet Control Devices

Outlet Orifice Name	Catch basin ID	Tributary Area ID	ICD Type	100 - Year Head (m)	100 - Year Flow (L/s)
L1001A-IC	CB1001A	L1001A	VORTEX LM70	1.38	5.06
L1001B-IC	CB1001B	L1001B	VORTEX LMF 90	1.38	8.44

5.3.1.2 Uncontrolled Areas

Two uncontrolled areas (UNC-1 and UNC-2) cannot be graded to enter the site storm sewer system and as such, they will sheet drain to Dumaurier Avenue and to the adjacent site to the south towards Ramsey Crescent as per existing conditions (see **Drawing EX-1** and **Drawing SD-1**).

Table 5-2 Peak Uncontrolled 5- and 100- Year run-off

Area IDs	Area (ha)	Runoff 'C' (5- Year)	5 Year uncontrolled peak flow (L/s)	Runoff 'C' (100 -Year)	100 Year uncontrolled peak flow (L/s)
UNC-1	0.07	0.64	12.98	0.80	27.80
UNC-2	0.01	0.76	2.20	0.95	4.72

5.3.1.3 Stormwater Cistern

The allowable release rate from the proposed building's underground cistern was determined by subtracting all uncontrolled 100-year peak flows (areas UNC-1, UNC-2, L1001A and L1001B) from the allowable 60.8 L/s release rate, which results in approximately 14.4 L/s.

The stormwater cistern will be designed to provide 110 m^3 of storage with a maximum controlled release rate of 14.4 L/s. The stormwater cistern is to discharge at the controlled release rate using a pump. **Table 5-3** summarizes the flow rates and volume of stormwater in the cistern in the 5-year and 100-year storm events.

Table 5-3: Proposed Cistern 5 and 100-Year Release Rates

Storm Return Period	Area IDs	Area (ha)	$Q_{release}$ (L/s)	V_{stored} (m^3)	$V_{available}$ (m^3)
5-year	R1001A, R1001B, R1001C, R1001D, R1001E	0.31	14.40	41	110.0
100-year	R1001A, R1001B, R1001C, R1001D, R1001E	0.31	14.40	110	

5.3.2 Results

Table 5-4 and **Table 5-5** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow for the site.

Table 5-4: Estimated Post-Development Discharge (5-Year)

Area Type	$Q_{release}$ (L/s)	Target (L/s)
Controlled Cistern Discharge (Areas R1001A through R1001E)	14.4	60.8
Access road areas (L1001A & L1001B)	7.3	
Uncontrolled (UNC-1 & UNC-2)	15.2	
Total	**36.9**	

Table 5-5: Estimated Post-Development Discharge (100-Year)

Area Type	$Q_{release}$ (L/s)	Target (L/s)
Controlled Cistern Discharge (Areas R1001A through R1001E)	14.4	60.8
Access road areas (L1001A & L1001B)	13.9	
Uncontrolled (UNC-1 & UNC-2)	32.5	
Total	**60.8**	

5.3.3 Water Quality Control

The RVCA confirmed that enhanced water quality protection (80% TSS removal) is required for the site based on the number of surface parking spaces (>5 spaces) correspondence with the RVCA is included in **Appendix D.3.** To achieve this end, storm runoff within the access road area of the site will be captured into the site storm sewer system and directed to the proposed oil/grit separator unit.

The Stormceptor sizing software has been used to size the required unit to provide 80% TSS removal based on drainage areas within the proposed access road and parking lots (i.e., 0.17 ha) as shown in the Stormceptor sizing design sheet included in **Appendix D.4.**

A Stormceptor STC300 (EF 40) or an approved equivalent designed to provide 80% TSS removal has been proposed to collect and treat storm runoff from the site before discharging into the existing 375mm diameter storm sewer on Dumaurier Avenue as shown in **Drawing SSP-1** in **Appendix F.**

6.0 GRADING AND DRAINAGE

The proposed re-development site measures approximately 0.42 ha in area. A detailed grading plan (see **Drawing GP-1**) has been prepared to satisfy the stormwater management requirements described in **Section 5.0** and to allow for positive drainage away from the face of the building.

A concrete retaining wall is proposed on the north end of the site to allow for a grade change of about 1.50m between the adjoining site (Boys & Girls Club of Ottawa) and the proposed development. The structural design of the retaining wall will be provided in a subsequent submission.

The site grading along the parking lots and access areas (driveway) (access road) is designed to effectively drain stormwater runoff in the area into catch-basins. Grading for the access ramp to the underground parking level has been coordinated with the architect.

The surface parking lot has been graded so as to sheet drain over catch-basins discharging to the stormwater cistern. No surface ponding above catchbasins is to be provided in the parking area.

The subject site maintains overland flow routes to sheet drain towards Dumaurier Avenue to the east and to the adjacent site to the south as per existing conditions**.** A ramp has also been provided near the southeast end corner of the proposed building to provide accessibility to the commercial entrance.

7.0 UTILITIES

Hydro Ottawa, Bell, Rogers, and Enbridge all have existing utility plants in the area, which will be used to service the site. The detailed design of the required utility services will be further investigated as part of the composite utility planning process, which will follow design circulation for the servicing plans. Existing hydro line, guy wire and pole located on the north end of the site will be relocated as per Hydro Ottawa. The relocation of existing utilities will be coordinated with the individual utility providers as part of the site plan approval process by the civil engineer.

Municipal water and sewer services are supplied by underground service trenches on the east portion of the Site leading to DuMaurier Avenue. Electricity is supplied to the Site buildings from underground service trenches from the west of the building. The phone line is supplied to the site building from Ramsey Crescent to the south of the Site (GHD) existing monitoring well on the parking area to be capped and decommissioned.

8.0 EROSION CONTROL DURING CONSTRUCTION

In order to protect downstream water quality and prevent sediment build up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing EC/DS-1** for the proposed location of silt fences, straw bales, and other erosion control measures.

9.0 GEOTECHNICAL INVESTIGATION AND PHASE I ESA

9.1 GEOTECHNICAL INVESTIGATION

A geotechnical report for the site was prepared by Paterson Group Inc. on December 18, 2019 (**see Appendix E.1**) based on field investigations completed in November 10 and 11 2019. The investigation consisted of three boreholes advanced to a maximum depth of 18.2m below existing grade, the borehole locations were distributed around the existing building on the site. As is stated in the geotechnical report, the subsurface profile encountered at the boreholes consist of asphaltic concrete overlying a fill layer consisting of crushed stone with sand and trace concrete and brick. A thin layer of brown silty clay was encountered at BH1A underlying the above noted layers. Glacial till was encountered below the above noted layers consisting of a compact to a very dense silty sand with clay, gravel, cobbles, and boulders. Weathered shale bedrock was encountered at depths ranging between 3.9 and 5.3 m below the existing ground surface. Upon review of the core hole samples, the upper first meter of the bedrock was found to be of fair quality.

As stated in the report, the subject site is located in an area where the bedrock consists of shale and dolomite of the Rockcliffe Formation. The overburden drift thickness is anticipated to be between 2 to 5 m in depth. Three groundwater monitoring wells were installed as part of the geotechnical investigation. Groundwater level measurements were recorded at the monitoring well locations It should be noted that no groundwater was encountered in any of the monitoring wells. It should also be noted that the groundwater level is subject to seasonal fluctuations. Therefore, groundwater could vary at the time of construction. As contained in the report, the subject site is considered satisfactory for the proposed development. The proposed high-rise building is anticipated to be founded on spread footings placed directly or indirectly by the use of a lean concrete in-filled trench on a clean, surface sounded bedrock bearing surface. Bedrock removal can be accomplished by hoe ramming where only small quantity of the bedrock needs to be removed. Sound bedrock may be removed by line drilling and controlled blasting and/or hoe ramming. Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be completed prior to commencing site activities. The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries/claims related to the blasting operations. As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures. The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant. Excavation side slopes in sound bedrock can be carried out using almost vertical side walls. A minimum 1m horizontal ledge, should be left between the bottom of the overburden excavation and the top of the bedrock surface to provide an area to allow for potential sloughing or to provide a stable base for the overburden shoring system.

A potential for heaving and rapid deterioration of the shale bedrock exists at this site. Paterson recommends limiting exposure of the bedrock surface to oxygen, keeping it as low as possible. The

bedrock surface within the proposed building footprint should be protected from excessive dewatering and exposure to ambient air. To accomplish this a 50 mm thick concrete mud slab should be placed on the exposed bedrock surface within a 48 hour period of being exposed. A 17 MPa sulphate resistant lean concrete may be used. As an alternative to the mud slab, keeping the shale surface covered with granular backfill is also acceptable. Selected excavated vertical sides of the exposed bedrock can be protected using a sprayed elastomeric coating or shotcrete to seal the bedrock from exposure to air and dewatering.

Foundation design can be based on Auxiliary footings placed on an undisturbed, dense glacial till bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of 250 kPa and a factored bearing resistance value at ultimate limit states (ULS) of 500 kPa. A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS. Footings designed using the above-noted bearing resistance value at SLS will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively. More design parameters to be considered in the foundation design are detailed in **Appendix E.1**

The report recommends a flexible pavement structure summarized in **Table 9-1** below for the design of car only parking areas in the lower level of the parking garage, local roadways, access lanes and heavy vehicle parking.

Table 9-1: Recommended Pavement Structure

Material	Parking Areas	Local Roadways, Access Lanes and Heavy Vehicle Parking
Superpave 12.5 Asphaltic Concrete – Wear Course	50 mm	40 mm
SP 19 Asphaltic Concrete – Binder Course	-	50 mm
Granular Base Course, OPSS Granular A	150 mm	150 mm
Granular Subbase Course, OPSS Granular B Type II	300 mm	400 mm

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for parking areas and local roadways and PG 64-34 asphalt cement should be used for roadways with bus traffic. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment. The proposed pavement structure, where it abuts the existing pavement, should match the existing pavement layers. It is recommended that a 300 mm wide and 50 mm deep stepped joint be provided where the new asphalt layer joins with the existing asphalt layer to provide more resistance to cracking at the joint.

9.1.1 Foundation Drain

The geotechnical report (included in **Appendix E.1**) states that a composite drainage system (such as Miradrain G100N, Delta Drain 6000 or equivalent) is to extend down to the footing level. 150 mm diameter sleeves at 3 m centres need to be cast in the foundation wall at the footing interface to allow the infiltration of water to flow to an interior perimeter drainage pipe. The perimeter drainage pipe should direct water to sump pit(s) within the lower basement area. The spacing of the underfloor drainage

system should be confirmed at the time of excavation when water infiltration can be better assessed. For design purposes, a 150 mm in diameter perforated pipe with a geotextile sock is to be placed in each bay. Unheated structures such as the access ramp are to be insulated against the deleterious effect of frost action. The foundation drain for the building is to be serviced by a 200 mm diameter sub-drain connected to the cistern. These flows will then be directed via a proposed 300 mm diameter storm sewer to the existing 375 mm diameter storm sewer on Dumaurier Avenue. A full port backwater valve is to be installed on this service lateral to prevent flooding if the storm sewer on Dumaurier Avenue surcharges. Refer to **Drawing SSP-1** in **Appendix F** for the proposed location of this service lateral.

9.2 2018 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

GHD was retained by 3223701 Canada Inc. (Client), to conduct a Phase I Environmental Site Assessment (ESA) of a commercial property located at Civic Nos. 2831, 2833, 2835, 2841 and 2865 Dumaurier Avenue, in Ottawa, Ontario (Site or Property). The building on Site consists of a single storey commercial plaza building. The Phase I ESA was conducted as detailed in our email quote dated August 8, 2018.

The purpose of the Phase I ESA was to identify, through a non-intrusive investigation, significant actual or potential environmental impairment associated with the Site, the on-Site building, and the immediate vicinity of the Site. As contained in the report in **Appendix E.2** the Phase I ESA was conducted for the Client for the purpose of due diligence for the potential purchase of the Property.

Based on the Phase I ESA study including the Site visit, documents reviewed, and the review of Site history and information provided by regulatory agencies, the following conclusions are noted. There was one potentially contaminating activity (PCA) identified at the Site; the placement of fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.

There was also one PCA identified at neighboring properties; the presence of a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site. The aforementioned PCAs are considered to represent areas of potential environmental concern (APECs) for the Site. Following the completion of the Phase I ESA for the subject Property, a Phase II Environmental Site Assessment was recommended for the Site.

9.3 2019 PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)

GHD (Consultant) was retained by 3223701 Canada Inc. (Brigil), to complete a Phase Two Environmental Site Assessment (a detailed report is enclosed in **Appendix E.3**) in general accordance with the O. Reg. 153/04 Phase Two ESA format for the current commercial/institutional property identified as 2831, 2851, and 2865 DuMaurier in Ottawa, Ontario (Site or Phase Two Property). GHD had previously prepared a Phase I Environmental Site Assessment (Phase I ESA) (Ref No: 11181273-E1-RPT-1, dated August 16, 2018) for 3223701 Canada Inc. The Phase I ESA was conducted for environmental due diligence for potential purchase of the Site. The Phase Two Environmental Site Assessment (Phase Two ESA) was recommended based on the APECs identified as part of the Phase I ESA. The purpose of the Phase Two

ESA is to assess the soil and groundwater quality at the Site. The investigation involved the advancement of five boreholes which were sampled for environmental purposes. All five boreholes were completed with groundwater monitoring well screened in the overburden or upper bedrock.

Based on the water table elevations recorded in the monitoring wells installed as part of this investigation on the Site, the direction of groundwater flow in the vicinity of the boreholes was determined to be towards the south.

During the investigation, soil layers were sampled for metals, PAHs, pH, Flashpoint, and TCLP for metals and inorganics, VOCs, and PCBs, with borehole depth ranging from 0.6 – 3.5mbg Six soil samples were submitted for laboratory analysis of Metals, Polycyclic Aromatic Hydrocarbons (PAHs) and pH. One duplicate soil sample was submitted for analysis of Metals, PAH and pH parameters. One soil sample was also submitted for toxicity characteristic leaching procedure (TCLP) analysis to determine options for off-Site disposal.

Soil samples were collected from the boreholes advanced on October 5, 2018 were analyzed for a combination of PAHs, metals and inorganics, and pH. Four soil samples, BH1-SS3 (1.4-2.0 mBG), BH2-SS5 (2.4-3.0 mBG), BH4-SS2/SS3 (0.6-1.8 mBG) and BH5-SS3 (a duplicate sample of BH4-SS2/SS3) presented O. Reg. 153/04 Table 3 exceedances of electrical conductivity and sodium adsorption ratio. The soil sample BH2-SS5 also presented exceedances of Boron. It is suspected that areas of contaminated soil are present across the Site and in localized areas where poor quality fill material was used for grading and/or backfill for the foundations of the existing on-site building. It is suspected that there may be additional contaminated soil present in other localized areas of the Site.

Six groundwater samples, including one duplicate sample, were submitted for laboratory analysis of a combination of Metals, VOCs, PHCs and pH. One trip blank water sample was also submitted for analysis of VOCs. Based on the soil depths, Site setting, and the existing land uses in the vicinity of the Site, the Full depth Generic Criteria provided in O. Reg. 153/04 Table 3 (non-potable, residential/institutional, coarse texture) is be considered to be the applicable comparison. The Site is not a sensitive Site, a Surface Water Site, or a potable groundwater use Site.

There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in four of the six submitted soil samples, including the duplicate QA/QC soil sample. There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in two of the six submitted groundwater samples, including the duplicate QA/QC soil sample. The Site is not considered to be in compliance with the O. Reg. 153/04 criteria for the proposed land use and requires soil remediation/removal or a risk assessment prior to redevelopment. Groundwater was sampled on October 19, 2018 and analyzed for Metals, VOCs, BTEX, and PHCs. Groundwater sample, MW2 presented O. Reg. 153/04 Table 3 exceedances of Chloride. Sample MW3S presented O. Reg. 153/04 Table 3 exceedances of PHCs (F2 and F3). The PHC contamination appears to be localized in the area of MW3S as PHCs were not detected in the analysis of the groundwater samples collected from the other well locations.

9.4 2021 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

Lopers & Associates (Lopers) was retained in January 2021 to carry out Phase one ESA for the site as part of due diligence requirements associated with the submission of a Development Application to the City of Ottawa Municipal Planning Department (see **Appendix E.4** for details). This Phase one ESA can also be used to support the filing of a record of site condition of the property. It is important note that GHD also conducted Phase I ESA for the site in August 2018 for the purpose of due diligence as part of a potential purchase of the property (see **Appendix E.2** for details).

According to Lopers, the presence of a former waste disposal site approximately 20m east of the property is a significant potential contaminating activity (PCA) which represents an area of potential environmental concern for the site (APEC), other PCAs identified include an active automotive service garage and former retail fuel outlet. Previous environmental reports and investigations have documented petroleum hydrocarbon (PHC), groundwater contamination and that waste fill material has been observed in boreholes on the north portion of the property, the Property is not in compliance with the Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, which are also for consideration of O.Reg. 153/04.

The contaminants of potential concern (CPCs) associated with the former disposal site are volatile organic compounds (VOCs) (for groundwater only), metals, polycyclic aromatic hydrocarbons (PAHs) and PHCs/BTEXs. An investigation of the soil and groundwater quality with respect to these CPCs at the property was completed in 2019. Based on the identification of an APEC at the Phase One Property;

i. a phase two Environmental Site Assessment is required to assess the soil and/or groundwater quality in the vicinity of the APEC.

ii. Record of Site Condition Based on Phase One Environmental Site Assessment Alone.

According to Lopers, O. Reg. 153/04 stipulates that reports being used to support the filing of a RSC must be done no later than 18 months before the submission of a RSC. Given that a recent (2019) Phase Two ESA report has been prepared for the Phase One Property, and because it is not anticipated that remediation of the Phase One ESA property will be completed and an RSc submission will not be completed in the next 18 months, it is recommended that an additional Phase Two ESA study, which is anticipated to include documentation of remediation and be used to support a RSC submission, take place in conjunction with redevelopment of the Phase One property.

10.0 APPROVALS/PERMITS

A Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for the extension of the sanitary sewer on Dumaurier Avenue needed to service the proposed development. Consultation with the Ottawa District Office of the MECP confirmed that the extension of this sanitary sewer is eligible for the Transfer of Review Program for standard works with the City of Ottawa. A consultation record is included in **Appendix C.2**. An ECA is not expected to be required for the remainder of the subject site as the site is under singular, private ownership, is not within industrial lands, and does not discharge to a combined sewer.

If the ground or surface water volumes being pumped during the construction phase are between 50,000 and 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. A Permit to Take Water (PTTW) through the MECP would be required for dewatering in excess of 400,000 L/day, which is unlikely for this site. However, if a PTTW is required, at least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP. If blasting is used to remove the bedrock as part of the excavation for the building foundation, prior approval is required from the owners/operators of any water storage reservoir, pumping station, and water works transformer station within 200 m of the site.

11.0 CONCLUSIONS

11.1 POTABLE WATER SERVICING

The proposed 30-storey residential high-rise building will be serviced by the existing 300mm diameter watermain on Dumaurier Avenue. To create a suitable water service connection for the property a section of the existing 300mm dia. watermain was modified to include: replacement of about 19m pipe length with new deflected 19m 300mm dia. pipe length, new valves, tees, bends and two 150mm watermain stubs to provide potable water and fire flow water supply to the development. Water demand calculation was based on a demand rate of 350 L/cap/day for residential units and 28,000 L/ha/day for commercial and amenity space.

The building contains 330 residential units with and estimated population of 557 persons. The commercial and amenity areas account for a total area of 1430m^2. The calculated average day flow, maximum day flow and peak hour demand are 2.30L/s, 5.72L/s and 12.56L/s. The fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) and determined to be approximately 7,000 L/min (116.7 L/s), it is anticipated that the building will be sprinklered, with final sprinkler design to conform to the NFPA 13 standard.

Based on the boundary conditions available, the 300 mm diameter watermain on Dumaurier Avenue provides adequate fire flow capacity as per the requirements of the Fire Underwriters Survey while respecting City of Ottawa design guidelines. Two 150 mm diameter service laterals connected to the 300 mm diameter watermain on Dumaurier Avenue will be capable of providing the anticipated water demands to the lower storeys. A booster pump, to be designed by the building's mechanical engineer, will be required to maintain minimum required pressures for the upper storeys.

The existing 150 mm private watermain running through the north end of the site, currently servicing Ottawa Boys & Girls club (1085 Grenon Avenue) as well as Ruth Wildgen Park (1099 Grenon Avenue) will be relocated outside the boundary of the site to allow for the development of structures and services within the subject site and to ensure an adequate level of service is provided to the adjoining properties.

11.2 WASTEWATER SERVICING

The proposed 30-storey residential high-rise building is to contain 330 units in total consisting of 194 one-bedroom units, 136 two-bedroom units, 440m^2 commercial area and 990m^2 communal amenity areas with a total estimated population of 557 people using the City of Ottawa's recommended population densities.

The calculated peak flow for the site is 6.28 L/s, this site will be serviced by a sanitary servicing for the proposed development will be provided through a single proposed 200 mm diameter service lateral connecting to a new 250mm Sanitary sewer flowing into an extension of the existing 250 mm diameter concrete sanitary sewer flowing southwards on Dumaurier Avenue. An extension of the Sanitary sewer network northwards towards the site was required to conveniently collect wastewater from the site. Consultation with the MECP Ottawa District Office confirmed that this sanitary sewer extension within the

Dumaurier Avenue right-of-way is eligible for the standard Transfer of Review program with the City of Ottawa.

The proposed sanitary service lateral is sufficiently sized to provide gravity drainage for the site. The floor drains in the underground parking will be connected to the building plumbing system and discharged to the sanitary service lateral through a sump pump. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guide and will be coordinated with the building's mechanical engineer.

The existing 225mm sanitary sewer running through the north end of the site, currently servicing Ottawa Boys & Girls club (1085 Grenon Ave) as well as Ruth Wildgen Park (1099 Grenon Ave) will be relocated outside site to allow for the development of new building structures and services within the subject and to ensure an adequate level of service is provided to the adjoining properties.

11.3 STORMWATER MANAGEMENT AND SERVICING

The proposed 0.42 ha re-development area will be serviced by the existing 375mm diameter concrete storm sewer running north to south on Dumaurier Avenue. A stormwater cistern will attenuate peak flows from the building's roof, outdoor amenity areas, surface parking lot, and landscaped areas west of the building. In order to meet the site target release rate for stormwater of 60.8 L/s, an on-site storm detention facility will need to be provided. The proposed stormwater cistern will be serviced by the internal plumbing of the building.

The use of a 110 m^3 stormwater cistern within the underground parking level is proposed to achieve this end. The stormwater cistern will be pumped at a controlled rate of no more than 14.40 L/s. The stormwater cistern's controlled release rate will be set by a pump to be designed by a mechanical engineer.

A proposed oil/grit separator unit will treat storm runoff from the site to achieve 80% TSS removal. A Stormceptor 300 or approved equivalent is recommended for this purpose.

11.4 SITE GRADING AND DRAINAGE

Grading for the site is designed as per City of Ottawa requirements and provides for outlet of emergency overland flow under extreme flood conditions. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

A concrete retaining wall is proposed on the north end of the site to allow for a grade change of about 1.50m between the adjoining site (Boys & Girls Club of Ottawa) and the proposed development. The structural design of the retaining wall will be provided in a subsequent submission.

11.5 UTILITIES

Hydro Ottawa, Bell, Rogers, and Enbridge all have existing utility plants in the area, which will be used to service the site. The exact size, location, and routing of utilities will be finalized after design circulation.

Existing overhead wires and utility plants may need to be moved/reconfigured to allow sufficient clearance to the proposed building. The relocation of existing utilities will be coordinated with the individual utility providers as part of the site plan approval process by the civil engineer.

11.6 APPROVALS/PERMITS

A Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for the extension of the sanitary sewer on Dumaurier Avenue needed to service the proposed development. Consultation with the Ottawa District Office of the MECP confirmed that the extension of this sanitary sewer is eligible for the Transfer of Review Program for standard works with the City of Ottawa. An ECA is not expected to be required for the remainder of the subject site as the site is under singular, private ownership, is not within industrial lands, and does not discharge to a combined sewer.

A Permit to Take Water (PTTW) may be required if the dewatering during the construction of the underground parking level is expected to exceed 400,000 L/day. No other approval requirements from other regulatory agencies are anticipated. For dewatering activities between 50,000 and 400,000 L/day, registration on the Environmental Activity and Sector Registry (EASR) will be required. If blasting is used to remove the bedrock as part of the excavation for the building foundation, prior approval is required from the owners/operators of any water storage reservoir, pumping station, and water works transformer station within 200 m of the site.

APPENDICES

Appendix A POTABLE WATER SERVICING

A.1 WATER DEMAND CALCULATIONS

2829 Dumaurier Avenue - Domestic Water Demand Estimates

Based on Site Statistics from Roderick Lahey Architect Inc. dated January 28, 2021
Last updated on February 12, 2021

Population densities as per City of Ottawa Guidelines:

1 Bedroom	1.4	ppu
2 Bedroom	2.1	ppu

Unit Type	Area (m^2)	Number of Units	Population	Daily Demand Rate (L/cap/day or L/ha/d)	Avg. Day Demand [1,2]		Max. Day Demand [1, 2]		Peak Hour Demand [1, 2]	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
1 Bedroom	-	194	272	350	66.1	1.10	165.3	2.75	363.6	6.06
2 Bedroom	-	136	286	350	69.5	1.16	173.8	2.90	382.3	6.37
Commercial Space	440	-	-	28000	0.9	0.01	1.3	0.02	2.3	0.04
Required communal space	990	-	-	28000	1.9	0.03	2.9	0.05	5.2	0.09
Total Site :	**1430**	**330**	**558**		**138.4**	**2.3**	**343.2**	**5.72**	**753.4**	**12.56**

1 Water demand criteria used to estimate peak demand rates for residential areas are as follows:
maximum daily demand rate = 2.5 x average day demand rate
peak hour demand rate = 2.2 x maximum day demand rate

2 Water demand criteria used to estimate peak demand rates for commercial/amenity/lobby areas are as follows:
maximum daily demand rate = 1.5 x average day demand rate
peak hour demand rate = 1.8 x maximum day demand rate

A.2 FIRE FLOW REQUIREMENTS PER FUS GUIDELINES

FUS Fire Flow Calculation Sheet

Stantec Project #: 160401596
Project Name: 2829 Dumaurier Avenue
Date: 2020-12-22
Fire Flow Calculation #: 1
Description: Residential high-rise
Notes: 30-storey residential high-rise with commercial space on ground floor. Information taken from Draft Architectural Drawings by Roderick Lahey Architect Inc. dated December 17, 2020. 2-hour fire separation provided between each floor and 1-hour fire separation provided for exterior vertical communications.

Step	Task	Notes	Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Non-Combustible Construction	0.8	-
2	Determine Ground Floor Area of One Unit (m2)	Used the 'gross construction area' of the second floor (floor with the largest footprint, 1593 m^2) + 25% of the gross construction area of the two immediately adjoining floors (the ground floor and third floor). Methodology as per Page 17 of the Fire Underwriters Survey's *Water Supply for Public Fire Protection, 1999* .	2390	-
	Determine Number of Adjoining Units	-	1	-
3	Determine Height in Storeys	Does not include floors >50% below grade or open attic space	1	-
4	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min	-	9000
5	Determine Occupancy Charge	Limited Combustible	-15%	7650
6	Determine Sprinkler Reduction	Conforms to NFPA 13	-30%	-3060
		Standard Water Supply	-10%	
		Not Fully Supervised or N/A	0%	
		% Coverage of Sprinkler System	100%	

7	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	-	-
		North	10.1 to 20	39	2	61-90	Wood Frame or Non-Combustible	14%	2372
		East	> 45	63	1	61-90	Wood Frame or Non-Combustible	0%	
		South	3.1 to 10	25	1	0-30	Wood Frame or Non-Combustible	17%	
		West	> 45	63	1	61-90	Wood Frame or Non-Combustible	0%	

8	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min	7000
		Total Required Fire Flow in L/s	116.7
		Required Duration of Fire Flow (hrs)	2.00
		Required Volume of Fire Flow (m^3)	840

A.3 BOUNDARY CONDITIONS

Chochlinski, Daniel

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Tuesday, February 2, 2021 3:23 PM
To: Kuruvilla, Santhosh
Subject: FW: 160401596 - 2829 Dumaurier Avenue - Hydraulic Boundary Conditions Request
Attachments: 2829 Dumaurier February 2021.pdf

The following are boundary conditions, HGL, for hydraulic analysis at 2829 Dumaurier (zone 1W) assumed to be connected to the 305mm on Dumaurier Avenue (see attached PDF for location).

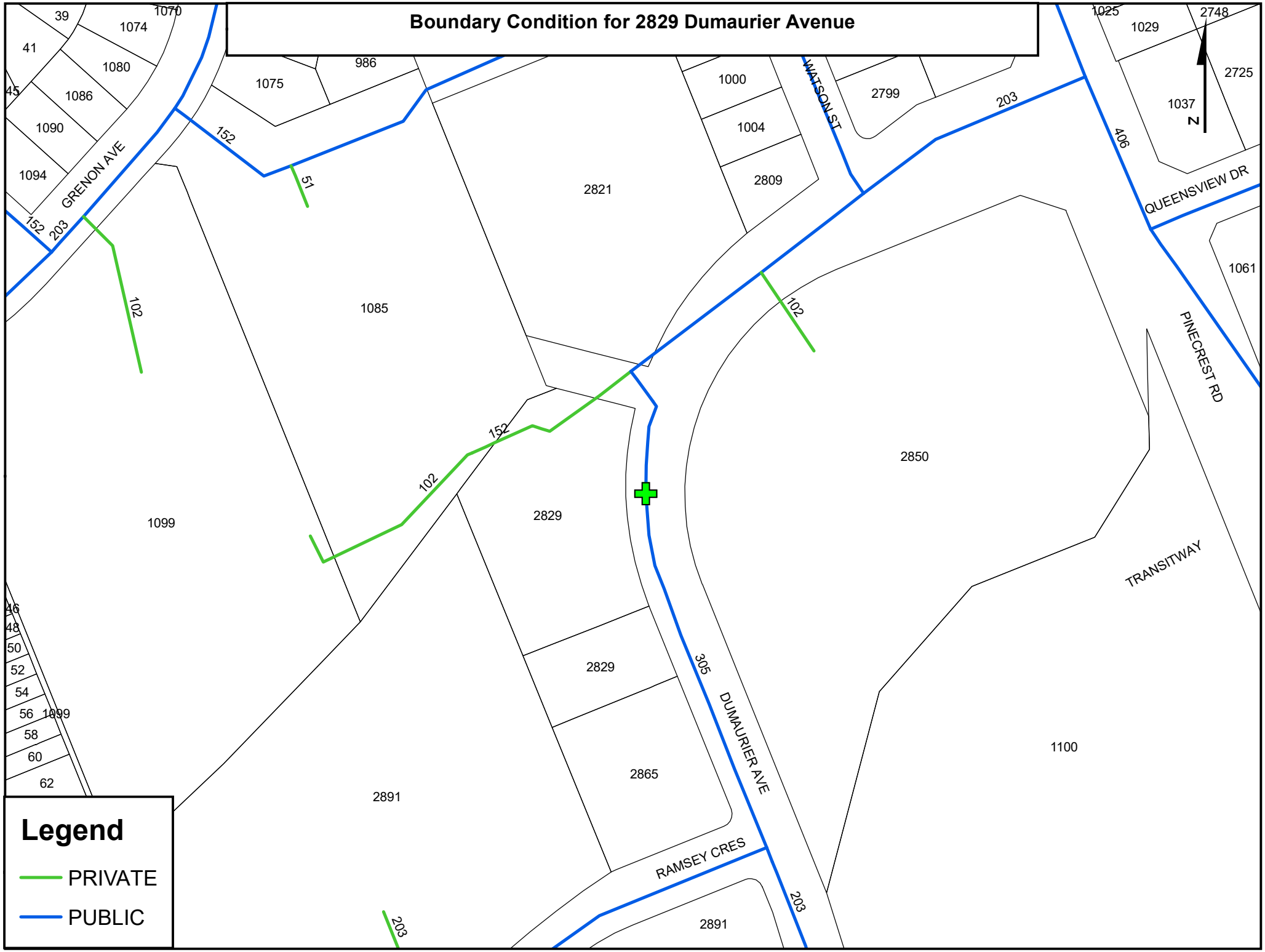
Minimum HGL = 107.4m

Maximum HGL = 114.3m

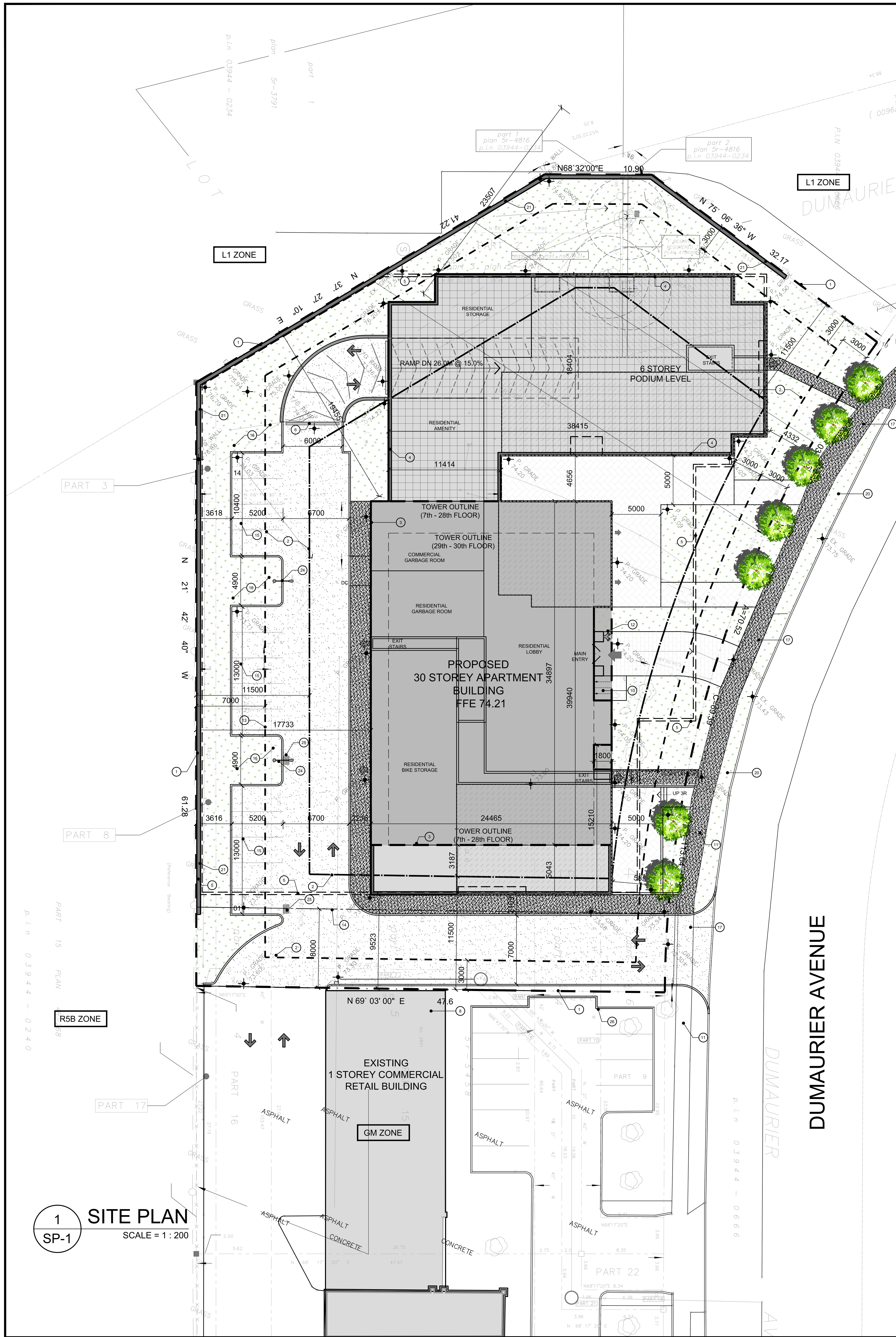
Max Day + Fire Flow (116.7 L/s) = 105.2m

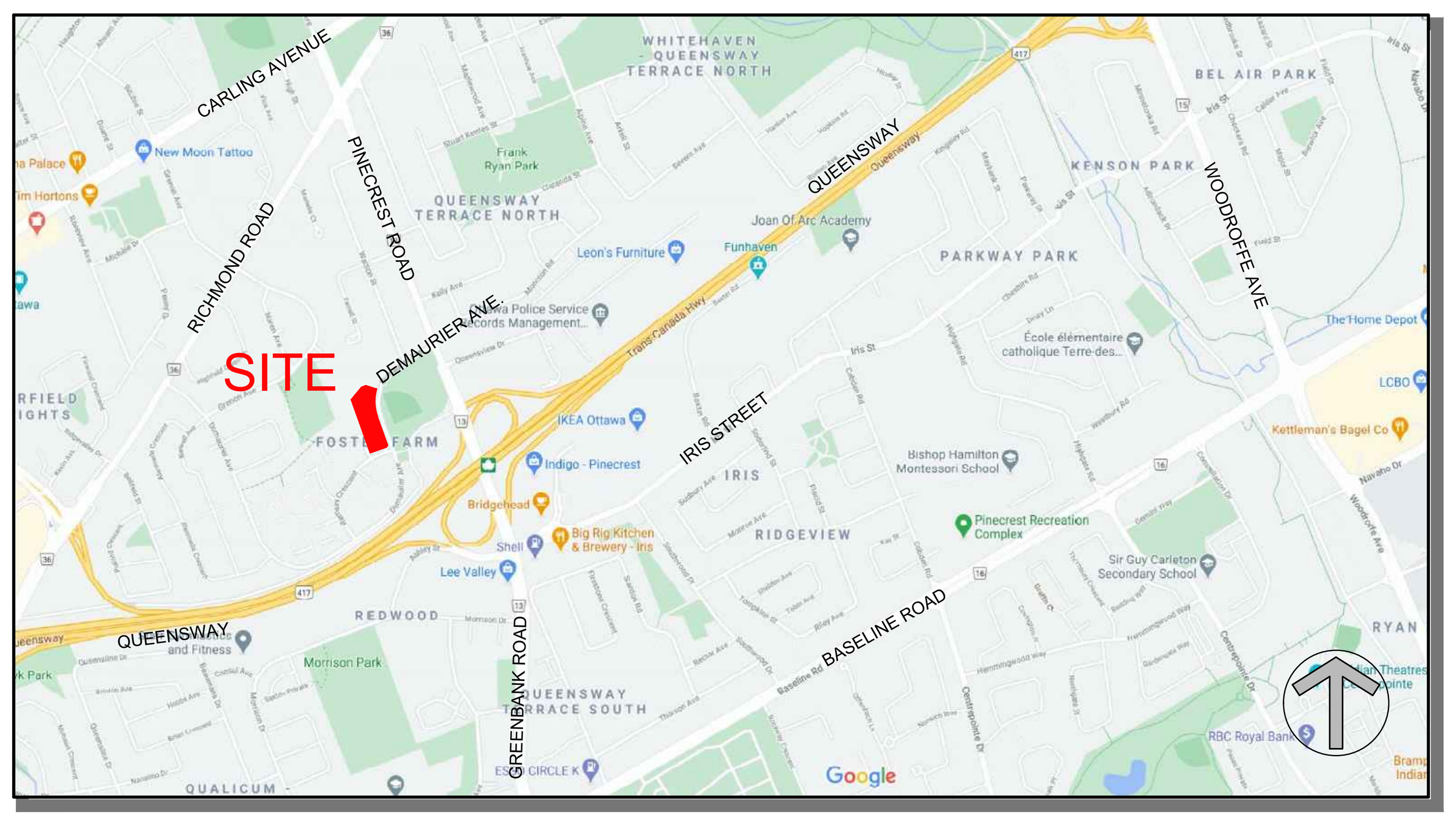
These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.


Boundary Condition for 2829 Dumaurier Avenue
39
41
45
1070
1074
1080
1086
1090
1094
GRENON AVE
1075
986
1000
1004
2809
WATSON ST
2799
1025
1029
2748
2725
1037
N
406
QUEENSVIEW DR
1061
PINECREST RD
203
152
51
102
2821
1085
1099
2829
2850
TRANSITWAY
46
48
50
52
54
56
58
60
62
305
DUMAURIER AVE
2865
1100
2891
RAMSEY CRES
Legend
PRIVATE
PUBLIC

Appendix B PROPOSED SITE PLAN





KEY MAP

DRAWING NOTES:

1. PROPERTY LINE
2. BUILDING / HEIGHT SETBACK LINE
3. OUTLINE OF TOWER
4. LINE OF PODIUM LEVEL
5. LINE OF PARKING GARAGE BELOW
6. RAMP TO U/G GARAGE WITH TRENCH DRAIN
7. EXISTING FIRE HYDRANT
8. EXISTING COMMERCIAL BUILDING
9. 2.0m WIDE CONCRETE SIDEWALK C/W DEPRESSED CURBS AT DRIVEWAY ENTRANCE
10. BICYCLE RACKS, SEE LANDSCAPE PLAN FOR TYPE
11. EXISTING 1.5m WIDE ASPHALT CITY SIDEWALK
12. SIAMESE CONNECTION
13. REAR YARD LANDSCAPE SETBACK
14. LINE OF 8.0M EASEMENT FROM ADJACENT PROPERTY
15. 2.6 X 5.2m STANDARD PARKING SPACES
16. AREA OF TEMPORARY SNOW STORAGE
17. NEW 1.8M W. CONCRETE SIDEWALK AS PER CITY STANDARDS C/W DEPRESSED CURB @ DRIVEWAY
18. SOFT LANDSCAPING
19. HARD LANDSCAPING - PAVERS
20. EXISTING CITY BOULEVARD TO BE REINSTATED UPON COMPLETION OF SITE WORK
21. CONCRETE RETAINING WALL C/W STONE FACE - SEE CIVIL AND LANDSCAPE
22. EXISTING TREE TO BE REMOVED
23. LINE OF U/G CISTERN; SEE CIVIL AND MECHANICAL FOR DETAILS
24. LIGHT STANDARD - SEE ELECTRICAL LIGHTING CERTIFICATE
25. CATCH BASIN - SEE CIVIL
26. NEW CURB TO TIE INTO EXISTING - SEE CIVIL

SITE PLAN SYMBOLS:

- TERRACE/LANDSCAPE PLANTING
- ASPHALT DRIVEISLE/PARKING
- CONCRETE SIDEWALK
- COMMERCIAL PATIO
- PAVERS @ TERRACE LEVEL
- COMMERCIAL @ L1
- RESIDENTIAL APARTMENTS @ L1
- PROPERTY LINE
- BUILDING SETBACK LINE
- 11.5M TOWER SETBACK LINE
- FENCE LINE
- BIKE RACK
- ENTRANCE / EXIT DOOR
- FH FIRE HYDRANT
- VEHICULAR DIRECTION
- EXISTING TREE TO BE REMOVED
- SIAMESE CONNECTION
- PRIMARY ENTRANCE / EGRESS DOOR
- SECONDARY DOOR
- PROPOSED GRADE - SEE CIVIL DRAWINGS

NOTE:
SEE LANDSCAPE FOR ALL SURFACE MATERIAL AND PATTERN

GROSS BUILDING - AREAS
(CONSTRUCTION AREA)

PARKING LEVEL		3,044.8 sq. m. 32,774 sq. ft.
GROUND FLOOR		1,593.0 sq. m. 17,147 sq. ft.
2nd to 6th FLOOR	5 x 923.73 sq. m. 5 x 17,729 sq. ft.	7,389.9 sq. m. 79,544 sq. ft.
7th FLOOR		454.3 sq. m. 7,837 sq. ft.
8th & 28th FLOOR	21 x 860.75 sq. m. 21 x 9,265 sq. ft.	18,075.7 sq. m. 194,565 sq. ft.
29th - 30th FLOOR	2 x 660.3 sq. m. 2 x 7,107 sq. ft.	1,320.5 sq. m. 14,214 sq. ft.
MECHANICAL LEVEL		371.6 sq. m. 4,000 sq. ft.
TOTAL AREA - ABOVE GRADE		29,478.8 sq. m. 317,307 sq. ft.

PROJECT INFORMATION

ZONING

Zoning By-Law 2008-250	GM [62] F (0.25)
SITE AREA	4,195.2 sq. m. (45,157) sq. ft.
BUILDING HEIGHT	90 m
FRONT YARD SETBACK	3.0 m
CORNER YARD SETBACK	3.0 m
INTERIOR YARD SETBACK	0.0 m
REAR YARD SETBACK	0.0 m
AMENITY SPACE (6.0 m² PER UNIT)	1,992.0 m²

PROJECT STATISTICS

BUILDING HEIGHT	94.0 M
BUILDING HEIGHT - STOREY'S	30
AVERAGE MEAN GRADE	(GEO. ELEV.) 74.20
FRONT YARD SETBACK	--- m
INTERIOR YARD SETBACK	--- m
REAR YARD SETBACK	--- m

GROSS BUILDING - AREAS
(CITY OF OTTAWA ZONING AREA)

PARKING LEVEL		0.0 sq. m. 000 sq. ft.
GROUND FLOOR		1,380.0 sq. m. 14,850 sq. ft.
2nd to 6th FLOOR	5 x 1,398.0 sq. m. 5 x 15,050 sq. ft.	6,990.0 sq. m. 75,250 sq. ft.
7th FLOOR		618.3 sq. m. 6,655 sq. ft.
8th - 28th FLOOR	21 x 725.7 sq. m. 21 x 7,811 sq. ft.	15,240.0 sq. m. 164,031 sq. ft.
29th - 30th FLOOR	2 x 566.5 sq. m. 2 x 6,098 sq. ft.	1,133.0 sq. m. 12,196 sq. ft.
MECHANICAL LEVEL		440.2 sq. m. 4,738 sq. ft.
TOTAL AREA		25,801.5 sq. m. 277,720 sq. ft.

UNIT STATISTICS

STUDIO UNIT	0
ONE BEDROOM UNIT	194
TWO BEDROOM UNIT	136
TOTAL	330

COMMERCIAL

TOTAL NFA, COMMERCIAL	440.0 sq. m. 4,735 sq. ft.

CAR PARKING

REQUIRED by ZONING BY-LAW

RESIDENCE	- 0.5 PER DWELLING UNIT	165
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	32
COMMERCIAL	- 3.0 PER 100 m2 NFA	14
TOTAL		211

PROVIDED

RESIDENCE (BELOW GRADE) (0.62 / UNIT)		205
VISITOR & COMMERCIAL (BLENDED @ 0.1/DWELLING UNIT)		
ABOVE GRADE:	14	
BELOW GRADE:	16	
TOTAL:		30
TOTAL		235
MAXIMUM PARKING RATE FOR RESIDENTIAL USE : 1.75 per UNIT (INCLUDING VISITOR)		578

BICYCLE PARKING

REQUIRED

REQUIRED	- 0.5 PER UNIT (330 UNITS)	166
PROVIDED		
ABOVE GRADE:	04	
BELOW GRADE:	166	
TOTAL:		170

LOT COVERAGE

PAVED SURFACE =	956.5 sq. m.	22.8%
BUILDING FOOTPRINT =	1,654.7 sq. m.	39.4%
LANDSCAPE OPEN SPACE =	1,584.0 sq. m.	37.8%
TOTAL =	4,195.2 sq. m.	100.0%

AMENITY SPACE

AT GRADE COMMUNAL EXTERIOR =	330.0 sq. m.
GROUND COMMUNAL INTERIOR =	100.0 sq. m.
PRIVATE BALCONIES =	2,754.0 sq. m.
7th FLOOR COMMUNAL INTERIOR =	204.0 sq. m.
7th FLOOR COMMUNAL EXTERIOR =	680.0 sq. m.
ROOF TOP COMMUNAL EXTERIOR =	0.0 sq. m.
TOTAL =	4,068.0 sq. m.
TOTAL COMMUNAL =	1,314.0 sq. m.
REQUIRED - 6.0M² PER UNIT (330) =	1,980.0 sq. m.
REQUIRED COMMUNAL @ 50% =	990.0 sq. m.

REFUGE REQUIREMENT (330 UNITS)

GARBAGE	- 0.11 PER UNIT	37 YARDS
RECYCLING GMP	- 0.018 PER UNIT	6 YARDS
RECYCLING FIBER	- 0.038 PER UNIT	13 YARDS
COMPOST	- 240L PER 50 UNITS	7

NOTATION SYMBOLS:

- 00 — INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
- 00 — INDICATES ASSEMBLIE TYPE; REFER TO TYPICAL ASSEMBLIES SCHEDUAL.
- 00 — INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A900 SERIES.
- 000 — INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A900 SERIES.
- DETAIL NUMBER / TITLE / SCALE / DETAIL REFERENCE PAGE / DETAIL CROSS REFERENCE PAGE

REVISIONS:

No.	DESCRIPTION	DATE
	ISSUED FOR CONSULTANT REVIEW	Feb. 02 21
2	ISSUED FOR CONSULTANT REVIEW	Nov. 23 20
1	ISSUED FOR DESIGN CONCEPT	Nov. 06 20

ARCHITECT SEAL: ONTARIO ASSOCIATION OF ARCHITECTS — RODERICK I. LAHEY — LICENCE 4375
SEAL DATE: STAMP DATE

NORTH ARROW:

CLIENT: brigil

ARCHITECT:
rla/architecture
roderick lahey architect inc.
56 beech street, ottawa, ontario K1S 3J6
t. 613.724.9932 f. 613.724.1209 rlaarchitecture.ca

PROJECT TITLE:
2858 DUMAURIER AVENUE
OTTAWA ONTARIO

SHEET TITLE:
SITE PLAN

DRAWN:	CHECKED:
R.V.	R.V.
SCALE: 1:200	SHEET No. SP-1
PROJECT No. 1922	

D07-12-20

PAPER SIZE: ISO Full Bleed B1 (1000.00 X 707.00 MM) PLOT DATE: Tuesday, February 02, 2021 PLOT SCALE: 1:1 PEN STYLE: 0-RLA-MASTER-100%.ctb

F:\2019\1922 - 2829 Dumaurier\01_Design Development\1922 SP-1 Site Plan 2021 01 28.dwg

DWG #

Appendix C SANITARY SERVICING

C.1 SANITARY SEWER DESIGN SHEET

Stantec

SUBDIVISION:
2829 Dumaurier Avenue

DATE: 2021-02-18
REVISION:
DESIGNED BY: NN
CHECKED BY: AMP

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401596

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL/AMENITY SPACE	28,000 l/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day	BEDDING CLASS	B
PERSONS / 1 BEDROOM APT.	1.4	INSTITUTIONAL	28,000 l/ha/day	MINIMUM COVER	2.50 m
PERSONS / 2 BEDROOM APT.	2.1	INFILTRATION	0.33 l/s/Ha	HARMON CORRECTION FACTOR	0.8
PERSONS / 3 BEDROOM APT.	3.1				

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM./AMENITY		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	1 BEDROOM	2 BEDROOM (OR 1BR + STUDY)	3 BEDROOM (OR 2BR + STUDY)	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)	(l/s)	(l/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
R100A, G100A	BLDG SAN	101	0.28	194	136	0	557	0.28	557	3.36	6.07	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.42	0.42	0.14	6.27	5.4	200	PVC	DR 28	1.00	33.4	**18.76%**	1.05	0.67
	101	100	0.00	0	0	0	0	0.28	557	3.36	6.07	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.42	0.14	6.27	24.1	250	PVC	SDR 35	0.30	33.2	**18.89%**	0.67	0.43
	100	EX 101	0.00	0	0	0	0	0.28	557	3.36	6.07	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.42	0.14	6.27	31.9	250	PVC	SDR 35	0.30	33.2	**18.89%**	0.67	0.43

1. Unit breakdown for proposed 30-storey mixed-use high-rise building provided by RLA Architecture in February 2021
2. Site to outlet to existing 250mm dia. sanitary sewer on Dumaurier Avenue. Sanitary sewer extension required.
3.Communal amenity areas and commercial space have been summed up to represent comm./amenity above

C.2 CORRESPONDENCE WITH MECP

Chochlinski, Daniel

From: Diamond, Emily (MECP) <Emily.Diamond@ontario.ca>
Sent: Wednesday, January 13, 2021 3:04 PM
To: Chochlinski, Daniel
Cc: Kilborn, Kris; Paerez, Ana
Subject: FW: 160401596 - 2829 Dumaurier Avenue SAN Sewer Extension - ECA ToR Eligibility

Good Afternoon Daniel,

You may proceed under the Transfer of Review.

Have a great day!

Emily Diamond
Environmental Officer
Ministry of the Environment, Conservation and Parks
Ottawa District Office
2430 Don Reid Drive
Ottawa, Ontario, K1H 1E1
Cell: 613-866-0938
Fax: 613-521-5437
e-mail: emily.diamond@ontario.ca

From: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Sent: January 13, 2021 2:56 PM
To: Diamond, Emily (MECP) <Emily.Diamond@ontario.ca>
Subject: RE: 160401596 - 2829 Dumaurier Avenue SAN Sewer Extension - ECA ToR Eligibility

Emily,

No concerns, can proceed under ToR.

Stay safe,

Aziz

Aziz S. Ahmed, P.Eng. | Manager
Municipal Water and Wastewater Permissions Section, Environmental Permissions Branch | Environmental Assessment and Permissions Division
Ministry of the Environment, Conservation and Parks | 40 St. Clair Ave. West, 2nd Floor, Toronto, ON M4V 1M2
Tel: 416.314.4625 | Cell: 416.712.7427 | Toll Free: 1-888-999-1305 | Fax: 416.314.1037 ✉: Aziz.Ahmed@ontario.ca

If you have any accommodation needs or require communication supports or alternate formats, please let me know.
Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.

From: Diamond, Emily (MECP) <Emily.Diamond@ontario.ca>
Sent: January-13-21 2:28 PM

To: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Subject: FW: 160401596 - 2829 Dumaurier Avenue SAN Sewer Extension - ECA ToR Eligibility

Hi Aziz,

I have a consultant asking whether this project would fall under the ToR. Could you please advise.

Thank you!

Emily Diamond
Environmental Officer
Ministry of the Environment, Conservation and Parks
Ottawa District Office
2430 Don Reid Drive
Ottawa, Ontario, K1H 1E1
Cell: 613-866-0938
Fax: 613-521-5437
e-mail: emily.diamond@ontario.ca

From: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Sent: January 13, 2021 12:55 PM
To: Diamond, Emily (MECP) <Emily.Diamond@ontario.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Paerez, Ana <Ana.Paerez@stantec.com>
Subject: 160401596 - 2829 Dumaurier Avenue SAN Sewer Extension - ECA ToR Eligibility

Hi Emily,

I am writing you to ask a question about a potential ECA Application for the 2829 Dumaurier Avenue project which Stantec Consulting is completing civil design services for in support of its Site Plan Application with the City of Ottawa.

We have identified that we may need to extend the existing 250 mm diameter concrete municipal sanitary sewer on Dumaurier Avenue northwards to service the proposed building at 2829 Dumaurier Avenue. During the pre-application consultation process with the City of Ottawa, we have been asked to reach out to you to identify whether this potential sanitary sewer extension work would be eligible for review under the Transfer of Review program (Standard Works) with the City of Ottawa. The reason for this question is the sanitary sewer's proximity to the now-closed Pinecrest Landfill.

Please find attached the following:

1) Map of the site identifying (conceptually) the potential extension of the sanitary sewer within the Dumaurier Avenue right-of-way.
2) A map provided by the City showing the infrastructure associated with the closed Pinecrest Landfill.

Please do not hesitate to reach out to me if you require any additional information. Thank you in advance for your time.

Regards,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

Better Together, Even If We're Apart. Read more about Stantec's COVID-19 response, including remote working and business continuity measures.

C.3 CORRESPONDENCE WITH CITY ON SANITARY SEWER CAPACITY

Chochlinski, Daniel

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Wednesday, February 10, 2021 2:47 PM
To: Kuruvilla, Santhosh
Subject: RE: 160401596 - 2829 Dumaurier Avenue - Sanitary Sewer Capacity

Hi Santhosh

I have no concerns with the additional flow.

Eric

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: February 04, 2021 10:20 AM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Subject: FW: 160401596 - 2829 Dumaurier Avenue - Sanitary Sewer Capacity

Good morning Eric,

Hope you are doing good.

I received an email from Stantec (see below) regarding sanitary capacity question for the future site plan application.

Will you be able to assist them with this question?

Thanks,

Santhosh

From: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Sent: February 04, 2021 10:05 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Paerez, Ana <Ana.Paerez@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>
Subject: 160401596 - 2829 Dumaurier Avenue - Sanitary Sewer Capacity

Good Morning Santhosh,

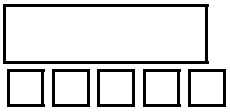
We have prepared the sanitary peak flow calculations for the 2829 Dumaurier Avenue site. May you please ask Eric Tousignant to verify whether sufficient residual capacity exists in the 250 mm dia. downstream sanitary sewer on Dumaurier Avenue to accommodate the increased flows? If you would prefer that we reach out to Eric directly, please let us know.

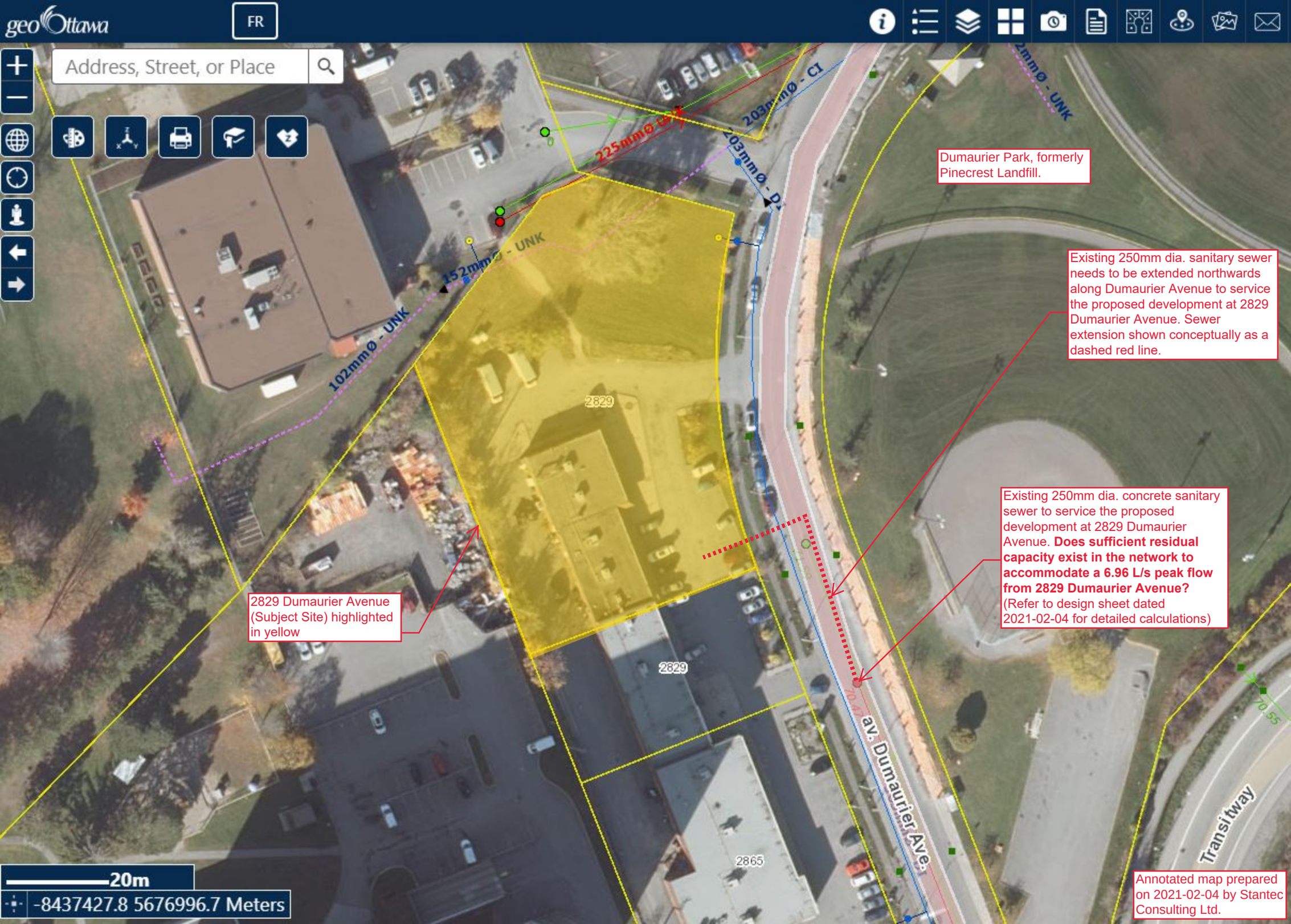
I have attached the sanitary peak flow calculations as well as a map outlining the site boundary and where we intend to discharge the sanitary wastewater.

If you require any additional information from our end, do not hesitate to reach out.

Regards,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4




geoOttawa
FR
Address, Street, or Place
225mmØ - UNK
203mmØ - C1
203mmØ - D
152mmØ - UNK
102mmØ - UNK
2829
2829
2865
av. Dumaurier Ave.
Transitway
70.55
Dumaurier Park, formerly Pinecrest Landfill.
Existing 250mm dia. sanitary sewer needs to be extended northwards along Dumaurier Avenue to service the proposed development at 2829 Dumaurier Avenue. Sewer extension shown conceptually as a dashed red line.
Existing 250mm dia. concrete sanitary sewer to service the proposed development at 2829 Dumaurier Avenue. **Does sufficient residual capacity exist in the network to accommodate a 6.96 L/s peak flow from 2829 Dumaurier Avenue?** (Refer to design sheet dated 2021-02-04 for detailed calculations)
2829 Dumaurier Avenue (Subject Site) highlighted in yellow
Annotated map prepared on 2021-02-04 by Stantec Consulting Ltd.
20m
-8437427.8 5676996.7 Meters

Appendix D STORMWATER SERVICING AND MANAGEMENT

D.1 PRECONSULTATION NOTES WITH CITY OF OTTAWA

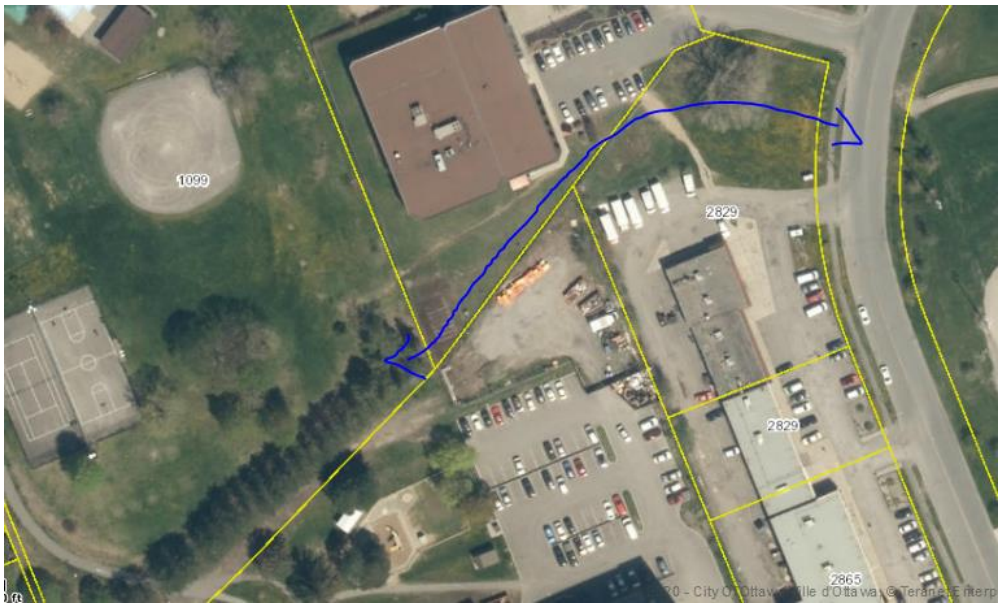
File Number: PC 2020-0117
May 20, 2020

2829 Dumaurier
Pre-Consultation Comments

Planning Comments

1. New Site Plan Control, Complex https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/development-application-forms
2. New Zoning By-law Amendment, Minor
3. The site is designated General Urban Area within the City's Official Plan. New taller building may be considered for sites that are in an area already characterized by taller building (adjacent OCH high rise).
4. The actual maximum height of the building should be based on an analysis of the neighbourhood context, appropriate transition to the adjacent low-rise developments, as well as the result of shadow and wind analysis. The upmost limit will be capped at 30 storeys given that this area is currently not within a secondary plan, so high-rise 31+ is not permitted.
    a. Please provide a shadow study showing the as-of-right shadow impact v. the proposed shadow impact.
    b. Please provide a cross section showing the building in relation to other buildings along Dumaurier. This comparison should take into account the grading change along the area. This will help develop an appropriate podium height that fits within the existing context. The maximum podium height should also be no more than the ROW width along Dumaurier.
    c. Please provide a plan showing possible high-rise intensification on the adjacent sites and how appropriate distance between towers are maintained.
    d. Please illustrate how the building transition into adjacent low-rise area.
5. UDRP is not required.
6. Please provide a section 37 analysis.
    a. Please provide GFA uplift. The as-of-right should be based on the current FSI maximum.
    b. Please provide a list of drawndown factors.
    c. Pleas note that section 37 will be transitioning to a Community Benefit Charge. The current target timeline is for spring 2021. The submission timing of the complete application will determine which system it falls under.
7. Will this building be rental or condo? Have there been any consideration for affordable housing units to be located within the building?

8. Please demonstrate how the 2829 and 2865 properties will function following the built out of 2829 Dumaurier.
9. Please consider securing a grocery store or food retail store as a tenant for the ground floor.
10. Please consider retaining the large maple tree on-site.
11. Please consider a pedestrian connection (in consultation with the adjacent property owner) through the adjacent property to connect Ruth Wildgen Park. Please consider this in conjunction with the retention of the maple tree.



12. Please note the total amount of parking spaces being proposed.
13. Please provide a proposed strategy for public consultation as directed by Bill 73, this can be included in the planning rationale.
14. Cash-in-lieu of parkland and associated appraisal fee will be required as a condition of approval as per the Parkland Dedication Bylaw.
15. Please consult with MTO prior to application submission. Kapusta, Stephen (MTO) Stephen.Kapusta@ontario.ca
16. Please consult with RVCA prior to application submission. Eric Lalande eric.lalande@rvca.ca
17. Please consult with the Ward Councillor prior to application submission. Kavanagh, Theresa Theresa.Kavanagh@ottawa.ca

Urban Design Comments

18. The point tower + podium form may be appropriate if a high-rise building is deemed appropriate.

19. However, the proposed 8 or 9-storey podium may be too tall in general terms. The height and the design of the podium should be determined by the context, including the width and geometry of the adjacent streets, the prevalent pattern of development in the vicinities, and the future vision. The proposed conceptual podium design seems quite arbitrary and does not respond to the context well.
20. The concept may have met the minimum tower separation standards established in the new zoning (approved by Council but subject to appeal). However, the City's aim is to achieve a minimum of 23m tower separation, and this site is large enough to achieve it.
21. On a related matter, the proposed tower may have a floor plate greater than the 750m² established by the City in the guidelines. Larger floor plates often mean wider shadows. If a slightly large floor plate is considered given the size and configuration of the site, greater tower separations must also be contemplated.
22. Overall, there is a need for a thorough urban design analysis of the neighbourhood before determining the appropriate built form on this site. This will include (but not limited to) an understanding of the relationship between the site and the future LRT station and the necessary connections, the development potential on the abutting properties, the desire and direction for transition, the characteristics of the streets, the potential needs for public spaces such as parks, streets, lanes, pathways, and etc. The attached TOR for the preparation of Design Brief indicates the information required as part of the submission.

Engineering Comments

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
2. Servicing and site works shall be in accordance with the following documents:
   - ⇨ Ottawa Sewer Design Guidelines (October 2012), including the related Technical Bulletins.
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010), including the related Technical Bulletins.
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)

- ⇨ City of Ottawa Accessibility Design Standards (2012)
- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455). If you have any issues obtaining information, please contact the Infrastructure Approvals Project Manager.

4. There appears to be easement(s) on-site. Please provide these easement documents along with your first submission and ensure the proposed design respects the easement requirements.
5. The underground parking structure will impede with the existing watermain located at the north end of the site. Additionally, in case the proponent revises the design, note that fire routes are not to be located on top of underground parking structures.
6. FYI: The site is located within the LRT Stage 2 Circulation Zone.
7. The site appears to be within the Ministry of Transportation's (MTO) Building and Land Use Permit Control Area. Please consult with MTO for required permits and criteria. Please include correspondence with MTO with your application to the City of Ottawa.
8. Sanitary Infrastructure
    a. There is an available 250mm diameter concrete sanitary sewer located on Dumaurier Ave. However, it currently does not front the proposed site, though it does service the existing building. This sewer is approximately 25 to 30m south of the proposed site's south boundary.
    b. A sanitary sewer extension within the Dumaurier Ave Right-Of-Way (ROW) will be required to service this site.
    c. The proponent will be required to demonstrate what the expected sanitary flows from the proposed site will be and show that the existing sanitary sewer infrastructure can accommodate the proposed site flows without any adverse affects.
    d. Due to the municipal sanitary sewer extension a Ministry of Environment, Conservation and Parks Environmental Compliance Approval (MECP ECA) will be required. Please contact Emily Diamond at the MECP Ottawa local office to inquire if the municipal sanitary sewer extension work qualifies to be reviewed under the Transfer of Review program (Standard Works) with the City of Ottawa or not, due to the proximity to the closed Pinecrest-Dumaurier landfill site. Please provide the correspondence as part of the site servicing study.

e. There is another 225mm diameter sanitary sewer located on private property north of the proposed site and on Dumaurier Ave. This sanitary sewer does not service the existing site. However, both sanitary sewers on Dumaurier Ave reach the same collector.

9. Watermain
    a. There is an available 305mm diameter ductile iron watermain fronting the site along Dumaurier Ave. Servicing for this site is expected to connect to this watermain.
    b. Note that a private 152mm diameter watermain service runs along the north property boundary on-site, servicing 1085 Grenon Ave as well as Ruth Wildgen Park (1099 Grenon Ave). This private service is to remain unless authorized to be relocated by the serviced properties.
    c. Drinking Water Boundary condition requests must include the location of the service connection and the expected loads required by the proposed development. Please provide the following information:
        i. Location of service (map/plan view)
        ii. (Draft) site plan or similar plan for building location
        iii. Fire flow demand: ____L/s (as per FUS, 1999)
        iv. Average daily demand: ___ L/s.
        v. Maximum daily demand: ___L/s.
        vi. Maximum hourly daily demand: ___ L/s.
        vii. Supporting calculations for domestic demands
        viii. Supporting calculations for FUS required fire flow
10. Storm
    a. There is an available 375mm diameter concrete storm sewer located on Dumaurier Ave with it's most upstream maintenance hole located near the site's southeast corner. Please note a site stormwater connection is to be made perpendicular to the municipal sewer.
    b. If a municipal storm sewer extension is required, the same MECP ECA requirements as the municipal sanitary sewer extension would apply.
11. The Stormwater Management Criteria, for the subject site, is to be based on the following:
    i. Post development peak 100 year flows are to be controlled to the pre-development peak 5 year release rate. Excess stormwater is to be detained on-site.

ii. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

iii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

iv. A calculated time of concentration (Cannot be less than 10 minutes).

v. Use of rooftop controls are recommended for this site, but are not limited to them, to meet the requirements.

12. City of Ottawa Landfill Gas Monitoring Program

a. A portion of the closed Pinecrest landfill extends under the north part of the subject property. Pockets of waste were noted in some of the probes near the north end of the existing building on-site. There are a number of LFG probes located on existing plaza property that are included in the City's monitoring program, and elevated methane concentrations are still measured at some of these probes.

b. The methane collection system consists of 18 extraction wells (EW1 to EW18 on the attached plan) located along Dumaurier Ave and Watson Street connected to the control building on the north edge of Dumaurier Park. The system was installed in 1989 and operated until 2003. Although the methane collection system is currently not active, it has not been officially approved for decommissioning by the Ontario Ministry of Environment, Conservation and Parks (MECP) due to the continued elevated methane levels near/adjacent to this site. The City reportedly offered to connect adjacent landowners within the landfill footprint to the system, but no adjacent owners accepted the offer.

c. A Phase I and II Environmental Site Assessments (ESAs) are to be completed in accordance with the requirements of Ontario Regulation 153/04.

d. The City will provide an updated summary of monitoring results to the proponent, to be incorporated into the Phase II ESA report; the results on the 2019 monitoring program were just received last month.

e. Since the proposed redevelopment will be a mixture of commercial and residential use, a Record of Site Condition (RSC) in accordance with O. Reg. 153/04 will be required.

f. Due to the continued presence of elevated methane on this property, a methane mitigation plan will be required as part of redevelopment (sub-slab venting system, etc.)

g. Given the environmental issues on this property, this site may be a potential candidate for participation in the City's Brownfield program.

h. We are conferring with the City's Environmental Remediation Unit on the potential setback requirements from the methane extraction wells.

Although they are not currently active, the methane collection system has not been officially approved for decommissioning by the MECP. We will get back to you on this matter.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x22517 or by email at gabrielle.schaeffer@ottawa.ca

Transportation Comments

- Follow Traffic Impact Assessment Guidelines
    - A TIA is required. Proceed to submitting Scoping report.
    - Start this process asap. The application will not be deemed complete until the submission steps 1-4, including the functional plan (if applicable), draft RMA package (if applicable) and/or monitoring report (if applicable).
    - You are highly encouraged to submit Step 4 for review and comment by City Staff prior to application.
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- Clear throat requirement for apartments with more than 200 units on a collector is 25m.
- Site within 400 m buffer of Pinecrest LRT Station.
- Concrete sidewalks, as per City Standards, are to be provided along the site's frontage. Sidewalk is to be depressed and continuous across site access (as per City Specification 7.1).
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage, emergency vehicles).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Grey out any area that will not be impacted by this application.
- AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.

- Noise Impact Studies required for the following:
    - Road, due to proximity to Hwy 417 and Dumaurier
    - Rail, due to proximity to future LRT
- Stationary, due to the proximity to neighbouring exposed mechanical equipment and if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses.

Documents required to deem application complete:

- TIA (Steps 1-4 submitted and reviewed by City staff)
- Noise Study (Road & Stationary)

Should you have any questions or require additional information, please contact Gervais, Josiane josiane.gervais@ottawa.ca

LRT Comments

1. A warning clause will have to be registered on title for noise and vibration, electromagnetic interference.
2. Noise attenuation may be required to deal with noise from the LRT – a study is required to assess this impact with and determine mitigation measures.
3. Depending on the timing of the construction program, a blasting plan will be required.

Heritage Comment

The subject property is very near 2821 Dumaurier Ave, which is listed on the City's Heritage Register. Given the scale of the development proposed nearby, we would recommend that the applicant provide a short heritage brief, acknowledging the nearby heritage resource and to comment on how the proposal will be compatible with the church, identifying any impacts it may have.

I've attached the information sheet we have for 2821 Dumaurier Ave.

Forester Comment

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan approval
2. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR

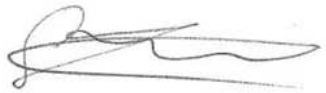
3. any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
4. for this site, the TCR may be combined with the Landscape Plan or EIS, provided all information is clearly displayed
5. the TCR must list all trees on site by species, diameter and health condition
6. the TCR must address all trees with a critical root zone that extends into the developable area – all trees including those located on adjoining properties, that could be impacted by the construction need to be addressed.
7. trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
8. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas
9. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
    a. the location of tree protection fencing must be shown on a plan
    b. show the full critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation and calculate the percentage of the area that will be disturbed
10. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees of the single large tree on site.
11. Please ensure newly planted trees have an adequate soil volume for their size at maturity
12. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at stream.shen@ottawa.ca or at 613-580-2424 extension 24488 if you have any questions.

Sincerely,



Stream Shen MCIP RPP
Planner II
Development Review - West

D.2 MODIFIED RATIONAL METHOD CALCULATIONS

Stormwater Management Calculations

File No: **160401596**
Project: **2829 Dumaurier Avenue**
Date: **2021-02-08**

SWM Approach:
Post-development controlled to pre-dev. flows with C=0.5

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Controlled - Tributary Access Areas	L1001A	Hard	0.010		0.9	0.009		
		Soft	0.000		0.2	0.000		
		Subtotal		0.01			0.009	0.90
Controlled - Tributary Access Area	L1001B	Hard	0.018		0.9	0.016		
		Soft	0.000		0.2	0.000		
		Subtotal		0.02			0.0162	0.90
Uncontrolled - Cistern Roof	R1001A	Hard	0.170		0.9	0.153		
		Soft	0.000		0.2	0.000		
		Subtotal		0.17			0.153	0.90
Uncontrolled - Cistern Courtyard	R1001B	Hard	0.010		0.9	0.009		
		Soft	0.000		0.2	0.000		
		Subtotal		0.01			0.009	0.90
Uncontrolled - Cistern Sideyard	R1001C	Hard	0.009		0.9	0.008		
		Soft	0.016		0.2	0.003		
		Subtotal		0.03			0.0115	0.46
Uncontrolled - Cistern Ramp	R1001D	Hard	0.007		0.9	0.006		
		Soft	0.000		0.2	0.000		
		Subtotal		0.01			0.0063	0.90
Uncontrolled - Cistern Parking	R1001E	Hard	0.066		0.9	0.059		
		Soft	0.034		0.2	0.007		
		Subtotal		0.10			0.068	0.68
Uncontrolled - Non-Tributary	UNC-2	Hard	0.008		0.9	0.007		
		Soft	0.002		0.2	0.000		
		Subtotal		0.01			0.0076	0.76
Uncontrolled - Non-Tributary	UNC-1	Hard	0.044		0.9	0.040		
		Soft	0.026		0.2	0.005		
		Subtotal		0.07			0.0448	0.64
Total				**0.42**			**0.325**	
Overall Runoff Coefficient= C:								**0.77**

Total Roof Areas **0.170 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled) **0.17 ha** (Stormceptor Sizing)
Total Tributary Area to Outlet **0.34 ha**

Total Uncontrolled Areas (Non-Tributary) **0.080 ha**

Total Site **0.42 ha**

Stormwater Management Calculations

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

5 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	998.071
b =	6.053
c =	0.814

t (min)	I (mm/hr)
10	104.19
20	70.25
30	53.93
40	44.18
50	37.65
60	32.94
70	29.37
80	26.56
90	24.29
100	22.41
110	20.82
120	19.47

5 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.42
C: 0.50 (as directed by the City of Ottawa)

Assumed as inlet time for existing condition development catchment

tc (min)	I (5 yr) (mm/hr)	Qtarget (L/s)
10	104.19	**60.8**

5 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L1001A — Controlled - Tributary
Area (ha): 0.01
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	2.61	2.61		
20	70.25	1.76	1.76		
30	53.93	1.35	1.35		
40	44.18	1.11	1.11		
50	37.65	0.94	0.94		
60	32.94	0.82	0.82		
70	29.37	0.73	0.73		
80	26.56	0.66	0.66		
90	24.29	0.61	0.61		
100	22.41	0.56	0.56		
110	20.82	0.52	0.52		
120	19.47	0.49	0.49		

Subdrainage Area: L1001B — Controlled - Tributary
Area (ha): 0.02
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	4.69	4.69		
20	70.25	3.16	3.16		
30	53.93	2.43	2.43		
40	44.18	1.99	1.99		
50	37.65	1.70	1.70		
60	32.94	1.48	1.48		
70	29.37	1.32	1.32		
80	26.56	1.20	1.20		
90	24.29	1.09	1.09		
100	22.41	1.01	1.01		
110	20.82	0.94	0.94		
120	19.47	0.88	0.88		

Subdrainage Area: R1001A — Uncontrolled - Cistern
Area (ha): 0.17
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	44.32	44.32		
20	70.25	29.88	29.88		
30	53.93	22.94	22.94		
40	44.18	18.79	18.79		
50	37.65	16.02	16.02		
60	32.94	14.01	14.01		
70	29.37	12.49	12.49		
80	26.56	11.30	11.30		
90	24.29	10.33	10.33		

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.42
C: 0.50 (as directed by the City of Ottawa)

Assumed as inlet time for existing condition development catchment

tc (min)	I (5 yr) (mm/hr)	Qtarget (L/s)
10	104.19	**60.8**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L1001A — Controlled - Tributary
Area (ha): 0.01
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	4.96	4.96		
20	119.95	3.33	3.33		
30	91.87	2.55	2.55		
40	75.15	2.09	2.09		
50	63.95	1.78	1.78		
60	55.89	1.55	1.55		
70	49.79	1.38	1.38		
80	44.99	1.25	1.25		
90	41.11	1.14	1.14		
100	37.90	1.05	1.05		
110	35.20	0.98	0.98		
120	32.89	0.91	0.91		

Storage: ICD Sized to capture 100-year flow

Orifice Diameter: Vortex LMF 70
Invert Elevation 71.93 m
T/G Elevation 73.31 m
Max Ponding Depth 0.00 m
Downstream W/L 71.40 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	73.31	1.38	5.06	0.00	0.00	OK
					0.00	

Subdrainage Area: L1001B — Controlled - Tributary
Area (ha): 0.02
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	8.94	8.94		
20	119.95	6.00	6.00		
30	91.87	4.60	4.60		
40	75.15	3.76	3.76		
50	63.95	3.20	3.20		
60	55.89	2.80	2.80		
70	49.79	2.49	2.49		
80	44.99	2.25	2.25		
90	41.11	2.06	2.06		
100	37.90	1.90	1.90		
110	35.20	1.76	1.76		
120	32.89	1.65	1.65		

Storage: ICD Sized to capture 100-year flow

Orifice Diameter: Vortex LMF 90
Invert Elevation 71.88 m
T/G Elevation 73.26 m
Max Ponding Depth 0.00 m
Downstream W/L 71.40 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	73.26	1.38	8.44	0.00	0.00	OK
					0.00	

Subdrainage Area: R1001A — Uncontrolled - Cistern
Area (ha): 0.17
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	84.39	84.39		
20	119.95	56.69	56.69		
30	91.87	43.42	43.42		
40	75.15	35.51	35.51		
50	63.95	30.22	30.22		
60	55.89	26.42	26.42		
70	49.79	23.53	23.53		
80	44.99	21.26	21.26		
90	41.11	19.43	19.43		

Stormwater Management Calculations

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

100	22.41	9.53	9.53
110	20.82	8.86	8.86
120	19.47	8.28	8.28

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001B — Uncontrolled - Cistern
Area (ha): 0.01
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	2.61	2.61		
20	70.25	1.76	1.76		
30	53.93	1.35	1.35		
40	44.18	1.11	1.11		
50	37.65	0.94	0.94		
60	32.94	0.82	0.82		
70	29.37	0.73	0.73		
80	26.56	0.66	0.66		
90	24.29	0.61	0.61		
100	22.41	0.56	0.56		
110	20.82	0.52	0.52		
120	19.47	0.49	0.49		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001C — Uncontrolled - Cistern
Area (ha): 0.03
C: 0.46

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	3.33	3.33		
20	70.25	2.25	2.25		
30	53.93	1.72	1.72		
40	44.18	1.41	1.41		
50	37.65	1.20	1.20		
60	32.94	1.05	1.05		
70	29.37	0.94	0.94		
80	26.56	0.85	0.85		
90	24.29	0.78	0.78		
100	22.41	0.72	0.72		
110	20.82	0.67	0.67		
120	19.47	0.62	0.62		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001D — Uncontrolled - Cistern
Area (ha): 0.01
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	1.82	1.82		
20	70.25	1.23	1.23		
30	53.93	0.94	0.94		
40	44.18	0.77	0.77		
50	37.65	0.66	0.66		
60	32.94	0.58	0.58		
70	29.37	0.51	0.51		
80	26.56	0.47	0.47		
90	24.29	0.43	0.43		
100	22.41	0.39	0.39		
110	20.82	0.36	0.36		
120	19.47	0.34	0.34		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001E (Incl. all flows to stormwater cistern) — Uncontrolled - Cistern
Area (ha): 0.10
C: 0.68

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	71.78	14.40	57.38	34.43
20	70.25	48.39	14.40	33.99	40.79
30	53.93	37.15	14.40	22.75	**40.95**
40	44.18	30.44	14.40	16.04	38.49
50	37.65	25.94	14.40	11.54	34.62
60	32.94	22.69	14.40	8.29	29.86
70	29.37	20.23	14.40	5.83	24.50
80	26.56	18.30	14.40	3.90	18.71
90	24.29	16.73	14.40	2.33	12.59
100	22.41	15.44	14.40	1.04	6.22
110	20.82	14.34	14.40	0.00	0.00
120	19.47	13.41	14.40	0.00	0.00

Notes: 1) Stormwater storage provide via a stormwater cistern located in the P1 level of the building.
2) Stormwater cistern accepts uncontrolled runoff from areas R1001A through R1001E. Uncontrolled runoff from all areas tributary to the stormwater cistern are presented in the Qactual column in this table.
3) Outflow from the 110 m3 stormwater cistern to be set by pump or orifice (if gravity outlet possible). Maximum outflow rate of 14.4 L/s.

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

100	37.90	17.91	17.91
110	35.20	16.64	16.64
120	32.89	15.55	15.55

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001B — Uncontrolled - Cistern
Area (ha): 0.01
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	4.96	4.96		
20	119.95	3.33	3.33		
30	91.87	2.55	2.55		
40	75.15	2.09	2.09		
50	63.95	1.78	1.78		
60	55.89	1.55	1.55		
70	49.79	1.38	1.38		
80	44.99	1.25	1.25		
90	41.11	1.14	1.14		
100	37.90	1.05	1.05		
110	35.20	0.98	0.98		
120	32.89	0.91	0.91		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001C — Uncontrolled - Cistern
Area (ha): 0.03
C: 0.58

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	7.14	7.14		
20	119.95	4.79	4.79		
30	91.87	3.67	3.67		
40	75.15	3.00	3.00		
50	63.95	2.56	2.56		
60	55.89	2.23	2.23		
70	49.79	1.99	1.99		
80	44.99	1.80	1.80		
90	41.11	1.64	1.64		
100	37.90	1.51	1.51		
110	35.20	1.41	1.41		
120	32.89	1.31	1.31		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001D — Uncontrolled - Cistern
Area (ha): 0.01
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	3.47	3.47		
20	119.95	2.33	2.33		
30	91.87	1.79	1.79		
40	75.15	1.46	1.46		
50	63.95	1.24	1.24		
60	55.89	1.09	1.09		
70	49.79	0.97	0.97		
80	44.99	0.88	0.88		
90	41.11	0.80	0.80		
100	37.90	0.74	0.74		
110	35.20	0.69	0.69		
120	32.89	0.64	0.64		

Notes: Areas R1001A, R1001B, R1001C, R1001D and R1001E to drain uncontrolled to stormwater cistern via internal plumbing. Refer to area R1001E for stormwater cistern details.

Subdrainage Area: R1001E (Incl. all flows to stormwater cistern) — Uncontrolled - Cistern
Area (ha): 0.10
C: 0.85

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	142.15	14.40	127.75	76.65
20	119.95	95.50	14.40	81.10	97.31
30	91.87	73.14	14.40	58.74	105.73
40	75.15	59.82	14.40	45.42	109.02
50	63.95	50.92	14.40	36.52	**109.55**
60	55.89	44.50	14.40	30.10	108.36
70	49.79	39.64	14.40	25.24	106.00
80	44.99	35.82	14.40	21.42	102.81
90	41.11	32.73	14.40	18.33	98.98
100	37.90	30.18	14.40	15.78	94.65
110	35.20	28.03	14.40	13.63	89.93
120	32.89	26.19	14.40	11.79	84.88

Notes: 1) Stormwater storage provide via a stormwater cistern located in the P1 level of the building.
2) Stormwater cistern accepts uncontrolled runoff from areas R1001A through R1001E. Uncontrolled runoff from all areas tributary to the stormwater cistern are presented in the Qactual column in this table.
3) Outflow from the 110 m3 stormwater cistern to be set by pump or orifice (if gravity outlet possible). Maximum outflow rate of 14.4 L/s.

Stormwater Management Calculations

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

4) No stormwater storage is provided on the building's roof or above CBs.

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	N/A	N/A	14.4	40.95	110.00	OK
			Excess storage (m3):		69.05	

Subdrainage Area: UNC-2 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.76

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	2.20	2.20		
20	70.25	1.48	1.48		
30	53.93	1.14	1.14		
40	44.18	0.93	0.93		
50	37.65	0.80	0.80		
60	32.94	0.70	0.70		
70	29.37	0.62	0.62		
80	26.56	0.56	0.56		
90	24.29	0.51	0.51		
100	22.41	0.47	0.47		
110	20.82	0.44	0.44		
120	19.47	0.41	0.41		

Notes: Area UNC-2 discharges uncontrolled to rear lane behind the Giant Tiger (towards Ramsey Crescent).

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.07
C: 0.64

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	12.98	12.98		
20	70.25	8.75	8.75		
30	53.93	6.72	6.72		
40	44.18	5.50	5.50		
50	37.65	4.69	4.69		
60	32.94	4.10	4.10		
70	29.37	3.66	3.66		
80	26.56	3.31	3.31		
90	24.29	3.02	3.02		
100	22.41	2.79	2.79		
110	20.82	2.59	2.59		
120	19.47	2.42	2.42		

Notes: Area UNC-1 discharges uncontrolled to the Dumaurier Avenue right-of-way.

SUMMARY TO OUTLET

			Cistern storage: Vrequired	Vavailable*	
Tributary Area	0.34	ha			
Total 5yr Flow to Sewer	21.7	L/s	40.9	110.0 m^3	Ok
Non-Tributary Area	0.08	ha			
Total 5yr Flow Uncontrolled	15.2	L/s			
Total Area	0.42	ha			
Total 5yr Flow	36.9	L/s			
Target	60.8	L/s			

Project #160401596, 2829 Dumaurier Avenue
Modified Rational Method Calculatons for Storage

4) No stormwater storage is provided on the building's roof or above CBs.

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	N/A	N/A	14.4	109.55	110.00	OK
			Excess storage (m3):		0.45	

Subdrainage Area: UNC-2 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.95

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	4.72	4.72		
20	119.95	3.17	3.17		
30	91.87	2.43	2.43		
40	75.15	1.98	1.98		
50	63.95	1.69	1.69		
60	55.89	1.48	1.48		
70	49.79	1.31	1.31		
80	44.99	1.19	1.19		
90	41.11	1.09	1.09		
100	37.90	1.00	1.00		
110	35.20	0.93	0.93		
120	32.89	0.87	0.87		

Notes: Area UNC-2 discharges uncontrolled to rear lane behind the Giant Tiger (towards Ramsey Crescent).

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.07
C: 0.80

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	27.80	27.80		
20	119.95	18.67	18.67		
30	91.87	14.30	14.30		
40	75.15	11.70	11.70		
50	63.95	9.96	9.96		
60	55.89	8.70	8.70		
70	49.79	7.75	7.75		
80	44.99	7.00	7.00		
90	41.11	6.40	6.40		
100	37.90	5.90	5.90		
110	35.20	5.48	5.48		
120	32.89	5.12	5.12		

Notes: Area UNC-1 discharges uncontrolled to the Dumaurier Avenue right-of-way.

SUMMARY TO OUTLET

			Cistern storage: Vrequired	Vavailable*	
Tributary Area	0.34	ha			
Total 100yr Flow to Sewer	28.3	L/s	109.5	110.0 m^3	Ok
Non-Tributary Area	0.08	ha			
Total 100yr Flow Uncontrolled	32.5	L/s			
Total Area	0.42	ha			
Total 100yr Flow	60.8	L/s			
Target	60.8	L/s			

14.4

	VORTEX ICD OPENING SIZE								
Head (m)	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**
0.10	0.42	0.57	0.73	0.90	1.05	1.15	1.30	1.59	1.81
0.20	0.59	0.80	1.02	1.23	1.47	1.60	1.88	2.24	2.56
0.30	0.73	0.98	1.24	1.49	1.79	1.96	2.32	2.74	3.13
0.40	0.85	1.14	1.43	1.72	2.06	2.27	2.69	3.16	3.61
0.50	0.95	1.27	1.59	1.91	2.30	2.54	3.02	3.54	4.04
0.60	1.04	1.39	1.75	2.09	2.52	2.78	3.31	3.87	4.43
0.70	1.13	1.51	1.88	2.26	2.71	3.01	3.58	4.18	4.78
0.80	1.21	1.61	2.02	2.42	2.90	3.22	3.83	4.47	5.11
0.90	1.28	1.71	2.14	2.56	3.07	3.42	4.07	4.75	5.42
1.0	1.35	1.80	2.25	2.70	3.24	3.60	4.29	5.00	5.71
1.2	1.48	1.98	2.47	2.96	3.55	3.95	4.71	5.48	6.26
1.4	1.61	2.14	2.67	3.20	3.83	4.27	5.09	5.92	6.76
1.6	1.72	2.29	2.85	3.42	4.09	4.57	5.45	6.33	7.23
1.8	1.82	2.43	3.03	3.63	4.34	4.85	5.78	6.72	7.67
2.0	1.93	2.56	3.19	3.83	4.57	5.12	6.10	7.08	8.08
2.5	2.16	2.86	3.57	4.28	5.10	5.73	6.83	7.92	9.04
3.0	2.37	3.14	3.91	4.69	5.59	6.29	7.49	8.67	9.90
5	3.06	4.06	5.06	6.07	7.21	8.14	9.68	11.20	12.78
7	3.63	4.80	5.99	7.19	8.52	9.65	11.46	13.26	15.12
9	4.12	5.45	6.80	8.16	9.66	10.95	13.01	15.04	17.15
11	4.56	6.03	7.52	9.02	10.68	12.12	14.38	16.63	18.96
13	4.96	6.55	8.17	9.81	11.60	13.18	15.64	18.08	20.61
15	5.33	7.04	8.78	10.54	12.46	14.17	16.81	19.42	22.14

85	90	95	100	105
2.02	2.21	2.56	2.79	3.11
2.86	3.17	3.59	3.98	4.39
3.51	3.90	4.38	4.88	5.37
4.05	4.51	5.05	5.64	6.19
4.53	5.05	5.65	6.31	6.92
4.96	5.54	6.18	6.92	7.58
5.36	5.99	6.68	7.47	8.19
5.73	6.41	7.14	7.99	8.76
6.08	6.80	7.57	8.47	9.29
6.41	7.17	7.98	8.93	9.79
7.02	7.86	8.74	9.78	10.73
7.58	8.50	9.44	10.56	11.58
8.11	9.09	10.10	11.29	12.39
8.60	9.64	10.71	11.98	13.14
9.06	10.17	11.29	12.63	13.85
10.14	11.37	12.62	14.11	15.48
11.10	12.46	13.83	15.46	16.96
14.34	16.10	17.86	19.95	21.90
16.96	19.06	21.14	23.60	25.92
19.24	21.62	23.98	26.76	29.39
21.27	23.90	26.51	29.58	32.50
23.12	25.99	28.82	32.16	35.33
24.84	27.92	30.96	34.54	37.95

D.3 CORRESPONDENCE WITH RIDEAU VALLEY CONSERVATION AUTHORITY (RVCA)

Chochlinski, Daniel

From: Chochlinski, Daniel
Sent: Sunday, January 24, 2021 3:43 PM
To: Eric Lalande
Cc: Kilborn, Kris; Paerez, Ana
Subject: RE: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Eric,

Thank you for following up. We will proceed with the enhanced protection requirement (80% TSS removal) for the site, as indicated.

Take care,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: Saturday, January 23, 2021 10:53 AM
To: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Subject: RE: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Dan,

Sorry I've missed this email, and wanted to make sure I follow up. The water quality requirements are as stated an enhanced level of protection is required.

Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Sent: Friday, January 8, 2021 11:46 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Paerez, Ana <Ana.Paerez@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>
Subject: RE: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Eric,

I have followed up and confirmed that our Client does not intend to reduce the number of surface parking spaces to 5 or less for the 2829 Dumaurier Avenue site. Therefore, if the 80% TSS removal quality control requirement is still applicable to the site, we will ensure to meet it with our stormwater management plan.

Please let me know if your measured distance to the stormwater outlet at all changes this requirement for our site.

Regards,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Chochlinski, Daniel
Sent: Monday, January 4, 2021 11:58 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Paerez, Ana <Ana.Paerez@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>
Subject: RE: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Eric,

I don't have this information available to me now so would greatly appreciate if you could look it up upon your return later this week. Thank you for your help so far; I look forward to continuing our discussion later.

Take care,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: Monday, January 4, 2021 11:55 AM
To: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Subject: Re: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Dan,

From the site to the outlet of the municipal system at the receiving watercourse. I could look it up but it wouldn't be until I'm back on Thursday.

Get Outlook for Android

From: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Sent: Monday, January 4, 2021 11:52:49 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Paerez, Ana <Ana.Paerez@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>
Subject: RE: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

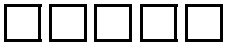
Hi Eric,

Thank you so much for your prompt reply. I will consult with our team and Client about the possibility of reducing the number of surface parking spaces to 5 or less.

May you please confirm when you say 'distance to receiving watercourse' whether you mean the distance from the site to the existing receiving storm sewer? If so, this distance is approximately 11 metres as measured from the property line to the nearest storm maintenance hole.

Regards,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4



From: Eric Lalande <eric.lalande@rvca.ca>
Sent: Monday, January 4, 2021 11:47 AM
To: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Subject: Re: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Hi Daniel,

The RVCA would typically require enhanced water quality protection (80% TSS Removal). Best management practices are encouraged to be integrated where possible.

I would note that this requirement would be applied based on the number of surface parking. (>5 spaces). As well as distance from the outlet. If you could confirm the distance to the stormwater outlet (receiving watercourse), or reduce surface spaces, there may have sufficient opportunities to waive the requirement.

I'm off on vacation today until Thursday, I could follow up more then.

Cheers, Happy New Year.

Eric

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From: Chochlinski, Daniel <Daniel.Chochlinski@stantec.com>
Sent: Monday, January 4, 2021 11:38:04 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Paerez, Ana <Ana.Paerez@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>
Subject: 160401596 - 2829 Dumaurier Avenue - RVCA Stormwater Management Criteria

Good morning Eric,

Stantec is preparing the civil engineering design submission in support of the rezoning and site plan application for a 30-storey high-rise located at 2829 Dumaurier Avenue (key plan attached) in the City of Ottawa.

In our pre-application consultation, the City has directed us to consult with you before the submission of our engineering package to confirm if there are any additional design criteria (namely, for stormwater quality control). May you please provide us with this information?

Below is a list of some pertinent site information:

1. The proposed 30-storey high-rise is proposed to contain commercial space on the ground floor and residential units on the remaining storeys.
    a. The building is to contain 108 one-bedroom units, 171 one-bedroom + study, 43 two-bedroom units, and 8 two-bedroom + study units.
    b. I have attached a draft of the site plan, dated 2020-12-17.
2. The proposed building replaces an existing one storey commercial building.
3. 16 surface parking spots are proposed. The remainder of the building's parking spots are expected to be provided in a multi-level underground parking garage.
4. Stormwater quantity control for the site is anticipated to be provided via rooftop storage and an underground stormwater storage tank, either discharging by gravity (controlled by an ICD) or pumped at a controlled release rate.
    a. The City of Ottawa has indicated that the allowable stormwater release rate is to be calculated using a maximum C of 0.5 and a 5-year storm event.

Please let me know if you require any additional information from our end. Thank you in advance for your help, and Happy New Year!

Regards,

Daniel Chochlinski EIT
Engineering Intern, Community Development
Mobile: 343-961-9619
daniel.chochlinski@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

D.4 STORMCEPTOR SIZING SHEET AND STANDARD DETAIL

Detailed Stormceptor Sizing Report – 2858 Dumaurier Avenue

Project Information & Location			
Project Name	2858 Dumaurier Avenue	**Project Number**	160401596
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	2/9/2021
Designer Information		**EOR Information (optional)**	
Name	ana paerez	**Name**	
Company	Stantec Consulting	**Company**	
Phone #	506-204-5856	**Phone #**	
Email	ana.paerez@stantec.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	2858 Dumaurier Avenue
Recommended Stormceptor Model	STC 300
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	81
PSD	Fine Distribution
Rainfall Station	OTTAWA MACDONALD-CARTIER INT'L A

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	81
STC 750	88
STC 1000	89
STC 1500	90
STC 2000	92
STC 3000	93
STC 4000	94
STC 5000	95
STC 6000	96
STC 9000	97
STC 10000	97
STC 14000	98
StormceptorMAX	Custom

Stormceptor
The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.
Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology
Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:
• Site parameters
• Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
• Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
• TSS load
• Detention time of the system

Hydrology Analysis

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour).
Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station

State/Province	Ontario	**Total Number of Rainfall Events**	4093
Rainfall Station Name	OTTAWA MACDONALD-CARTIER INT'L A	**Total Rainfall (mm)**	20978.1
Station ID #	6000	**Average Annual Rainfall (mm)**	567.0
Coordinates	45°19'N, 75°40'W	**Total Evaporation (mm)**	1872.4
Elevation (ft)	370	**Total Infiltration (mm)**	20.9
Years of Rainfall Data	37	**Total Rainfall that is Runoff (mm)**	19084.8

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

Drainage Area	
Total Area (ha)	0.17
Imperviousness %	99.90

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Design Details	
Stormceptor Inlet Invert Elev (m)	71.48
Stormceptor Outlet Invert Elev (m)	71.45
Stormceptor Rim Elev (m)	73.27
Normal Water Level Elevation (m)	
Pipe Diameter (mm)	
Pipe Material	PVC - plastic
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	No

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name	2858 Dumaurier Avenue

Site Details

Drainage Area

Total Area (ha)	0.17
Imperviousness %	99.90

Surface Characteristics

Width (m)	82.00
Slope %	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Maintenance Frequency (months) >	12

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/hr)	61.98
Min. Infiltration Rate (mm/hr)	10.16
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (lps)	0

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	

Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	
Exponential Buildup Power	
Exponential Washoff Exponent	

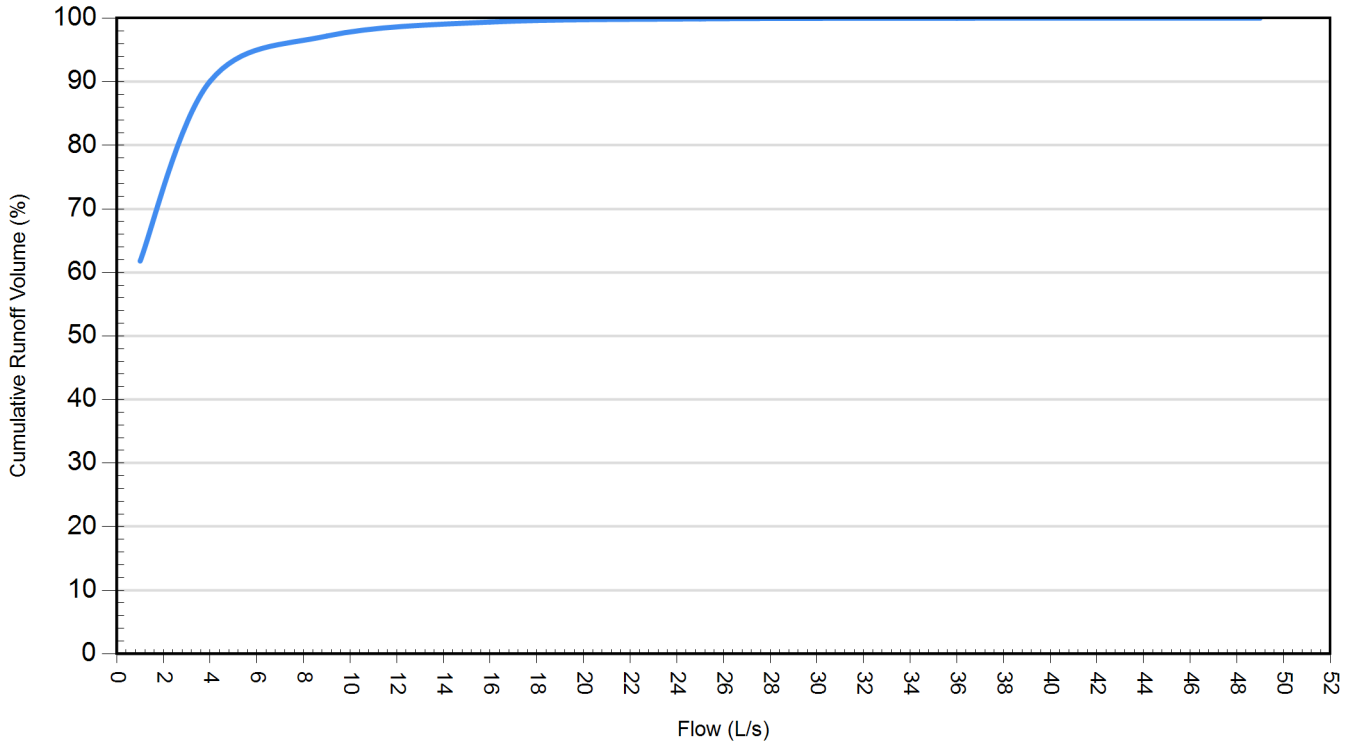
TSS Availability Parameters

Availability Constant A	
Availability Factor B	
Availability Exponent C	
Min. Particle Size Affected by Availability (micron)	

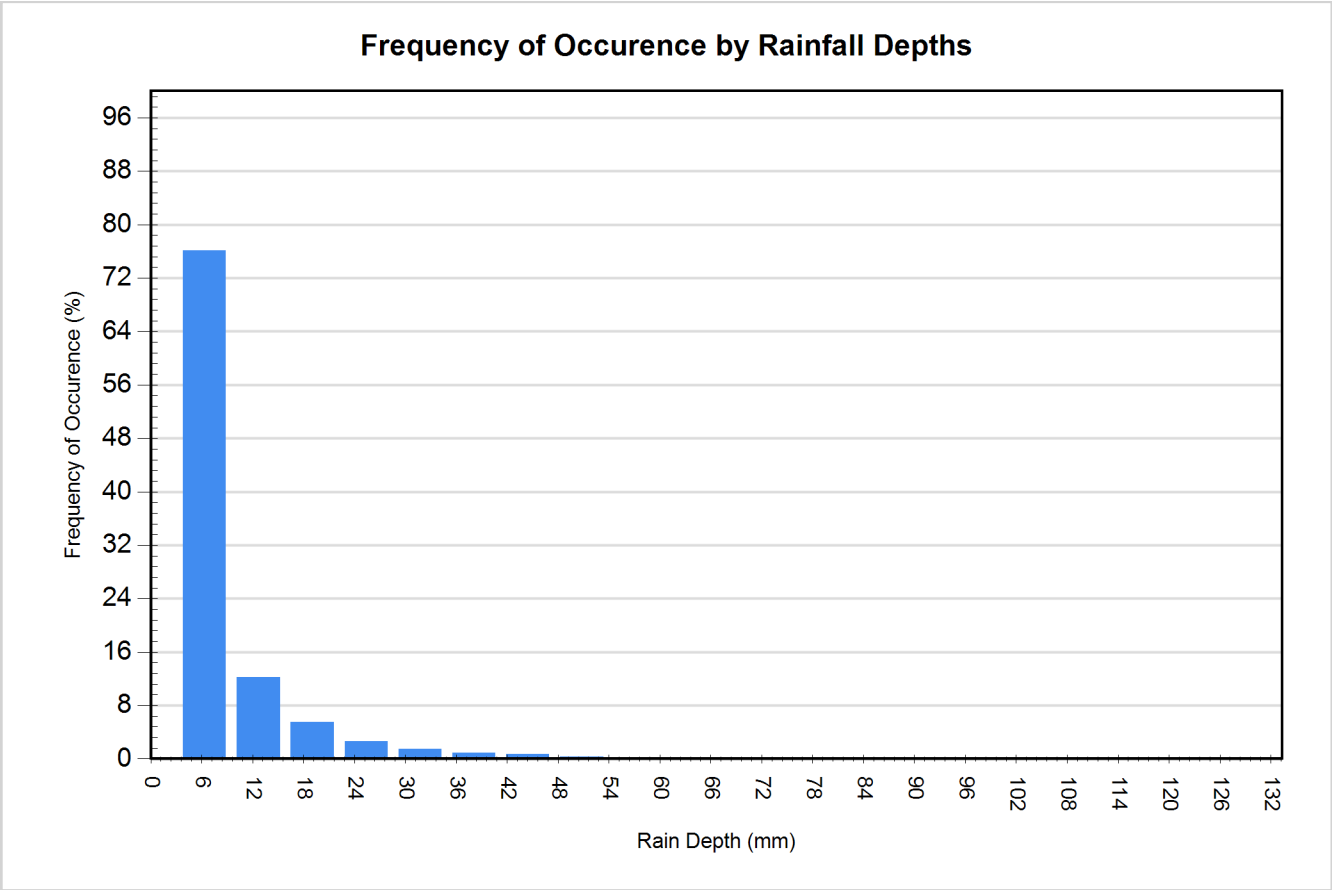
Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	Runoff Volume (m^3)	Volume Over (m^3)	Cumulative Runoff Volume (%)
1	20212	12471	61.8
4	29452	3235	90.1
9	31781	907	97.2
16	32497	191	99.4
25	32664	24	99.9
36	32688	0	100.0
49	32688	0	100.0

Cumulative Runoff Volume by Runoff Rate

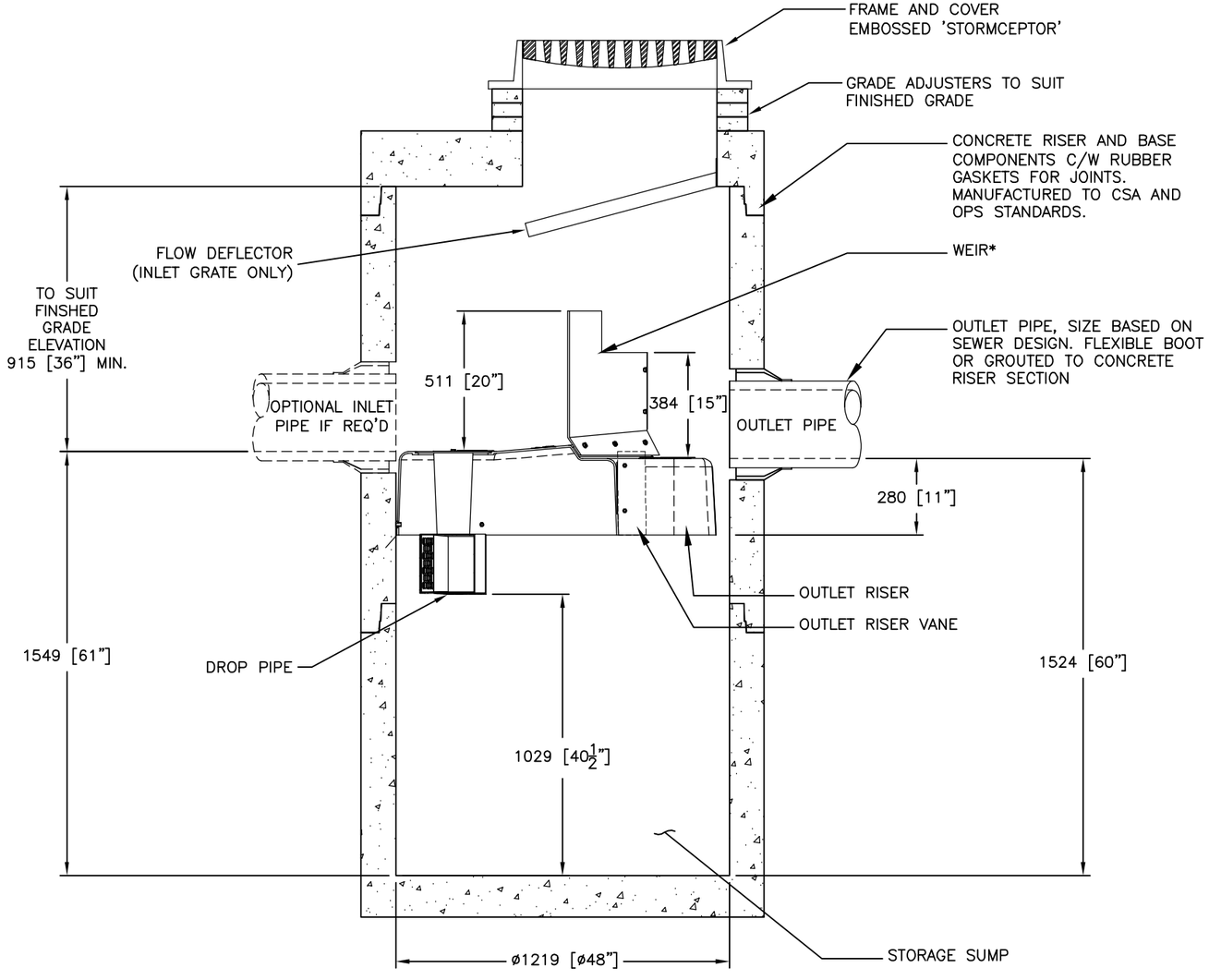
For area: 0.17(ha), imperviousness: 99.90%, rainfall station: OTTAWA MACDONALD-CARTIER INT'L A



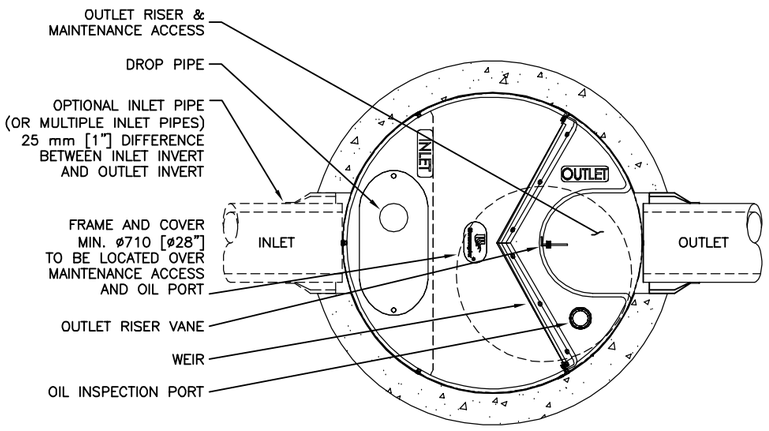
Rainfall Event Analysis				
Rainfall Depth (mm)	No. of Events	Percentage of Total Events (%)	Total Volume (mm)	Percentage of Annual Volume (%)
6.35	3113	76.1	5230	24.9
12.70	501	12.2	4497	21.4
19.05	225	5.5	3469	16.5
25.40	105	2.6	2317	11.0
31.75	62	1.5	1765	8.4
38.10	35	0.9	1206	5.8
44.45	28	0.7	1163	5.5
50.80	12	0.3	557	2.7
57.15	7	0.2	378	1.8
63.50	1	0.0	63	0.3
69.85	1	0.0	64	0.3
76.20	1	0.0	76	0.4
82.55	0	0.0	0	0.0
88.90	1	0.0	84	0.4
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0
107.95	0	0.0	0	0.0
114.30	1	0.0	109	0.5
120.65	0	0.0	0	0.0
127.00	0	0.0	0	0.0



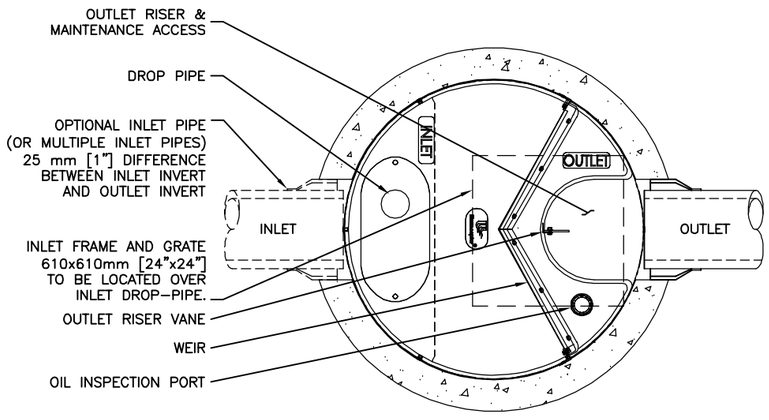
For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EF4				
STRUCTURE ID					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
7007 RIDGE ROAD, SUITE 350, HANOVER, MD 21076
USA: 888-279-9828 CA: 800-388-4601 INTL: +1-416-960-9900

DATE: 5/26/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EF4	*

SHEET: 1 OF 1

Appendix E EXTERNAL REPORTS

E.1 GEOTECHNICAL INVESTIGATION (PATERSON, 2019)

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.
Consulting Engineers
154 Colonnade Road South
Ottawa, Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Geotechnical Investigation

Proposed Hi-Rise Building
2929 DuMaurier Avenue
Ottawa, Ontario

Prepared for

3223701 Canada Inc.

December 18, 2019

Report PG4928-1

Table of Contents

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by 3223701 Canada Inc. to conduct a geotechnical investigation for the proposed hi-rise building to be located at 2829 DuMaurier Avenue in the City of Ottawa, Ontario (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the current investigation were to:

- ❏ Determine the subsurface and groundwater conditions by means of boreholes and existing soils information.
- ❏ Provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. The report contains Paterson's findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as understood at the time of writing this report.

2.0 Proposed Development

The development is understood to consist of a 30 storey multi-use residential complex with up to five levels of underground parking with a ground floor mezzanine and commercial areas. It is further understood that the proposed building will encompass the majority of the subject site. Associated at-grade access lanes, car parking and landscaped areas are also anticipated. The proposed building is anticipated to be municipally serviced.

The subject property is presently occupied by a slab on grade commercial building. It is expected that the existing building within the north portion of the site will be demolished as part of the proposed project.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current investigation was completed between November 10 and 11, 2019. At that time, 3 boreholes were advanced to a maximum depth of 18.2 m below existing grade. The borehole locations were distributed in a manner to provide general coverage of the proposed development taking into consideration existing site features. The borehole locations are shown on Drawing PG4928-1 - Test Hole Location Plan included in appendix 2.

Sampling and In-Situ Testing

Soil samples were recovered with a 50 mm diameter split-spoon sample or from the auger flights. The split-spoon and auger samples were classified on site and placed in sealed plastic bags. All samples were transported to Paterson's laboratory. The depths at which the split-spoon and auger samples were recovered from the boreholes are presented as SS and AU, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Rock samples were recovered from all boreholes using a core barrel and diamond drilling techniques. The bedrock samples were classified on site, placed in hard cardboard core boxes and transported to Paterson's laboratory. The depths at which rock core samples were recovered from the boreholes are presented as RC on the Soil Profile and Test Data sheets in Appendix 1.

The recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section of bedrock and are presented on the borehole logs. The recovery value is the length of the bedrock sample recovered over the length of the drilled section. The RQD value is the total length of intact rock pieces longer than 100 mm over the length of the core run. The values indicate the bedrock quality.

The subsurface conditions observed in the boreholes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1.

Groundwater

A 32 mm diameter groundwater monitoring wells were installed in all boreholes to monitor the groundwater level subsequent to the completion of the sampling program. The groundwater observations are discussed in subsection 4.3 and presented in the Soil Profile and Test Data Sheets in Appendix 1.

3.2 Field Survey

The test hole locations were determined and located in the field by Paterson. The locations of the boreholes and the ground surface elevations for each borehole location are presented on Drawing PG4928-1 -Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

The soil samples and bedrock cores were recovered from the subject site and visually examined in Paterson's laboratory to review the field logs.

All samples will be stored in the laboratory for a period of one month after issuance of this report. The samples will then be discarded unless otherwise directed.

3.4 Analytical Testing

One soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity and the pH of the sample. The results are presented in Appendix 1 and are discussed further in Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The subject property is presently occupied a slab on grade commercial building with associated above ground parking structure.

The ground surface across the subject site is relatively flat and at grade with the Dumaurier Avenue. A slope was noted on the north side of the property. The residential property situated to the west of the subject site is slightly elevated. The site is bordered by high rise residential building and parking lot to the west, Dumaurier Avenue and Ramsey Crescent to the east and south, and an institutional property to the north.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the boreholes consist of asphaltic concrete overlying a fill layer consisting of crushed stone with sand and trace concrete and brick. A thin layer of brown silty clay was encountered at BH1A underlying the above noted layers. Glacial till was encountered below the above noted layers consisting of a compact to a very dense silty sand with clay, gravel, cobbles, and boulders.

Bedrock

Bedrock was cored at all borehole locations. Weathered shale bedrock was encountered at depths ranging between 3.9 and 5.3 m below the existing ground surface. Upon review of the core hole samples, the upper first meter of the bedrock was found to be of fair quality.

Based on available geological mapping, the subject site is located in an area where the bedrock consists of shale and dolomite of the Rockcliffe Formation. The overburden drift thickness is anticipated to be between 2 to 5 m in depth.

4.3 Groundwater

Three groundwater monitoring wells were installed as part of our geotechnical investigation. Groundwater level measurements were recorded at the monitoring well locations and our findings are presented in Table 1. It should be noted that no groundwater was encountered in any of the monitoring wells. It should also be noted that the groundwater level is subject to seasonal fluctuations. Therefore, groundwater could vary at the time of construction.

Table 1 - Groundwater Measurements at Monitoring Well Locations

Test Hole Location	Ground Surface Elevation (m)	GW Level Reading (m)	GW Level Elevation (m)	Date
BH 1	74.80	7.12	67.68	**November 20, 2019**
BH 2	73.38	5.75	67.63	**November 20, 2019**
BH 3	73.56	5.94	67.62	**November 20, 2019**

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered satisfactory for the proposed development. The proposed hi-rise building is anticipated to be founded on spread footings placed directly or indirectly by the use of a lean concrete in-filled trench on a clean, surface sounded bedrock bearing surface.

Bedrock removal may be required to complete the underground level. Hoe ramming is an option where only small quantities of bedrock need to be removed. Line drilling and controlled blasting where large quantities of bedrock need to be removed is recommended. The blasting operations should be planned and completed under the guidance of a professional engineer with experience in blasting operations.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Since the building will occupy the entire boundaries of the subject site, all overburden will be removed to bedrock.

Bedrock Removal

Bedrock removal can be accomplished by hoe ramming where only small quantity of the bedrock needs to be removed. Sound bedrock may be removed by line drilling and controlled blasting and/or hoe ramming. Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be completed prior to commencing site activities. The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries/claims related to the blasting operations.

As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of

a licensed professional engineer who is also an experienced blasting consultant.

Excavation side slopes in sound bedrock can be carried out using almost vertical side walls. A minimum 1 m horizontal ledge, should be left between the bottom of the overburden excavation and the top of the bedrock surface to provide an area to allow for potential sloughing or to provide a stable base for the overburden shoring system.

Vibration Considerations

Construction operations are the cause of vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain, as much as possible, a cooperative environment with the residents.

The following construction equipments could be the source of vibrations: hoe ram, compactor, dozer, crane, truck traffic, etc. Vibrations, whether caused by blasting operations or by construction operations, could be the source of detrimental vibrations on the nearby buildings and structures. Therefore, all vibrations are recommended to be limited.

Two parameters are used to determine the permissible vibrations, namely, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). The guidelines are for current construction standards. Considering that these guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, a pre-construction survey is recommended be completed to minimize the risks of claims during or following the construction of the proposed building.

Protection of Potential Expansive Bedrock

It is possible that expansive shale will be encountered at the subject site. Although the effects of expansive shale will not affect the proposed building structure, it is possible that it will affect the proposed basement floor slabs founded close to the shale bedrock and the basement floor slab of the adjacent hotel.

A potential for heaving and rapid deterioration of the shale bedrock exists at this site. To reduce the long term deterioration of the shale, exposure of the bedrock surface to oxygen should be kept as low as possible. The bedrock surface within the proposed

building footprint should be protected from excessive dewatering and exposure to ambient air.

To accomplish this a 50 mm thick concrete mud slab should be placed on the exposed bedrock surface within a 48 hour period of being exposed. A 17 MPa sulphate resistant lean concrete may be used. As an alternative to the mud slab, keeping the shale surface covered with granular backfill is also acceptable.

Selected excavated vertical sides of the exposed bedrock can be protected using a sprayed elastomeric coating or shotcrete to seal the bedrock from exposure to air and dewatering.

5.3 Foundation Design

Bearing Resistance Values

Auxiliary footings placed on an undisturbed, **dense glacial till bearing surface** can be designed using a bearing resistance value at serviceability limit states (SLS) of **250 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **500 kPa**. A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS. Footings designed using the above-noted bearing resistance value at SLS will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Footings placed on the **upper levels of the fractured shale and dolomite bedrock** a clean, surface sounded shale bedrock bearing surface can be designed using a factored bearing resistance value at ultimate limit states (ULS) of **1,500 kPa**, incorporating a geotechnical resistance factor of 0.5. Where the design underside of footing is slightly above the bedrock surface, footings can be placed over concrete in-filled (17 MPa). zero entry, near vertical trenches extended to a surface sounded bedrock bearing surface using the same bearing resistance values. The concrete in-filled trenches should extend a minimum 300 mm beyond the footing faces in all directions.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

A factored bearing resistance value at ULS of **4,000 kPa**, incorporating a geotechnical resistance factor of 0.5 if founded on **sound dolomite and shale bedrock** and the bedrock is free of seams, fractures and voids within 1.5 m below the founding level. This could be verified by completing and probing 50 mm diameter drill holes to a depth

of 1.5 m below the founding level within the footing footprint(s). One drill hole should be completed per footing. The drill hole inspection should be completed by the geotechnical consultant.

Settlement

Footings bearing on an acceptable bedrock bearing surface and designed using the bearing resistance values provided herein will be subjected to negligible potential post-construction total and differential settlements.

Soil/Bedrock Transition

It's expected that all footings will be founded on bedrock. However, between the footings for the main building and any auxiliary footings (canopy, vent shafts, etc.) where the building is founded on bedrock the auxiliary footings on the glacial till deposit, it is recommended to decrease the soil bearing capacity by 25% for the footing placed on soil bearing media to reduce the potential long term total and differential settlements. Also, at the soi/bedrock and bedrock/soil transitions, it is recommended that a 2 m transition zone composed of 0.5 m layer of nominally compacted OPSS Granular A or Granular B type II be placed directly on sound bedrock. Steel reinforcement, extending at least 3 m on both sides of the 2 m long transition should be placed in the top part of the footing and foundation walls.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a sound bedrock bearing medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1H:6V (or flatter) passes only through sound bedrock or a material of the same or higher capacity as the bedrock, such as concrete. A weathered bedrock bearing medium will require a lateral support zone of 1H:1V (or flatter).

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the foundations considered at this site. However, A higher site class (**Class A**) can be achieved. The higher site class will require a site specific shear wave velocity test to be completed in confirmation of the seismic site classification. The soils underlying the subject site are not susceptible to liquefaction. Refer to the latest revision of the Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab

All overburden soil will be removed from the subject site leaving the bedrock as the founding medium for the lower basement floor slab. It is expected that the basement area will be mostly parking and a rigid pavement structure designed by a structural engineer will be applicable. However, if storage or other uses of the lower level where a concrete floor slab will be used it is recommended that the upper 200 mm of sub-slab fill consists of 19 mm clear crushed stone. All backfill material within the footprint of the proposed building should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Basement Wall

It is understood that the basement walls are to be poured against a dampproofing system, which will be placed against the exposed bedrock face. Below the bedrock surface, a nominal coefficient for at-rest earth pressure of 0.01 is recommended in conjunction with a bulk unit weight of 24.5 kN/m^3 (effective 15.5 kN/m^3). A seismic earth pressure component will not be applicable for the foundation wall, which is to be poured against the bedrock face. It is expected that the seismic earth pressure will be transferred to the underground floor slabs, which should be designed to accommodate these pressures. A hydrostatic groundwater pressure should be added for the portion below the groundwater level.

Where soil is to be retained, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m^3. Undrained conditions are anticipated (i.e. below the groundwater level). Therefore, the applicable effective (undrained) unit weight of the retained soil can be taken as 13 kN/m^3, where applicable. A hydrostatic pressure should be added to the total static earth pressure when using the effective unit weight.

Two distinct conditions, static and seismic, must be reviewed for design calculations. The parameters for design calculations for the two conditions are presented below.

Static Conditions

The static horizontal earth pressure (p_o) can be calculated using a triangular earth pressure distribution equal to $K_o \cdot \gamma \cdot H$ where:

K_o = at-rest earth pressure coefficient of the applicable retained soil, 0.5
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the "at-rest" case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Conditions

The total seismic force (P_{AE}) includes both the earth force component (P_o) and the seismic component (ΔP_{AE}).

The seismic earth force (ΔP_{AE}) can be calculated using $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$ where:

a_c = $(1.45-a_{max}/g)a_{max}$
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)
g = gravity, 9.81 m/s^2

The peak ground acceleration, (a_{max}), for the Ottawa area is 0.32g according to OBC 2012. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using $P_o = 0.5\ K_o\ \gamma\ H^2$, where $K_o = 0.5$ for the soil conditions noted above.

The total earth force (P_{AE}) is considered to act at a height, h (m), from the base of the wall, where:

$h = \{P_o \cdot (H/3) + \Delta P_{AE} \cdot (0.6 \cdot H)\}/P_{AE}$

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

5.7 Rock Anchor Design

The geotechnical design of grouted rock anchors in sedimentary bedrock is based upon two possible failure modes. The anchor can fail either by shear failure along the grout/rock interface or by pullout of a 60 to 90 degree cone of rock with the apex of the cone near the middle of the bonded length of the anchor. It should be noted that interaction may develop between the failure cones of anchors that are relatively close to one another resulting in a total group capacity smaller than the sum of the load capacity of each anchor taken individually.

A third failure mode of shear failure along the grout/steel interface should also be reviewed by a qualified structural engineer to ensure all typical failure modes have been reviewed. Typical rock anchor suppliers, such as Dywidag Systems International (DSI Canada), have qualified personnel on staff to recommend appropriate rock anchor size and materials.

It should be further noted that center to center spacing between bond lengths be at least four times the anchor hole diameter and greater than 1.2 m to lower the group influence effects. It is also recommended that anchors in close proximity to each other be grouted at the same time to ensure any fractures or voids are completely in-filled and that fluid grout does not flow from one hole to an adjacent empty one.

Anchors can be of the “passive” or the “post-tensioned” type, depending on whether the anchor tendon is provided with post-tensioned load or not prior to being put into service. To resist seismic uplift pressures, a passive rock anchor system can be used. It should be noted that a post-tensioned anchor will take the uplift load with much less deflection than a passive anchor.

Regardless of whether an anchor is of the passive or the post tensioned type, it is recommended that the anchor be provided with a bonded length, or fixed anchor length, at the base of the anchor, which will provide the anchor capacity, as well an unbonded length, or free anchor length, between the rock surface and the start of the bonded length. As the depth at which the apex of the shear failure cone develops is midway along the bonded length, a fully bonded anchor would tend to have a much shallower cone, and therefore less geotechnical resistance, than one where the bonded length is limited to the bottom part of the overall anchor.

Permanent anchors should be provided with corrosion protection. As a minimum, this requires that the entire drill hole be filled with cementitious grout. The free anchor length is provided by installing a plastic sleeve to act as a bond break.

Grout to Rock Bond

A factored tensile grout to rock bond resistance value at ULS of **1.0 MPa**, incorporating a resistance factor of 0.3, can be used. A minimum grout strength of 30 MPa is recommended.

Rock Cone Uplift

As discussed previously, the geotechnical capacity of the rock anchors depends on the dimensions of the rock anchors and the configuration of the anchorage system. Based on existing bedrock information, a **Rock Mass Rating (RMR) of 64** was assigned to the bedrock, and Hoek and Brown parameters (**m and s**) were taken as **0.575 and 0.00293**, respectively.

Recommended Rock Anchor Lengths

Parameters used to calculate rock anchor lengths are provided in Table 2.

Table 2 - Parameters used in Rock Anchor Review

Grout to Rock Bond Strength - Factored at ULS	1.0 MPa
Compressive Strength - Grout	30 MPa
Rock Mass Rating (RMR) - Good quality interbedded **Shale and Doloston bedrock** Hoek and Brown parameters	64 m=0.574 and s=0.00293
Unconfined compressive strength - black shale bedrock	40 MPa
Unit weight - Submerged Bedrock	15.2 kN/m^3
Apex angle of failure cone	60^o
Apex of failure cone	mid-point of fixed anchor length

From a geotechnical perspective, the fixed anchor length will depend on the diameter of the drill holes. Recommended anchor lengths for a 75 and 125 mm diameter hole are provided in Table 3 below.

Table 3 - Recommended Rock Anchor Lengths - Grouted Rock Anchor				
Diameter of Corehole (mm)	Anchor Lengths (m)			Factored Tensile Resistance (kN)
	Bonded Length	Unbonded Length	Total Length	
75	2.1	0.7	2.8	500
	3.4	0.6	4.0	800
	4.5	0.5	5.0	1,000
125	1.3	1.1	2.4	500
	2.1	1.2	3.3	800
	2.7	1.2	3.9	1,000

It is recommended that the anchor drill hole diameter be within 1.5 to 2 times the rock anchor tendon diameter and the anchor drill holes be inspected by geotechnical personnel and should be flushed clean prior to grouting. The use of a grout tube to place grout from the bottom up in the anchor holes is further recommended.

The geotechnical capacity of each rock anchor should be proof tested at the time of construction. More information on testing can be provided upon request. Compressive strength testing is recommended to be completed for the rock anchor grout. A set of grout cubes should be tested for each day grout is prepared.

Bedrock Excavation Face Stabilisation

Due to the poor quality of bedrock near surface and potential founding of the proposed development, bedrock stabilization may be required when the proposed foundation extends into the shale bedrock.

Horizontal rock anchors may be required at specific locations to prevent pop-outs of the bedrock, especially in areas where bedrock fractures are conducive to the failure of the bedrock surface.

The requirement for horizontal rock anchors and/or shotcrete for face protection excavation should be evaluated during the excavation operations and should be discussed with the structural engineer during the design stage.

5.8 Pavement Structure

For design purposes, the flexible pavement structure presented in the following table could be used for the design of car only parking areas in the lower level of the parking garage.

Table 4 - Recommended Pavement Structure - Parking Areas

Thickness (mm)	Material Description
50	**Wear Course** - HL 3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ silty clay or sand or crushed stone material placed over in situ soil.	

Table 5 - Recommended Pavement Structure - Local Roadways, Access Lanes and Heavy Vehicle Parking

Thickness (mm)	Material Description
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
400	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ silty clay or sand or crushed stone material placed over in situ soil.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for parkibg areas and local roadways and PG 64-34 asphalt cement should be used for roadways with bus traffic. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

The proposed pavement structure, where it abuts the existing pavement, should match the existing pavement layers. It is recommended that a 300 mm wide and 50 mm deep stepped joint be provided where the new asphalt layer joins with the existing asphalt layer to provide more resistance to cracking at the joint.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

It is understood that the building foundation walls will be placed in close proximity to all the boundaries. It is expected that insufficient room will be available for exterior backfill along these walls and, therefore, the foundation wall will be poured against a drainage system placed against the shoring face.

It is recommended that the composite drainage system (such as Miradrain G100N, Delta Drain 6000 or equivalent) extend down to the footing level. It is recommended that 150 mm diameter sleeves at 3 m centres be cast in the foundation wall at the footing interface to allow the infiltration of water to flow to an interior perimeter drainage pipe. The perimeter drainage pipe should direct water to sump pit(s) within the lower basement area.

Underfloor Drainage

It is anticipated that underfloor drainage will be required to control water infiltration. The spacing of the underfloor drainage system should be confirmed at the time of excavation when water infiltration can be better assessed. For design purposes, we suggest a 150 mm in diameter perforated pipe with a geotextile sock be placed in each bay.

Foundation Backfill

Above the bedrock surface, backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Miradrain G100N or Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

6.2 Protection of Footings Against Frost Action

The parking garage is expected to not require protection against frost action due to the founding depth. Unheated structures such as the access ramp may required to be insulated against the deleterious effect of frost action.

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. A minimum of 1.5 m of soil cover alone, or a minimum of 0.6 m of soil cover, in conjunction with adequate foundation insulation, should be provided. More details regarding foundation insulation can be provided, if requested.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the heated structure and require additional protection, such as soil cover of 2.1 m or an equivalent combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

Unsupported Side Slopes

The side slopes of excavations in the soil and fill overburden materials should either be excavated at acceptable slopes or should be retained by shoring systems from the beginning of the excavation until the structure is backfilled. Insufficient room is expected for majority of the excavation to be constructed by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or shallower. The shallower slope is required for excavation below groundwater level. The subsurface soils are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress. A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by “cut and cover” methods and excavations should not remain open for extended periods of time.

Temporary Shoring

Temporary shoring will be required to support the overburden soils. The design and implementation of these temporary systems will be the responsibility of the excavation contractor or the shoring contractor and their design team. Inspections and approval of the temporary system will also be the responsibility of the designer. Geotechnical information provided below is to assist the designer in completing a suitable and safe shoring system. The designer should take into account the potential for a fully saturated condition following a significant precipitation event. Any changes to the approved shoring design system should be reported immediately to the owner's representative prior to implementation.

Temporary shoring may be required to complete the required excavations where insufficient room is available for open cut methods. The shoring requirements will depend on the depth of the excavation, the proximity of the adjacent buildings and underground structures and the elevation of the adjacent building foundations and underground services. Additional information can be provided when the above details are known.

For design purposes, the temporary system may consist of soldier pile and lagging system or interlocking steel sheet piling. Any additional loading due to street traffic, construction equipment, adjacent structures and facilities, etc., should be added to the earth pressures described below. These systems can be cantilevered, anchored or braced. The earth pressures acting on the shoring system may be calculated using the following parameters.

Table 6 - Soil Parameters for Shoring System Design

Parameters	Values
Active Earth Pressure Coefficient (K_a)	0.33
Passive Earth Pressure Coefficient (K_p)	3
At-Rest Earth Pressure Coefficient (K_o)	0.5
Unit Weight (γ), kN/m^3	20
Submerged Unit Weight (γ), kN/m^3	13

Generally, it is expected that the shoring systems will be provided with tie-back rock anchors to ensure their stability. It is further recommended that the toe of the shoring be adequately supported to resist toe failure.

The geotechnical design of grouted rock anchors in sedimentary bedrock is based upon two possible failure modes. The anchor can fail either by shear failure along the grout/rock interface or by pullout of a 60 to 90 degree cone of rock with the apex of the cone near the middle of the bonded length of the anchor.

The anchor derives its capacity from the bonded portion, or fixed anchor length, at the base of the anchor. An unbonded portion, or free anchor length, is also usually provided between the rock surface and the start of the bonded length. A factored tensile grout to rock bond resistance value at ULS of **1.0 MPa**, incorporating a resistance factor of 0.3, can be used. A minimum grout strength of 40 MPa is recommended.

It is recommended that the anchor drill hole diameter be within 1.5 to 2 times the rock anchor tendon diameter and the anchor drill holes be inspected by geotechnical personnel and should be flushed clean prior to grouting. The use of a grout tube to place grout from the bottom up in the anchor holes is further recommended.

The geotechnical capacity of each rock anchor should be proof tested at the time of construction. More information on testing can be provided upon request. Compressive strength testing is recommended to be completed for the rock anchor grout. A set of grout cubes should be tested for each day grout is prepared.

Soldier Pile and Lagging System

The active earth pressure acting on a soldier pile and lagging shoring system can be calculated using a rectangular earth pressure distribution with a maximum pressure of 0.65 K γ H for strutted or anchored shoring or a triangular earth pressure distribution with a maximum value of K γ H for a cantilever shoring system. H is the height of the excavation.

The active earth pressure should be used where wall movements are permissible while the at-rest pressure should be used if no movement is permissible.

The total unit weight should be used above the groundwater level while the submerged unit weight should be used below the groundwater level.

The hydrostatic groundwater pressure should be added to the earth pressure distribution wherever the submerged unit weights are used for earth pressure calculations should the level on the groundwater not be lowered below the bottom of the excavation. If the groundwater level is lowered, the total unit weight for the soil should be used full weight, with no hydrostatic groundwater pressure component.

Concrete Underpinning

Based on proximity of existing adjacent buildings support in the form of concrete underpinning maybe required during excavation for the proposed building. It is expected that the founding elevations of the existing foundations will be in close proximity to the bedrock surface (less than 1.5 m) and conventional concrete underpinning may be used to support the full width and length of the foundation.

It is expected that the structural engineer along with the geotechnical engineer will review the site conditions at the time of construction and finalize the underpinning program based on their observations at that time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications & Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on soil subgrade. If the bedding is placed on bedrock, the thickness of the bedding should be increased to 300 mm for sewer pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to 95% of the SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to reduce the potential differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the SPMDD.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be controllable using open sumps. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary Ministry of Environment, Conservation and Parks (MECP) Category 3 Permit to Take Water (PTTW) may be required if more than 400,000 L/day are to be pumped during the construction phase. At least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be carried out in a manner to avoid the introduction of frozen materials, snow or ice into the trenches. Precaution must be taken where excavations are carried in proximity of existing structures which may be adversely affected due to the freezing conditions. In particular, it should be recognized that where a shoring system is used, the soil behind the shoring system will be subjected to freezing conditions and could result in heaving of the structure(s) placed within or above frozen soil. Provisions should be made in the contract document to protect the walls of the excavations from freezing, if applicable.

6.7 Corrosion Potential and Sulphate

The analytical testing results indicate that the sulphate content is less tan 0.1%. This results indicates that Type 10 Portland Cement (i.e. normal cement) would be appropriate for this site. The chloride content and pH of the samples indicate that they are not significant factors in creating a corrosive environment, whereas the resistivity is indicative of an aggressive corrosive environment.

7.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

- ❏ Review of the geotechnical aspects of the excavating contractor's shoring design, prior to construction.
- ❏ Review the bedrock stabilization and excavation requirements.
- ❏ Review proposed foundation drainage design and requirements.
- ❏ Observation of all bearing surfaces prior to the placement of concrete.
- ❏ Sampling and testing of the concrete and fill materials used.
- ❏ Observation of all subgrades prior to backfilling.
- ❏ Field density tests to determine the level of compaction achieved.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations provided in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

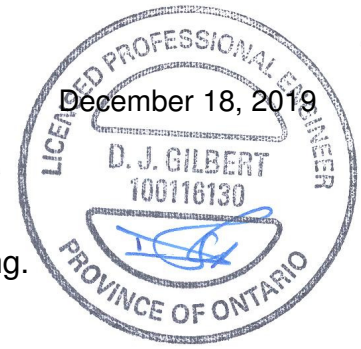
A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine its suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than 3223701 Canada Inc. or their agents is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

December 18, 2019



Joey R. Villeneuve, M.A.Sc., P.Eng.

David J. Gilbert, P.Eng.

Report Distribution

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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
2829 Dumaurier Avenue
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of subject site. Geodetic elevation = 74.952m.

FILE NO. PG4928

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	74.80
TOPSOIL 0.18		AU	1				
FILL: Brown clayey silt, some sand and gravel 0.86		SS	2	42	7	1	73.80
FILL: Brown silty sand 1.52		SS	3	62	5	2	72.80
FILL: Brown sand, trace gravel		SS	4	8	3		
2.90						3	71.80
Loose, brown **FINE SAND** with silty clay 3.81		SS	5	75	5		
GLACIAL TILL: Dense, brown silty sand with gravel, clay and shale fragments		SS	6	92	35	4	70.80
5.28		SS	7	78	50+	5	69.80
		RC	1	100	67	6	68.80
BEDROCK: Fair to excellent quality, green shale interbedded with dolomite		RC	2	93	88	7	67.80
		RC	3	100	84	8	66.80
		RC	4	97	92	9	65.80
						10	64.80

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

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SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE									
BEDROCK: Fair to excellent quality, green shale interbedded with dolomite		RC	5	97	92	10	64.80		
						11	63.80		
		RC	6	100	98	12	62.80		
13.51						13	61.80		
BEDROCK: Good excellent quality, grey dolostone		RC	7	100	93	14	60.80		
						15	59.80		
		RC	8	92	74	16	58.80		
						17	57.80		
		RC	9	95	85	18	56.80		
18.19									
End of Borehole									
(GWL @ 7.12m - Nov. 20, 2019)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
2829 Dumaurier Avenue
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of subject site. Geodetic elevation = 74.952m.

FILE NO. PG4928

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	73.38		
Asphaltic concrete 0.08									
FILL: Brown sand with gravel, crushed stone 0.33		AU	1						
FILL: Brown silty sand, trace clay		SS	2	25	15	1	72.38		
1.62									
PEAT		SS	3	62	4	2	71.38		
2.03									
Loose, grey **FINE SAND** with silt and clay		SS	4	62	6				
3.05						3	70.38		
Grey **SILTY CLAY,** trace sand		SS	5	75	2				
		SS	6	0	50+	4	69.38		
4.37		RC	1	100	0				
		RC	2	100	100	5	68.38		
						6	67.38		
BEDROCK: Excellent quality, green shale interbedded with dolostone		RC	3	98	89	7	66.38		
						8	65.38		
		RC	4	100	97	9	64.38		
		RC	5	100	100	10	63.38		

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
2829 Dumaurier Avenue
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of subject site. Geodetic elevation = 74.952m.

FILE NO. PG4928

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						10	63.38		
						11	62.38		
BEDROCK: Excellent quality, green shale interbedded with dolostone		RC	6	85	80	12	61.38		
		RC	7	100	95	13	60.38		
13.49									
		RC	8	95	88	14	59.38		
BEDROCK: Good to excellent quality, grey dolostone						15	58.38		
		RC	9	100	98	16	57.38		
						17	56.38		
		RC	10	98	98				
18.08						18	55.38		
End of Borehole									
(GWL @ 5.75m - Nov. 20, 2019)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
2829 Dumaurier Avenue
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of subject site. Geodetic elevation = 74.952m.

FILE NO. PG4928

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.08						0	73.56		
FILL: Brown sand with gravel 0.28		AU	1						
FILL: Brown silty clay, trace sand 0.76									
FILL: Dark brown silt, some sand 0.97		SS	2	50	4	1	72.56		
FILL: Grey-brown silty clay, some organics, trace sand		SS	3	0	3	2	71.56		
		SS	4	62	1				
3.05						3	70.56		
GLACIAL TILL: Grey sandy silt, some clay and gravel		SS	5	83	P				
3.86		SS	6	100	50+				
		RC	1	100	88	4	69.56		
		RC	2	96	88	5	68.56		
BEDROCK: Good quality, green shale interbedded with dolostone						6	67.56		
		RC	3	98	93	7	66.56		
		RC	4	100	100	8	65.56		
						9	64.56		
		RC	5	98	88	10	63.56		

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
2829 Dumaurier Avenue
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of subject site. Geodetic elevation = 74.952m.

FILE NO. PG4928

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						10	63.56		
BEDROCK: Good quality, green shale interbedded with dolostone		RC	6	98	81	11	62.56		
12.20						12	61.56		
		RC	7	90	57	13	60.56		
		RC	8	100	92	14	59.56		
BEDROCK: Fair to excellent quality, grey dolostone						15	58.56		
		RC	9	95	95	16	57.56		
		RC	10	97	97	17	56.56		
18.11						18	55.56		
End of Borehole									
(GWL @ 5.94m - Nov. 20, 2019)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	**ROCK QUALITY**
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC%	-	Natural water content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic Limit, % (water content above which soil behaves plastically)
PI	-	Plasticity Index, % (difference between LL and PL)
Dxx	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

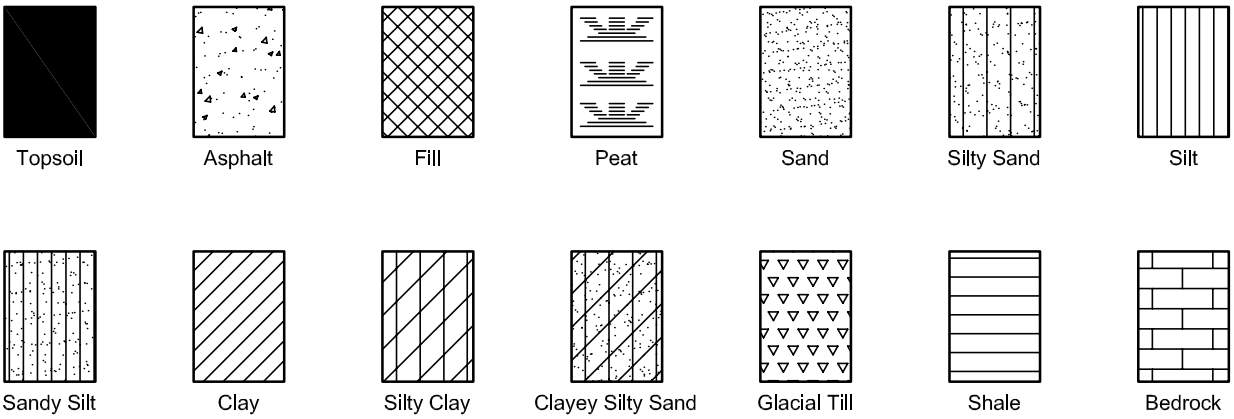
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

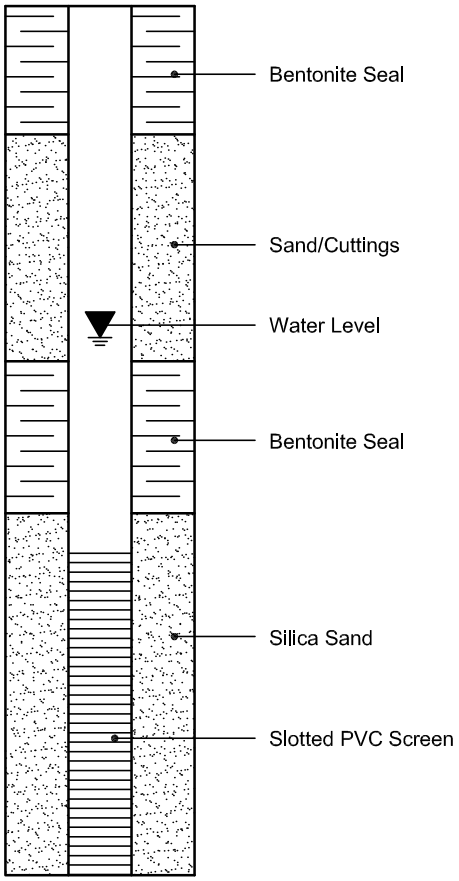
SYMBOLS AND TERMS (continued)

STRATA PLOT

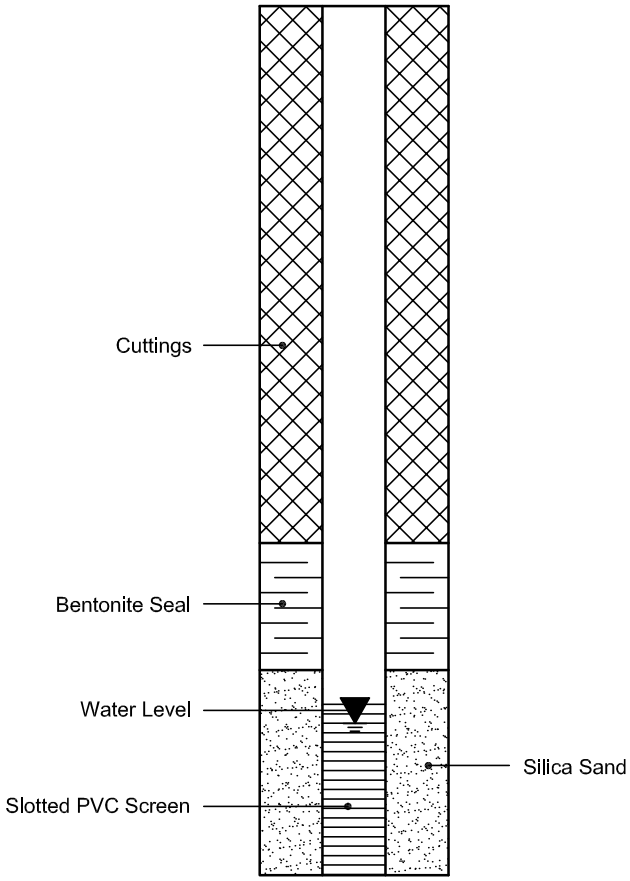


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 29072

Report Date: 14-Nov-2019

Order Date: 12-Nov-2019

Project Description: PG4928

	Client ID:	BH1-SS3, 5'-7'	-	-	-
	Sample Date:	11-Nov-19 11:00	-	-	-
	Sample ID:	1946129-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	80.4	-	-	-
General Inorganics					
pH	0.05 pH Units	7.34	-	-	-
Resistivity	0.10 Ohm.m	15.8	-	-	-
Anions					
Chloride	5 ug/g dry	333	-	-	-
Sulphate	5 ug/g dry	21	-	-	-

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG4928-1 - TEST HOLE LOCATION PLAN

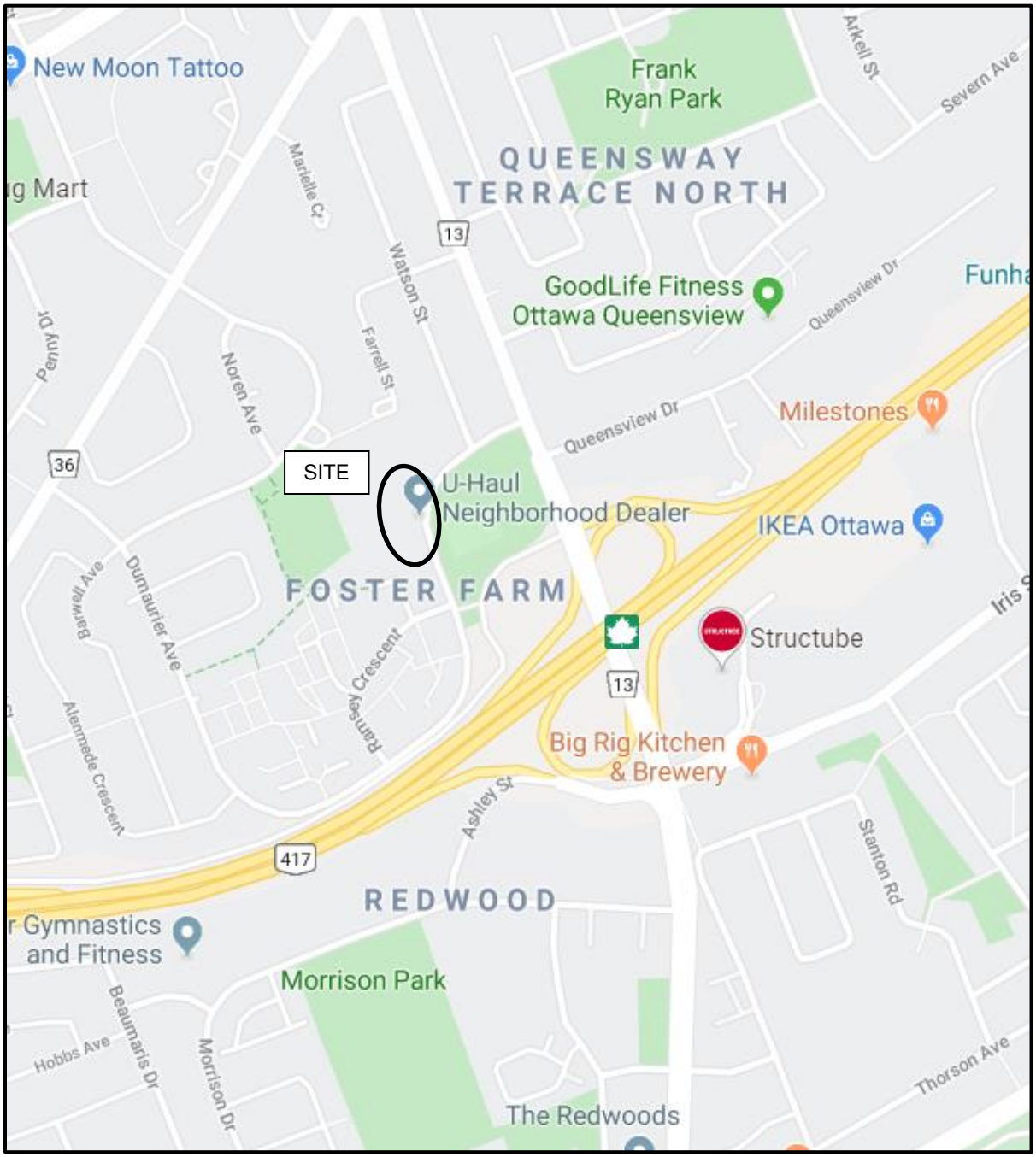
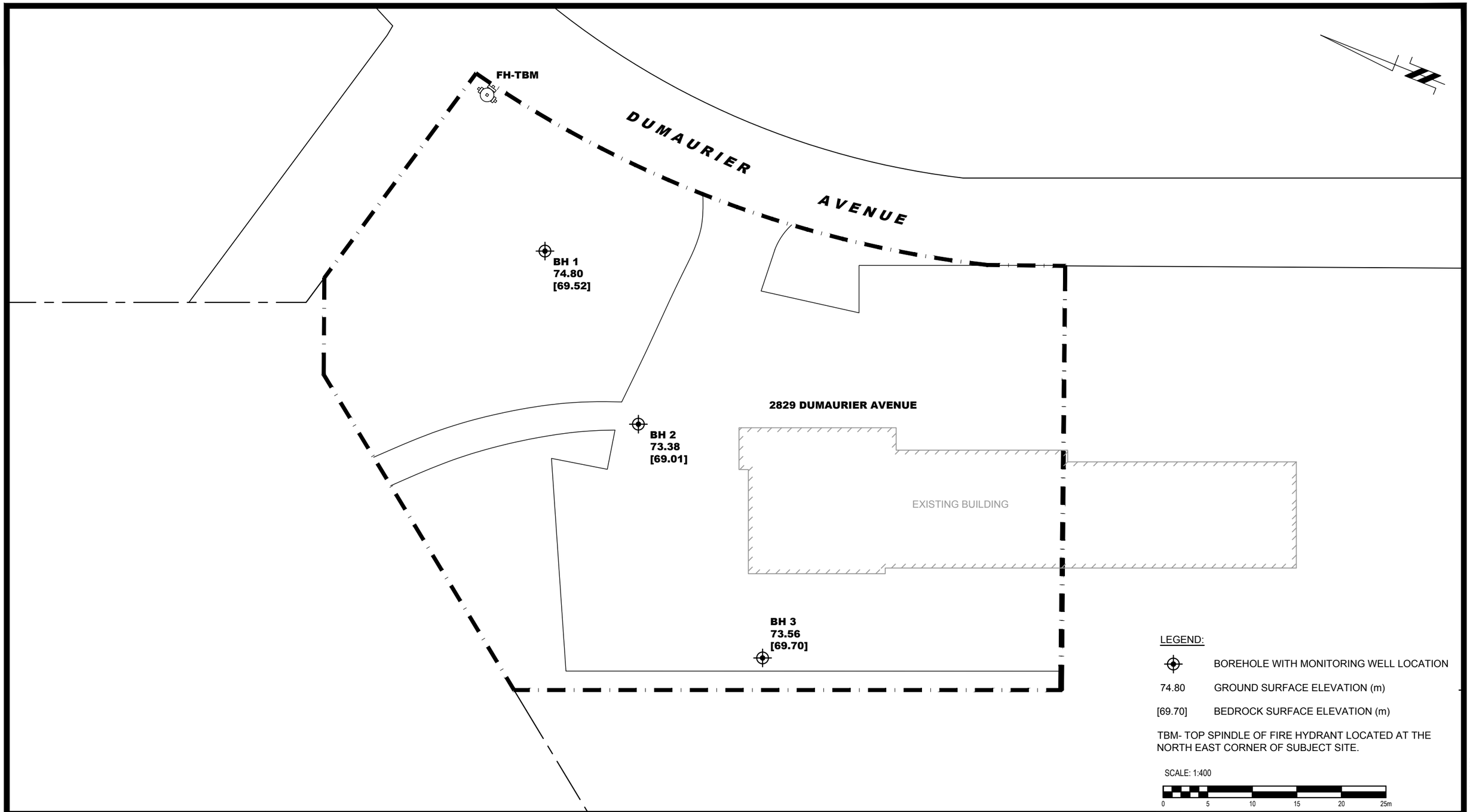


FIGURE 1

KEY PLAN



LEGEND:

BOREHOLE WITH MONITORING WELL LOCATION

74.80 GROUND SURFACE ELEVATION (m)

[69.70] BEDROCK SURFACE ELEVATION (m)

TBM- TOP SPINDLE OF FIRE HYDRANT LOCATED AT THE NORTH EAST CORNER OF SUBJECT SITE.

SCALE: 1:400

0 5 10 15 20 25m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

3223701 CANADA INC.

GEOTECHNICAL INVESTIGATION
PROPOSED HIGH-RISE BUILDING-2829 DUMAURIER AVENUE
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 11/2019
Drawn by: YA	Report No.: PG4928-1
Checked by: JV	Dwg. No.: PG4928-1
Approved by: DJG	Revision No.:

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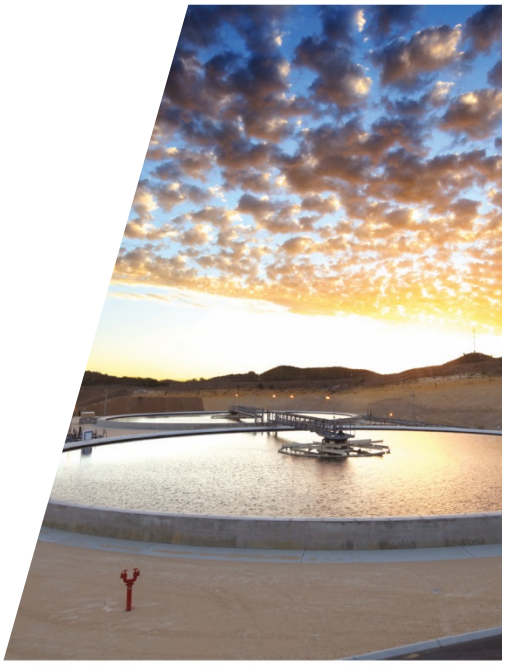
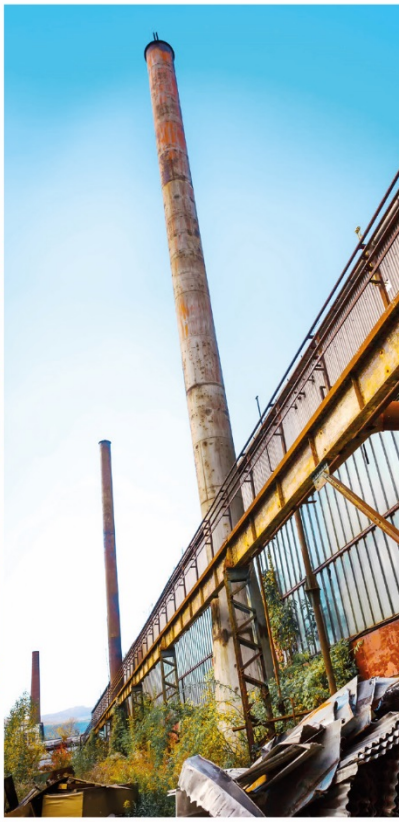
E.2 PHASE I ENVIRONMENTAL SITE ASSESSMENT (GHD 2018)



Phase I Environmental Site Assessment

2831, 2833, 2835, 2841 and
2865 DiMaurier Avenue
Ottawa, Ontario

3223701 Canada Inc.



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1. Introduction

GHD was retained by 3223701 Canada Inc. (Client), represented by Mr. Jean-Luc-Rivard, to conduct a Phase I Environmental Site Assessment (ESA) of a commercial property located at Civic Nos. 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue, in Ottawa, Ontario (Site or Property). The building on Site consists of a single storey commercial plaza building. The Phase I ESA was conducted as detailed in our email quote dated August 8, 2018.

The purpose of the Phase I ESA was to identify, through a non-intrusive investigation, significant actual or potential environmental impairment associated with the Site, the on-Site building, and the immediate vicinity of the Site. GHD understands that the Phase I ESA has been conducted for the Client for the purpose of due diligence purposes as part of a potential purchase of the Property.

The Phase I ESA was conducted in general accordance with the Canadian Standards Association CSA Z768-01 publication for conducting Environmental Site Assessments. CSA Z768-01 is the accepted Canadian standard for Environmental Assessments. The CSA Z768-01 ESA process was developed using Federal and Provincial environmental regulations, policies and guidelines. This Phase I ESA included a Site visit, a review of Site history using publicly available and readily accessible documents including historical Property title records, documentation review, and inquiries with regulatory agencies. The following tasks were conducted by GHD during this assessment:

- A review of publicly available historical documents, city directories, aerial photographs, and fire insurance plans of the Site and surrounding area.
- Submission of inquiries to applicable regulatory agencies regarding environmental infractions or notices registered against the Property, owner, or occupant.
- Interviews with person(s) knowledgeable about the Site and the Site operations.
- A review of past and current Site usage and adjacent property occupancy.
- A review of environmental databases.
- An inspection of the Property, equipment, operations, utility services, and associated records available for the Site.
- Inquiries of present and historical activities of the current and former occupants or owners that may have caused or are causing potential environmental impact to the Site.
- A review of available aboveground storage tank (AST) and underground storage tank (UST) records.
- A review of chemical use, storage and handling practices, and spill/release incidents.
- A review of waste handling, storage, and disposal practices as they may impact the environment.
- A review of wastewater discharges.
- Identification of point-source air emissions.
- A review of equipment that potentially contain polychlorinated biphenyls (PCBs) and chlorofluorocarbons (CFCs).

- Visual identification of potential asbestos-containing materials (ACM), urea formaldehyde foam insulation (UFFI), and lead-based paint.
- A review of available third party environmental reports, documents, and correspondence provided by Site personnel or the Client.

This Phase I ESA was conducted for due diligence purposes and therefore GHD has followed CSA documents as described earlier. If this Phase I ESA is intended to be utilised in support of the filing of a Record of Site Condition under Ontario Regulation 153/04 or for submission to the City of Ottawa for Site Plan submission, additional work would be required in order to produce a Phase One ESA report per Ontario Regulation 153/04 requirements.

As part of the Phase I ESA, a Site visit was conducted on August 10, 2018, by Mr. Luke Lopers, P. Eng., a technical representative of GHD. At the time of the Site visit, GHD conducted an interview with Mr. Daniel Blais, Property Manager to assist in documenting the Site conditions and operating history. Mr. Blais reported that he has been familiar with the Site for at least 20 years.

The following report summarises the information gathered by GHD during the Phase I ESA in order to identify significant actual or potential environmental liabilities associated with the Site and the on-Site buildings. GHD relied on information received from all parties as accurate unless contradicted by field observations or written documentation.

This report has been prepared for the use of 3223701 Canada Inc., and may not be relied upon by any other party without the written concurrence of GHD.

2. Site Description

2.1 Building and Property

The Site is located in the Foster Farm borough within the City of Ottawa, Ontario. The Property is located on the west side of DuMaurier Avenue, within the neighbourhood that is bordered by DuMaurier Avenue to the east and west, Ramsey Crescent to the south, and Richmond Road to the north. The Civic Nos. associated with the Property are 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue in Ottawa, Ontario (Site or Property). The Site is legally described as Part of Lot 20, Concession 2, being Parts 4 to 7 and Parts 9 to 17 on Registered Plan 4R16235, Nepean, City of Ottawa. The property identification numbers associated with the Site are 03944-0827, 03944-0826, and 03944-0238.

The coordinates of the approximate center of the Site are 45° 21' 01" N by 75° 47' 37" W (UTM Coordinates 437840 m E, 5022180 m N). A Site Location Map (Figure 1) and a Site Plan (Figure 2) are provided following this report. The municipal zoning for the Site is currently General Mixed Use Zone (residential, commercial, and/or institutional).

The Site is rectangular in shape, covers an area of approximately 0.8 hectares (2 acres), and is located in an area that is developed for mixed use (residential, commercial, and/or institutional). The Site is occupied by a single storey slab-on-grade commercial plaza building. The Site building covers approximately 30 percent of the Site. The remainder of the Site consists of asphalt paved parking, access laneways and landscaped sections along the perimeter. Vehicular access to the Site

is from DuMaurier Avenue to the east and Ramsey Crescent to the south. The topography in the Phase I Study Area is undulating with a general slope downward to the south and southwest. The property to the northwest of the Site is elevated approximately 3 to 4 m with respect to the Site, while the property to the west of the Site is elevated approximately 0.6 m with respect to the Site.

General exterior building construction materials consist of brick veneer finishes, metal and wood siding and metal framed glass windows and doors consisting of metal framed glazing units. Interior construction materials consist of drywall board walls, drywall board, suspended tile ceilings, mixture of vinyl tile, carpet, ceramic tile, and poured concrete floor finishes. The roof which was accessed at the time of the Site visit, is a flat tar and gravel roof.

2.2 Site Operations

The Site building consisted of an occupied single storey slab-on-grade commercial plaza building at the time of the Site visit. Tenants of the Site building included: Pinecrest Deli (2831), Halal Meat and Grocery (2833), Da Al Sahaba Association (2835), Barney's Pizza (2841), and Giant Tiger (2865). There were no identified Potentially Contaminating Activities (PCAs) observed during the site walkover. No visual evidence of areas of potential environmental concern (APECs) with respect to current Site operations was noted by GHD at the time of the Site visit.

2.3 Environmental Setting

The Site is located in an area that is developed for mixed use (residential, commercial, and/or institutional). The Site is generally flat and at grade with respect to DuMaurier Avenue and Ramsey Crescent and is lower with respect to the surrounding neighbouring properties to the north and west. The topography in the area of the Site slopes slightly down to the south and southwest towards the Queensway. The nearest significant surface water body is the Ottawa River, located approximately 1.3 km northwest of the Property. There are no natural surface water bodies or open drainage ditches currently located on the Site.

2.3.1 Geological Setting

Knowledge of the geological setting is based on published bedrock, soil and groundwater maps for the general area, as well as previous GHD studies conducted in the area. According to the 1987 Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No.: 1506A), the natural soil consists of "Abandoned river channel deposits of silt and silty clay; commonly including lenses of sand and generally underlain at variable depth by stratified, buff, medium grained sand".

Based on regional topography and the location of the closest significant water body, the interpreted local groundwater flow direction in the shallow groundwater aquifer unit is toward the southwest, while it is suspected that regional groundwater flow is toward the north-northwest towards the Ottawa River.

2.3.2 Neighbouring Properties

At the time of Site inspection, the properties adjacent to the Site were visually inspected by GHD for evidence of potentially contaminating activities (PCAs) that may result in APECs for the Site. The inspection was conducted from public rights-of-way without physically accessing adjoining

properties. At the time of Site inspection the area within 100 m of the Site is occupied by the following facilities or features:

- Northeast | Institutional property (Church) located at Civic No. 2821 DuMaurier Avenue.
- Northwest | Institutional property (community center and school) located at Civic No. 1085 Grenon Avenue.
- East | DuMaurier Avenue followed by parkland (baseball fields) located at 2850 DuMaurier Avenue.
- South | Ramsey Crescent followed by residential dwellings at Civic No. 2891 DuMaurier Avenue.
- West | Residential apartment and dwellings at Civic No. 2891 DuMaurier Avenue.

The Site and surrounding properties are located in a predominantly residential, institutional and commercial sector of the City of Ottawa. It should be noted that the parkland to the east of DuMaurier Avenue is a known closed landfill Site, which is a PCA and is considered to represent an APEC for the Site. No other PCAs were identified in the Phase I Study Area at the time of the Site inspection.

3. Historical Records Review

Historical land use of the Site was investigated by GHD through the review of historical records including, Property title documents, city directories, available fire insurance plans, aerial photographs, and environmental databases. The following sections present the findings of the historical records reviewed.

3.1 Previous Reports

The Client did not provide any previous reports (environmental or geotechnical) for review. No previous environmental studies for the Property were discovered as a result of our assessment.

It should be noted that a historical Ecolog ERIS search was completed for the Property (2865 DuMaurier Avenue) in August 2013 by Pinchin Ltd. Additionally, two monitoring wells were observed at the Site during the Site visit. These observations suggest that previous environmental reports have been completed for the Site.

3.2 Property Title Search

A request for current ownership title search was submitted to Ecolog ERIS on behalf of GHD. The Phase I ESA Property is legally described as Part of Lot 20, Concession 2, being Parts 4 to 7 and Parts 9 to 17 on Registered Plan 4R16235, Nepean, City of Ottawa, with associated property identification numbers 03944-0827, 03944-0826, and 03944-0238. The results of the Title search with respect to current ownership of the Site are summarized in Table 3.1 below. A summary of the results of the search are included in Appendix A.

Table 3.1 Summary of Chain of Title Records

Year	Property Ownership
2831, 2833, 2835, 2841 DuMaurier Avenue	
January 8, 2001	1248816 Ontario Inc.
2865 DuMaurier Avenue	
January 8, 2001	Giant Tiger Stores Limited

No PCAs or APECs were identified for the Site with respect to the current property ownership.

3.3 Fire Insurance Plans

Fire insurance plans (FIP) assist in the identification of historical land use and commonly indicate building layouts, detached structures, Site improvements, facility operations, names of tenants, the existence and location of boiler rooms, aboveground and underground storage tanks and adjoining property uses. GHD conducted a search for publicly available historical fire insurance plans for the Site and adjacent lands from the National Archives Library in Ottawa, Ontario.

No FIPs were available for the Site or neighbouring properties. No other fire insurance plans or reports were obtained by GHD or were provided by the Client for review.

3.4 City Directories

City directories list occupant(s) at a site address for a specific year, and infer land use with respect to occupant history. GHD consulted National Archives Canada located in Ottawa, Ontario, for any publicly available historical city directories for intermittent years between 1940 and 2000.

According to the information obtained from the reviewed City Directories, DuMaurier Avenue was first listed in 1970, however, the civic address of the Site was not listed.

The first description of the Site as Civic Nos.: 2835, 2845 and 2851 DuMaurier Avenue were in 1980, when the Site was listed as being occupied by DuMaurier Shopping Plaza, Livio's Pizza, and Le Quickie Convenience Store. The Site has been listed for commercial (retail) purposes since the 1980s.

The surrounding properties are listed as both institutional and residential since at least 1970. In general, no current or historical service stations, automotive garages or dry cleaners are listed within a 100 m radius of the Site. No operations, which are considered PCAs, were identified within 100 m of the Site in the City directories.

3.5 Aerial Photographs

Aerial photographs are reviewed to generally document development of the Site and properties in close vicinity of the Site. They identify potential waste disposal areas, storage activities, landfilling, and other PCAs on Site and in the immediate vicinity of the Site. Typically, the scale of aerial photographs only permits the identification of large features on the landscape. Aerial photographs of the Site and surrounding area were obtained for intermittent years between 1956 and 2011 from the National Air Photo Library (NAPL) and on the City of Ottawa Mapping System

(http://maps.ottawa.ca/geoottawa/). Comments for each photograph are presented in the following Table 3.2.

Table 3.2 Aerial Photographs

Year	Site Description	Neighbourhood Description
1956	The Site is undeveloped, is partially tree covered and may have been used for agricultural purposes on the southern portion of the Site. What appears to be a creek or drainage feature is present on the north portion of the Site.	Neighbouring properties are undeveloped and generally consist of agricultural land or tree covered areas. A railway line is present approximately 180 m south of the Site. Pinecrest Road has been constructed further east of the Site. Some residential development is apparent further to the north of the Site.
1965	Increased tree cover is apparent on the north portion of the Site. An additional drainage feature (ditch) is present on the south portion of the Site and is present in an east-west orientation. No developed use of the Site was observed.	The property to the east of the Site appears to have undergone some soil disturbance, suspected to be associated with landfilling activities. The railway line to the south of the Site has been removed and replaced with Highway 417 (Queensway). The institutional property to the northeast of the Site appears to be under construction. Residential development is apparent further northeast of the Site.
1976	The Site has been cleared of trees and appears to be grass covered. Soil disturbance is apparent on the north portion of the Site. Previously observed drainage features at the Site are no longer present. What appears to be a walking path is present across the approximate centre of the Site in a northeast-southwest orientation.	DuMaurier Avenue has been constructed immediately east of the Site, while Ramsey Crescent has been constructed immediately to the south. The neighbouring properties to the east and south of the Site have been developed with residential apartments and townhomes in the present orientations. Some indications of soil disturbance remain on the property to the east of the Site. What appears to be an access path or road is present to the north of the Site. The institutional property to the northwest of the Site has been partially developed with the present day school building.
1991	The Site has been developed with a commercial building, similar to the present day orientation. The south portion of the existing commercial plaza appears to be connected to the north portion of the building by a narrow walkway.	Neighbouring properties appear to be developed to their present configurations. The property to the east of DuMaurier Avenue is occupied by baseball fields. The institutional property to the northwest of the Site has been fully developed with a community centre and previously existing school building.
1999	Essentially unchanged from 1991.	Essentially unchanged from 1991.
2005	The Site building is present in the current configuration. An addition to the central portion of the building has been constructed.	Essentially unchanged from 1999.
2011	Essentially unchanged from 2005.	Essentially unchanged from 2005.

The Site appears to have been undeveloped until at least 1976. The Site was fully developed as a commercial plaza since at least 1991. What appear to be two drainage features were present on the

Site and were filled in prior to Site development. Based on the above information, the fill material used to grade the Site, which is of unknown environmental quality is considered a PCA and APEC for the Site.

In addition, the property to the east of DuMaurier Avenue appears to have undergone soil disturbance from at least 1965 to 1976. This property is a known closed landfill site (as identified in Sections 3.6 and 3.7 of this report). The presence of this closed landfill site (PCA) in close proximity to the subject Site represents an APEC for the Site.

No additional PCAs resulting in APECs for the Site were identified during the review of the aerial photographs.

3.6 Ecolog ERIS Environmental Database

GHD contracted Ecolog ERIS to conduct a search of available Federal, Provincial and private environmental databases, within a 250-m radius of the Site. The database searches were completed to assist in the identification of environmental conditions at the Site and on immediate and extended neighbouring properties. A total of 69 Provincial, Federal, and private environmental databases were searched by Ecolog ERIS in the August 8, 2018 report.

This report was prepared in general accordance with the Canadian Standards Association CSA Z768-01 publication for conducting Environmental Site Assessments. The CSA Z768-01 considers sites located within 100 m radius of the subject Site as the most influential for APEC. As such only the properties that could have potential adverse environmental concerns for the subject Site are summarized below while all findings are presented in the complete report provided in Appendix B.

The Site was listed in the ERIS Historical Searches and Pesticide Register databases. The following records were noted for the Site:

- A historical ERIS search was completed for the Site by Pinchin Ltd. in August of 2013.
- Giant Tiger Store #22 was listed in the Pesticide Register as a vendor. Given that the records pertain to a Site occupant who is listed as a vendor, the application of pesticides at the Site is not suspected.

Of the aforementioned On-Site records, neither are considered to be PCAs or were considered APECs for the Site.

Immediate neighbouring properties within a 100-m radius of the Site were listed in the Waste Disposal Sites – MOE 1991 Historical Approval Inventory, Anderson's Waste Disposal Sites, Environmental Compliance Approval, Certificates of Approval, Ontario Spills, Ontario Regulation 347 Waste Generators Summary, ERIS Historical Searches, and TSSA Historic Incidents databases.

One property identified in the historic records, a former landfill site, located approximately 20 m east of the Site is a PCA and is considered to represent an APEC for the Site. Based on the records, this property operated as a municipal landfill, however, the period of operation of this landfill Site is uncertain.

3.7 Environmental Databases

GHD reviewed several published environmental summary documents and databases as part of the Site history review to determine if past use of the Site or land in close vicinity of the Site may have resulted in environmental impairment of the Site. The following documents were reviewed with the findings presented as follows:

1. Inventory of Coal Gasification Plant Waste Sites in Ontario, April 1987:

   The report titled Inventory of Coal Gasification Plant Waste Sites in Ontario, April 1987 provides an inventory and preliminary assessment of the potential environmental impacts of 41 known manufactured gas plant waste sites in the Province of Ontario as of April 1987. Industrial facilities that utilized coal carbonization for manufacturing of gas, coke, ammonia and other products were addressed in this study. The Site was not listed in the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars. There were no former Sites Producing or Using Coal Tar and Related Tars identified within 2 km of the Site.

2. MOE Waste Disposal Site Inventory, June 1991:

   The MOE Waste Disposal Site Inventory June 1991 contains a list, prepared by the MOE, of all known active and closed waste disposal sites in the Province of Ontario as of October 31, 1990. This document is a "working document", subject to continual revisions and updating. The document contains an active site inventory, a closed site inventory, a closed municipal coal gasification plant site inventory, and an inventory of industrial sites producing and using coal tars and related tars in Ontario. No active waste disposal sites were identified within 250 m of the Site; however, a closed landfill was identified to the east of the Site. Landfill No. X1006 is classified as A5 – Potential Human Impact – Urban Municipal/Domestic Waste. The MOE Waste Disposal Site Inventory June 1991 was confirmed by the results of the subcontracted Ecolog Environmental ERIS search; a copy of the Ecolog ERIS Database Summary is included in Appendix B. Further information is provided in the below Mapping and Assessment of Former Industrial Sites section.

3. Ontario PCB Inventory:

   The Ontario Inventory of PCB Storage Sites (1987 – October 2004), as noted in the subcontracted Ecolog ERIS Database Summary report dated May 26, 2011 and January 25, 2018, contains information on PCB Storage Sites in the Province of Ontario, which is maintained by the Ontario Ministry of the Environment, Waste Management Branch. The database is an inventory of known private and provincially-operated PCB storage sites as of 1987. The document does not include Federal PCB storage sites, which are under Environment Canada jurisdiction. The Site was not listed in the Ontario Inventory of PCB Storage Sites. No properties within 250 m of the Site were identified in the Ontario Inventory of PCB Storage Sites. A copy of the Ecolog ERIS Database Summary is included in Appendix B.

4. Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario, November 1988:

   The report titled Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario, November 1988 provides the results of an inventory and preliminary assessment of

potential environmental impacts of 44 known industrial sites in Ontario which produced or used coal tar and related tars, as of November 1988. This report was prepared to continue the inventory and assessment process started by the Inventory of Coal Gasification Plant Waste Sites in Ontario, April 1987. The Site was not listed in the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars. There were no former Sites Producing or Using Coal Tar and Related Tars identified within 2 km of the Site.

5. Mapping and Assessment of Former Industrial Sites, City of Ottawa:

   The report titled Mapping and Assessment of Former Industrial Sites, City of Ottawa, July 1988, provides the results of an inventory and preliminary assessment of 177 known former industrial sites in the City of Ottawa, as of July 1988. The Site is not listed in the Mapping and Assessment of Former Industrial Sites report, and no former industrial sites were identified within 250 m of the Site. However, a former landfill (L-1: Pinecrest Road – DuMaurier Avenue and Watson Street) was identified at the Site and on the adjacent property to the east. As noted in the MOE Waste Disposal Inventory (June 1991) section above, a closed landfill was identified to the east of the Site and contained urban municipal/domestic wastes.

   GHD also reviewed the report titled Old Landfill Management Strategy, Phase I - Identification of Sites, City of Ottawa, October 2004, prepared by Golder Associates, which indicated the neighbouring property to the east of DuMaurier Avenue as part of the Pinecrest and DuMaurier closed landfill site. The following information was reviewed as part of this Phase One ESA:

   - Active Time Period | 1953 to 1957.
   - Total Approximate Area | 4 hectares, bounded by Pinecrest Road, DuMaurier Avenue, Hwy 417 Interchange, and line north of St. Remi Church and through 1000 and 999 Watson Road and 2793 DuMaurier Avenue.
   - Waste Thickness | Estimated depth of refuse is 3 to 5 m, locally at the southern end; fill layer is at least 6 m in thickness but thins towards the north end.
   - Type of Waste | mainly domestic some commercial and industrial waste.

   Based on the above information, the closed landfill is considered a PCA and is considered to represent an APEC for the Site.

6. MOECC Notices, Instruments and Records of Site Condition:

   The Ministry of the Environment and Climate Change (MOECC) Brownfields Environmental Site Registry (ESR) was consulted for historical certificates and instrument compliance records and records of site condition (RSCs). The Site was not listed in the Brownfields ESR. No properties within 100 m of the Site were listed in the Brownfields ESR.

3.8 Regulatory Agency Correspondence

GHD contacted the Ontario Ministry of the Environment, Conservation and Parks (MECP) and the City of Ottawa to request any information they may have in their files concerning the Site. GHD also contacted the Technical Standards and Safety Authority (TSSA) to request a search of their databases for the current or historical presence of any ASTs or USTs at the Site.

Summary of TSSA Correspondence

An email response was received from the TSSA on August 10, 2018, indicating that there were no records were found in the TSSA database indicating the presence of underground storage tanks, spills, incidents or infractions at the Property or at immediately adjacent properties. A copy of the TSSA response is included in Appendix C.

Summary of MOECC Freedom of Information Correspondence

A request was submitted to the Ontario Ministry of the Environment, Conservation and Parks (MECP) under the Freedom of Information (FOI) and Protection of Privacy Act relating to the Site. The requested information included environmental approvals, certificates and instruments maintained by the MECP for the Site. The MECP response was not received in the timeframe allowed for this mandate. A copy of the MECP request is included in Appendix D. A copy of the MECP response and an addendum to this report will be provided should the documentation alter the findings and conclusions of this assessment.

Summary of City of Ottawa HLUI Correspondence

A request was made to the City of Ottawa to review their Historic Land Use Inventory (HLUI). The HLUI response was not received in the timeframe allowed for this mandate. A copy of the HLUI request is included in Appendix E. A copy of the HLUI response and an addendum to this report will be provided should the documentation alter the findings and conclusions of this assessment.in Appendix E of this report.

4. Site Visit

The following Site conditions were observed by GHD during the August 10, 2018 Site visit and are considered pertinent to the current Phase I ESA.

4.1 Utility Services

Electricity is supplied to the Site by Hydro-Ottawa. Natural gas is supplied by Enbridge Inc.

The Site building is heated by natural gas fired heating ventilating and air conditioning (HVAC) units, located on the roof of the building. Domestic hot water for the building is heated by natural gas; the hot water tanks are located in the individual commercial units.

Potable water and sanitary sewer services are supplied to the Site by the municipal system. No water supply wells or septic systems were reported to exist on Site and no evidence of on-Site water supply wells or septic systems were noted during the Site visit.

4.2 Underground Storage Tanks (USTs)

No visual evidence (such as filler or vent pipes), suggesting the presence of current or former USTs, was observed by GHD during the Site visit. The presence of former or current USTs was not reported by the Site representative.

4.3 Aboveground Storage Tanks (ASTs)

No visual evidence (such as filler or vent pipes, or retention walls), suggesting the presence of existing ASTs, was observed by GHD during the Site visit. The presence of former or current ASTs was not reported by the Site representative.

4.4 Chemical Use and Storage

The on-Site operations (commercial/retail) are not anticipated to require the use and storage of chemicals, with the exception of small volumes of commercially available cleaning products.

4.5 Chemical Spills/Releases

No significant oil or chemical staining was noted on the finished or landscaped surfaces exterior to the Site buildings. No distressed vegetation, or abnormal odours suggesting the presence of significant chemical or petroleum spills or releases, were noted at the time of the current Site visit.

It should be noted that two monitoring wells were observed at the Site at the time of the Site visit. No reports were provided to document the installation or chemical analysis of soil and/or groundwater from these locations. The locations of the observed monitoring wells are noted on Figure 2.

4.6 Solid Waste/Recyclables

The solid waste generated at the Site typically includes general domestic waste and recyclable materials such as cardboard, paper and plastic. In addition, cooking oil and grease can be expected to be generated, due to the on site restaurant. Solid waste and recyclable materials were observed at the time of the Site visit, stored in commercial waste containers for collection on a bi-weekly basis by private waste collection services for off-Site disposal and recycling, respectively. No evidence of on-Site solid waste disposal was noted by GHD at the time of the Site visit.

4.7 Hazardous Material

Based on GHD's field observations and interviews with the Client representative, no hazardous material is generated on the Site, nor is such material expected to be stored or generated based on the nature of the operations (light commercial) currently conducted at the Site. No visual evidence of hazardous material disposal at the Site was noted during the Site visit.

4.8 Wastewater

Wastewater generated at the Site includes domestic liquid effluent. The domestic effluent is discharged into the municipal wastewater system. No visual evidence suggesting the presence of other wastewater production was observed during the Site visit.

4.8.1 Floor/Trench Drains, Pits and Sumps

No floor drains, pits or sumps were noted by GHD during the course of the Site Visit.

4.9 Stormwater

Stormwater at the Site is collected and/or discharged by overland flow on improved Site surfaces for subsequent discharge to the municipal wastewater system or storm sewer system. No evidence of process-related effluent discharges to the storm water system from on-Site sources was observed by GHD during the Site visit. No areas of potential environmental concern to the Site with respect to the on-Site storm sewer system were observed by GHD.

4.10 Asbestos-Containing Materials (ACM)

Under the Hazardous Products Act, as of April 24, 1980, the use of asbestos was prohibited in most consumer products where dust particles are generated during normal use. Asbestos is considered a health hazard generally when asbestos fibres become airborne.

Friable types of ACM (pipe insulation, sprayed-on insulation, boiler wrap, and ceiling tiles) may remain on Site and in use indefinitely, provided the ACM are adequately maintained, covered and prevented from being disturbed under normal use. Friable types of asbestos are more likely to become airborne as compared to non-friable types. Products containing non-friable ACM (floor tiles, asbestos cement tiling, and piping) present a limited potential danger for airborne fibre release.

During the Site visit, GHD made visual observations in easily accessible areas of the building for the presence of friable and non-friable ACM. No intrusive investigations were conducted to examine concealed spaces for the presence of ACM. Given the age of the building (late 1970s), there is a potential for the presence of ACM to be present in the vinyl floor tiles, drywall joint compound, suspended ceiling tiles, caulking and insulation.

4.11 Polychlorinated Biphenyls (PCBs)

According to the Chlorobiphenyls Regulation, which is part of the Canadian Environmental Protection Act, the manufacturing, processing, using, selling, or importing of new equipment containing more than 50 ppm PCBs was prohibited as of July 1, 1980. Existing PCB-containing equipment (prior to 1977, and prior to 1980 for electrical transformers and capacitors) could remain in place within the context of the Regulation, although the dismantling and disposal of PCB-containing equipment are subject to the Regulation.

Based on GHD's visual observations during the Site visit and information obtained during the course of the study, no evidence of on-Site waste PCB storage or potential PCB-containing equipment was identified.

4.12 Chlorofluorocarbons (CFCs)

Based on observations during the Site visit, equipment which was present at the Site that potentially contains chlorofluorocarbons (ozone-depleting substances) consists of commercial refrigerators, freezers, air conditioners, and fire extinguishers. The presence of CFCs in the on-Site refrigeration, cooling, and fire extinguishing equipment is not considered to represent a significant potential environmental concern for the Property.

4.13 Urea Formaldehyde Foam Insulation (UFFI)

Urea formaldehyde foam insulation (UFFI) was introduced to the Canadian building industry in 1960 as a means of insulating enclosed or inaccessible cavities in building walls. It was typically made at a construction site from a mixture of urea formaldehyde resin, a foaming agent, and compressed air. Most installations in Canada occurred prior to December 17, 1980, when it was banned due to the possibility of long-term health risks to occupants of buildings insulated with UFFI.

The presence of urea formaldehyde foam insulation was not reported by the Site representative; however, due to the period of construction it may be a risk to be present, unless a document can be presented to prove that it is not present.

4.14 Lead-Based Paint

The amount of lead in surface coating (paint) has been regulated since 1976 through Health Canada's Hazardous Products Act to below 0.5 percent, and in recent years the limit was reduced to 0.009 percent. Based on the initial year (late 1970s) of construction of the Site building, lead-based paint may be present on-Site. Any demolition or renovation activities should take into account the potential presence of lead-based paint.

4.15 Air Emissions

From observations made by GHD during the Site visit, there is no fixed-point air emission sources (other than domestic heating associated emission sources) that may constitute a potential adverse environmental impact presently operated on Site.

4.16 Ionizing Radiation

No evidence of ionising radiation sources was observed at the Site by GHD.

4.17 Radon

According to publicly available maps reviewed (2004, Carson, J M; Holman, P B; Ford, K L; Grant, J A; Shives, R B K; Airborne Gamma Ray Spectrometry Compilation Equivalent Uranium Ontario Map 4551; Geologic Survey of Ontario), the Site is located in an area with the equivalent Uranium (eU) appearing to range from 0.750 to 0.950 eU (ppm), generally representing a low radon gas emission potential.

A long-term radon test would need to be conducted by a certified radon measurement professional to determine if there is a potential for radon to represent a significant potential adverse environmental concern for the subject Site.

4.18 Interviews

Mr. Daniel Blais, Property Manager, was present during the Site inspection and was interviewed to assist in documenting the Site conditions and operating history. Mr. Blais stated that construction of the Site building was completed in the late 1970s and the Site has operated for commercial purposes since that time. Mr. Blais stated that the building is heated with natural gas and was not aware of any current fuel storage at the Site. Mr. Blais stated that, to the best of his knowledge,

there has never been a dry cleaners on Site. Mr. Blais was unaware of any environmental concerns with the Site since his involvement with the Property. Mr. Blais stated that he was aware that the property to the east of DuMaurier Avenue had operated as a landfill, however, he was uncertain of the time period of operation.

5. Conclusion

GHD has performed this Phase I ESA of the Site in general accordance with the CSA Z768-01 publication for conducting Environmental Site Assessments. Based on the Phase I ESA study including the Site visit, documents reviewed, and the review of Site history and information provided by regulatory agencies, the following conclusions are noted.

There was one potentially contaminating activity (PCA) identified at the Site; the placement of fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.

There was one PCA identified at neighbouring properties; the presence of a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site.

The aforementioned PCAs are considered to represent areas of potential environmental concern (APECs) for the Site.

Following the completion of the Phase I ESA for the subject Property, **it is our opinion that a Phase II Environmental Site Assessment is recommended for the Site**.

6. Limitation of the Investigation

The findings and conclusions of the Phase I ESA are founded on the accuracy and reliability of the information obtained from all parties, unless contradicted by visual Site observations or written documentation.

The conclusions are presented based upon the readily available public information within the time frame of this mandate by trained professionals, following a prescribed and recognised assessment procedure.

This report is not intended to address, or provide comment on the presence, or absence of organic growth organisms commonly referred to as mould, through statements, inferences, or omissions.

The report is prepared for the use of the Client and his named representatives in making an informed financial and business decision regarding environmental liabilities that may be associated with the Site. The use of this report for any other purpose is at the Client's own risk.

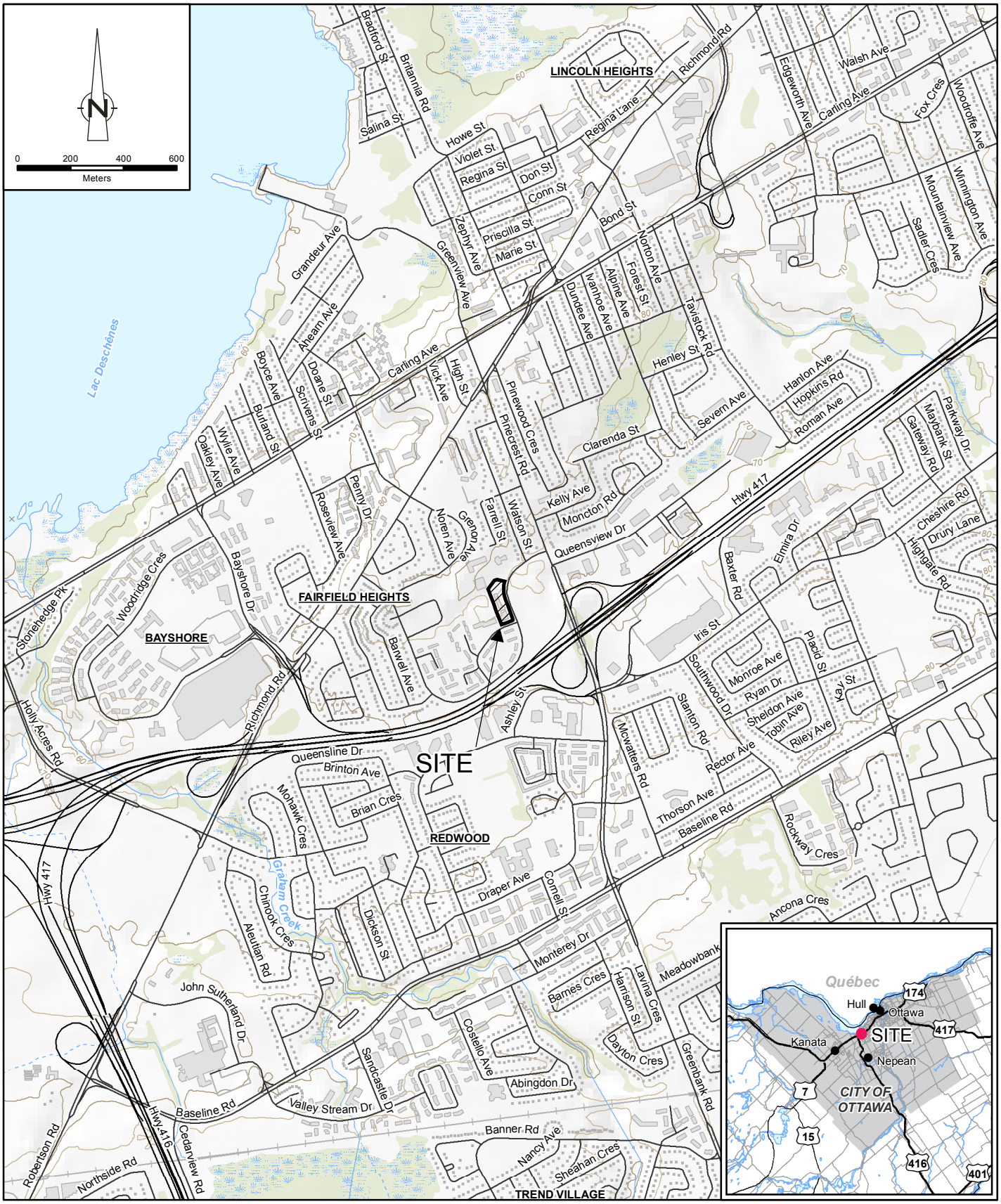
The Client must understand that changing circumstances in the physical or regulatory environment, the administration and use of the Site, as well as changes in any substances stored, used, or disposed of at the Site, could significantly alter the conclusions and information contained in this report. Therefore, it is important that the Client periodically re-evaluates the Site and reviews developments or operations, which may potentially impact the Site.

All of Which is Respectfully Submitted,

GHD

Luke Lopers, P. Eng.

Kevin Emenau, P. Geo.



Source: MNRF NRVIS, 2018. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018.
Coordinate System: NAD 1983 UTM Zone 18N

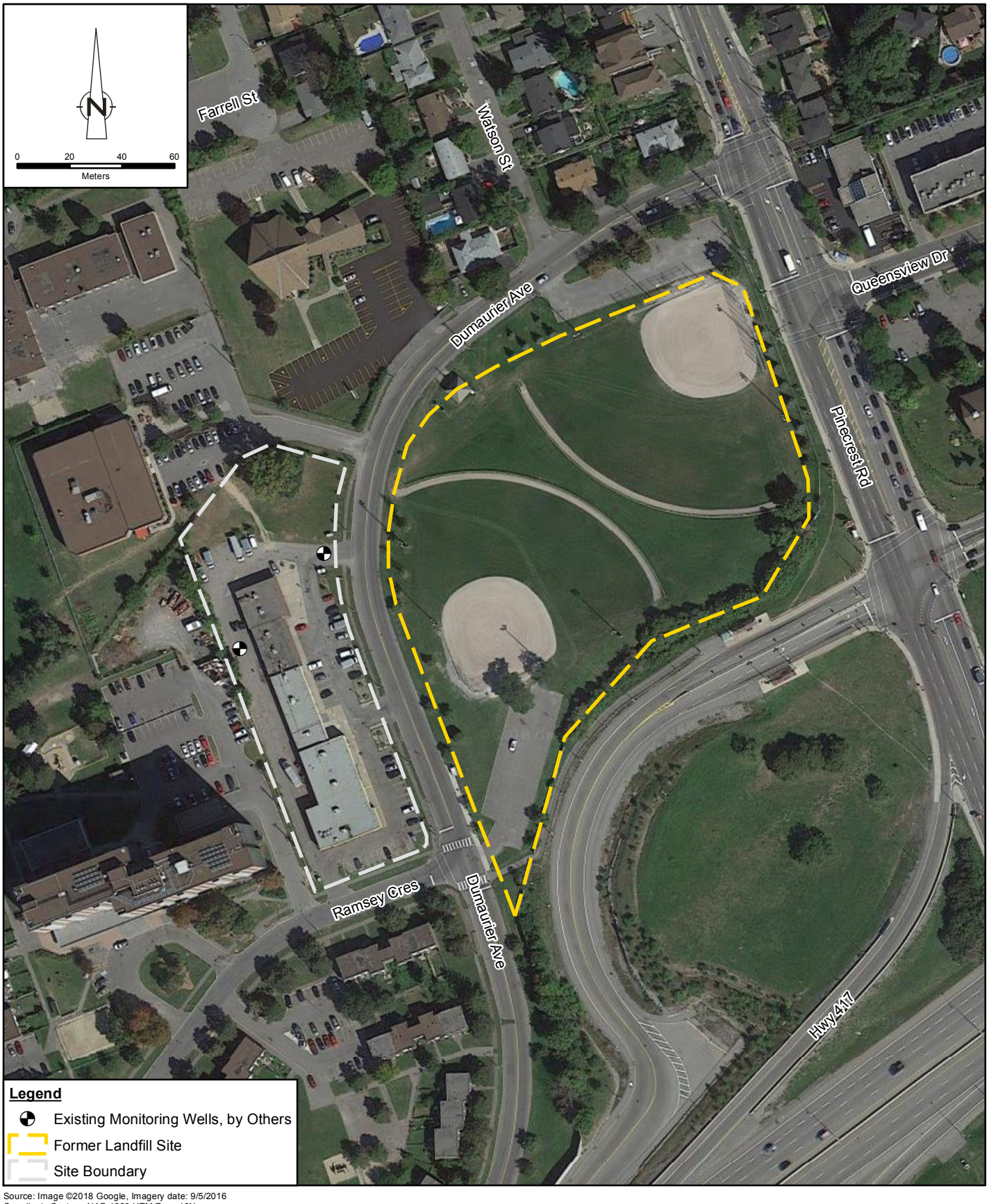
3223701 CANADA INC.
2831, 2833, 2835, 2841 AND 2865 DUMAURIER AVENUE, OTTAWA, ONTARIO
PHASE I ENVIRONMENTAL SITE ASSESSMENT

11181273
Aug 14, 2018

SITE LOCATION MAP

FIGURE 1

GIS File: Q:\GIS\PROJECTS\11181000s\11181273\Layouts\001\11181273-00(001)GIS-OT001.mxd



Source: Image ©2018 Google, Imagery date: 9/5/2016
Coordinate System: NAD 1983 UTM Zone 18N

3223701 CANADA INC.
2831, 2833, 2835, 2841 AND 2865 DUMAURIER AVENUE, OTTAWA, ONTARIO
PHASE I ENVIRONMENTAL SITE ASSESSMENT

11181273
Aug 14, 2018

SITE PLAN

FIGURE 2

GIS File: Q:\GIS\PROJECTS\11181000s\11181273\Layouts\001\11181273-00(001)GIS-OT002.mxd

Appendices

Appendix A
Title Search

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PART OF LOT 20 CONCESSION 2 OTTAWA FRONT, AND PART DUMAURIER AVENUE PLAN 479600 AS CLOSED BY NS41961, 1 FOOT RESERVE PLAN 4R479600 PARTS 1TO 8 PLAN 4R16235, OTTAWA. SUBJECT TO OVER PART 12 PLAN 4R16235 AS IN NS87431. SUBJECT TO RIGHT OVER PARTS 5, 10, 11, 12 AND 16 PLAN 4R16235AS IN N502320. TOGETHER WITH A RIGHT OF WAY OVER PARTS 10 TO 12 PLAN 4R16235 AS IN LT1345806. SUBJECT TO A RIGHT OF WAY IN FAVOUR OF PARTS 9 TO 17 PLAN 4R16235 OVER PART 5 PLAN 4R16235 AS IN LT1345806. SUBJECTTO AN EASEMENT IN FAVOUR OF HYDRO OTTAWA LIMITED OVER PARTS 3 AND 8 PLAN 4R16235 AS IN LT1353269.

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
DIVISION FROM 03944-0237

PIN CREATION DATE:
2001/07/30

OWNERS' NAMES
1248816 ONTARIO INC.

CAPACITY SHARE

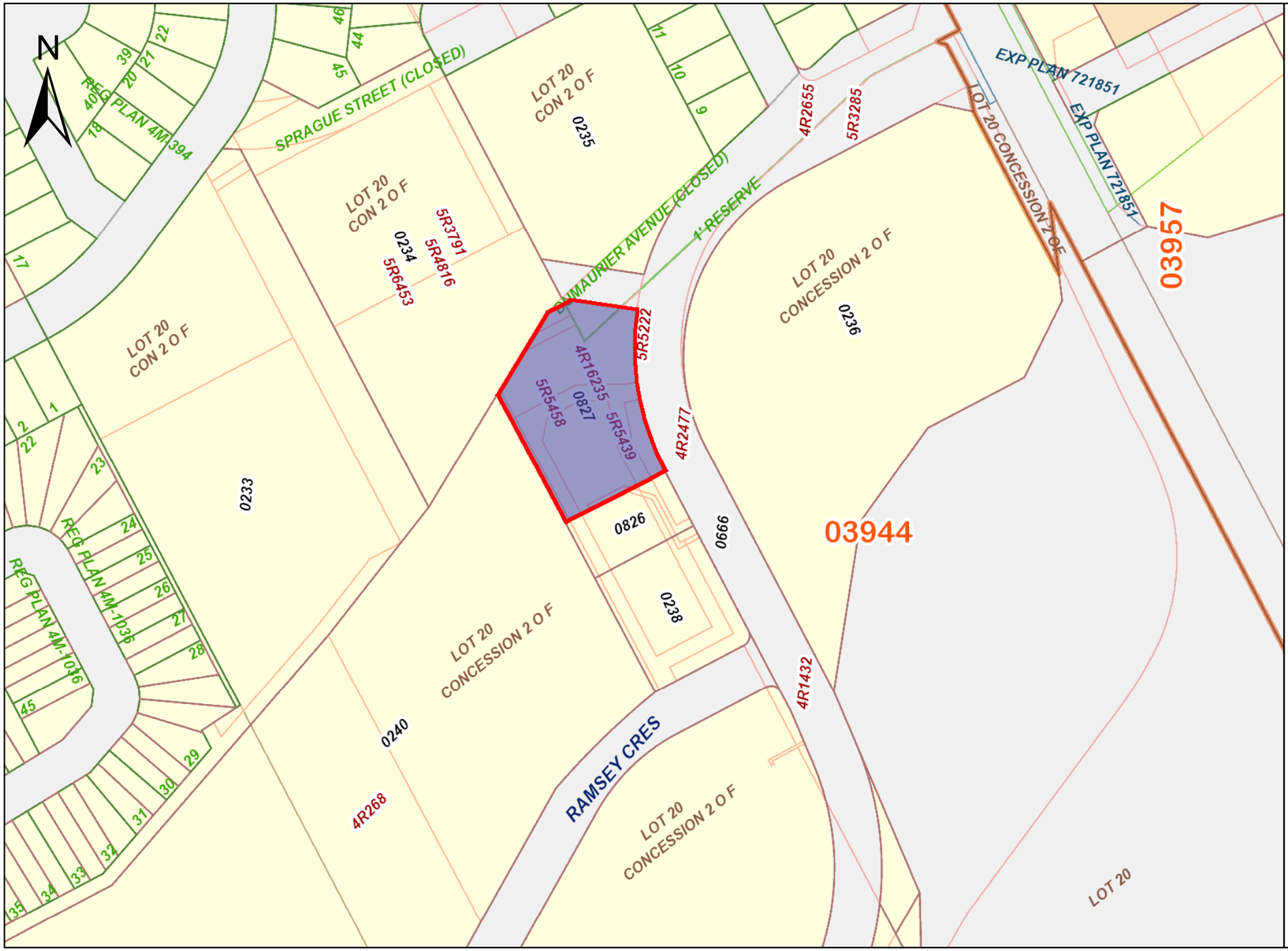
REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
** PRINTOUT INCLUDES ALL DOCUMENT TYPES (DELETED INSTRUMENTS NOT INCLUDED) **						
**SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:						
**	SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *					
**	AND ESCHEATS OR FORFEITURE TO THE CROWN.					
**	THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF					
**	IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY					
**	CONVENTION.					
**	ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.					
**DATE OF CONVERSION TO LAND TITLES: 1993/08/09 **						
4R268	1971/09/23	PLAN REFERENCE				C
CR710766	1977/06/22	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
NS24195	1978/08/09	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
5R5222	1980/08/25	PLAN REFERENCE				C
5R5439	1980/12/16	PLAN REFERENCE				C
NS106449	1980/12/17	AGREEMENT				C
NS106503	1980/12/18	DEPOSIT				C
5R5458	1980/12/23	PLAN REFERENCE				C
NS140195	1982/01/06	ORDER				C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
LT1078867	1997/10/01	TRANS POWER SALE	$155,000	BUSINESS DEVELOPMENT BANK OF CANADA	1248816 ONTARIO INC.	C
4R16235	2000/11/20	PLAN REFERENCE				C
LT1353269	2001/01/08	TRANSFER EASEMENT		1248816 ONTARIO INC.	HYDRO OTTAWA LIMITED	C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.



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SCALE

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meters

PROPERTY INDEX MAP

OTTAWA-CARLETON(No. 04)

LEGEND

FREEHOLD PROPERTY	
LEASEHOLD PROPERTY	
LIMITED INTEREST PROPERTY	
CONDOMINIUM PROPERTY	
RETIRED PIN (MAP UPDATE PENDING)	
PROPERTY NUMBER	*0449*
BLOCK NUMBER	**08050**
GEOGRAPHIC FABRIC	
EASEMENT	

THIS IS NOT A PLAN OF SURVEY

NOTES

REVIEW THE TITLE RECORDS FOR COMPLETE PROPERTY INFORMATION AS THIS MAP MAY NOT REFLECT RECENT REGISTRATIONS

THIS MAP WAS COMPILED FROM PLANS AND DOCUMENTS RECORDED IN THE LAND REGISTRATION SYSTEM AND HAS BEEN PREPARED FOR PROPERTY INDEXING PURPOSES ONLY

FOR DIMENSIONS OF PROPERTIES BOUNDARIES SEE RECORDED PLANS AND DOCUMENTS

ONLY MAJOR EASEMENTS ARE SHOWN

REFERENCE PLANS UNDERLYING MORE RECENT REFERENCE PLANS ARE NOT ILLUSTRATED

Ontario

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PART OF LOT 20 CONCESSION 2 OTTAWA FRONT, PARTS 9 TO 17 PLAN 4R16235, OTTAWA. TOGETHER WITH RIGHT AS IN N502320. TOGETHER WITH A RIGHT OF WAY OVER PART 5 PLAN 4R16235 AS IN LT1345806. SUBJECT TO A RIGHT OF WAY IN FAVOUR OF PARTS 1 TO 8 PLAN 4R16235 OVER PARTS 10 TO 12 PLAN 4R16235 AS IN LT1345806.

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
DIVISION FROM 03944-0237

PIN CREATION DATE:
2001/07/30

OWNERS' NAMES
GIANT TIGER STORES LIMITED

CAPACITY SHARE
BENO

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
** PRINTOUT INCLUDES ALL DOCUMENT TYPES (DELETED INSTRUMENTS NOT INCLUDED) **						
**SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:						
** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *						
** AND ESCHEATS OR FORFEITURE TO THE CROWN.						
** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF						
** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY						
** CONVENTION.						
** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.						
**DATE OF CONVERSION TO LAND TITLES: 1993/08/09 **						
4R268	1971/09/23	PLAN REFERENCE				C
CR710766	1977/06/22	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
NS24195	1978/08/09	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
5R5222	1980/08/25	PLAN REFERENCE				C
5R5439	1980/12/16	PLAN REFERENCE				C
NS106449	1980/12/17	AGREEMENT				C
NS106503	1980/12/18	DEPOSIT				C
5R5458	1980/12/23	PLAN REFERENCE				C
NS140195	1982/01/06	ORDER				C

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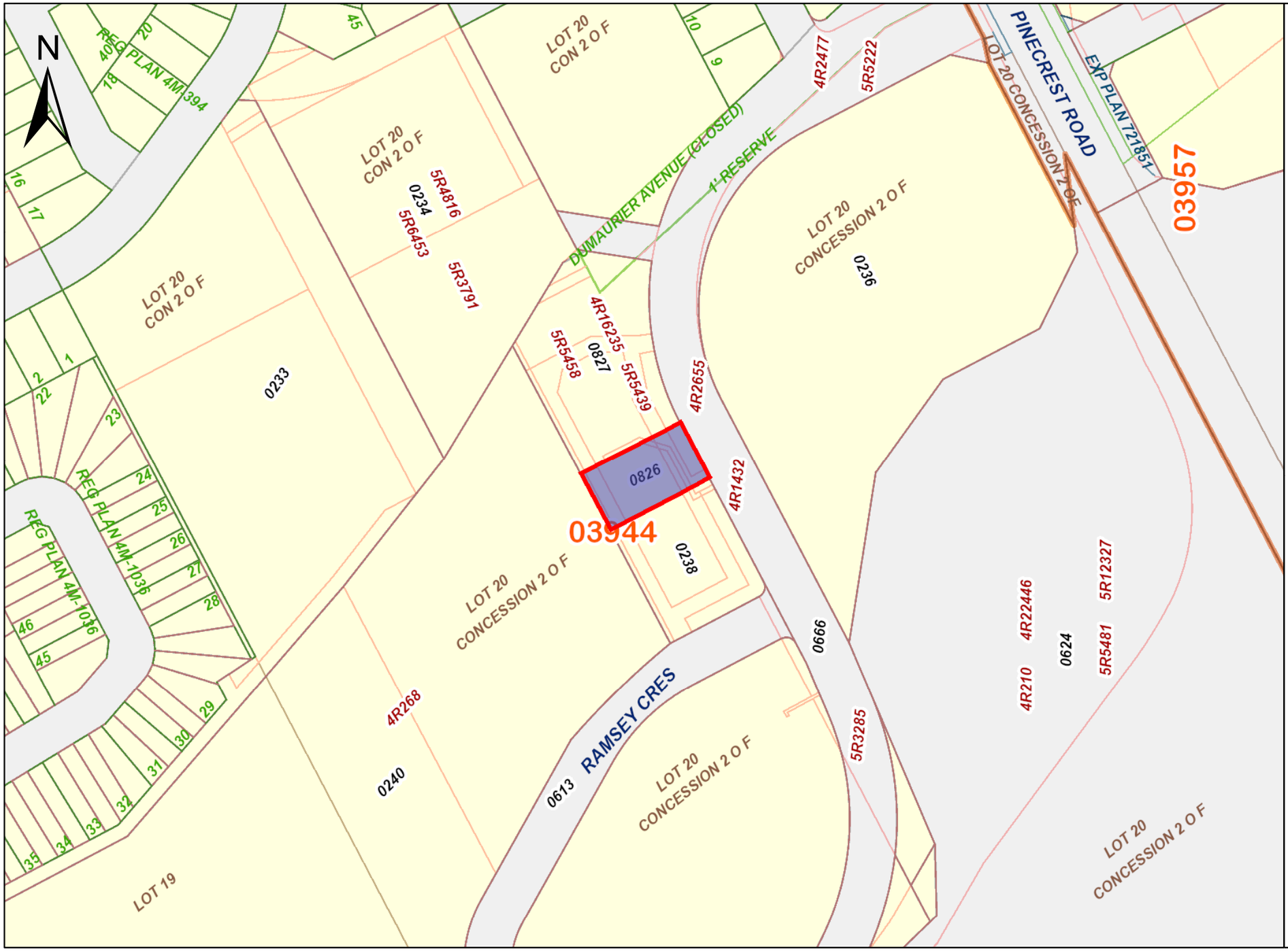
* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
4R16235	2000/11/20	PLAN REFERENCE				C
LT1345806	2000/12/01	TRANSFER	$150,000	1248816 ONTARIO INC.	GIANT TIGER STORES LIMITED	C
	REMARKS: PLANNING ACT CERTIFICATE. S/T & T/W RIGHTS OF WAY IN LT1345806.					
LT1345807	2000/12/01	NOTICE		GIANT TIGER STORES LIMITED	1248816 ONTARIO INC.	C
	REMARKS: PARTS 9 TO 17 INCLUSIVE ON PLAN 4R16235					



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SCALE

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PROPERTY INDEX MAP

OTTAWA-CARLETON(No. 04)

LEGEND

FREEHOLD PROPERTY	
LEASEHOLD PROPERTY	
LIMITED INTEREST PROPERTY	
CONDOMINIUM PROPERTY	
RETIRED PIN (MAP UPDATE PENDING)	
PROPERTY NUMBER	*0449*
BLOCK NUMBER	**08050**
GEOGRAPHIC FABRIC	
EASEMENT	

THIS IS NOT A PLAN OF SURVEY

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FOR DIMENSIONS OF PROPERTIES BOUNDARIES SEE RECORDED PLANS AND DOCUMENTS

ONLY MAJOR EASEMENTS ARE SHOWN

REFERENCE PLANS UNDERLYING MORE RECENT REFERENCE PLANS ARE NOT ILLUSTRATED

Ontario

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PT LT 20 CON 2 OF, PTS 1, 2 & 3 5R5439; S/T & T/W NS106448 S/T EASEMENT IN FAVOUR OF HYDRO OTTAWA LIMITED OVER PART 24 4R16235 AS IN LT1353268.

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK NEP 25

PIN CREATION DATE:
1993/08/09

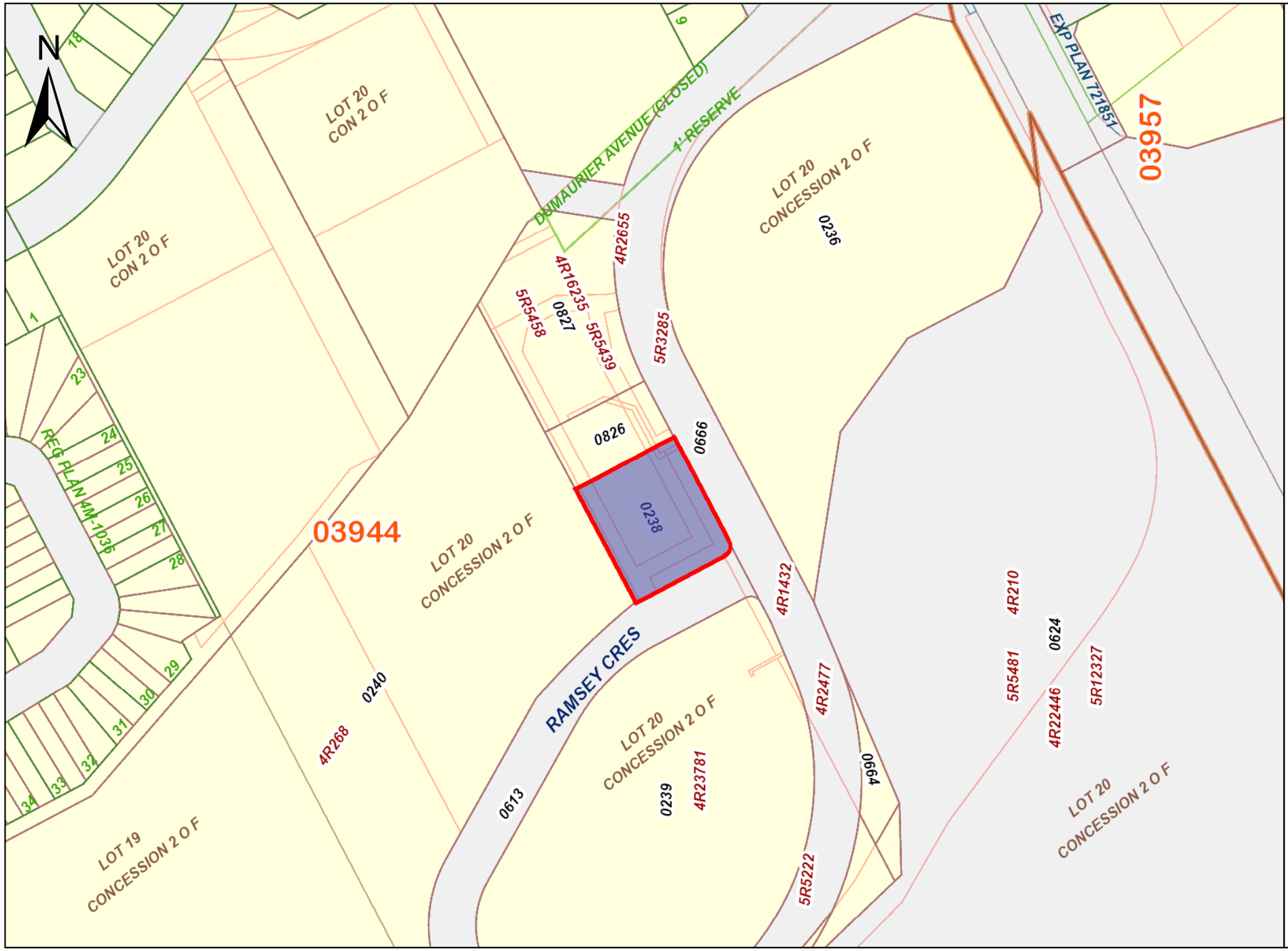
OWNERS' NAMES
GIANT TIGER STORES LIMITED

CAPACITY SHARE
BENO

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
EFFECTIVE 2000/07/29 THE NOTATION OF THE "BLOCK IMPLEMENTATION DATE" OF 1993/08/09 ON THIS PIN						
WAS REPLACED WITH THE "PIN CREATION DATE" OF 1993/08/09						
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES (DELETED INSTRUMENTS NOT INCLUDED) ***						
***SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:*						
*** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES **						
*** AND ESCHEATS OR FORFEITURE TO THE CROWN.*						
*** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF*						
*** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY*						
*** CONVENTION.*						
*** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.*						
***DATE OF CONVERSION TO LAND TITLES: 1993/08/09 ***						
4R268	1971/09/23	PLAN REFERENCE				C
CR710766	1977/06/22	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
NS24195	1978/08/09	AGREEMENT			THE CORPORATION OF THE CITY OF OTTAWA	C
NS92283	1980/07/29	AGREEMENT TO LEASE			D.A.P.I. LIMITED	C
REMARKS: RE SKETCH ATTACHED RE TERM OF 10 YEARS						
5R5439	1980/12/16	PLAN REFERENCE				C
NS106448	1980/12/17	TRANSFER	$150,000		GIANT TIGER STORES LIMITED	C
NS106448Z	1980/12/17	REST COV APL ANNEX				C
NS106449	1980/12/17	AGREEMENT				C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
5R5458	1980/12/23	PLAN REFERENCE				C
N412985	1987/10/22	NO ASSG LESSEE INT			LEIZERT, RUTH ROMANZAS, LEONIDA	C
N415003	1987/11/04	NO ASSG LESSEE INT			LEIZERT, RUTH	C
4R16235	2000/11/20	PLAN REFERENCE				C
LT1353268	2001/01/08	TRANSFER EASEMENT		GIANT TIGER STORES LIMITED	HYDRO OTTAWA LIMITED	C



ServiceOntario

PRINTED ON 14 AUG, 2018 AT 10:59:14
FOR EEGOOLAB

SCALE

0 30 60 90 meters

PROPERTY INDEX MAP

OTTAWA-CARLETON(No. 04)

LEGEND

FREEHOLD PROPERTY	
LEASEHOLD PROPERTY	
LIMITED INTEREST PROPERTY	
CONDOMINIUM PROPERTY	
RETIRED PIN (MAP UPDATE PENDING)	
PROPERTY NUMBER	*0449*
BLOCK NUMBER	**08050**
GEOGRAPHIC FABRIC	
EASEMENT	

THIS IS NOT A PLAN OF SURVEY

NOTES

REVIEW THE TITLE RECORDS FOR COMPLETE PROPERTY INFORMATION AS THIS MAP MAY NOT REFLECT RECENT REGISTRATIONS

THIS MAP WAS COMPILED FROM PLANS AND DOCUMENTS RECORDED IN THE LAND REGISTRATION SYSTEM AND HAS BEEN PREPARED FOR PROPERTY INDEXING PURPOSES ONLY

FOR DIMENSIONS OF PROPERTIES BOUNDARIES SEE RECORDED PLANS AND DOCUMENTS

ONLY MAJOR EASEMENTS ARE SHOWN

REFERENCE PLANS UNDERLYING MORE RECENT REFERENCE PLANS ARE NOT ILLUSTRATED

Ontario

Appendix B
Ecolog ERIS Report

ENVIRONMENTAL RISK INFORMATION SERVICES

DATABASE REPORT

Project Property:	*Phase I ESA* *2865 Dumaurier Avenue* *Ottawa ON K2B 7W3*
Project No:	*11177877Rivard-1*
Report Type:	*Standard Express Report*
Order No:	*20180808091*
Requested by:	*GHD Ltd.*
Date Completed:	*August 8, 2018*

Environmental Risk Information Services
A division of Glacier Media Inc.
P: 1.866.517.5204
E: info@erisinfo.com

www.erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:	*Phase I ESA* *2865 Dumaurier Avenue Ottawa ON K2B 7W3*
Project No:	*11177877Rivard-1*

Coordinates:

Latitude:	*45.350177*
Longitude:	*-75.79332*
UTM Northing:	*5,022,157.92*
UTM Easting:	*437,856.27*
UTM Zone:	*UTM Zone 18T*

Elevation:	*236 FT* *72.06 M*

Order Information:

Order No:	*20180808091*
Date Requested:	*August 8, 2018*
Requested by:	*GHD Ltd.*
Report Type:	*Standard Express Report*

Historical/Products:

Land Title Search	*Current Land Title Search*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Within 0.25 km	Total
AAGR	*Abandoned Aggregate Inventory*	Y	0	0	0
AGR	*Aggregate Inventory*	Y	0	0	0
AMIS	*Abandoned Mine Information System*	Y	0	0	0
ANDR	*Anderson's Waste Disposal Sites*	Y	0	1	1
AUWR	*Automobile Wrecking & Supplies*	Y	0	0	0
BORE	*Borehole*	Y	0	2	2
CA	*Certificates of Approval*	Y	0	2	2
CFOT	*Commercial Fuel Oil Tanks*	Y	0	0	0
CHEM	*Chemical Register*	Y	0	0	0
CNG	*Compressed Natural Gas Stations*	Y	0	0	0
COAL	*Inventory of Coal Gasification Plants and Coal Tar Sites*	Y	0	0	0
CONV	*Compliance and Convictions*	Y	0	0	0
CPU	*Certificates of Property Use*	Y	0	0	0
DRL	*Drill Hole Database*	Y	0	0	0
DRYCLEANERS	*Dry Cleaning Facilities*	Y	0	0	0
EASR	*Environmental Activity and Sector Registry*	Y	0	0	0
EBR	*Environmental Registry*	Y	0	0	0
ECA	*Environmental Compliance Approval*	Y	0	2	2
EEM	*Environmental Effects Monitoring*	Y	0	0	0
EHS	*ERIS Historical Searches*	Y	1	1	2
EIIS	*Environmental Issues Inventory System*	Y	0	0	0
EMHE	*Emergency Management Historical Event*	Y	0	0	0
EXP	*List of TSSA Expired Facilities*	Y	0	0	0
FCON	*Federal Convictions*	Y	0	0	0
FCS	*Contaminated Sites on Federal Land*	Y	0	0	0
FOFT	*Fisheries & Oceans Fuel Tanks*	Y	0	0	0
FST	*Fuel Storage Tank*	Y	0	0	0
FSTH	*Fuel Storage Tank - Historic*	Y	0	0	0
GEN	*Ontario Regulation 347 Waste Generators Summary*	Y	0	3	3
GHG	*Greenhouse Gas Emissions from Large Facilities*	Y	0	0	0
HINC	*TSSA Historic Incidents*	Y	0	1	1
IAFT	*Indian & Northern Affairs Fuel Tanks*	Y	0	0	0
INC	*TSSA Incidents*	Y	0	0	0
LIMO	*Landfill Inventory Management Ontario*	Y	0	0	0
MINE	*Canadian Mine Locations*	Y	0	0	0
MISA PENALTY	*Environmental Penalty Annual Report*	Y	0	0	0

Database	Name	Searched	Project Property	Within 0.25 km	Total
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBW	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0
OGW	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	3	0	3
PINC	TSSA Pipeline Incidents	Y	0	0	0
PRT	Private and Retail Fuel Storage Tanks	Y	0	0	0
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0
SPL	Ontario Spills	Y	0	2	2
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	TSSA Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	1	1
WWIS	Water Well Information System	Y	0	1	1
	Total:		4	16	20

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
2	EHS		2865 Dumaurier Ave Ottawa ON K2B7W3	S/11.7	0.00	14
2	PES	GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B7W3	S/11.7	0.00	14
2	PES	GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B 7W3	S/11.7	0.00	14
2	PES	GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B 7W3	S/11.7	0.00	15

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
1	WDSH		Pinecrest Rd. & DuMaurier Ave. OTTAWA ON	NNE/11.1	0.00	15
3	ANDR	Pinecrest & DuMaurier Dump	Ottawa ON K2B	ENE/31.8	-0.19	15
4	ECA	City of Ottawa	Bayshore Transit Station to Pinecrest Road Ottawa ON K1P 1J1	SE/66.9	-1.19	16
4	ECA	City of Ottawa	Bayshore Transit Station to Pinecrest Road Ottawa ON K1P 1J1	SE/66.9	-1.19	16
5	CA	Ottawa Community Housing Corporation	1065 Ramsey Crescent Ottawa ON	SW/88.4	0.90	16
5	SPL	UNKNOWN	1065 RAMSEY CRESC., OTTAWA/CARLETON REGIONAL HOUSING AUTHORITY COMPLEX. OTTAWA CITY ON K2B 8A1	SW/88.4	0.90	17
6	EHS		2825 Dumaurier Ave. Ottawa ON K2B 7W3	NNW/130.6	3.81	17
7	GEN	CONSEIL SCOLAIRE DE LANGUE FRANCAIS	ECOLE FRANCO-NATIONS 1085 AVE GRENON OTTAWA ON K2B 8L7	NNW/189.5	4.78	17
7	GEN	CONSEIL DES ECOLES PUBLIQUES	FRANCO-NATIONS 1085, AVENUE GRENON OTTAWA ON K2B 8L7	NNW/189.5	4.78	18
7	GEN	CONSEIL (OUT OF BUS)	ECOLE FRANCO-NATIONS 1085 AVE GRENON OTTAWA ON K2B 8L7	NNW/189.5	4.78	18
8	CA	OTTAWA CITY	DUMAURIER AVE. NEAR WATSON ST. OTTAWA CITY ON	NNE/192.7	3.53	18
9	HINC		2921 DUMAURIER AVENUE OTTAWA ON K2B 8A2	S/194.4	-2.32	19
10	BORE		ON	ESE/203.3	-2.73	19
11	SPL	Ottawa Community Housing Corporation	1095 Ramsey Crescent Ottawa ON K2B 7Z9	SSW/226.5	-0.49	19
12	BORE		ON	ENE/230.7	0.73	20
12	WWIS		ON	ENE/230.7	0.73	20

Executive Summary: Summary By Data Source

ANDR - Anderson's Waste Disposal Sites

A search of the ANDR database, dated 1860s-Present has found that there are 1 ANDR site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
Pinecrest & DuMaurier Dump	Ottawa ON K2B	ENE	31.83	3

BORE - Borehole

A search of the BORE database, dated 1875-Jul 2014 has found that there are 2 BORE site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	ON	ENE	230.67	12

Lower Elevation	Address	Direction	Distance (m)	Map Key
	ON	ESE	203.34	10

CA - Certificates of Approval

A search of the CA database, dated 1985-Oct 30, 2011* has found that there are 2 CA site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
Ottawa Community Housing Corporation	1065 Ramsey Crescent Ottawa ON	SW	88.43	5
OTTAWA CITY	DUMAURIER AVE. NEAR WATSON ST. OTTAWA CITY ON	NNE	192.72	8

ECA - Environmental Compliance Approval

A search of the ECA database, dated Oct 2011-Jun 30, 2018 has found that there are 2 ECA site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
City of Ottawa	Bayshore Transit Station to Pinecrest Road Ottawa ON K1P 1J1	SE	66.88	4
City of Ottawa	Bayshore Transit Station to Pinecrest Road Ottawa ON K1P 1J1	SE	66.88	4

EHS - ERIS Historical Searches

A search of the EHS database, dated 1999-Feb 28, 2018 has found that there are 2 EHS site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	2865 Dumaurier Ave Ottawa ON K2B7W3	S	11.70	2
	2825 Dumaurier Ave. Ottawa ON K2B 7W3	NNW	130.61	6

GEN - Ontario Regulation 347 Waste Generators Summary

A search of the GEN database, dated 1986-December 31, 2017 has found that there are 3 GEN site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
CONSEIL (OUT OF BUS)	ECOLE FRANCO-NATIONS 1085 AVE GRENON OTTAWA ON K2B 8L7	NNW	189.46	7
CONSEIL SCOLAIRE DE LANGUE FRANCAIS	ECOLE FRANCO-NATIONS 1085 AVE GRENON OTTAWA ON K2B 8L7	NNW	189.46	7
CONSEIL DES ECOLES PUBLIQUES	FRANCO-NATIONS 1085, AVENUE GRENON OTTAWA ON K2B 8L7	NNW	189.46	7

HINC - TSSA Historic Incidents

A search of the HINC database, dated 2006-June 2009* has found that there are 1 HINC site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
	2921 DUMAURIER AVENUE OTTAWA ON K2B 8A2	S	194.42	9

PES - Pesticide Register

A search of the PES database, dated 1988-Mar 2018 has found that there are 3 PES site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B7W3	S	11.70	2
GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B 7W3	S	11.70	2
GIANT TIGER STORE # 22 - ISHIKO LIMITED	2865 DUMAURIER AVE OTTAWA ON K2B 7W3	S	11.70	2

SPL - Ontario Spills

A search of the SPL database, dated 1988-Feb 2018 has found that there are 2 SPL site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
UNKNOWN	1065 RAMSEY CRESC., OTTAWA/CARLETON REGIONAL HOUSING AUTHORITY COMPLEX. OTTAWA CITY ON K2B 8A1	SW	88.43	5

Lower Elevation	Address	Direction	Distance (m)	Map Key
Ottawa Community Housing Corporation	1095 Ramsey Crescent Ottawa ON K2B 7Z9	SSW	226.49	11

WDSH - Waste Disposal Sites - MOE 1991 Historical Approval Inventory

A search of the WDSH database, dated Up to Oct 1990* has found that there are 1 WDSH site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	Pinecrest Rd. & DuMaurier Ave. OTTAWA ON	NNE	11.11	1

WWIS - Water Well Information System

A search of the WWIS database, dated Dec 31, 2017 has found that there are 1 WWIS site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	ON	ENE	230.67	12

Map : 0.25 Kilometer Radius

Order No: 20180808091

Address: 2865 Dumaurier Avenue, Ottawa, ON K2B 7W3 CA

ERIS
ENVIRONMENTAL RISK INFORMATION SERVICES

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Expressway
- Principal Highway
- Secondary Highway
- Major Road
- Local road
- Trail
- Proposed Road
- Ferry Route/Ice Road
- Industrial and Resource - Regions
- Main Line
- Sidetrack
- Transit Line
- Abandoned Line
- National Park
- Provincial or Territorial Park
- Other Park
- Golf Course or Driving Range
- Park or Sports Field
- Other Recreation Area

Source: © 2015 DMTI Spatial Inc.

75°48'W

45°21'N

45°21'N

Aerial (2017)

Address: 2865 Dumaurier Avenue, Ottawa, ON K2B 7W3 CA

Source: ESRI World Imagery

Order No: 20180808091

ERIS
ENVIRONMENTAL RISK INFORMATION SERVICES

Topographic Map

Address: 2865 Dumaurier Avenue, Ottawa, ON K2B 7W3 CA

Source: ESRI World Topographic Map

Order No: 20180808091

ERIS ENVIRONMENTAL RISK INFORMATION SERVICES

Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	1 of 4	S/11.7	72.1 / 0.00	2865 Dumaurier Ave Ottawa ON K2B7W3	EHS

Order ID:	265335	**Date Received:**	06-AUG-13
Order No:	20130806035	**Lot/Building Size:**	
Customer ID:	92028	**Municipality:**	
Company ID:	77	**Client Prov/State:**	ON
Status:	C	**Search Radius (km):**	.25
Report Code:	4CAN	**Large Radius:**	2
Report Type:	Custom Report	**X:**	-75.793327
Report Date:	13-AUG-13	**Y:**	45.350072
Report Requested by:	Pinchin Ltd		
Nearest Intersection:			
Previous Site Name:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	2 of 4	S/11.7	72.1 / 0.00	GIANT TIGER STORE # 22 - ISHIKO LIMITED 2865 DUMAURIER AVE OTTAWA ON K2B7W3	PES

Licence No:		**Operator Box:**	
Detail Licence No:		**Operator Class:**	
Licence Type Code:	23	**Operator No:**	
Licence Type:	Limited Vendor	**Operator Type:**	
Licence Class:		**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Trade Name:		**Operator Region:**	
Post Office Box:		**Operator District:**	
Lot:		**Operator County:**	
Concession:		**Oper Phone Area Cd:**	
Region:		**Ext:**	
District:		**Oper Phone No:**	
County:		**Proponent Ext:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	3 of 4	S/11.7	72.1 / 0.00	GIANT TIGER STORE # 22 - ISHIKO LIMITED 2865 DUMAURIER AVE OTTAWA ON K2B 7W3	PES

Licence No:		**Operator Box:**	
Detail Licence No:		**Operator Class:**	
Licence Type Code:		**Operator No:**	
Licence Type:	Vendor	**Operator Type:**	
Licence Class:		**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Trade Name:		**Operator Region:**	
Post Office Box:		**Operator District:**	
Lot:		**Operator County:**	
Concession:		**Oper Phone Area Cd:**	
Region:		**Ext:**	
District:		**Oper Phone No:**	
County:		**Proponent Ext:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	4 of 4	S/11.7	72.1 / 0.00	GIANT TIGER STORE # 22 - ISHIKO LIMITED 2865 DUMAURIER AVE OTTAWA ON K2B 7W3	PES

Licence No:		Operator Box:	
Detail Licence No:	23-01-13515-0	Operator Class:	
Licence Type Code:		Operator No:	
Licence Type:	LIMITED	Operator Type:	
Licence Class:		Operator Lot:	
Licence Control:		Oper Concession:	
Trade Name:		Operator Region:	
Post Office Box:		Operator District:	
Lot:		Operator County:	
Concession:		Oper Phone Area Cd:	
Region:		Ext:	
District:		Oper Phone No:	
County:		Proponent Ext:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 1	NNE/11.1	72.1 / 0.00	Pinecrest Rd. & DuMaurier Ave. OTTAWA ON	WDSH

Site No.:	X1006
Region:	SOUTHEAST
County:	OTTAWA CARLETON
Concession:	
Lot:	Pinecrest Rd. & DuMaurier Ave.
Easting::	437860
Northing::	5021950
Zone::	18
Date Closed:	
Status::	CLOSED
Classification::	A5 - POTENTIAL HUMAN IMPACT-URBAN MUNICIPAL/DOMESTIC WASTE - CLOSED 10-20 YRS
%CommericialWste::	n/a
%DomesticWste Rec::	n/a
%LiquidWste Rec::	n/a
%HazardousWste Rec::	n/a
%Non-haz.Wste Rec::	n/a
%Sewage/Sludge Rec::	n/a
%Other Wste Rec::	n/a

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
3	1 of 1	ENE/31.8	71.9 / -0.19	Pinecrest & DuMaurier Dump Ottawa ON K2B	ANDR

Legal Description:	Nepean Con 2 Lot 20 pt
Location Description:	Pinecrest Rd & DuMaurier Ave, 100m S of Sprague Ave*, 100m N of DuMaurier Ave*, 100m W of Pinecrest Rd*
Municipality:	Ottawa City
Current Municipality:	Ottawa City
RM:	Ottawa-Carleton Region
Facility:	Dump
Date Active:	1950s?
Date Begun:	
Date Complete:	
Area (Ha):	
Landfill Type:	
Group Name:	
Operated By:	
Serial:	MOEE 1006
NTS:	31G05
Diameter (m):	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Historical Summary:

Pinecrest & DuMaurier Dump MOEE 1994 Pinecrest Rd & DuMaurier Ave cited as closed waste disposal site (Ontario Ministry of the Environment [1994] Waste disposal site inventory, [Toronto]: Ontario Environment, 1994., i, 196 pp., maps, ISBN 0772984093). datapoint plots to Nepean Con 2 Lot 20 pt. 1954 Airphotomap Slight ground disturbance visible at or near this location [YUML: 1954 Airphotomap 453754E]. 1965 Military Town Plan ASE 306 Not marked, partly wooded site [1965 Military Town Plan Ottawa-Hull ASE 306 Edition 1 (produced 1965)]. 1968 NTS Map 31G05 Not marked, site is 100m S of Sprague Ave*, 100m N of DuMaurier Ave*, 100m W of Pinecrest Rd* [1968 NTS Map Ottawa-Hull Sheet 31G05 edition 7 (air photos 1967, publication 1968)]. 1973 Military Town Plan MCE 306 Not marked [1973 Military Town Plan Ottawa-Hull MCE 306 Edition 2 (information 1972, produced 1973)]. 1976 NTS Map 31G05 Not marked [1976 NTS Map Ottawa-Hull Sheet 31G05 edition 8 (air photos 1975, culture check 1975, information 1975, publication 1976)]. 1982 Military Town Plan MCE 306 Not marked [1982 Military Town Plan Ottawa-Hull MCE 306 Edition 5 (information 1980, produced 1982)]. 1983 NTS Map 31G05 Not marked [1983 NTS Map Ottawa-Hull Sheet 31G05 edition 9 (air photos 1979, culture check 1979, publication 1983)]. 1987 NTS Map 31G05 Not marked [1987 NTS Map Ottawa-Hull Sheet 31G05 edition 10 (air photos 1984, culture check 1985, publication 1987)]. *[1992] MapArt Corporation Ontario, Towns and Cities [Street Atlas].

Waste Type:
UTM X Nad 27: 437860
UTM Y Nad 27: 5021950
UTM Zone: 18

---

4 ***1 of 2*** ***SE/66.9*** ***70.9 / -1.19*** ***City of Ottawa***
Bayshore Transit Station to Pinecrest Road
Ottawa ON K1P 1J1 ***ECA***

Approval No: 2842-7AQRZZ
Approval Date: 2008-01-30
Status: Approved
Record Type: ECA
Link Source: IDS
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Address: Bayshore Transit Station to Pinecrest Road
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/6172-74LPZS-14.pdf
SWP Area Name: Rideau Valley
MOE District: Ottawa
City: Ottawa
Longitude: -75.7928
Latitude: 45.3497

---

4 ***2 of 2*** ***SE/66.9*** ***70.9 / -1.19*** ***City of Ottawa***
Bayshore Transit Station to Pinecrest Road
Ottawa ON K1P 1J1 ***ECA***

Approval No: 9001-776HB6
Approval Date: 2007-09-18
Status: Approved
Record Type: ECA
Link Source: IDS
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Address: Bayshore Transit Station to Pinecrest Road
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/6041-76JHVU-14.pdf
SWP Area Name: Rideau Valley
MOE District: Ottawa
City: Ottawa
Longitude: -75.7928
Latitude: 45.3497

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5 ***1 of 2*** ***SW/88.4*** ***73.0 / 0.90*** ***Ottawa Community Housing Corporation***
1065 Ramsey Crescent
Ottawa ON ***CA***

Certificate #: 6610-5HUS4N
Application Year: 2003
Issue Date: 1/18/2003
Approval Type: Air
Status: Approved
Application Type:
Client Name::

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Client Address::
Client City::
Client Postal Code::
Project Description::
Contaminants::
Emission Control::

---

5 **2 of 2** **SW/88.4** **73.0 / 0.90** **UNKNOWN** **SPL**
1065 RAMSEY CRESC., OTTAWA/CARLETON REGIONAL HOUSING AUTHORITY COMPLEX.
OTTAWA CITY ON K2B 8A1

Ref No:	115040	**Discharger Report:**	
Site No:		**Material Group:**	
Incident Dt:	6/28/1995	**Client Type:**	
Year:		**Sector Type:**	
Incident Cause:	UNKNOWN	**Source Type:**	
Incident Event:		**Nearest Watercourse:**	
Contaminant Code:		**Site Name:**	
Contaminant Name:		**Site Address:**	
Contaminant Limit 1:		**Site District Office:**	
Contam Limit Freq 1:		**Site County/District:**	
Contaminant UN No 1:		**Site Postal Code:**	
Contaminant Qty:		**Site Region:**	
Environment Impact:	POSSIBLE	**Site Municipality:**	20101
Nature of Impact:	Water course or lake	**Site Lot:**	
Receiving Medium:	WATER	**Site Conc:**	
Receiving Env:		**Northing:**	
Health/Env Conseq:		**Easting:**	
MOE Response:		**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Geo Ref Meth:**	
MOE Reported Dt:	6/28/1995	**Site Map Datum:**	
Dt Document Closed:			
SAC Action Class:			

Incident Reason: INTENTIONAL/PLANNED
Incident Summary: SOURCE UNKNOWN: MOTOR OILDUMPED IN STORM C.B.,E.G.NUMBER ISSUED TO DRAINALL

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6 **1 of 1** **NNW/130.6** **75.9 / 3.81** **2825 Dumaurier Ave.** **EHS**
Ottawa ON K2B 7W3

Order ID:	98543	**Date Received:**	4/10/2007
Order No:	20070410010	**Lot/Building Size:**	
Customer ID:	47508	**Municipality:**	
Company ID:	97	**Client Prov/State:**	
Status:	C	**Search Radius (km):**	0.25
Report Code:	3CAN	**Large Radius:**	2
Report Type:	CAN - Complete Report	**X:**	-75.793761
Report Date:	4/13/2007	**Y:**	45.351311

Report Requested by: Trow Associates Inc.
Nearest Intersection:
Previous Site Name:
Additional Info Ordered: Fire Insur. Maps And /or Site Plans

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7 **1 of 3** **NNW/189.5** **76.8 / 4.78** **CONSEIL SCOLAIRE DE LANGUE FRANCAIS** **GEN**
ECOLE FRANCO-NATIONS 1085 AVE GRENON
OTTAWA ON K2B 8L7

Generator No.:	ON1285754	**PO Box No.:**	
Status:		**Country:**	
Approval Years:	94,95,96	**Choice of Contact:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Contam. Facility: ***Co Admin:***
MHSW Facility: ***Phone No. Admin:***
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.

--Details--
Waste Code: 243
Waste Description: PCB'S

---

7 ***2 of 3*** ***NNW/189.5*** ***76.8 / 4.78*** ***CONSEIL DES ECOLES PUBLIQUES FRANCO-NATIONS 1085, AVENUE GRENON OTTAWA ON K2B 8L7*** ***GEN***

Generator No.: ON1879409 ***PO Box No.:***
Status: ***Country:***
Approval Years: 94,95,96,97,98 ***Choice of Contact:***
Contam. Facility: ***Co Admin:***
MHSW Facility: ***Phone No. Admin:***
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.

--Details--
Waste Code: 243
Waste Description: PCB'S

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7 ***3 of 3*** ***NNW/189.5*** ***76.8 / 4.78*** ***CONSEIL (OUT OF BUS) ECOLE FRANCO-NATIONS 1085 AVE GRENON OTTAWA ON K2B 8L7*** ***GEN***

Generator No.: ON1285754 ***PO Box No.:***
Status: ***Country:***
Approval Years: 97,98 ***Choice of Contact:***
Contam. Facility: ***Co Admin:***
MHSW Facility: ***Phone No. Admin:***
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.

--Details--
Waste Code: 243
Waste Description: PCB'S

---

8 ***1 of 1*** ***NNE/192.7*** ***75.6 / 3.53*** ***OTTAWA CITY DUMAURIER AVE. NEAR WATSON ST. OTTAWA CITY ON*** ***CA***

Certificate #: 8-4101-87-
Application Year: 87
Issue Date: 5/13/1988
Approval Type: Industrial air
Status: Approved in 1988
Application Type:
Client Name::
Client Address::
Client City::
Client Postal Code::
Project Description:: LANDFILL GAS VENT
Contaminants:: Methane (Incl. Hydrocarbons Expr. As Ch4
Emission Control:: No Controls

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

9 | **1 of 1** | **S/194.4** | **69.7 / -2.32** | **2921 DUMAURIER AVENUE OTTAWA ON K2B 8A2** | **HINC**

External File Num:	FS INC 0710-05604
Date of Occurrence:	9/17/2007
Fuel Occurrence Type:	Pipeline Strike
Fuel Type Involved:	Natural Gas
Status Desc::	Completed - Causal Analysis(End)
Job Type Desc::	Incident/Near-Miss Occurrence (FS)
Oper. Type Involved::	Construction Site (pipeline strike)
Service Interruptions::	No
Property Damage::	No
Fuel Life Cycle Stage::	Transmission, Distribution and Transportation
Root Cause::	Root Cause: Equipment/Material/Component:No Procedures:No Maintenance:No Design:No Training:No Management:Yes Human Factors:No
Reported Details::	
Fuel Category::	Gaseous Fuel
Occurrence Type::	Incident
Affiliation::	Industry Stakeholder (Licensee/Registration/Certificate Holder, Facility Owner, etc.)
County Name::	Ottawa
Approx. Quant. Rel::	
Nearby body of water::	
Enter Drainage Syst.::	
Approx. Quant. Unit::	
Environmental Impact::	

10 | **1 of 1** | **ESE/203.3** | **69.3 / -2.73** | **ON** | **BORE**

Borehole ID:	610827	***Type:***	Borehole
Use:		***Status::***	
Drill Method::		***UTM Zone::***	18
Easting::	438041	***Northing::***	5022072
Location Accuracy::		***Orig. Ground Elev m::***	72.2
Elev. Reliability Note::		***DEM Ground Elev m::***	70.9
Total Depth m::	-999	***Primary Name::***	
Township::		***Concession::***	
Lot::		***Municipality:***	
Completion Date::		***Static Water Level::***	-999.9
Primary Water Use::		***Sec. Water Use::***	

--Details--

Stratum ID:	218386655	***Top Depth(m):***	0.0
Bottom Depth(m):	1.8	***Stratum Desc:***	FILL.
Stratum ID:	218386656	***Top Depth(m):***	1.8
Bottom Depth(m):		***Stratum Desc:***	BEDROCK,SHALE. WEATHERED. LAYERED. SAND,CLAY. BROWN,GREY,FISSURED. SAND-FINE. VERY LOOSE. S

11 | **1 of 1** | **SSW/226.5** | **71.6 / -0.49** | **Ottawa Community Housing Corporation 1095 Ramsey Crescent Ottawa ON K2B 7Z9** | **SPL**

Ref No:	1237-7LWQCF	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:		***Client Type:***	
Year:		***Sector Type:***	Other Motor Vehicle
Incident Cause:	Other Discharges	***Source Type:***	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Incident Event:		**Nearest Watercourse:**	
Contaminant Code:	12	**Site Name:**	Ottawa Community Housing Corporation<UNOFFICIAL>
Contaminant Name:	GASOLINE	**Site Address:**	
Contaminant Limit 1:		**Site District Office:**	Ottawa
Contam Limit Freq 1:		**Site County/District:**	
Contaminant UN No 1:		**Site Postal Code:**	
Contaminant Qty:	20 L	**Site Region:**	
Environment Impact:	Not Anticipated	**Site Municipality:**	Ottawa
Nature of Impact:		**Site Lot:**	
Receiving Medium:		**Site Conc:**	
Receiving Env:		**Northing:**	
Health/Env Conseq:		**Easting:**	
MOE Response:	No Field Response	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Geo Ref Meth:**	
MOE Reported Dt:	12/1/2008	**Site Map Datum:**	
Dt Document Closed:	12/4/2008		
SAC Action Class:	Watercourse Spills		
Incident Reason:	Unknown - Reason not determined		
Incident Summary:	Ottawa Community Housing, Gas 20L to Cb Cln		

12 **1 of 2** **ENE/230.7** **72.8 / 0.73** **ON** **BORE**

Borehole ID:	610845	**Type:**	Borehole
Use:		**Status::**	
Drill Method::		**UTM Zone::**	18
Easting::	438051	**Northing::**	5022282
Location Accuracy::		**Orig. Ground Elev m::**	73.2
Elev. Reliability Note::		**DEM Ground Elev m::**	73.7
Total Depth m::	35.1	**Primary Name::**	
Township::		**Concession::**	
Lot::		**Municipality:**	
Completion Date::	NOV-1953	**Static Water Level::**	-999.9
Primary Water Use::		**Sec. Water Use::**	

--Details--

Stratum ID:	218386706	**Top Depth(m):**	0.0
Bottom Depth(m):	4.6	**Stratum Desc:**	SAND. BROWN.
Stratum ID:	218386707	**Top Depth(m):**	4.6
Bottom Depth(m):	8.8	**Stratum Desc:**	HARDPAN.
Stratum ID:	218386708	**Top Depth(m):**	8.8
Bottom Depth(m):	32.0	**Stratum Desc:**	LIMESTONE.
Stratum ID:	218386709	**Top Depth(m):**	32.0
Bottom Depth(m):	35.1	**Stratum Desc:**	SHALE,SANDSTONE. BLACK. 00112DOLOMITE. BEDROCK,DOLOMITE. BEDROCK,DOLOMITE. 00000 020 0

12 **2 of 2** **ENE/230.7** **72.8 / 0.73** **ON** **WWIS**

Well ID:	1508638	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	1/6/1954
Sec. Water Use:	0	**Selected Flag:**	Yes
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	3566
Casing Material:		**Form Version:**	1

Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	OTTAWA-CARLETON
Elevation (m):		**Municipality:**	OTTAWA CITY
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	
Well Depth:		**Concession:**	
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

Bore Hole Information

Bore Hole ID:	10030672	**Elevation:**	73.72
DP2BR:	29	**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:	r	**East83:**	438050.7
Code OB Desc:	Bedrock	**Org CS:**	
Open Hole:		**North83:**	5022282
Cluster Kind:		**UTMRC:**	9
Date Completed:	18-NOV-53	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	931010204
Layer:	2
Color:	
General Color:	
Mat1:	14
Most Common Material:	HARDPAN
Mat2:	
Other Materials:	
Mat3:	
Other Materials:	
Formation Top Depth:	15
Formation End Depth:	29
Formation End Depth UOM:	ft

Formation ID:	931010203
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	
Other Materials:	
Mat3:	
Other Materials:	
Formation Top Depth:	0
Formation End Depth:	15
Formation End Depth UOM:	ft

Formation ID:	931010205

Layer: 3
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Other Materials:
Mat3:
Other Materials:
Formation Top Depth: 29
Formation End Depth: 105
Formation End Depth UOM: ft

Formation ID: 931010206
Layer: 4
Color: 8
General Color: BLACK
Mat1: 17
Most Common Material: SHALE
Mat2: 18
Other Materials: SANDSTONE
Mat3:
Other Materials:
Formation Top Depth: 105
Formation End Depth: 115
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961508638
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 10579242
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930053975
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 115
Casing Diameter: 4
Casing Diameter UOM: inch
Casing Depth UOM: ft

Casing ID: 930053974
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 30
Casing Diameter: 4
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID:	991508638
Pump Set At:	
Static Level:	38
Final Level After Pumping:	48
Recommended Pump Depth:	
Pumping Rate:	6
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	N

Water Details

Water ID:	933463247
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	70
Water Found Depth UOM:	ft

Water ID:	933463248
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	112
Water Found Depth UOM:	ft

Unplottable Summary

Total: 20 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
CA	City of Ottawa	Bayshore Station to Pinecrest Road	Ottawa ON	
CA	CAMPEAU CORP.	PINECREST OFFICE PARK	OTTAWA CITY ON	
CA	R.M. OF OTTAWA-CARLETON	PINECREST RD., WEST TRANSITWAY	NEPEAN CITY ON	
CA	REG.MUN.OF OTTAWA-CARLETON	QUEENSWAY N.	OTTAWA ON	
CA	SAKTO DEVELOPMENTS	PRESTON ST. QUEENSWAY CENTRE	OTTAWA CITY ON	
CA	City of Ottawa	Bayshore Transit Station to Pinecrest Road	Ottawa ON	
CA	R.M. OF OTTAWA-CARLETON	MCEWEN AVE./PINECREST COLL.	OTTAWA CITY ON	
CA	CAMPEAU CORP.	PINECREST OFFICE PARK	OTTAWA CITY ON	
EBR	Laurent Leblanc Ltd.,	Watson Road, Lot 13, Concession 4, formerly the Township of Cumberland (geographic township). CITY OF OTTAWA	ON	
SPL	OTTAWA STRUCTURAL CONCRETE SER	GRAHAM CREEK AT QUEENSWAY FROM BAYSHORE SHOPP'G CTRE.	NEPEAN CITY ON	
SPL		Watson Mill Dam - Manitec	Ottawa ON	
SPL	TRANSPORT TRUCK	QUEENSWAY MOTOR VEHICLE (OPERATING FLUID)	OTTAWA CITY ON	
SPL	TRANSPORT TRUCK	EAST SIDE OF QUEENSWAY (HIGHWAY 417) BETWEEN MOODIE & EAGLESON ROADS. TRANSPORT TRUCK (CARGO)	NEPEAN CITY ON	
SPL	City of Ottawa	Bike path north of Hurdman/Queensway Bridge	Ottawa ON	
SPL	Loblaws Company East<UNOFFICIAL>	Queensway, from Greenbank Exit to 1735 Iris Road (Pine Crest Shopping Centre - infront of IKEA)<UNOFFICIAL>	Ottawa ON	
SPL	BUS	RAMSEY CRESCENT AND DU MAURIER INTERSECTION. MOTOR VEHICLE (OPERATING FLUID)	OTTAWA CITY ON	
SPL	OTTAWA-CARLETON TRANSIT	MOODIE BETWEEN QUEENSWAY AND	OTTAWA CITY ON	

		CARLING AVE, CARLING E AND W TO CORKSTOWN ROAD	
SPL	TANK TRUCK	QUEENSWAY (EASTBOUND) BETWEEN EAGLESON AND MOODY TANK TRUCK (CARGO)	NEPEAN CITY ON
SPL	O.C. TRANSPO	PINECREST STATION IN QUEENSDALE OTTAWA SITE 1500 ST. LAURENT BOULEVARD	OTTAWA CITY ON
SPL	UNKNOWN	BLAIR STATION AND QUEENSWAY	OTTAWA CITY ON

Unplottable Report

Site: ***City of Ottawa***
Bayshore Station to Pinecrest Road Ottawa ON

Database: ***CA***

Certificate #:	2842-7AQRZZ
Application Year:	2008
Issue Date:	1/30/2008
Approval Type:	Municipal and Private Sewage Works
Status:	Approved
Application Type:	
Client Name::	
Client Address::	
Client City::	
Client Postal Code::	
Project Description::	
Contaminants::	
Emission Control::	

Site: ***CAMPEAU CORP.***
PINECREST OFFICE PARK OTTAWA CITY ON

Database: ***CA***

Certificate #:	3-1380-85-006
Application Year:	85
Issue Date:	11/15/85
Approval Type:	Municipal sewage
Status:	Approved
Application Type:	
Client Name::	
Client Address::	
Client City::	
Client Postal Code::	
Project Description::	
Contaminants::	
Emission Control::	

Site: ***R.M. OF OTTAWA-CARLETON***
PINECREST RD., WEST TRANSITWAY NEPEAN CITY ON

Database: ***CA***

Certificate #:	3-0011-99-
Application Year:	99
Issue Date:	2/22/1999
Approval Type:	Municipal sewage
Status:	Approved
Application Type:	
Client Name::	
Client Address::	
Client City::	
Client Postal Code::	
Project Description::	
Contaminants::	
Emission Control::	

Site: ***REG.MUN.OF OTTAWA-CARLETON***
QUEENSWAY N. OTTAWA ON

Database: ***CA***

Certificate #:	3-0468-85-006
Application Year:	85

Issue Date: 6/4/85
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name::
Client Address::
Client City::
Client Postal Code::
Project Description::
Contaminants::
Emission Control::

Site: ***SAKTO DEVELOPMENTS***
PRESTON ST. QUEENSWAY CENTRE OTTAWA CITY ON

Database: ***CA***

Certificate #: 7-1268-88-
Application Year: 88
Issue Date: 8/16/1988
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name::
Client Address::
Client City::
Client Postal Code::
Project Description::
Contaminants::
Emission Control::

Site: ***City of Ottawa***
Bayshore Transit Station to Pinecrest Road Ottawa ON

Database: ***CA***

Certificate #: 9001-776HB6
Application Year: 2007
Issue Date: 9/18/2007
Approval Type: Municipal and Private Sewage Works
Status: Approved
Application Type:
Client Name::
Client Address::
Client City::
Client Postal Code::
Project Description::
Contaminants::
Emission Control::

Site: ***R.M. OF OTTAWA-CARLETON***
MCEWEN AVE./PINECREST COLL. OTTAWA CITY ON

Database: ***CA***

Certificate #: 3-1219-93-
Application Year: 93
Issue Date: 10/26/1993
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name::
Client Address::
Client City::
Client Postal Code::
Project Description::
Contaminants::
Emission Control::

Site: ***CAMPEAU CORP.***
PINECREST OFFICE PARK OTTAWA CITY ON

Database: ***CA***

Certificate #:	7-1039-85-006
Application Year:	85
Issue Date:	11/15/85
Approval Type:	Municipal water
Status:	Approved
Application Type:	
Client Name::	
Client Address::	
Client City::	
Client Postal Code::	
Project Description::	
Contaminants::	
Emission Control::	

Site: ***Laurent Leblanc Ltd.,***
Watson Road, Lot 13, Concession 4, formerly the Township of Cumberland (geographic township). CITY OF OTTAWA ON

Database: ***EBR***

Company Name:	Laurent Leblanc Ltd.,
EBR Registry No.:	IB06E2033
Ministry Ref. No.:	FSD KEM 02/06
Notice Type:	Instrument Decision
Notice Date:	March 22, 2016
Proposal Date:	May 01, 2006
Year:	2006
Proponent Address:	3000 Navan Road, Gloucester Ontario, K1C 7G4
Instrument Type:	(ARA s. 13 (2)) - Add, rescind, or vary a condition of a licence
Location Other:	

Location:

Watson Road, Lot 13, Concession 4, formerly the Township of Cumberland (geographic township). CITY OF OTTAWA

Site: ***OTTAWA STRUCTURAL CONCRETE SER***
GRAHAM CREEK AT QUEENSWAY FROM BAYSHORE SHOPP'G CTRE. NEPEAN CITY ON

Database: ***SPL***

Ref No:	74243	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	7/27/1992	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	OTHER CAUSE (N.O.S.)	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	CONFIRMED	***Site Municipality:***	20104
Nature of Impact:	Water course or lake	***Site Lot:***	
Receiving Medium:	WATER	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	REGION OF OTTAWA-CARLTON
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	7/27/1992	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	NEGLIGENCE (APPARENT)		
Incident Summary:	OTTAWA STRUCT'L CONCRETE -WASHED OUT CONTAINERS IN STORM DRAIN.		

Site: *Watson Mill Dam - Manitec Ottawa ON*

Database: SPL

Ref No:	4685-7ETJRK	**Discharger Report:**	
Site No:		**Material Group:**	
Incident Dt:		**Client Type:**	
Year:		**Sector Type:**	Pleasure Craft
Incident Cause:	Ship's Tank / Bilge Pumping	**Source Type:**	
Incident Event:		**Nearest Watercourse:**	
Contaminant Code:	12	**Site Name:**	Ottawa River<UNOFFICIAL>
Contaminant Name:	GASOLINE	**Site Address:**	
Contaminant Limit 1:		**Site District Office:**	Ottawa
Contam Limit Freq 1:		**Site County/District:**	
Contaminant UN No 1:		**Site Postal Code:**	
Contaminant Qty:	other - see incident description	**Site Region:**	
Environment Impact:	Possible	**Site Municipality:**	Ottawa
Nature of Impact:	Surface Water Pollution	**Site Lot:**	
Receiving Medium:		**Site Conc:**	
Receiving Env:		**Northing:**	
Health/Env Conseq:		**Easting:**	
MOE Response:		**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Geo Ref Meth:**	
MOE Reported Dt:	5/20/2008	**Site Map Datum:**	
Dt Document Closed:	5/23/2008		
SAC Action Class:	Watercourse Spills		
Incident Reason:	Spill		
Incident Summary:	Ottawa River: Gas spill from pleasure craft		

Site: *TRANSPORT TRUCK QUEENSWAY MOTOR VEHICLE (OPERATING FLUID) OTTAWA CITY ON*

Database: SPL

Ref No:	224201	**Discharger Report:**	
Site No:		**Material Group:**	
Incident Dt:	4/19/2002	**Client Type:**	
Year:		**Sector Type:**	
Incident Cause:	OTHER TRANSPORTATION ACCIDENT	**Source Type:**	
Incident Event:		**Nearest Watercourse:**	
Contaminant Code:		**Site Name:**	
Contaminant Name:		**Site Address:**	
Contaminant Limit 1:		**Site District Office:**	
Contam Limit Freq 1:		**Site County/District:**	
Contaminant UN No 1:		**Site Postal Code:**	
Contaminant Qty:		**Site Region:**	
Environment Impact:	CONFIRMED	**Site Municipality:**	20107
Nature of Impact:	Soil contamination	**Site Lot:**	
Receiving Medium:	LAND	**Site Conc:**	
Receiving Env:		**Northing:**	
Health/Env Conseq:		**Easting:**	OPP-KANATA; MTO
MOE Response:		**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Geo Ref Meth:**	
MOE Reported Dt:	4/19/2002	**Site Map Datum:**	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	ERROR		
Incident Summary:	LOBLAWS: 450L DIESEL FROMTRUCK TO ROAD ONLY; OPP; MTO.		

Site: *TRANSPORT TRUCK EAST SIDE OF QUEENSWAY (HIGHWAY 417) BETWEEN MOODIE & EAGLESON ROADS. TRANSPORT TRUCK (CARGO) NEPEAN CITY ON*

Database: SPL

Ref No:	76887	**Discharger Report:**	
Site No:		**Material Group:**	
Incident Dt:	9/28/1992	**Client Type:**	
Year:		**Sector Type:**	
Incident Cause:	OTHER CONTAINER LEAK	**Source Type:**	
Incident Event:		**Nearest Watercourse:**	
Contaminant Code:		**Site Name:**	

Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	NOT ANTICIPATED	***Site Municipality:***	20104
Nature of Impact:	Soil contamination	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	F.D., MTO
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	9/28/1992	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	UNKNOWN		
Incident Summary:	TRANSPORT TRUCK-30 L DIESEL FUEL TO DITCH.		

Site: ***City of Ottawa***
Bike path north of Hurdman/Queensway Bridge Ottawa ON

Database: ***SPL***

Ref No:	7517-7QRMF9	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:		***Client Type:***	
Year:		***Sector Type:***	Sewer
Incident Cause:	Unknown	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	City Storm Sewer Outfall to Rideau River- Bike Path<UNOFFICIAL>
Contaminant Name:	OIL (PETROLEUM BASED, NOT SPECIFIED)	***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	Not Anticipated	***Site Municipality:***	Ottawa
Nature of Impact:		***Site Lot:***	
Receiving Medium:		***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	
MOE Response:	Planned Field Response	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	4/3/2009	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:	Pollution Incident Reports (PIRs) and ¿Other¿ calls		
Incident Reason:			
Incident Summary:	Ottawa Rideau River - oily sheen water from storm outfall		

Site: ***Loblaws Company East<UNOFFICIAL>***
Queensway, from Greenbank Exit to 1735 Iris Road (Pine Crest Shopping Centre - infront of IKEA)<UNOFFICIAL>
Ottawa ON

Database: ***SPL***

Ref No:	6833-6H4GWP	***Discharger Report:***	0
Site No:		***Material Group:***	Oil
Incident Dt:	10/12/2005	***Client Type:***	
Year:		***Sector Type:***	Other Motor Vehicle
Incident Cause:	Pipe Or Hose Leak	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	Queensway, from Greenbank Exit to 1735 Iris Road
Contaminant Name:	DIESEL FUEL	***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	Ottawa
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	Not Anticipated	***Site Municipality:***	Ottawa
Nature of Impact:		***Site Lot:***	
Receiving Medium:	Land	***Site Conc:***	

Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	10/12/2005	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:	Land Spills		
Incident Reason:	Unknown - Reason not determined		
Incident Summary:	Loblaws: 10 to 15 L diesel to road/parking lot		

Site: ***BUS***
RAMSEY CRESCENT AND DU MAURIER INTERSECTION. MOTOR VEHICLE (OPERATING FLUID) OTTAWA CITY ON

Database: ***SPL***

Ref No:	119082	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	9/29/1995	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	OTHER CONTAINER LEAK	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	NOT ANTICIPATED	***Site Municipality:***	20101
Nature of Impact:		***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	OTTAWA CITY WORKS
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	9/29/1995	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	EQUIPMENT FAILURE		
Incident Summary:	SCHOOL BUS-MOTOR OIL TO ROAD & INTERSECTION.		

Site: ***OTTAWA-CARLETON TRANSIT***
MOODIE BETWEEN QUEENSWAY AND CARLING AVE, CARLING E AND W TO CORKSTOWN ROAD OTTAWA CITY ON

Database: ***SPL***

Ref No:	223236	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	3/13/2002	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	PIPE/HOSE LEAK	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	POSSIBLE	***Site Municipality:***	20107
Nature of Impact:	Soil contamination	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	3/13/2002	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	UNKNOWN		
Incident Summary:	O/C TRANSIT BUS: LOST COOLENT ONTO ROADS. SEWER-MATIC CLEANING UP.		

Site: ***TANK TRUCK***
QUEENSWAY (EASTBOUND) BETWEEN EAGLESON AND MOODY TANK TRUCK (CARGO) NEPEAN CITY ON

Database: ***SPL***

Ref No:	95884	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	1/30/1994	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	OTHER CONTAINER LEAK	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	NOT ANTICIPATED	***Site Municipality:***	20104
Nature of Impact:		***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	FIRE DEPARTMENT, OPP
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	1/30/1994	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	UNKNOWN		
Incident Summary:	TANK TRUCK: 15 L FURNACE OIL TO ROAD		

Site: ***O.C. TRANSPO***
PINECREST STATION IN QUEENSDALE OTTAWA SITE 1500 ST. LAURENT BOULEVARD OTTAWA CITY ON

Database: ***SPL***

Ref No:	118820	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	9/22/1995	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	UNDERGROUND TANK LEAK	***Source Type:***	
Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	CONFIRMED	***Site Municipality:***	20101
Nature of Impact:	Soil contamination	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	MCCR
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	9/22/1995	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	UNKNOWN		
Incident Summary:	O.C. TRANSPO:DIESEL FUEL LEAK FOUND DURING LEAK DETECTION TESTING.		

Site: ***UNKNOWN***
BLAIR STATION AND QUEENSWAY OTTAWA CITY ON

Database: ***SPL***

Ref No:	239018	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	9/11/2002	***Client Type:***	
Year:		***Sector Type:***	
Incident Cause:	UNKNOWN	***Source Type:***	

Incident Event:		***Nearest Watercourse:***	
Contaminant Code:		***Site Name:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site County/District:***	
Contaminant UN No 1:		***Site Postal Code:***	
Contaminant Qty:		***Site Region:***	
Environment Impact:	POSSIBLE	***Site Municipality:***	20107
Nature of Impact:	Water course or lake	***Site Lot:***	
Receiving Medium:	LAND, WATER	***Site Conc:***	
Receiving Env:		***Northing:***	
Health/Env Conseq:		***Easting:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Meth:***	
MOE Reported Dt:	9/11/2002	***Site Map Datum:***	
Dt Document Closed:			
SAC Action Class:			
Incident Reason:	UNKNOWN		
Incident Summary:	SOURCE UNK: UNK VOLUME OF ANTIFREEZE IN THE STORMSEWER, CLEANING		

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Provincial AAGR

The MAAP Program maintains a database of abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.*

Government Publication Date: Sept 2002*

Aggregate Inventory: Provincial AGR

The Ontario Ministry of Natural Resources maintains a database of all active pits and quarries. The database provides information regarding the registered owner/operator, location name, operation type, approval type, and maximum annual tonnage.

Government Publication Date: Up to Sep 2017

Abandoned Mine Information System: Provincial AMIS

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Government Publication Date: 1800-Nov 2016

Anderson's Waste Disposal Sites: Private ANDR

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1860s-Present

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Jan 31, 2018

Borehole: Provincial BORE

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Government Publication Date: 1875-Jul 2014

Certificates of Approval: Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Government Publication Date: 1985-Oct 30, 2011*

Commercial Fuel Oil Tanks: Provincial CFOT

Since May 2002, Ontario developed a new act where it became mandatory for fuel oil tanks to be registered with Technical Standards & Safety Authority (TSSA). This data would include all commercial underground fuel oil tanks in Ontario with fields such as location, registration number, tank material, age of tank and tank size.

Government Publication Date: Feb 28, 2017

Chemical Register: Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Government Publication Date: 1999-Jan 31, 2018

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 31, 2012

Inventory of Coal Gasification Plants and Coal Tar Sites: Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Government Publication Date: Apr 1987 and Nov 1988*

Compliance and Convictions: Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Government Publication Date: 1989-Apr 2018

Certificates of Property Use: Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Government Publication Date: 1994-Apr 30, 2018

Drill Hole Database: Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Government Publication Date: 1886-Nov 30, 2017

Dry Cleaning Facilities: Federal DRYCLEANERS

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2016

Environmental Activity and Sector Registry: Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Government Publication Date: Oct 2011-Jun 30, 2018

Environmental Registry: Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Government Publication Date: 1994-Apr 30, 2018

Environmental Compliance Approval: Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For certificates of approval prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Government Publication Date: Oct 2011-Jun 30, 2018

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Feb 28, 2018

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Emergency Management Historical Event: Provincial EMHE

List of locations of historical occurrences of emergency events, including those assigned to the Ministry of Natural Resources by Order-In-Council (OIC) under the Emergency Management and Civil Protection Act, as well as events where MNR provided requested emergency response assistance. Many of these events will have involved community evacuations, significant structural loss, and/or involvement of MNR emergency response staff. These events fall into one of ten (10) type categories: Dam Failure; Drought / Low Water; Erosion; Flood; Forest Fire; Soil and Bedrock Instability; Petroleum Resource Center Event, EMO Requested Assistance, Continuity of Operations Event, Other Requested Assistance. EMHE record details are reproduced by ERIS under License with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.

Government Publication Date: Dec 31, 2016

List of TSSA Expired Facilities: Provincial EXP

List of facilities with removed tanks which were once registered with the Fuels Safety Program of the Technical Standards and Safety Authority (TSSA). Includes private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc. Tanks which have been removed automatically fall under the expired facilities inventory held by TSSA.

Government Publication Date: Feb 28, 2017

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government.

Government Publication Date: Jun 2000-May 2018

Fisheries & Oceans Fuel Tanks: Federal FOFT

Fisheries & Oceans Canada maintains an inventory of aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Government Publication Date: 1964-Sep 2017

Fuel Storage Tank: Provincial FST

The Technical Standards & Safety Authority (TSSA), under the Technical Standards & Safety Act of 2000 maintains a database of registered private and retail fuel storage tanks in Ontario with fields such as location, tank status, license date, tank type, tank capacity, fuel type, installation year and facility type.

Government Publication Date: Feb 28, 2017

Fuel Storage Tank - Historic: Provincial FSTH

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks. Public records of private fuel storage tanks are only available since the registration became effective in September 1989. This information is now collected by the Technical Standards and Safety Authority.

Government Publication Date: Pre-Jan 2010*

Ontario Regulation 347 Waste Generators Summary: Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

Government Publication Date: 1986-December 31, 2017

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2016

TSSA Historic Incidents: Provincial HINC

This database will cover all incidences recorded by TSSA with their older system, before they moved to their new management system. TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. The TSSA works to protect the public, the environment and property from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from pipelines, diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Government Publication Date: 2006-June 2009*

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

TSSA Incidents: Provincial INC

TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Includes incidents from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Government Publication Date: Feb 28, 2017

Landfill Inventory Management Ontario: Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the ministry compiles new and updated information. The inventory will include small and large landfills. Additionally, each year the ministry will request operators of the larger landfills complete a landfill data collection form that will be used to update LIMO and will include the following information from the previous operating year. This will include additional information such as estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills will include information such as site owner, site location and certificate of approval # and status.

Government Publication Date: Dec 31, 2013

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Environmental Penalty Annual Report: Provincial MISA PENALTY

This database contains data from Ontario's annual environmental penalty report published by the Ministry of the Environment and Climate Change. These reports provide information on environmental penalties for land or water violations issued to companies in one of the nine industrial sectors covered by the Municipal Industrial Strategy for Abatement (MISA) regulations.

Government Publication Date: Jan 1, 2011 - Dec 31, 2017

Mineral Occurrences: Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the plan metric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Government Publication Date: 1846-Jan 2018

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

Non-Compliance Reports: Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Government Publication Date: Dec 31, 2016

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Apr 2018

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Mar 31, 2018

National Energy Board Wells: Federal NEBW

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGW

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-April 30, 2018

Ontario Oil and Gas Wells: Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, and well cap date, license No., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Government Publication Date: 1800-May 2018

Inventory of PCB Storage Sites: Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Government Publication Date: 1987-Oct 2004; 2012-Dec 2013

Orders: Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Government Publication Date: 1994-Apr 30, 2018

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Pesticide Register: Provincial PES

The Ontario Ministry of the Environment and Climate Change maintains a database of licensed operators and vendors of registered pesticides.

Government Publication Date: 1988-Mar 2018

TSSA Pipeline Incidents: Provincial PINC

TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. This database will include spills, strike and leaks from recorded by the TSSA.

Government Publication Date: Feb 28, 2017

Private and Retail Fuel Storage Tanks: Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Government Publication Date: 1989-1996*

Permit to Take Water: Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Government Publication Date: 1994-Apr 30, 2018

Ontario Regulation 347 Waste Receivers Summary: Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Government Publication Date: 1986-2016

Record of Site Condition: Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Government Publication Date: 1997-Sept 2001, Oct 2004-Apr 2018

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Jan 31, 2018

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Ontario Spills: Provincial SPL

This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X.

Government Publication Date: 1988-Feb 2018

Wastewater Discharger Registration Database: Provincial SRDS

Information under this heading is combination of the following 2 programs. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment maintained a database of all direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation; Mining; Petroleum Refining; Organic Chemicals; Inorganic Chemicals; Pulp & Paper; Metal Casting; Iron & Steel; and Quarries. All sampling information is now collected and stored within the Sample Result Data Store (SRDS).

Government Publication Date: 1990-Dec 31, 2016

Anderson's Storage Tanks: Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1915-1953*

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970-Aug 2017

TSSA Variances for Abandonment of Underground Storage Tanks: Provincial VAR

List of variances granted for abandoned tanks. Under the Technical Standards and Safety Authority (TSSA) Liquid Fuels Handling Code and Fuel Oil Code, all underground storage tanks must be removed within two years of disuse. If removal of a tank is not feasible, an application may be sought for a variance from this code requirement.

Government Publication Date: Feb 28, 2017

Waste Disposal Sites - MOE CA Inventory: Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Government Publication Date: Oct 2011-Jun 30, 2018

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Government Publication Date: Up to Oct 1990*

Water Well Information System: Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Government Publication Date: Dec 31, 2017

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

Appendix C
TSSA Correspondence

From:	Public Information Services
To:	Luke Lopers
Subject:	RE: Environmental Assessment - TSSA Records Search Request ~COR-11181273-E1~
Date:	Friday, August 10, 2018 1:15:21 PM
Attachments:	image001.jpg

No Records Found
Hello,
Thank you for your request for confirmation of public information.

- We confirm that there are **no fuel storage tanks records** in our database at the subject address(es).

For copies of documents, please complete the Release of Public Information form, found at https://www.tssa.org/en/about-tssa/resources/Release-of-Records-form--Jan-2018Final.pdf and email the completed form to publicinformationservices@tssa.org or through mail along with the appropriate fee. TSSA's fee schedule can be found at: https://www.tssa.org/en/about-tssa/resources/Documents/Public-Information-Fee-Schedule_Jan_2018.pdf. Fees are payable with a credit card (Visa or MasterCard) or by a cheque made payable to TSSA.
Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.
Kind regards,
Connie

From: Luke.Lopers@ghd.com <Luke.Lopers@ghd.com>
Sent: August 8, 2018 3:48 PM
To: Public Information Services <publicinformationservices@tssa.org>
Cc: filing@craworld.com
Subject: Environmental Assessment - TSSA Records Search Request ~COR-11181273-E1~

Good Afternoon,

Could you please search the TSSA database for records of fuel storage tanks, spills, incidents or infractions for the following addresses located in the **City of Ottawa (formerly Nepean),** ON:

- 2821, 2829, 2831, 2850, 2851, 2865, 2891 DuMaurier Avenue
- 1085 Grenon Avenue

Thank you for your time,

Luke Lopers, P.Eng.
Project Manager

GHD
Direct Line: +1 613 288 1723 | Ottawa Office: +1 613 727 0510 | Email: Luke.Lopers@ghd.com
179 Colonnade Road South Suite 400 Ottawa Ontario K2E 7J4 Canada | www.ghd.com
WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

Appendix D
Ministry of Environment Freedom of Information Correspondence

Ontario Ministry of Environment

Freedom of Information Request

This form is for requesting documents which are in the Ministry's files on environmental concerns related to properties. Please refer to the guide on the completion and use of this form. Our fax no. is (416) 314-4285.

Requester Data			For Ministry Use Only	
Name, Title, Company Name and Mailing Address of Requester Luke Lopers GHD Limited 179 Colonnade Drive, Suite 400 Ottawa, Ontario K2E 7J4			FOI Request No.	Date Request Received
			Fee Paid $ ~ ACCT ~ CHQ ~ VISA/MC ~ CASH	
Telephone/Fax Nos. Tel : 613-727-0895 Fax : 613-727-0581	Your Project/Reference No. 11181273-E1	Signature of Requester	☐ CNR ☐ ER ☐ NOR ☐ SWR ☐ WCR ☐ SAC ☐ IEB ☐ EAA ☐ EMR ☐ SWA	

Request Parameters

Municipal Address / Lot, Concession, Geographic Township (Municipal address essential for cities, towns or regions)

2831, 2833 2835, 2841 DuMaurier Avenue, Ottawa, Ontario (all adjacent properties with common ownership)

Present Property Owner(s) and Date(s) of Ownership

1248816 ONTARIO INC. (January 2001-present)

Previous Property Owner(s) and Date(s) of Ownership

Present /Previous Tenant(s), (if applicable)

Search Parameters Files older than 2 years may require $60.00 retrieval cost. There is no guarantee that records responsive to your request will be located.	**Specify Year(s) Requested**
Environmental concerns (General correspondence, occurrence reports, abatement)	All
Orders	All
Spills	All
Investigations/prosecutions ▸ ***Owner and tenant information must be provided***	All
Waste Generator number/classes	All

Certificates of Approval ▸ Proponent information must be provided

1987 and prior records are searched manually. **Search fees in excess of $300.00** could be incurred, depending on the types and years to be searched. Specify Certificates of Approval number (s) (if known). **If supporting documents are also required, mark SD box** and specify type e.g. maps, plans, reports, etc.

		SD	Specify Year(s) Requested
air - *emissions*			All
water - *mains, treatment, ground level, standpipes & elevated storage, pumping stations (local & booster)*			All
sewage - *sanitary, storm, treatment, stormwater, leachate & leachate treatment & sewage pump stations*			All
waste water - *industrial discharge*			All
waste sites - *disposal, landfill sites, transfer stations, processing sites, incinerator sites*			All
waste systems	- *haulers: sewage, non-hazardous & hazardous waste, mobile waste processing units, PCB destruction*		All
pesticides - *licenses*			All

A $5.00 non-refundable application fee, payable to the Minister of Finance, is mandatory. The cost of locating on-site and/or preparing any record is $30.00/hour and 20 cents/page for photocopying and you will be contacted for approval for fees in excess of $30.00.

Ontario Ministry of Environment

Freedom of Information Request

This form is for requesting documents which are in the Ministry's files on environmental concerns related to properties. Please refer to the guide on the completion and use of this form. Our fax no. is (416) 314-4285.

Requester Data			For Ministry Use Only	
Name, Title, Company Name and Mailing Address of Requester Luke Lopers GHD Limited 179 Colonnade Drive, Suite 400 Ottawa, Ontario K2E 7J4			FOI Request No.	Date Request Received
			Fee Paid $ ~ ACCT ~ CHQ ~ VISA/MC ~ CASH	
Telephone/Fax Nos. Tel : 613-727-0895 Fax : 613-727-0581	Your Project/Reference No. 11181273-E1	Signature of Requester	☐ CNR ☐ ER ☐ NOR ☐ SWR ☐ WCR ☐ SAC ☐ IEB ☐ EAA ☐ EMR ☐ SWA	

Request Parameters

Municipal Address / Lot, Concession, Geographic Township (Municipal address essential for cities, towns or regions)

2865 DuMaurier Avenue, Ottawa, Ontario

Present Property Owner(s) and Date(s) of Ownership

GIANT TIGER STORES LIMITED (December 2000-present)

Previous Property Owner(s) and Date(s) of Ownership

Present /Previous Tenant(s), (if applicable)

Search Parameters Files older than 2 years may require $60.00 retrieval cost. There is no guarantee that records responsive to your request will be located.	**Specify Year(s) Requested**
Environmental concerns (General correspondence, occurrence reports, abatement)	All
Orders	All
Spills	All
Investigations/prosecutions ▸ ***Owner and tenant information must be provided***	All
Waste Generator number/classes	All

Certificates of Approval ▸ Proponent information must be provided

1987 and prior records are searched manually. **Search fees in excess of $300.00** could be incurred, depending on the types and years to be searched. Specify Certificates of Approval number (s) (if known). **If supporting documents are also required, mark SD box** and specify type e.g. maps, plans, reports, etc.

	SD	Specify Year(s) Requested
air - *emissions*		All
water - *mains, treatment, ground level, standpipes & elevated storage, pumping stations (local & booster)*		All
sewage - *sanitary, storm, treatment, stormwater, leachate & leachate treatment & sewage pump stations*		All
waste water - *industrial discharge*		All
waste sites - *disposal, landfill sites, transfer stations, processing sites, incinerator sites*		All
waste systems - *haulers: sewage, non-hazardous & hazardous waste, mobile waste processing units, PCB destruction*		All
pesticides - *licenses*		All

A $5.00 non-refundable application fee, payable to the Minister of Finance, is mandatory. The cost of locating on-site and/or preparing any record is $30.00/hour and 20 cents/page for photocopying and you will be contacted for approval for fees in excess of $30.00.

Appendix E
City of Ottawa HLUI Correspondence

Office Use Only		
Application Number:	Ward Number:	Application Received: (dd/mm/yyyy):
Client Service Centre Staff:		Fee Received: $

Historic Land Use Inventory

Application Form

Notice of Public Record

All information and materials required in support of your application shall be made available to the public, as indicated by Section 1.0.1 of *The Planning Act*, R.S.O. 1990, C.P.13.

Municipal Freedom of Information and Protection Act

Personal information on this form is collected under the authority the *Planning Act*, RSO 1990, c. P. 13 and will be used to process this application. Questions about this collection may be directed by mail to Manager, Business Support Services, Planning Infrastructure and Economic Development Department, 110 Laurier Avenue West, Ottawa, K1P 1J1, or by phone at (613) 580-2424, ext. 24075

Background Information

***Site Address or Location:** *2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue, Ottawa, ON*

** Mandatory Field*

Applicant/Agent Information:

Name:	*GHD Limited*		
Mailing Address:	*179 Colonnade Road South, Suite 400, Ottawa, ON, K2E 7J4*		
Telephone:	*613-288-1723*	Email Address:	*luke.lopers@ghd.com*

Registered Property Owner Information: ☐ Same as above

Name:	*Giant Tiger Stores Limited*		
Mailing Address:	*2865 DuMaurier Avenue, Ottawa, ON, K2B 7W3*		
Telephone:	*613-829-6581*	Email Address:	

Site Details

Legal Description and PIN:	*Part of Lot 20, Concession 2, being Parts 4 to 7 and Parts 9 to 17 on Registered Plan 4R16235, Nepean, City of Ottawa PINs: 03944-0827, 03944-0826, and 03944-0238*
What is the land currently used for?	*Commercial Plaza (Retail)*

Lot frontage: _____ m Lot depth: _____ m Lot area: _____ m^2

OR Lot area: (irregular lot) _____ m^2

Does the site have Full Municipal Services: (•) Yes ( ) No

Required Fees

Please don't hesitate to visit the Historic Land Use Inventory website more information. Fees must be paid in full at the time of application submission.

Planning Fee	$100.00

Submittal Requirements

The following are required to be submitted with this application:

1. **Consent to Disclose Information:** Consultants and other third parties may make requests for information on behalf of an individual or corporation. However, if the requester is not the owner of the property, **the requester must provide the City of Ottawa with a 'consent to disclose information' letter, signed by the property owner.** This will authorize the City of Ottawa to release any relevant information about the property or its owner(s) to the requester. Consent for disclosure is required in the event that personal information or proprietary company information is found concerning the property and its owner. All consents must clearly indicate the name of the property owner as well as the name of the requester, and must be signed and dated.

2. **Disclaimer:** Requesters must read and understand the conditions included in the attached disclaimer and submit a signed disclaimer to the City of Ottawa's Planning, Infrastructure and Economic Development Department. This disclaimer is related to the Historic Land Use Inventory and must be received by the City of Ottawa, signed and dated by the requestor, before the process can begin.

3. A site plan or key plan of the property, its location and particular features.

4. Any significant dates or time frames that you would like researched.

Disclaimer
For use with HLUI Database

CITY OF OTTAWA ("the City") is the owner of the Historical Land Use Inventory ("HLUI"), a database of information on the type and location of land uses within the geographic area of Ottawa, which had or have the potential to cause contamination in soil, groundwater or surface water.

The City, in providing information from the HLUI, to GHD Limited ("the Requester") does so only under the following conditions and understanding:

1. The HLUI may contain erroneous information given that such records and sources of information may be flawed. Changes in municipal addresses over time may have introduced error in such records and sources of information. The City is not responsible for any errors or omissions in the HLUI and reserves the right to change and update the HLUI without further notice. The City does not, however, make any commitment to update the HLUI. Accordingly, all information from the HLUI is provided on an "as is" basis with no representation or warranty by the City with respect to the information's accuracy or exhaustiveness in responding to the request.

2. City staff will perform a search of the HLUI based on the information given by the Requester. City staff will make every effort to be accurate, however, the City does not provide an assurance, guarantee, warranty, representation (express or implied), as to the availability, accuracy, completeness or currency of information which will be provided to the Requester. The HLUI in no way confirms the presence or absence of contamination or pollution of any kind. The information provided by the City to the Requester is provided on the assumption that it will not be relied upon by any person whatsoever. The City denies all liability to any such persons attempting to rely on any information provided from the HLUI database.

3. The City, its employees, servants, agents, boards, officials or contractors take no responsibility for any actions, claims, losses, liability, judgments, demands, expenses, costs, damages or harm suffered by any person whatsoever including negligence in compiling or disseminating information in the HLUI.

4. Copyright is reserved to the City.

5. Any use of the information provided from the HLUI which a third party makes, or any reliance on or decisions to be based on it, are the responsibilities of such third parties. The City, its employees, servants, agents, boards, officials or contractors accept no responsibility for any damages, if any, suffered by a third party as a result of decisions made as a result of an information search of the HLUI.

6. Any use of this service by the Requestor indicates an acknowledgement, acceptance and limits of this disclaimer.

7. All information collected under this request and all records provided in response to this request are subject to the provisions of the Municipal Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c. M.56, as amended.

Signed: 

Dated (dd/mm/yyyy): 10/08/2018

Per: Luke Lopers

(Please print name)

Title: Project Manager

Company: GHD Limited

August 8, 2018 Reference No. 11181273-E1

Mr. Michael Boughton, MCIP, RPP
Infrastructure Services
City of Ottawa
110 Laurier Ave. W.
4th Floor
Ottawa, ON
K1P 1J1

Re: Request for Information
Municipal Freedom and Information and Protection of Privacy Act
Historical Land Use Records
2831,2851, and 2865 DuMaurier Avenue, Ottawa, Ontario

Dear Mr. Boughton;

GHD Limited (**GHD**) has been retained to conduct a Phase One Environmental Site Assessment (ESA) of the commercial properties located at Civic Nos. 2831,2851, and 2865 DuMaurier Avenue, in Ottawa, Ontario. Please note that the Site is one continuous commercial property with multiple civic addresses.

As part of the Phase I ESA, **GHD** would like to ensure that this property is currently and was formerly in compliance with applicable municipal/city by-laws/ regulations relative to the environment. Therefore, could you please search the City of Ottawa's Historical Land Use database and provide any information regarding former or outstanding infractions, control or other orders, violation notices, permits and approvals or reported spill incidents to the above reference properties or nearby properties to **GHD**.

As this information search is urgently required, we would appreciate if you could provide a response as soon as possible (via email). Thank you in advance for your prompt attention to this matter.

Yours truly,

Signature: _____

Name: Jean-Luc Rivard

Organization: Brigil

Address: 98 Lois Street, Gatineau, Qc

Telephone: 613-355-1260

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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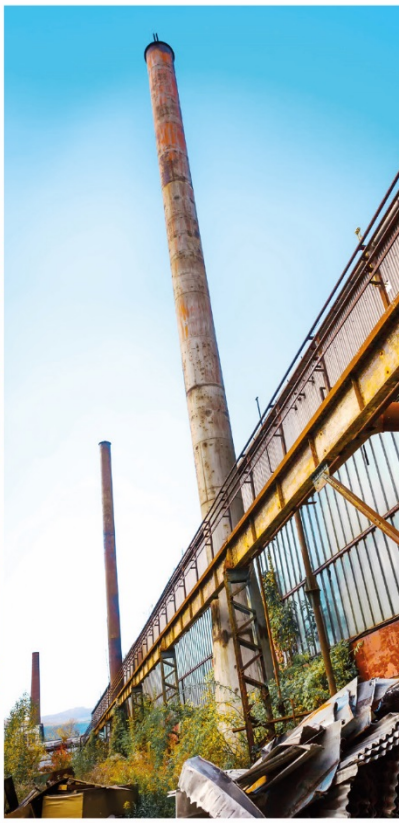
E.3 PHASE II ENVIRONMENTAL SITE ASSESSMENT (GHD 2019)

Phase Two Environmental Site Assessment

2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

3223701 Canada Inc.



Executive Summary

GHD (Consultant) was retained by 3223701 Canada Inc. (Client), to complete a Phase Two Environmental Site Assessment (Phase Two ESA) in general accordance with the O. Reg. 153/04 Phase Two ESA format for the current commercial/institutional property identified as 2831, 2851, and 2865 DuMaurier in Ottawa, Ontario (Site or Phase Two Property). GHD has previously prepared a Phase I Environmental Site Assessment (Phase I ESA) (Ref No: 11181273-E1-RPT-1, dated August 16, 2018) for 3223701 Canada Inc. The Phase I ESA was conducted for environmental due diligence for potential purchase of the Site.

The Phase I ESA identified one on-Site potentially contaminating activity (PCA); the suspected historical placement of fill material during redevelopment of the Site with the present day building. This PCA was considered to represent an area of potential environmental concern (APEC) for the Site. There was one PCA identified at a neighboring property in the Phase One Study Area as part of this assessment: the presence of a former landfill to the east of DuMaurier Avenue, approximately 20 m east of the site; this off-Site PCA was also considered to represent an APEC for the subject Site.

The Phase Two Environmental Site Assessment (Phase Two ESA) was recommended based on the APECs identified as part of the Phase I ESA. The purpose of the Phase Two ESA is to assess the soil and groundwater quality at the Site. The investigation involved the advancement of five boreholes which were sampled for environmental purposes. All of the boreholes were completed with groundwater monitoring well screened in the overburden or upper bedrock.

Six soil samples were submitted for laboratory analysis of Metals, Polycyclic Aromatic Hydrocarbons (PAHs) and pH. One duplicate soil sample was submitted for analysis of Metals, PAH and pH parameters. One soil sample was also submitted for toxicity characteristic leaching procedure (TCLP) analysis to determine options for off-Site disposal. Six groundwater samples, including one duplicate sample, were submitted for laboratory analysis of a combination of Metals, VOCs, PHCs and pH. One trip blank water sample was also submitted for analysis of VOCs.

Based on the soil depths, Site setting, and the existing land uses in the vicinity of the Site, the Full depth Generic Criteria provided in O. Reg. 153/04 Table 3 (non-potable, residential/institutional, coarse texture) is be considered to be the applicable comparison. The Site is not a sensitive Site, a Surface Water Site, or a potable groundwater use Site.

Site Compliance

There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in four of the six submitted soil samples, including the duplicate QA/QC soil sample.

There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in two of the six submitted groundwater samples, including the duplicate QA/QC soil sample.

The Site is not considered to be in compliance with the O. Reg. 153/04 criteria for the proposed land use and requires soil remediation/removal or a risk assessment prior to redevelopment.

Note that a remedial action plan that includes a soil and groundwater management program may be developed as part of the Site preparation prior to the construction phase of the Site redevelopment in order to manage and dispose of the contaminated soil at the time of redevelopment.

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1. Introduction

1.1 Site Description

Location and Identifier

The Site is located in the Foster Farm borough within the City of Ottawa, Ontario. The Property is located on the west side of DuMaurier Avenue, within the neighbourhood that is bordered by DuMaurier Avenue to the east and west, Ramsey Crescent to the south, and Richmond Road to the north. The Civic Nos. associated with the Property are 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue in Ottawa, Ontario (Site or Property). The Site is legally described as Part of Lot 20, Concession 2, being Parts 4 to 7 and Parts 9 to 17 on Registered Plan 4R16235, Nepean, City of Ottawa. The property identification numbers associated with the Site are 03944-0827, 03944-0826, and 03944-0238.

The coordinates of the approximate center of the Site are 45° 21' 01" N by 75° 47' 37" W (UTM Coordinates 437840 m E, 5022180 m N). A Site Location Map (Figure 1) and a Borehole Location Plan (Figure 2) are provided following this report. The municipal zoning for the Site is currently General Mixed Use Zone (residential, commercial, and/or institutional).

In all aspects of this report the Phase Two property is referred to as the Site or Phase Two Property.

Size and Boundaries

The Site is rectangular in shape, covers an area of approximately 0.8 hectares (2 acres), and is located in an area that is developed for mixed use (residential, commercial, and/or institutional). The Site is occupied by a single storey slab-on-grade commercial plaza building. The Site building covers approximately 30 percent of the Site. The remainder of the Site consists of asphalt paved parking, access laneways and landscaped sections along the perimeter. Vehicular access to the Site is from DuMaurier Avenue to the east and Ramsey Crescent to the south. The topography in the Phase I Study Area is undulating with a general slope downward to the south and southwest. The property to the northwest of the Site is elevated approximately 3 to 4 m with respect to the Site, while the property to the west of the Site is elevated approximately 0.6 m with respect to the Site.

The boundaries of the Site and location of the existing buildings are shown on Figure 2, Borehole Location Plan, following the text of this report.

1.2 Property Ownership

The north portion of the Site with Civic Nos. 2831, 2833, 2835, and 2841 DuMaurier Avenue are currently owned by 1248816 Ontario Inc. The south portion of the Site, with Civic No. 2865 DuMaurier Ave. is currently owned by Giant Tiger Stores Limited.

1.3 Current and Proposed Future Uses

The current property use is mixed commercial and institutional. The Site building consists of an occupied single storey slab-on-grade commercial plaza building with tenants including: Pinecrest

Deli (2831), Halal Meat and Grocery (2833), Da Al Sahaba Association (2835), Barney's Pizza (2841), and Giant Tiger (2865).

The Site and surrounding properties are located in a predominantly residential, institutional and commercial sector of the City of Ottawa. The properties surrounding the Site consist of the following facilities and features:

- Northeast | Institutional property (Church) located at Civic No. 2821 DuMaurier Avenue.
- Northwest | Institutional property (community center and school) located at Civic No. 1085 Grenon Avenue.
- East | DuMaurier Avenue followed by parkland (baseball fields) located at 2850 DuMaurier Avenue.
- South | Ramsey Crescent followed by residential dwellings at Civic No. 2891 DuMaurier Avenue.
- West | Residential apartment and dwellings at Civic No. 2891 DuMaurier Avenue.

The Site consists of the existing plaza with associated surrounding paved parking and driveways. A landscaped area is present at the northern limits of the Site. Under Ottawa Bylaw 2008-250, the Site property has a municipal zoning designation of GM "General Mixed Use Zone".

GHD understands that the Client intends to demolish the existing structures and construct a 40-storey residential building with six underground parking levels. The Property is currently used for mixed commercial and institutional purposes and therefore requires a Record of Site Condition (RSC), required for a change in land use to more sensitive land uses. This report will also be used to support a submission to the local municipal planning department and may also be used as a supporting document for a RSC.

1.4 Applicable Site Condition Standard

The pH of the soil was tested and observed to be within the range of 5-9. There are no Areas of Natural Scientific Interest (ANSI) identified by the Ministry of Natural Resources (MNR) within 250 m of the Site. There are no areas designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) identified within 250 m of the Site. As the Site does not contain an area of natural significance, and properties within 30 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

Drilling conducted as part of this investigation revealed that there is more than 2 m of soil in all boreholes locations advanced on the Site. The native soils encountered show a single native soil deposit consisting of a mixture of silt, clay and sand. In the absence of grain size analysis testing, the Site will be compared to the Coarse grain size condition

No natural surface water bodies were identified on the Site or within the Phase One Study Area. The nearest natural surface body is the Ottawa River, which is located approximately 1.5 km to the Northwest of the Site. There is no open surface water bodies within 30 m of the Site limits. As the property does not include all or part of a water body, and the property is not adjacent to a water body, and does not include land that is within 30 m of a water body, the Property is not considered a Surface Water site (O. Reg. 153/04, s43.1[1]).

The existing property use is mixed commercial and institutional. The proposed property use is residential. The Site is considered as being residential/parkland/institutional land use as per Section 3 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s1[3]).

The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone. The Site is not in an area designated on the City of Ottawa official plan as a well-head protection area (WHPA). The Site is not an agricultural property. The Site is considered as being non-potable water use as per Section 35 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s35).

Grain Size analysis of the recovered soil samples was not conducted as part of this investigation; accordingly, the most conservative soil texture criteria will be applied to the Site. The Site is considered as being medium and fine grained soil texture as per Section 42 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s42).

Based upon the above described assessments, accordingly, the full depth generic O. Reg. 153/04 Table 3 (full depth, residential/institutional land use, non-potable groundwater use, coarse grained soil texture) criteria is considered the applicable Site comparison.

2. Background Information

2.1 Physical Setting

Surface Water

No natural surface water bodies were identified on the Site or within the Phase One Study Area. The nearest natural surface water body is the Ottawa River, which is located approximately 1.5 km to the Northwest of the Site.

Topography and Drainage

The Site is relatively flat, sloping up at the northern property limits in the landscaped area, and sloping away from the Site building, directing storm water away from the buildings towards the property perimeter, and towards the central storm drain. The Site is generally elevated approximately 0.3 m with respect to the neighbouring streets to the east, and south.

The regional topography in the general area of the Site slopes down to the south and southwest.

The Phase Two ESA drilling program identified limestone bedrock between 3.2 and 3.9 meters below grade (mBG), with an upper surface described as ranging from very poor to good quality that become fair to good with depth. This material was overlain with a native soil deposit consisting of a mixture of silt, clay, and sand, covered with a fill material to provide engineered grading.

Hard surfaces at the Site include the paved parking area and driveway surrounding the existing buildings on Site. Precipitation falling on improved paved surfaces will travel by sheet flow to the Site storm drains. Precipitation falling on unimproved landscaped surfaces will infiltrate at the ground surface.

2.2 Past Investigation

The following environmental report was reviewed prior to conducting this Phase Two ESA:

- "Phase I Environmental Site Assessment, 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue, Ottawa, Ontario" Reference No. 11181273-E1-RPT-1, prepared by GHD, dated August 16, 2018

The Phase I ESA was completed for the entire Site which contains a one-storey plaza building, an associated paved parking and driveway areas, and a landscaped area at the north end of the site.

According to the historical research, the earliest developed use of the site is approximately 1980, based on information provided from the property owner's representative, listings from the City directories and observations from the aerial photographs. Based on the historical research, the Site has been used for commercial purposes since 1980 to the time of report preparation, with portions of the Site being used for institutional purposes since 2011. Based on aerial photographs, the Site was redeveloped with the present day building between 1976 and 1991.

At the time of the Phase I ESA, the Site was developed for mixed commercial and institutional uses. The Site building consists of an occupied single storey slab-on-grade plaza building with tenants including: Pinecrest Deli (2831), Halal Meat and Grocery (2833), Da Al Sahaba Association (2835), Barney's Pizza (2841), and Giant Tiger (2865).

Based on the historical research and known information of the general area of the Site, there was one suspected on-Site potentially contaminating activities (PCA); the suspected historical placement of fill material that is suspected to have occurred during the construction of the existing building, specifically for infilling previously observed drainage features at the Site. This PCA (identified as PCA#1) is considered to represent an area of potential environmental concern (APEC) for the Site (identified as APEC#1).

There was one off-Site PCA; the presence of a former landfill site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site. This PCA (identified as PCA#2) is considered to represent an APEC for the Site (identified as APEC#2).

A Phase Two ESA was recommended for the Phase I Property to assess the soil and groundwater quality at the Site as a result of the identified APECs.

3. Scope of the Investigation

3.1 Overview of Site Investigation

Underground utilities (both public and private services) were identified by GHD prior to drilling activities. Copies of the underground utility clearances are included in Appendix A.

On October 5, 2018, five boreholes (BH1/MW1, BH2/MW2, BH3S/MW3S, BH3D/MW3D, and BH4/MW4) were advanced by means of a truck mounted CME 55 power drill rig equipped for environmental soil sampling under the supervision of GHD field staff. Samples were recovered using 50 mm diameter split spoon samplers advanced to the sampling depth with a hydraulic hammer. Recovered soil samples were screened in the field for evidence of visual and olfactory evidence of

contamination. All boreholes were outfitted with groundwater monitoring wells to measure the groundwater levels and collect representative groundwater samples.

- Borehole BH1 was advanced to a depth of approximately 3.8 metres below grade (mBG), located to the west of 2829 DuMaurier Avenue. The borehole was equipped with a groundwater monitoring well screened in the overburden to intercept the shallow groundwater table. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with the imported fill materials (APEC#1) and potential impacts from the former off-Site landfill (APEC#2).
- Borehole BH2 was advanced to a depth of approximately 4.9 mBG, near the southeast limit of the Site property boundary. The borehole was equipped with a groundwater monitoring well screened in the bedrock. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with the imported fill materials (APEC#1) and potential impacts from the former off-Site landfill (APEC#2).
- Boreholes BH3D was advanced to a depth of approximately 5.4 mBG, near the northeast limit of the Site property boundary. The borehole was equipped with a groundwater monitoring well screened in the bedrock. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with the imported fill materials (APEC#1) and potential impacts from the former off-Site landfill (APEC#2).
- Boreholes BH3S was advanced to a depth of approximately 3.7 mBG, approximately 0.9 m to the south of BH3D. The borehole was equipped with a groundwater monitoring well screened in the overburden. This borehole/monitoring well was located to assess the environmental groundwater quality associated with the imported fill materials (APEC#1) and potential impacts from the former off-Site landfill (APEC#2).
- Borehole BH4 was advanced to a depth of approximately 5.4 mBG, located to the east of 2829 DuMaurier Ave. The borehole was equipped with a groundwater monitoring well screened in the bedrock. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with the imported fill materials (APEC#1) and potential impacts from the former off-Site landfill (APEC#2).

The following soil samples were submitted to the laboratory for analysis: BH1-SS3, BH2-SS5, BH3-SS3, BH4-SS2/SS3, DUP (a blind duplicate sample of BH4-SS2/SS3), and auger cuttings collected from BH3. The samples were submitted to AGAT Laboratories in Ottawa, Ontario under Chain of Custody (CoC) T075943 on October 5, 2018.

- All soil samples were analysed according to O. Reg. 153/04 requirements. All samples except the BH3 auger cuttings were tested for a combination of polycyclic aromatic hydrocarbons (PAHs), metals and inorganics and pH. The BH3 auger cuttings were not tested for metals and inorganics.
- The sample collected from the BH3 auger cuttings was also analysed for flashpoint and Toxicity Characteristic Leaching Procedure (TCLP) analysis for metals and inorganics on leachate, VOCs on leachate, and PCBs on leachate, for comparison to Ontario Regulation 558/00 to provide a waste classification of the soil.

On October 15, 2018, GHD returned to the Site to measure the static groundwater levels in all monitoring wells. The monitoring wells were then developed, with GHD purging the wells dry at least twice or a minimum of three well volumes. On October 19, 2018, GHD returned to Site to collect groundwater samples from all monitoring wells. A duplicate groundwater sample was collected from BH3S. The groundwater samples to be analysed for metals were filtered using dedicated 45 µm filters, the remainder of the samples were unfiltered. The collected groundwater samples, along with a trip blank, were submitted to the laboratory on October 19, 2018.

The groundwater samples were submitted to AGAT Laboratories in Ottawa, Ontario under Chain of Custody (CoC) T080076. The samples were analysed according to O. Reg. 153/04 requirements.

- All collected groundwater samples were analysed VOCs, metals and inorganics, and pH.
- Groundwater sample MW3S was additionally analysed for PHCs.
- Trip Blank (prepared by the laboratory on October 18, 2018) were analysed for VOCs.

On November 11, 2018 GHD surveyed the relative elevations of the advanced boreholes and monitoring wells, relative to an assigned elevation of 100.00 m of the fire hydrant on the northeast corner of the property, the location of this temporary benchmark is shown on Figure 2.

3.2 Media Investigated

Rationale for Inclusion of Various Media

Based on known historic potentially contaminating activities (PCAs) in the Phase One Study Area of the Site, it was suspected that overburden soil and groundwater have the potential to have been impacted by the PCAs. A Phase One Study Area is defined in O. Reg. 153/04 as 250 m from the Site's property limits, or any other property beyond this limit that the qualified person considers should be included.

PCAs in the Phase One Study area, which are considered to represent areas of potential environmental concern (APECs) for the Site, consisted of on-Site imported fill material of unknown quality (PCA/APEC#1), and the presence of a former landfill site, identified to the east of DuMaurier Avenue, approximately 20 m east of the Site (PCA/APEC#2). Accordingly, boreholes were placed across the Site to allow for collection of soil samples from the Site for an assessment of their environmental quality.

To assess the environmental quality of the groundwater, all of the boreholes advanced at the Site were outfitted with groundwater monitoring wells, which were screened in the overburden or the bedrock to intercept the groundwater table and possible aquifers in the bedrock. A seal was installed above the sand pack to the ground surface. The groundwater was sampled from the aforementioned monitoring wells using a peristaltic pump and Waterra tubing, following a period of stabilization, well development, and purging performed prior to the day of sampling. There were no natural surface water bodies observed at the Site during the Phase Two ESA, and therefore no sampling of surface water or sediment was conducted at the time of this investigation.

3.3 Phase One Conceptual Site Model

The Site is located in an area that is developed for mixed use (residential, commercial, and/or institutional).

The Civic Nos. associated with the Property are 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue in Ottawa, Ontario (Site or Property) and is approximately 0.8 hectares (2 acres) in area. The Site building consisted of an occupied single storey slab-on-grade commercial plaza building at the time of the Site visit. Tenants of the Site building included: Pinecrest Deli (2831), Halal Meat and Grocery (2833), Da Al Sahaba Association (2835), Barney's Pizza (2841), and Giant Tiger (2865). Based on the historical research, the Site has been used for commercial purposes since 1980 to the time of report preparation, with portions of the Site being used for institutional purposes since 2011.

No natural surface water bodies were identified on the Site or within the Phase One Study Area. The nearest natural surface body is the Ottawa River, which is located approximately 1.5 km to the Northwest of the Site. There are no open surface water bodies within 30 m of the Site limits. The Site is generally elevated approximately 0.3 m with respect to the neighbouring streets to the east, and south. The soil conditions in the vicinity of the Site are expected to consist of silt, clay, and sand type soils over limestone bedrock at approximately 3 to 4 meters below grade (mBG) and a water table, if present to be near 2 to 3 m below grade.

The historical records and use and present operations of properties located within 100 m of the subject land were considered from an environmental perspective for the purposes of this report. Properties located outside of the Phase I Study Area (100 m radius) were not considered to have had the potential to have impacted the subject land. Based on the historical research and known information of the general area of the Site, there was one suspected on-Site potentially contaminating activity (PCA): the suspected historical placement of fill material during redevelopment of the Site with the present day building. This PCA is considered to represent an area of potential environmental concern (APEC) for the Site.

There was one PCA identified for the surrounding properties in the Phase One Study Area as part of this assessment: the presence of a former landfill site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site. This PCA is considered to represent an APEC for the subject Site.

The Phase One Study area is serviced by municipal water and sewer services and is in a non-potable area within the City of Ottawa. Electrical and natural gas services are available from private utility companies. Given the location of underground services on the Site and the locations of the PCAs at the Site and neighbouring properties, the presence of underground services are considered to have the potential to have contributed to contaminant distribution on the subject land.

Subsurface Conditions

Municipal water and sewer services are supplied by underground service trenches on the east portion of the Site leading to DuMaurier Avenue. Electricity is supplied to the Site buildings from underground service trenches from the west of the building. Telecommunications are supplied to the Site building from Ramsey Crescent to the south of the Site. These service trenches are considered to have the potential to act as conduits for contaminant migration.

According to the 1987 Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No.: 1506A), the natural soil consists of "Abandoned river channel deposits of silt and silty clay; commonly including lenses of sand and generally underlain at variable depth by stratified, buff, medium grained sand". The thickness of overburden is expected to be approximately 3 to 4 m and the bedrock in the general area of the Site is expected to be limestone. According to records from the water well information system and borehole databases, as presented in the results of the subcontracted Ecolog Environmental ERIS search, the overburden soil in the vicinity of the Site consists of a mixture of silt, clay, and sand type soils. The overburden soil was reportedly underlain by shale or limestone bedrock at an approximate depth ranging from 1.8 to 8.8 m below ground surface.

Regional groundwater flow direction in the overburden within the Study Area was expected to be towards the south to southwest, following regional topography.

Potentially Contaminating Activities (PCAs)

Based on the known information of the general area of the Site, there was one on-Site PCA, and one off-Site PCAs identified in the Study Area.

- PCA#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.
- PCA#2 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners) | Off-Site, a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site.

Areas of Potential Environmental Concern (APECs)

The potentially contaminating activities provided above are considered to represent areas of potential environmental concern for the Site.

Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) in soil and groundwater for the Site were based on the APECs identified at the Site during Phase One ESA and observations at the time of the drilling program. The following CPCs for the Site were suspected to be associated with fill material at the Site, and the off site former landfill:

1. Metals and Inorganics
2. Polycyclic Aromatic Hydrocarbons (PAHs)
3. Additionally, Volatile Organic Compounds (VOCs) were considered a CPC in the groundwater only.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan (SAP) proposed

- Screens in each groundwater monitoring well should have a maximum wetted length of 3.0 m and a minimum total length of 1.5 m. GHD installed screens up to 1.5 m in length based on uncertainty of the elevation of the static groundwater table. The water table was lower than anticipated in areas of the Site and higher in others, resulting in a wetted screen length less than 1.5 m and other greater than 3.0 m. This modification to the SAP did not adversely affect this assessment.
- The possible presence of hydrocarbons was noted during the groundwater sampling at the MW3S well location using olfactory observations. One groundwater sample from MW3S was submitted for analysis of Petroleum Hydrocarbons (PHCs). The analysis showed O. Reg. 153/04 Table 3 exceedances of PHCs. The groundwater samples collected from all other wells were then analysed for PHCs as well.

No other deviations were made to the Sampling and Analysis Plan (SAP). A copy of the SAP is presented in Appendix B.

3.5 Impediments

There were no impediments that prevented completion of the work plan.

4. Investigation Method

4.1 General

The investigation method took into account the surficial features of the Site, the location and observations on the Site and the PCAs and APECs identified for the Site. Based upon these conditions, GHD determined that boreholes with split spoon soil sampling, installation and sampling of four new groundwater monitoring wells were considered adequate to assess if contaminants of potential concern (CPCs) would be detected within the soil and groundwater.

The fieldwork as part of the Phase Two ESA included advancement of boreholes, and selection of soil samples for testing based upon visual and olfactory observations and combustible vapour screening. All of the boreholes were then equipped with groundwater monitoring wells to allow collection of water level data, and sample collection for testing of CPC in the groundwater. The boreholes were surveyed relative to a readily identified benchmark (top of spindle of a fire hydrant located on the northeast corner of the property.

Samples were kept in ice chilled coolers and then submitted to an accredited laboratory under Chain of Custody control for chemical analysis of CPCs. Quality control procedures, including analysis of trip blanks, were followed.

The following sections present more detailed descriptions of each activity of the investigation.

4.2 Drilling and Excavating

Advancement of BH1/MW1 through BH4/MW4 was conducted on October 5, 2018 by George Downing Estate Drilling Ltd. of Grenville Sur La Rouge, Quebec, using a truck mounted CME 55 power drill rig. Drilling was conducted under full-time supervision and direction by GHD personnel.

Soil samples were recovered using 50 mm diameter split spoon samplers advanced to the sampling depth with a hydraulic hammer, and washed with soapy water between uses to avoid cross contamination. Soil samples were collected at pre-defined intervals to the maximum proposed depth of drilling.

4.3 Soil Sampling

Equipment

Split spoon soil samples were recovered from BH1/MW1 through BH4/MW4 on October 5, 2018 using 50 mm diameter continually advanced stainless steel split spoon samplers advanced with a hydraulic hammer, and washed between uses, as stated in the SAP. Samples of soil intended for PHCs F1 range and VOCs analysis were collected using 2 cc syringes and placed in methanol vials supplied by the laboratory. Additional soil samples were collected in laboratory supplied jars. Laboratory samples were held in coolers with ice packs prior to delivery to the laboratory.

Description

The findings reflect that there are generally six main materials above the limestone bedrock:

- Asphalt
- Grass vegetation and Topsoil
- Fill (Sand and Gravel) or (Silty Clay) or (Silty Sand)
- Sandy Silt
- Silty Clay
- Peat

The subsurface soil encountered in the five borehole locations is described in the following sections, and is presented graphically on the borehole logs, in Appendix C.

Asphalt

A surface layer of asphalt was encountered in boreholes BH1, BH2, and BH4. This layer was found at the ground surface extending down approximately 0.05 mBG.

Topsoil

A surface layer of topsoil and grass was encountered in boreholes BH3D/3S. This material was described as silty sand with organics, loose, dark brown, and damp. This layer was found at the ground surface extending down approximately 0.08 mBG.

No petroleum odours or visible evidence of staining were noted within the topsoil material.

Fill

A layer fill material consisting of a mixture of silt, sand and gravel was encountered underlying the surficial materials at all borehole locations. This material was described as grey and brown, loose to compact, and damp. The thickness of the fill material ranged from approximately 1.4 m (BH2) to 3.0 m (BH2).

It is suspected that the encountered fill material was used to backfill the foundation of the existing building and provide the granular structure for the existing pavement on the Site.

Visible evidence of staining was noted within the fill materials encountered in all boreholes except BH4.

Silty Clay

Native material was encountered beneath the fill material at the BH1, BH3D, and BH4 locations.

A native deposit of silty clay was encountered beneath the fill material at the borehole BH1 location. It was described as grey, moist, and very stiff. The layer was found to be approximately 1.2 m thick.

No evidence of staining was noted in the native material.

Sandy Silt

Underlying the clay deposit was a deposit of sandy silt that was found to be greyish brown in colour, damp to moist, and loose to very dense. The deposit was found to be approximately 0.9 m thick.

A thin sandy silt deposit was encountered beneath the peat layer at the BH4 location. The sandy silt deposit was found to be approximately 0.5 m thick and was recovered in a moist to wet condition and loose to very dense.

No evidence of staining was noted in the native material.

Peat

A native deposit of peat was encountered at the BH3D and BH4 locations underlying the fill material. The peat deposit was found to be approximately 1.0 to 1.2 m thick and was recovered in a damp to wet condition and very loose to loose.

No evidence of staining was noted in the native material.

4.4 Field Screening Measurements

The soil samples were field screened using visual and olfactory observations as well as combustible vapour screening using a Photoionization Detector (PID) for the CPCs. Field observations and PID readings are provided in the borehole logs provided in Appendix C.

4.5 Ground Water: Monitoring Well Installation

Advancement of boreholes BH1/MW1 through BH4/MW4 was conducted on October 5, 2018 by George Downing Estate Drilling Ltd. of Grenville Sur La Rouge, Quebec.

All of the boreholes were equipped with 51 mm diameter temporary groundwater monitoring wells respectively identified as MW1, MW2, MW3S, MW3D, and MW4. The well screens consisted of slotted No. 10, 51 mm diameter PVC. The 51 mm PVC risers extended from the top of the screen to finish height, approximately 0.05 mBG. The risers were encased in flush mount well protectors. A PVC slip cap was installed at the base of the screen to prevent sediment infiltration. A J-plug was used in the installations at the top of the riser to prevent surface water or precipitation influence.

Each well was backfilled with clean sand to 0.3 m above the top of the screen. The remaining annular space (directly above the sand pack) was backfilled with bentonite hole plug to within approximately 0.5 m of the ground surface, then backfilled with sand and equipped with a well protector.

Each well was equipped with dedicated 12 mm LDPE Waterra™ tubing and a dedicated Waterra™ footvalve. The Waterra™ tubing/footvalve was then used to develop the well. Wells were purged dry or up to three additional well volumes were removed prior to sampling to allow the collection of fresh groundwater and stabilization of field parameters.

4.6 Ground Water: Field Measurement of Water Quality Parameters

Field measurements of groundwater quality were measured in the field using a Hanna Water Quality Meter prior to sampling. Measurements of pH, turbidity, electrical conductivity (EC), and temperature were collected during purging prior to sampling. Measurements were collected following the removal of 1 L, one well volume and each subsequent well volume until the water quality parameters stabilized (subsequent readings within 10 percent difference).

4.7 Ground Water: Sampling

Stabilized groundwater levels were recorded in each monitoring well prior to disturbance of the water column.

All wells were developed then purged dry or up to three additional well volumes prior to sampling using a footvalve with dedicated 12 mm LDPE tubing in each monitoring well. Field measurements of water quality parameters were collected, as described above, to ensure stabilization of these parameters.

Following the repeated purging of the well, a groundwater sample was collected from all monitoring wells using dedicated 12 mm LDPE Waterra tubing and a Waterra footvalve.

All groundwater samples were collected in dedicated amber glass bottles and vials prepared by the laboratory. The groundwater samples for metal analysis were field filtered; the samples for PHCs, VOCs, and pH analysis were not field filtered.

Following sampling, the groundwater samples were stored in an ice pack chilled cooler and were taken directly to the laboratory following the sampling event.

4.8 Sediment Sampling

Sediment was not sampled as part of this assessment, as no natural surface water bodies were present at the Site.

4.9 Analytical Testing

All soil and groundwater analytical testing as part of this assessment was conducted by AGAT Laboratories (AGAT). AGAT is a member of the Standards Council of Canada (SCC) and Canadian Association for Laboratory Accreditation (CALA).

4.10 Residue Management Procedures

Soil cuttings from drilling activities were containerized in metal drums and placed in designated areas of the Site. The analytical results indicated there are exceedances of the O. Reg. 153/04 Table 3 criteria, which was determined to be applicable for the Site. The cuttings should be disposed of off-Site at a facility licenced to accept contaminated, non-hazardous waste soil.

Purge water was containerized in the field and was retained on-Site in one metal drum. The purge water should be disposed of off-Site at a facility licenced to accept contaminated, non-hazardous waste water.

4.11 Elevation Surveying

Survey data of the ground surface elevation of all boreholes and elevation of the top of pipe (riser) of all groundwater monitoring wells was collected as part of this assessment. Survey elevations were based on an assumed elevation of a temporary benchmark (TBM) of 100 m for the top of spindle of a fire hydrant located on the northeast corner of the property. The assigned elevations were as follows:

Table 4.1 Elevations

Location	Relative Grade Elevation (m)	Relative Top Of Piezometer (TOP) Elevation (m)	Remarks
TBM Hydrant	100.00	-	Assigned elevation 100 m
BH1/MW1	98.64	98.54	
BH2/MW2	98.39	98.29	
BH3D/MW3D	99.25	99.15	
BH3S/MW3S	99.33	99.23	
BH4/MW4	98.53	98.43	

4.12 Quality Assurance and Quality Control Measures

All soil sample jars were provided by AGAT. All PHC F1 range and BTEX soil samples were collected with laboratory provided single use 2 cc soil syringes. Each sample was given a unique identification.

Stainless steel split spoons were used to recover soil samples from the boreholes; the spoons were washed in soapy water between uses. A metal spatula was used to transfer samples from the split spoons to the sample jars; this spatula was cleaned between uses. While transferring samples from split spoons into the sample jars, GHD field staff wore nitrile gloves, which were changed prior to jarring each sample to prevent cross contamination.

To ensure laboratory quality control, a blind duplicate sample of soil was submitted for laboratory analysis of one of the six submitted soil samples. Duplicate sample DUP was submitted for laboratory analysis of metals and inorganics, and PAHs. This duplicate sample provides quality assurance and quality control of soil samples submitted as part of this assessment.

All groundwater sample jars were provided by AGAT. Each sample was given a unique identification. All groundwater samples were transferred directly from the dedicated LDPE tubing directly to the sampling containers. The bottles and vials for PHCs, BTEXs, VOCs, and general chemistry (pH) were not field filtered.

To ensure laboratory quality control, a field duplicate was submitted for laboratory analysis of one of the five collected groundwater samples. One field duplicate (DUP) was submitted for laboratory analysis of metals and inorganics, VOCs, BTEXs, and pH. A trip blank groundwater sample was submitted for laboratory analysis of VOCs for each day that sampling was completed. These duplicate and blank samples provide quality assurance and quality control of all parameter sets analysed for groundwater samples submitted as part of this assessment.

5. Review and Evaluation

5.1 Geology

Asphalt

A surface layer of asphalt was encountered in boreholes BH1, BH2, and BH4. This layer was found at the ground surface extending down approximately 0.05 mBG.

Topsoil

A surface layer of topsoil and grass was encountered in boreholes BH3D/3S. This material was described as silty sand with organics, loose, dark brown, and damp. This layer was found at the ground surface extending down approximately 0.08 mBG.

No petroleum odours or visible evidence of staining were noted within the topsoil material.

Fill

A layer fill material consisting of a mixture of silt, sand and gravel was encountered underlying the surficial materials at all borehole locations. This material was described as grey and brown, loose to compact, and damp. The thickness of the fill material ranged from approximately 1.4 (BH1) to 3.0 m (BH2).

It is suspected that the encountered fill material was used to backfill the foundation of the existing building and provide the granular structure for the existing pavement on the Site.

Visible evidence of staining was noted within the fill materials encountered in all boreholes except BH4.

Silty Clay and Sandy Silt (Native)

Native silty clay material was encountered beneath the fill material at the BH1, BH3D, and BH4 locations.

A native deposit of silty clay was encountered beneath the fill material at the borehole BH1 location. It was described as grey, moist, and very stiff. The layer was found to be approximately 1.2 m thick.

Underlying the clay deposit was a deposit of sandy silt that was found to be greyish brown in colour, damp to moist, and loose to very dense. The deposit was found to be approximately 0.9 m thick.

A native deposit of peat was encountered at the BH3D and BH4 locations underlying the fill material. The peat deposit was found to be approximately 1.0 to 1.2 m thick and was recovered in a damp to wet condition and very loose to loose.

A thin sandy silt deposit was encountered beneath the peat layer at the BH4 location. The sandy silt deposit was found to be approximately 0.5 m thick and was recovered in a moist to wet condition and loose to very dense.

No evidence of staining was noted in the native material.

5.2 Ground Water - Elevations and Flow Direction

In order to assess the environmental quality of the groundwater at the Site, five groundwater monitoring wells (MW1, MW2, MW3S, MW3D, and MW4) were installed on the subject Property as part of this assessment. Wells MW1 and MW3S were screened in the overburden. All other wells were screened in the upper surface of the bedrock aquifer. A bentonite seal above the monitoring well screen/sandpack was formed during all monitoring well installations. Monitoring well construction details are presented in Table 5.1.

Table 5.1 Monitoring Well Installation

Well ID	Grade Elevation (m)	TOP Elevation (m)	Borehole Bottom Elevation (m)	Screen Elevation (m)	Sand Pack Elevation (m)	Bentonite Seal Elevation (m)	Well Bottom Depth (mBG)
BH1/MW1	98.64	98.54	94.8	96.7 to 95.2	97.1 to 95.2	98.2 to 97.1	3.4
BH2/MW2	98.39	98.29	93.5	94.6 to 93.5	94.8 to 93.5	97.9 to 94.8	4.9
BH3D/MW3D	99.25	99.15	93.9	95.2 to 93.9	95.3 to 93.9	98.8 to 95.3	5.4
BH3S/MW3S	99.33	99.23	95.6	97.1 to 95.6	97.5 to 95.6	98.8 to 97.5	3.7
BH4/MW4	98.53	98.43	93.1	94.2 to 93.1	94.3 to 93.1	98.0 to 94.3	5.4

Notes:
*Elevations are not geodetic. Relative to assigned TBM as discussed in Section 4.11

Following a period of stabilization of the groundwater in the overburden wells, water levels were collected on October 15, 2018. Groundwater elevations were determined based on the assigned elevation of 100 m for the surveyed benchmark (fire hydrant located on the northeast corner of the Site), and the monitoring well survey and the measured groundwater level within each monitoring well. Water table elevation details are presented in Table 5.2.

Table 5.2 Water Table Details

Well ID	Grade Elevation (m)	TOP Elevation (m)	Depth to groundwater (m below grade)	Depth to Groundwater (m below TOP)	Water Table Elevation (m)
BH1/MW1	98.64	98.54	2.07	1.97	96.57
BH2/MW2	98.39	98.29	3.21	3.11	95.18
BH3D/MW3D	99.25	99.15	1.37	1.27	97.88
BH3S/MW3S	99.33	99.23	1.26	1.16	98.07
BH4/MW4	98.53	98.43	1.28	1.18	97.25

Free product was not identified during any monitoring. The results of the LNAPL/DNAPL investigation are presented in Table 1.

Three groundwater monitoring wells are required to triangulate groundwater elevations and provide a direction of groundwater flow. Five wells were installed as part of this investigation. BH1/MW1 BH3S/MW3S were installed in the overburden. All other wells were installed in the upper bedrock. These wells were used to determine a direction of groundwater flow and hydraulic gradient. Based on the water table elevations recorded in the monitoring wells installed as part of this investigation on the Site, the direction of groundwater flow in the vicinity of the boreholes was determined to be towards the south. This direction of groundwater flow is logical based on the surficial topography observed at the Site and neighbouring properties.

5.3 Ground Water - Hydraulic Gradients

The hydraulic gradient was calculated by dividing the difference in hydraulic head by the lateral distance between monitoring locations. Based on the recorded groundwater elevations in Table 5.2 above, the horizontal hydraulic gradient is approximately 0.025 m/m.

5.4 Fine-Medium or Coarse Soil Texture

Borehole advancement has identified a native deposit consisting of a mixture or silt, clay, and sand. A significant layer of fill material was also encountered as part of the borehole drilling program. As no grain size analysis was completed as part of this assessment, the Coarse textured soil conditions will be applied, as this provides a conservative comparison of contaminant concentrations to their criteria.

5.5 Soil Field Screening

The soil samples were field screened for the olfactory and visible presence of CPCs and for combustible vapour. The combustible vapour readings for the soil samples collected as part of this assessment were negligible.

5.6 Soil Quality

Location and Depth of Sampling

The locations of the boreholes and sampling locations are indicated on Figure 2: Borehole Location Plan, in the Figures section of this report. During the investigation, soil layers were sampled for metals, PAHs, pH, Flashpoint, and TCLP for metals and inorganics, VOCs, and PCBs, as follows:

Table 5.3 Soil Sample Details

Sample ID	Submitted Sample	Sample depth	Parameters
BH1-SS3	BH1-SS3	1.4-2.0	metals, PAHs, pH
BH2-SS5	BH2-SS5	2.4-3.0	metals, PAHs, pH
BH3-SS3	BH3-SS3	1.2-1.8	metals, PAHs, pH
BH4-SS2/SS3	BH4-SS2/SS3	0.6-1.8	metals, PAHs, pH
BH3 (Auger Cuttings)	BH3 (Auger Cuttings)	2.5-3.5	PAHs, pH, TCLP metals, TCLP VOCs, TCLP PCBs, Flashpoint
BH5-SS3 (DUP of BH4-SS2/SS3)	BH4-SS2/SS3	0.6-1.8	metals, PAHs, pH

Comparison of Analytical Results to O. Reg. 153/04 Criteria

As determined in Section 1.4 (Applicable Site Class), full depth generic O. Reg. 153/04 Table 3 (residential/parkland land use, non-potable groundwater use, coarse grain soil texture) criteria is considered the applicable Site comparison.

Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 3 criteria (residential/parkland, coarse grained texture):

- BH2-SS5
  - Boron, Electrical Conductivity, and Sodium Adsorption Ratio
- BH1-SS3, BH2-SS5, BH4-SS2/SS3, BH5-SS3 (DUP of BH4-SS2/SS3)
  - Electrical Conductivity, and Sodium Adsorption Ratio

A complete summary of the analytical soil testing conducted as part of this Phase Two ESA and comparison to O. Reg. 153/04 criteria are present in Table 2. The maximum soil concentrations detected as part of this investigation are presented in Table 4, following the text of this report. A copy of the laboratory certificates of analysis for the soil samples are presented in Appendix D.

Contaminants of Concern

The contaminants of potential concern (CPC) in soil for the Site were based on the APECs identified at the Site during the Phase One ESA:

- PCA#1 (on-Site, fill of an unknown origin)/APEC #1 (various locations) | metals and PAHs
- PCA#2 (off-Site, a former landfill)/APEC #2 (approx. 20 m east of Site) | metals and PAHs

Comparison of TCLP Analytical Results to O. Reg. 558/00 Schedule IV Criteria

A soil sample was collected for leachate testing and was analyzed using the toxicity characteristic leaching procedure (TCLP). The results of the submitted TCLP sample are shown on the laboratory Certificate of Analysis – AGAT #18Z394508 in Appendix D. The results of the TCLP testing were compared to O. Reg. 558/00 criteria. The TCLP results are in compliance with the O. Reg. 558/00 criteria. In the event that the Site soil cannot be handled as clean fill, the Site soil can be considered solid non-hazardous waste.

Chemical or Biological Transformations

Parameters related to chemical or biological transformations of CPCs were not suspected to be present and were not detected in the analytical results as part of this investigation.

Soil Acting as a Contaminant Mass Contributing to Other Media

Based on the laboratory results of the analysed soil samples, there is no soil on the Site which is acting as a contaminant mass contributing to other media.

LNAPL/DNAPL

Light Non Aqueous Phase Liquids (LNAPL) and Dense Non Aqueous Phase Liquids (DNAPL) were not suspected to be present in the groundwater at the Site as a result of the identified PCAs/APECs. Free product was not detected in the groundwater recovered from the monitoring wells.

5.7 Ground Water Quality

Location and Depth of Sampling

The depths of the screens are indicated in Table 5.1 in Section 5.2 of this report; the screened intervals were situated in the upper (weathered) portion of the limestone bedrock or in the overburden, straddling the shallow static groundwater table.

Field Filtering

Field filtering is not conducted under standard field protocols for groundwater sampling of PHCs, VOCs, BTEXs, PAHs, or pH.

Samples intended for metal analysis were field filtered using a 45 µm filter.

Contaminants of Concern

The contaminants of potential concern (CPC) in groundwater for the Site were based on the APECs identified at the Site during the Phase One ESA:

- PCA#1 (on-Site, fill of an unknown origin)/APEC #1 (various locations) | metals and inorganics, BTEXs, PHCs
- PCA#2 (off-Site, a former landfill)/APEC #2 (approx. 20 m east of Site) | metals and inorganics, VOCs

Comparison of Analytical Results to O. Reg. 153/04 Criteria

As determined in Section 1.4 (Applicable Site Class), full depth generic O. Reg. 153/04 Table 3 (residential/parkland land use, non-potable groundwater use, coarse soil texture) criteria is considered the applicable Site comparison.

Analytical testing of the aforementioned groundwater samples indicated the following parameters exceed the O. Reg. 153/04 Table 3 criteria (residential/parkland, coarse grained texture):

- MW2
  - Chloride
- MW3S
  - PHCs (F2 and F3)

A complete summary of the analytical groundwater testing conducted as part of this Phase Two ESA and comparison to O. Reg. 153/04 criteria are present in Table 3, following the text of this report. The maximum groundwater concentrations detected as part of this investigation are presented in Table 5, following the text of this report. A copy of the laboratory certificates of analysis for the groundwater samples are presented in Appendix D.

Chemical or Biological Transformations

Parameters related to chemical or biological transformations of the CPCs were not suspected to be present and were not detected in the analytical results as part of this investigation.

LNAPL/DNAPL

Light Non Aqueous Phase Liquids (LNAPL) and Dense Non Aqueous Phase Liquids (DNAPL) were not considered to have the potential to be present in the groundwater at the Site as a result of the identified PCAs/APECs.

There were detections of PHCs (F2 and F3 range) in the analyzed groundwater sample collected from MW3S, which was reported at concentrations in exceedance of O. Reg. 153/04 Table 3 Site criteria.

There were detection of VOCs parameters in the analyzed groundwater sample collected from MW1,MW3S, MW4, and MW6 (a duplicate sample of MW3S), at concentrations in compliance with of O. Reg. 153/04 Table 3 Site criteria.

Free product was not detected in the groundwater recovered from the monitoring wells.

5.8 Sediment Quality

Natural Surface Water Bodies were not present on the Site; as such sediment sampling was not conducted at the Site as part of the Phase Two ESA.

5.9 Quality Assurance and Quality Control Results

Quality Control

One field duplicate soil sample (BH5-SS3, a duplicate of sample BH4-SS2/SS3) was submitted for laboratory analysis of metals, PAHs, and pH. This duplicate analysis provides quality assurance and quality control of parameter sets analysed in the six soil samples submitted as part of this assessment. In general the relative percent differences (RPDs) were less than 40 percent for the duplicate soil samples. This range of RPDs is typically greater than that which would indicate consistency in laboratory results, however, given the low level concentrations of parameters which were generally detected in the analysed soil sample duplicates, the level of variability among results is considered acceptable to indicate that the duplicate soil results do indicate general consistency in the laboratory data.

One blind field duplicate groundwater sample (MW6, a duplicate of MW3S) was submitted for laboratory analysis of metals, VOCs, PHCs, and pH. This duplicate provides quality assurance and quality control of parameter sets analysed in the six groundwater samples submitted as part of this assessment. The relative percent differences (RPDs) were less than 70 percent for the duplicate groundwater samples. This range of RPDs is typically greater than that which would indicate consistency in laboratory results, however, given the low level concentrations of parameters which were generally detected in the analysed soil sample duplicates, the level of variability among results is considered acceptable to indicate that the duplicate soil results do indicate general consistency in the laboratory data.

One trip blank samples (one for each day of groundwater sampling) was submitted for laboratory analysis of VOCs in groundwater. This trip blanks provides quality assurance and quality control of volatile parameter sets analysed for groundwater samples submitted as part of this assessment. No contaminants concentrations were detected in the analyzed trip blank sample.

Handling and Transport

All samples were delivered to the laboratory in laboratory supplied containers. Samples were hand delivered to the laboratory in coolers, equipped with ice packs and trip blanks. All samples were delivered to the Laboratory within the mandated holding time and temperature requirements.

Analytical Documentation

The documentation provided from the laboratory meets the requirements of O. Reg. 153/04 Section 47(3). Documentation for each laboratory submitted sample has been included as an appendix to this report. Full documentation, including the laboratory certificates of analysis, is provided in Appendix D.

Analytical Qualifiers

No analytical qualifiers were reported on laboratory report 18Z394508 (soil samples) or report 18Z399894 (groundwater samples) with respect to submissions as part of this assessment.

General Comments on Field Data

For the purposes of this investigation, the quality of the field data:

- Meets the objectives of the investigation.
- Did not affect the decision making process.

5.10 Phase Two Conceptual Site Model

Potentially Contaminating Activities (PCAs)

Based on the known information of the general area of the Site, there was one on-Site PCA, and one off-Site PCA identified in the Study Area.

- PCA#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.
- PCA#2 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners) | Off-Site, a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site.

Areas of Potential Environmental Concern (APECs)

The potentially contaminating activities considered to represent areas of potential environmental concern for the Site are:

- APEC#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.
- APEC#2 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners) | Off-Site, a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site.

Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) in soil and groundwater for the Site were based on the APECs identified at the Site during Phase I ESA and observations at the time of the drilling program. The following CPCs for the Site were suspected to be associated with fill material at the Site, and the off-Site former landfill:

1. Petroleum Hydrocarbons ranges F1-F4 (PHCs) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEXs)
2. Volatile Organic Compounds (VOCs) – in groundwater only
3. Metals and Inorganics
4. Polycyclic Aromatic Hydrocarbons (PAHs)

An assessment of the CPCs for the Site was completed as part of the Phase Two ESA analytical submission program. Soil and groundwater samples were submitted for a combination of the CPCs dependent on borehole/monitoring well locations with respect to the APECs.

Subsurface Conditions

Municipal water and sewer services are supplied by underground service trenches on the east portion of the Site leading to DuMaurier Avenue. Electricity is supplied to the Site buildings from underground service trenches from the west of the building. The phone line is supplied to the Site building from Ramsey Crescent to the south of the Site. These service trenches are considered to have the potential to act as conduits for contaminant migration.

According to the 1987 Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No.: 1506A), the natural soil consists of "Abandoned river channel deposits of silt and silty clay; commonly including lenses of sand and generally underlain at variable depth by stratified, buff, medium grained sand". The thickness of overburden is expected to be approximately 3 to 4 m thick and the bedrock in the general area of the Site is expected to be limestone. According to records from the water well information system and borehole databases, as presented in the results of the subcontracted Ecolog Environmental ERIS search, the overburden soil in the vicinity of the Site consist of a mixture of silt, clay, and sand type soils. The overburden soil was reportedly underlain by shale or limestone bedrock at an approximate depth ranging from 1.8 to 8.8 m below ground surface.

Physical Setting - Stratigraphy

As presented in the Borehole Logs in Appendix C, the investigation identified seven materials within the depth investigated, namely:

- Asphalt
- Grass vegetation and Topsoil
- Fill (Sand and Gravel) or (Silty Clay) or (Silty Sand)
- Sandy Silt
- Silty Clay
- Peat
- Limestone bedrock

Physical Setting – Hydrogeological

The interpretation of groundwater flow was based upon the generally known geology, the location and flow direction of surface water bodies and the static water levels collected from monitoring wells completed on the Site as part of this assessment. The overburden/weathered upper bedrock groundwater flows to the south. Based on the recorded groundwater elevations in Table 5.2, and a lateral separation distance between monitoring well locations, the horizontal hydraulic gradient is approximately 0.025 m/m. The hydraulic gradient is expected to vary with seasonal and weather conditions.

Based on the geology observed at the Site, the overburden/weathered upper bedrock aquifer is considered as unconfined.

Physical Setting – Bedrock

Limestone bedrock was encountered in boreholes BH2, BH3D, and BH4 at the Site, generally at depths ranging between 3.2 and 3.9 mBG. In general, the upper surface (top 0.5-1.5 m) of the bedrock was revealed to be very poor to good quality, becoming to fair to good rock quality with increasing depth.

Physical Setting – Groundwater Table

The static groundwater table in overburden wells installed by GHD, were measured at depths ranging from approximately 1.3 to 2.1 mBG on October 15, 2018.

The groundwater table in the wells installed in the upper bedrock were measured at depths ranging from approximately 1.3 to 3.2 mBG.

Groundwater flow direction was interpreted to be towards the south with a calculated hydraulic gradient of 0.025 m/m, based on measured relative groundwater elevations.

The water table details are summarized in Table 5.2. It should be noted that the water table elevation is expected to vary with seasonal and weather conditions.

Physical Setting – Sensitive or Shallow or Surface Water

The pH of the soil was tested and observed to be within the range of 5-9. There are no Areas of Natural Scientific Interest (ANSI) identified by the Ministry of Natural Resources (MNR) within 250 m of the Site. There are no areas designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) identified within 250 m of the Site. As the Site does not contain an area of natural significance, and properties within 30 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

No natural surface water bodies were identified on the Site or within the Phase One Study Area. The nearest natural surface body is the Ottawa River, which is located approximately 1.5 km to the Northwest of the Site. There is no open surface water bodies within 30 m of the Site limits. As the property does not include all or part of a water body, and the property is not adjacent to a water body, and does not include land that is within 30 m of a water body, the Property is not considered a Surface Water site (O. Reg. 153/04, s43.1[1]).

Drilling conducted as part of this investigation revealed that there is more than 2 m of soil in all boreholes locations advanced on the Site. The native soils encountered show a single native soil deposit consisting of a mixture of silt, clay and sand; coarse grained soils were assumed as a conservative comparison approach. The full depth generic criteria of Tables 3 of O. Reg. 153/04 is considered applicable.

The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone (IPZ). The Site is not in an area designated on the City of Ottawa official plan as a well-head protection area (WHPA). The Site

is not an agricultural property. The Site is considered as being non-potable water use as per Section 35 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s35).

The existing property use is mixed commercial and institutional. The proposed property use will be residential. The Site is considered as being residential/parkland/institutional land use as per Section 3 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s1[3]).

Accordingly, the appropriate Site classification under O. Reg. 153/04 will be full depth generic non-potable residential land use (O. Reg. 153/04, Table 3).

Physical Setting – Fill

A layer fill material consisting of a mixture of silt, sand and gravel was encountered underlying the surficial materials at all borehole locations. This material was described as grey and brown, loose to compact, and damp. The thickness of the fill material ranged from approximately 1.4 (BH1) to 3.0 m (BH2).

It is suspected that the encountered fill material was used to backfill the foundation of the existing building and provide the granular structure for the existing pavement on the Site.

Visible evidence of staining was noted within the fill materials encountered in all boreholes except BH4.

In addition to the fill material identified in the Phase Two ESA drilling program, it is expected that underground services on the property are bedded in imported granular material. It is expected that the construction of the foundations of the existing on-Site building included backfill, and material from off-Site. Backfill around the existing structures and services was not investigated as part of the Phase Two ESA.

Physical Setting – Existing and Proposed Structures

At the time of report preparation:

- The current property use is mixed commercial and institutional
- The existing building on Site is surrounded by asphalt paved parking area that is accessed from Dumaurier Avenue to the east and Ramsey Crescent to the south.
- The north portion of the Site is a landscaped area.

GHD understands that the Client intends to demolish the existing structures and construct a 40-storey residential building with six underground parking levels. The Property is currently used for mixed commercial and institutional purposes and therefore requires a Record of Site Condition (RSC), required for a change in land use to more sensitive land uses. This report will also be used to support a submission to the local municipal planning department.

Contamination

Soil samples were collected from the boreholes advanced on October 5, 2018 and were analysed for a combination of PAHs, metals and inorganics, and pH.

Four soil samples, BH1-SS3 (1.4-2.0 mBG), BH2-SS5 (2.4-3.0 mBG), BH4-SS2/SS3 (0.6-1.8 mBG) and BH5-SS3 (a duplicate sample of BH4-SS2/SS3) presented O. Reg. 153/04 Table 3

exceedances of electrical conductivity and sodium adsorption ratio. The soil sample BH2-SS5 also presented exceedances of Boron.

The sample BH1-SS3 was collected from the native silty clay deposit. All other samples were collected from fill material at various locations around the site. It is suspected that areas of contaminated soil are present across the Site and in localized areas where poor quality fill material was used for grading and/or backfill for the foundations of the existing on-site building. It is suspected that there may be additional contaminated soil present in other localised areas of the Site.

Groundwater was sampled on October 19, 2018 and analysed for Metals, VOCs, BTEX, and PHCs. Groundwater sample, MW2 presented O. Reg. 153/04 Table 3 exceedances of Chloride. Sample MW3S presented O. Reg. 153/04 Table 3 exceedances of PHCs (F2 and F3). The PHC contamination appears to be localized in the area of MW3S as PHCs were not detected in the analysis of the groundwater samples collected from the other well locations.

A remedial action plan and groundwater management program will be developed for the Client in order to manage and dispose of the contaminated soil and groundwater at the time of redevelopment.

6. Conclusions

Soil samples were collected from the boreholes advanced on October 5, 2018 and were analysed for a combination of Metals, PAHs, and pH.

Four soil samples, BH1-SS3 (1.4-2.0 mBG), BH2-SS5 (2.4-3.0 mBG), BH4-SS2/SS3 (0.6-1.8 mBG) and BH5-SS3 (a duplicate sample of BH4-SS2/SS3) presented O. Reg. 153/04 Table 3 exceedances of electrical conductivity and sodium adsorption ratio. The soil sample BH2-SS5 also presented exceedances of Boron.

The sample BH1-SS3 was collected from the native silty clay deposit. All other samples were collected from fill material at various locations around the site. It is suspected that areas of contaminated soil are present across the Site and in localized areas where poor quality fill material was used for grading and/or backfill for the foundations of the existing on-site building. It is suspected that there may be additional contaminated soil present in other localised areas of the Site.

Groundwater was sampled on October 19, 2018 and analysed for Metals, VOCs, BTEX, and PHCs. Groundwater sample, MW2 presented O. Reg. 153/04 Table 3 exceedances of Chloride. Sample MW3S presented O. Reg. 153/04 Table 3 exceedances of PHCs (F2 and F3). The PHC contamination appears to be localized in the area of MW3S as PHCs were not detected in the analysis of the groundwater samples collected from the other well locations.

A remedial action plan and groundwater management program will be developed for the Client in order to manage and dispose of the contaminated soil and groundwater at the time of redevelopment.

Site Compliance

There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in four of the six submitted soil samples, including the duplicate QA/QC soil sample.

There were O. Reg. 153/04 Table 3 (residential land use, coarse soil texture) criteria exceedances in two of the six submitted groundwater samples, including the duplicate QA/QC soil sample.

The Site is not considered to be in compliance with the O. Reg. 153/04 criteria for the proposed land use and requires soil and groundwater remediation/removal or a risk assessment.

7. References

Ontario Regulation 153/04

Phase I Environmental Site Assessment, 2831, 2833, 2835, 2841 and 2865 DuMaurier Avenue, Ottawa, Ontario. Reference No. 11181273-E1 (1), prepared by GHD Ltd., dated August 16, 2018

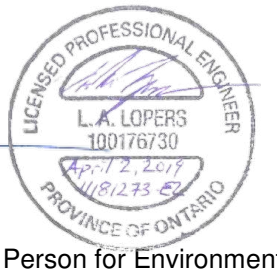
Certificate of Analysis – AGAT #18Z394508 – Soil and TCLP– October 15, 2018

Certificate of Analysis – AGAT #18Z399894 – Groundwater – October 30, 2018

All of Which is Respectfully Submitted,

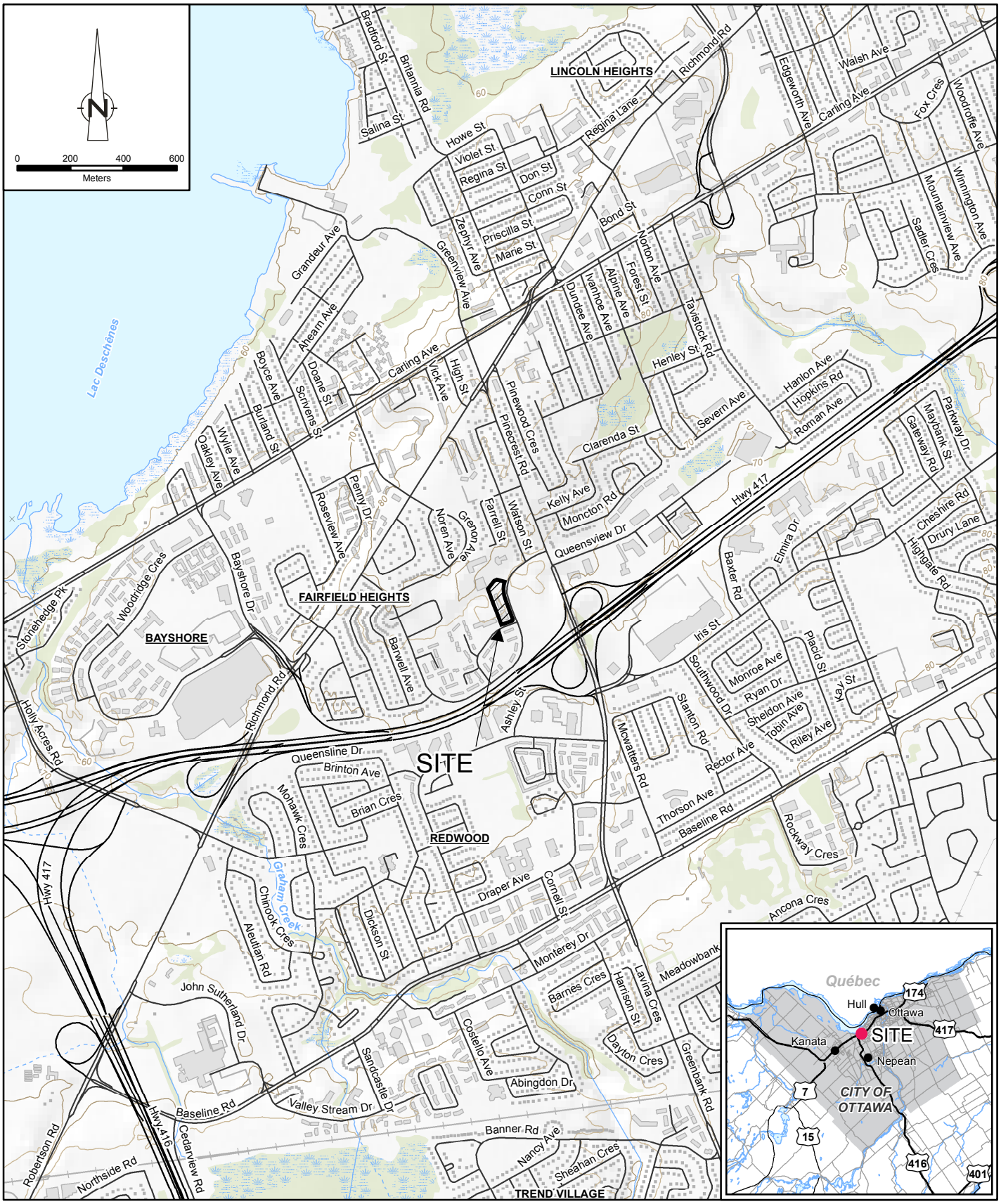
GHD

Ryan Vanden Tillaart, EIT



Luke Lopers, P. Eng.

Luke Lopers, P. Eng., Qualified Person for Environmental Site Assessment under O. Reg. 153/04, confirms the carrying out of the Phase Two Environmental Site Assessment and the findings and conclusions of this report.



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Coordinate System: NAD 1983 UTM Zone 18N

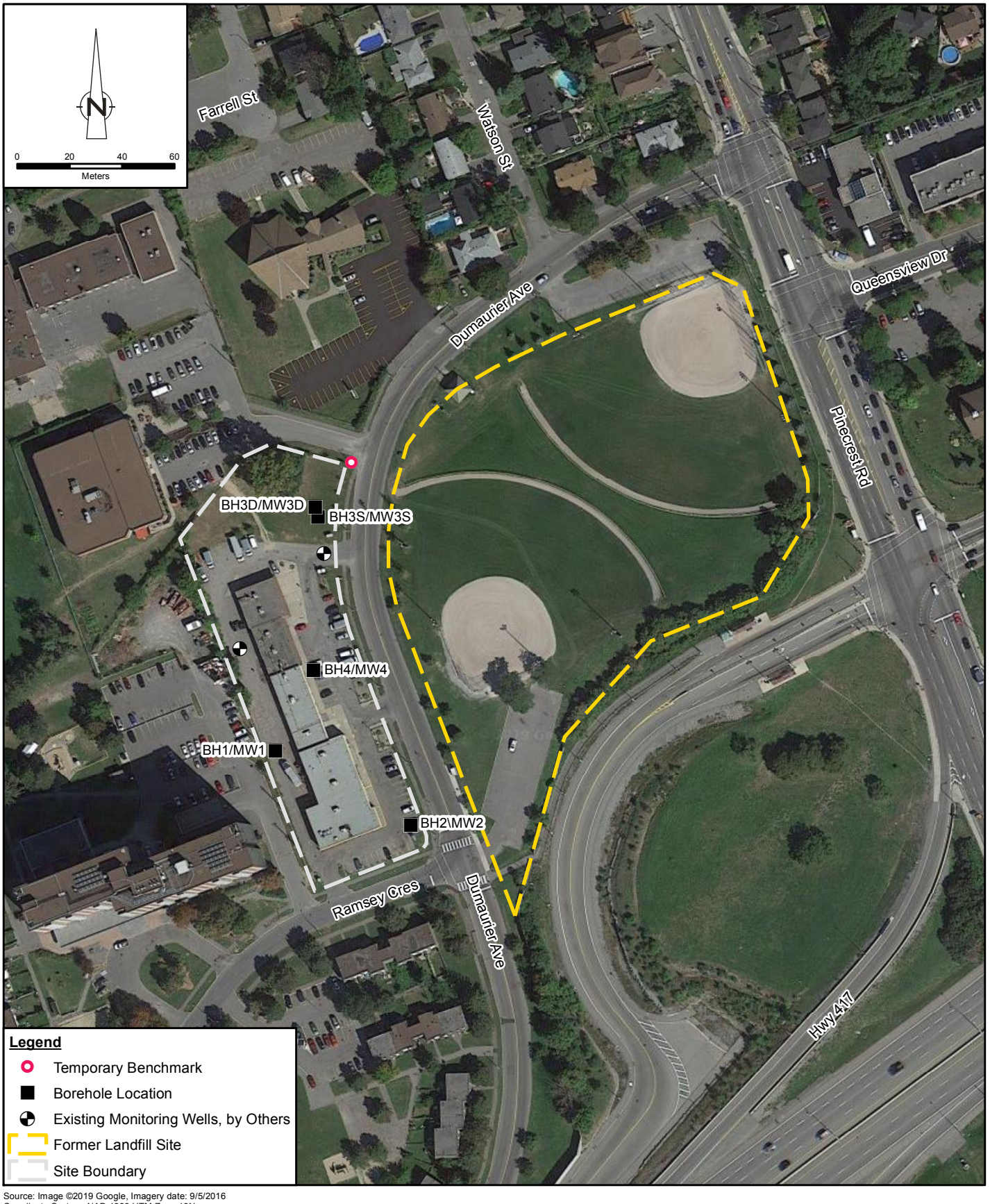
3223701 CANADA INC.
2831, 2833, 2835, 2841 AND 2865 DUMAURIER AVENUE, OTTAWA, ONTARIO
TWO ENVIRONMENTAL SITE ASSESSMENT

11181273-E2
Nov 6, 2018

SITE LOCATION MAP

FIGURE 1

GIS File: Q:\GIS\PROJECTS\11181000s\11181273\Layouts\002\11181273-E2(001)GIS-OT001.mxd



Source: Image ©2019 Google, Imagery date: 9/5/2016
Coordinate System: NAD 1983 UTM Zone 18N

3223701 CANADA INC.
2831, 2833, 2835, 2841 AND 2865 DUMAURIER AVENUE, OTTAWA, ONTARIO
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

11181273-E2
Mar 29, 2019

BOREHOLE LOCATION PLAN

FIGURE 2

GIS File: Q:\GIS\PROJECTS\11181000s\11181273\Layouts\002\11181273-E2(002)GIS-OT002.mxd

Table 1

DNAPL/LNAPL Layers
Phase Two Environmental Site Assessment
2831, 2851, 2865 DuMaurier Avenue
Ottawa, Ontario

WELL ID	Grade Elevation (m)	TOP Elevation (m)	Bottom Depth (m below grade)	Bottom Elevation (m)	September 8, 2017 Depth to Watertable (m below grade)	September 8, 2017 Elevation Watertable (m)	Thickness of LNAPL (m)	Thickness of DNAPL (m)
BH1/MW1	98.64	98.54	3.84	94.80	2.07	96.57	0.00	0.00
BH2/MW2	98.39	98.29	4.89	93.50	3.21	95.18	0.00	0.00
BH3D/MW3D	99.25	99.15	5.35	93.90	1.37	97.88	0.00	0.00
BH3S/MW3S	99.33	99.23	3.73	95.60	1.26	98.07	0.00	0.00
BH4/MW4	98.53	98.43	5.43	93.10	1.28	97.25	0.00	0.00

Elevation relative to Site BM=100.00 m, assigned to Top of Spindle of Hydrant on the northeast corner of the Site

Table 2

Summary of Soil Analysis
Phase Two Environmental Site Assessment
2831, 2851, 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 Background residential/industrial	O.Reg.153/04 Table 3 Full Depth non-potable, coarse grained residential/ parkland/ institutional	BH1 1.4-2.0 mBG Silty Clay	BH2 2.4-3.0 mBG Fill	BH3D 1.2-1.8 mBG Fill	BH4 0.6-1.8 mBG Fill	BH5 (duplicate of BH4) 0.6-1.8 mBG Fill
Metals									
Antimony	ug/g dry	0.8	1.3	7.5	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	ug/g dry	1	18	18	2	5	2	2	2
Barium	ug/g dry	2	220	390	94	118	56	91	91
Beryllium	ug/g dry	0.5	2.5	4	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	ug/g dry	5	36	120	6	9	<5	6	6
Boron (Hot Water Soluble)	ug/g dry	0.1	NV	1.5	0.27	**1.54**	0.37	0.34	0.32
Cadmium	ug/g dry	0.5	1.2	1.2	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	ug/g dry	2	70	160	37	22	15	29	31
Cobalt	ug/g dry	0.5	21	22	8.2	6.1	4.7	6.9	7.3
Copper	ug/g dry	1	92	140	14	105	19	17	18
Lead	ug/g dry	1	120	120	11	61	28	5	6
Molybdenum	ug/g dry	0.5	2	6.9	<0.5	1.4	<0.5	<0.5	0.5
Nickel	ug/g dry	1	82	100	18	21	10	18	19
Selenium	ug/g dry	0.4	1.5	2.4	<0.4	0.5	<0.4	0.7	<0.4
Silver	ug/g dry	0.2	0.5	20	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	ug/g dry	0.4	1	1	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	ug/g dry	0.5	2.5	23	1.3	0.9	0.5	1	1.2
Vanadium	ug/g dry	1	86	86	41	21	21	32	33
Zinc	ug/g dry	5	290	340	58	183	124	36	36
Chromium VI	ug/g dry	0.2	0.66	8	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	ug/g dry	0.04	0.051	0.051	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	ug/g dry	0.1	0.27	0.27	<0.10	0.23	<0.10	<0.10	<0.10
Electrical Conductivity	ug/g dry	0.005	0.57	0.7	**1.87**	**1.01**	0.372	**0.929**	**0.913**
Sodium Adsorption Ratio	ug/g dry	NA	2.4	5	**15.5**	**11.2**	1.88	**13.6**	**8.98**
PAHs									
Naphthalene	ug/g dry	0.05	0.09	0.6	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	ug/g dry	0.05	0.093	0.15	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	ug/g dry	0.05	0.072	7.9	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	ug/g dry	0.05	0.12	62	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	ug/g dry	0.05	0.69	6.2	<0.05	0.16	0.06	0.06	0.06
Anthracene	ug/g dry	0.05	0.16	0.67	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	ug/g dry	0.05	0.56	0.69	<0.05	0.25	0.11	<0.05	<0.05
Pyrene	ug/g dry	0.05	1	78	<0.05	0.21	0.09	<0.05	<0.05
Benz(a)anthracene	ug/g dry	0.05	0.36	0.5	<0.05	0.11	0.06	<0.05	<0.05
Chrysene	ug/g dry	0.05	2.8	7	<0.05	0.14	0.06	<0.05	<0.05
Benzo(b)fluoranthene	ug/g dry	0.05	0.47	0.78	<0.05	0.16	0.07	<0.05	<0.05
Benzo(k)fluoranthene	ug/g dry	0.05	0.48	0.78	<0.05	0.06	<0.05	<0.05	<0.05
Benzo(a)pyrene	ug/g dry	0.05	0.3	0.3	<0.05	0.1	0.06	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	ug/g dry	0.05	0.23	0.38	<0.05	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	ug/g dry	0.05	0.1	0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	ug/g dry	0.05	0.68	6.6	<0.05	0.07	0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	ug/g dry	0.05	0.59	0.99	<0.05	<0.05	<0.05	0.09	0.1
pH	NA	NA	NA	NA	6.82	7.23	7.44	7.78	7.49
Lab ID	-	-	-	-	9610083	9610085	9610086	9610087	9610088
Sample Date	-	-	-	-	5-Oct-18	5-Oct-18	5-Oct-18	5-Oct-18	5-Oct-18
Notes									

BOLD ble 3 (non-potable, residential land use, fine grained soil) criteria
NA ot Analysed by laboratory

Table 3

Summary of Groundwater Analysis
Phase Two Environmental Site Assessment
2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 background	O.Reg.153/04 Table 3 non-potable, coarse grained	MW1	MW2	MW3S	MW3D	MW4	MW6 (Duplicate of MW3S)	TRIP BLANK
Metals											
Antimony	µg/L	1	1.5	20000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Arsenic	µg/L	1	13	1900	7.2	1.2	3.1	<1.0	<1.0	<1.0	-
Barium	µg/L	2	610	29000	**747**	**1190**	**680**	493	**1110**	**688**	-
Beryllium	µg/L	0.5	0.5	67	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	µg/L	10	1700	45000	26.3	240	58.4	20	76.9	62.8	-
Cadmium	µg/L	0.2	0.5	2.7	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-
Chromium	µg/L	2	11	810	**31.4**	5.9	**12.6**	**14.5**	**14.7**	10	-
Cobalt	µg/L	0.5	3.8	66	2.2	1.8	1.2	<0.5	0.5	1.3	-
Copper	µg/L	1	5	87	1.1	1.2	<1.0	2.2	<1.0	<1.0	-
Lead	µg/L	0.5	1.9	25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Molybdenum	µg/L	0.5	23	9200	0.6	0.8	1.5	1.3	1	1.8	-
Nickel	µg/L	1	14	490	1.5	1.1	<1.0	1	<1.0	<1.0	-
Selenium	µg/L	1	5	63	1.8	1.7	<1.0	<1.0	<1.0	<1.0	-
Silver	µg/L	0.2	0.3	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-
Thallium	µg/L	0.3	0.5	510	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-
Uranium	µg/L	0.5	8.9	420	0.8	<0.5	<0.5	1.5	<0.5	<0.5	-
Vanadium	µg/L	0.4	3.9	250	**4.7**	1.1	3.3	**4.1**	**4.7**	2.8	-
Zinc	µg/L	5	160	1100	<5.0	6.3	<5.0	<5.0	<5.0	6	-
Mercury	µg/L	0.02	0.1	0.29	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-
Chromium VI	µg/L	5	25	140	<5	<5	<5	<5	<5	<5	-
Cyanide	µg/L	2	5	66	<2	<2	<2	<2	<2	<2	-
Sodium	µg/L	2500	490000	2300000	**651000**	**1150000**	384000	**606000**	214000	385000	-
Chloride	µg/L	1000	790000	2300000	**1830000**	**2350000**	**1150000**	**1400000**	472000	**1130000**	-
Electrical Conductivity	µg/L	2	NA	NA	5560	7260	3630	4580	2000	3640	-
VOCs											
Dichlorodifluoromethane	µg/L	0.2	590	4400	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.17	0.5	0.5	<0.17	<0.68	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	0.2	0.89	5.6	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	0.4	150	2500	<0.40	<1.60	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	1	2700	130000	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	0.3	0.5	1.6	<0.30	<1.20	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	0.3	5	610	<0.30	<1.20	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	0.2	1.6	1.6	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	0.2	15	190	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	0.3	0.5	320	<0.30	<1.20	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1	400	470000	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	0.2	1.6	1.6	<0.20	<0.80	<0.20	<0.20	<0.20	0.27	<0.20
Chloroform	µg/L	0.2	2	2.4	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.2	0.5	1.6	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	0.3	0.5	640	<0.30	<1.20	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.2	0.2	0.79	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	0.2	0.5	44	<0.20	<0.80	0.49	<0.20	<0.20	**0.85**	<0.20
1,2-Dichloropropane	µg/L	0.2	0.5	16	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	0.2	0.5	1.6	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	0.2	2	85000	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	1	640	140000	<1.0	<4.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	0.2	0.5	4.7	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.2	0.8	18000	<0.20	<0.80	<0.20	<0.20	<0.20	0.32	<0.20
Dibromochloromethane	µg/L	0.1	2	82000	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.1	0.2	0.25	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	0.2	0.5	1.6	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	0.1	1.1	3.3	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	0.1	0.5	630	<0.10	<0.40	**0.64**	<0.10	<0.10	**1.3**	<0.10
Ethylbenzene	µg/L	0.1	0.5	2300	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
Bromoform	µg/L	0.1	5	380	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	0.1	0.5	1300	0.23	<0.40	<0.10	<0.10	**0.54**	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.1	0.5	3.2	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	0.1	0.5	9600	<0.10	<0.40	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.1	0.5	8	<0.10	<0.40	**0.79**	<0.10	<0.10	**1.6**	<0.10
1,2-Dichlorobenzene	µg/L	0.1	0.5	4600	<0.10	<0.40	<0.10	<0.10	<0.10	0.14	<0.10
1,3-Dichloropropene	µg/L	0.3	0.5	5.2	<0.30	<1.20	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	0.2	72	4200	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20

Table 3

Summary of Groundwater Analysis
Phase Two Environmental Site Assessment
2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 background	O.Reg.153/04 Table 3 non-potable, coarse grained	MW1	MW2	MW3S	MW3D	MW4	MW6 (Duplicate of MW3S)	TRIP BLANK
n-Hexane	µg/L	0.2	5	51	<0.20	<0.80	<0.20	<0.20	<0.20	<0.20	<0.20
PHCs / BTEX											
F1 (C6 - C10)	µg/L	25	NA	NA	<25	<25	<25	<25	<25	<25	-
F1 (C6 to C10) minus BTEX	µg/L	25	420	750	<25	<25	<25	<25	<25	<25	-
F2 (C10 to C16)	µg/L	100	150	150	<100	<100	**170**	<100	<100	<100	-
F3 (C16 to C34)	µg/L	100	500	500	<100	<100	**860**	<100	<100	<100	-
F4 (C34 to C50)	µg/L	100	500	500	<100	<100	170	<100	<100	<100	-
Gravimetric Heavy Hydrocarbons	µg/L	500	500	500	NA	NA	NA	NA	NA	NA	-
pH	NA	NA	NA	NA	6.8	7.26	7.09	7.57	7.34	7.12	-
Lab ID					9641620	9641666	9641876	9641877	9641878	9641879	9641881
Sample Date					19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18
Notes											

BOLD - concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria
BOLD - concentration meets or exceeds O.Reg. 153/04 Table 3 (non-potable, any land use, fine grained soil) criteria
NA - Parameter not Analysed by laboratory

Table 4

Maximum Soil Parameter Concentrations
Phase Two Environmental Site Assessment
2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 Background residential/industrial	O.Reg.153/04 Table 3 Full Depth non-potable, coarse grained residential/ parkland/ institutional	Maximum Soil Concentration	sample location	sample depth (mBG)
Metals							
Antimony	ug/g dry	0.8	1.3	7.5	<0.8	all	-
Arsenic	ug/g dry	1	18	18	5	BH2-SS5	2.4-3.0 mBG
Barium	ug/g dry	2	220	390	118	BH2-SS5	2.4-3.0 mBG
Beryllium	ug/g dry	0.5	2.5	4	<0.5	all	-
Boron	ug/g dry	5	36	120	9	BH2-SS5	2.4-3.0 mBG
Boron (Hot Water Soluble)	ug/g dry	0.1	NV	1.5	**1.54**	BH2-SS5	2.4-3.0 mBG
Cadmium	ug/g dry	0.5	1.2	1.2	<0.5	all	-
Chromium	ug/g dry	2	70	160	37	BH1-SS3	1.4-2.0 mBG
Cobalt	ug/g dry	0.5	21	22	8.2	BH1-SS3	1.4-2.0 mBG
Copper	ug/g dry	1	92	140	105	BH2-SS5	2.4-3.0 mBG
Lead	ug/g dry	1	120	120	61	BH2-SS5	2.4-3.0 mBG
Molybdenum	ug/g dry	0.5	2	6.9	1.4	BH2-SS5	2.4-3.0 mBG
Nickel	ug/g dry	1	82	100	21	BH2-SS5	2.4-3.0 mBG
Selenium	ug/g dry	0.4	1.5	2.4	0.7	BH4-SS2/SS3	0.6-1.8 mBG
Silver	ug/g dry	0.2	0.5	20	<0.2	all	-
Thallium	ug/g dry	0.4	1	1	<0.4	all	-
Uranium	ug/g dry	0.5	2.5	23	1.3	BH1-SS3	1.4-2.0 mBG
Vanadium	ug/g dry	1	86	86	41	BH1-SS3	1.4-2.0 mBG
Zinc	ug/g dry	5	290	340	183	BH2-SS5	2.4-3.0 mBG
Chromium VI	ug/g dry	0.2	0.66	8	<0.2	all	-
Cyanide	ug/g dry	0.04	0.051	0.051	<0.04	all	-
Mercury	ug/g dry	0.1	0.27	0.27	0.23	BH2-SS5	2.4-3.0 mBG
Electrical Conductivity	ug/g dry	0.005	0.57	0.7	**1.87**	BH1-SS3	1.4-2.0 mBG
Sodium Adsorption Ratio	ug/g dry	NA	2.4	5	**15.5**	BH1-SS3	1.4-2.0 mBG
PAHs							
Naphthalene	ug/g dry	0.05	0.09	0.6	<0.05	all	-
Acenaphthylene	ug/g dry	0.05	0.093	0.15	<0.05	all	-
Acenaphthene	ug/g dry	0.05	0.072	7.9	<0.05	all	-
Fluorene	ug/g dry	0.05	0.12	62	<0.05	all	-
Phenanthrene	ug/g dry	0.05	0.69	6.2	0.16	BH2-SS5	2.4-3.0 mBG
Anthracene	ug/g dry	0.05	0.16	0.67	<0.05	all	-
Fluoranthene	ug/g dry	0.05	0.56	0.69	0.25	BH2-SS5	2.4-3.0 mBG
Pyrene	ug/g dry	0.05	1	78	0.21	BH2-SS5	2.4-3.0 mBG
Benz(a)anthracene	ug/g dry	0.05	0.36	0.5	0.11	BH2-SS5	2.4-3.0 mBG
Chrysene	ug/g dry	0.05	2.8	7	0.14	BH2-SS5	2.4-3.0 mBG
Benzo(b)fluoranthene	ug/g dry	0.05	0.47	0.78	0.16	BH2-SS5	2.4-3.0 mBG
Benzo(k)fluoranthene	ug/g dry	0.05	0.48	0.78	0.06	BH2-SS5	2.4-3.0 mBG
Benzo(a)pyrene	ug/g dry	0.05	0.3	0.3	0.1	BH2-SS5	2.4-3.0 mBG
Indeno(1,2,3-cd)pyrene	ug/g dry	0.05	0.23	0.38	0.05	BH2-SS5	2.4-3.0 mBG
Dibenz(a,h)anthracene	ug/g dry	0.05	0.1	0.1	<0.05	all	-
Benzo(g,h,i)perylene	ug/g dry	0.05	0.68	6.6	0.07	BH2-SS5	2.4-3.0 mBG
2-and 1-methyl Naphthalene	ug/g dry	0.05	0.59	0.99	0.1	BH5 (dup. of BH4-SS2/SS3	0.6-1.8 mBG
Lab ID							
Sample Date							
Notes							

BOLD - concentration meets or exceeds O.Reg. 153/04 Table 3 (non-potable, residential land use, fine grained soil) criteria

Table 5

Maximun Groundwater Parameter Concentrations
Phase Two Environmental Site Assessment
2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 Background	O.Reg.153/04 Table 3 Non-Porable Course grained	Maximum groundwater concentration	Sample ID	Location
Metals							
Antimony	µg/L	1	1.5	20000	<1.0	all	all
Arsenic	µg/L	1	13	1900	7.2	MW1	MW1
Barium	µg/L	2	610	29000	**1190**	MW2	MW2
Beryllium	µg/L	0.5	0.5	67	<0.5	all	all
Boron	µg/L	10	1700	45000	240	MW2	MW2
Cadmium	µg/L	0.2	0.5	2.7	<0.2	all	all
Chromium	µg/L	2	11	810	**31.4**	MW1	MW1
Cobalt	µg/L	0.5	3.8	66	2.2	MW1	MW1
Copper	µg/L	1	5	87	2.2	MW3D	MW3D
Lead	µg/L	0.5	1.9	25	<0.5	all	all
Molybdenum	µg/L	0.5	**23**	9200	1.8	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
Nickel	µg/L	1	14	490	1.5	MW1	MW1
Selenium	µg/L	1	**5**	63	1.8	MW1	MW1
Silver	µg/L	0.2	0.3	1.5	<1.0	all	all
Thallium	µg/L	0.3	0.5	510	<0.2	all	all
Uranium	µg/L	0.5	8.9	420	1.5	MW3D	MW3D
Vanadium	µg/L	0.4	3.9	250	**4.7**	MW4	MW4
Zinc	µg/L	5	160	1100	6.3	MW2	MW2
Mercury	µg/L	0.02	0.1	0.29	<0.02	all	all
Chromium VI	µg/L	5	25	140	<5	all	all
Cyanide	µg/L	2	5	66	<2	all	all
Sodium	µg/L	2500	490000	2300000	**1150000**	MW2	MW2
Chloride	µg/L	1000	790000	2300000	**2350000**	MW2	MW2
Electrical Conductivity	µg/L	2	NA	NA	7260	MW2	MW2
VOCs							
Dichlorodifluoromethane	µg/L	0.2	590	4400	<0.20	all	all
Vinyl Chloride	µg/L	0.17	0.5	0.5	<0.17	all	all
Bromomethane	µg/L	0.2	0.89	5.6	<0.20	all	all
Trichlorofluoromethane	µg/L	0.4	150	2500	<0.40	all	all
Acetone	µg/L	1	2700	130000	<1.0	all	all
1,1-Dichloroethylene	µg/L	0.3	0.5	1.6	<0.30	all	all
Methylene Chloride	µg/L	0.3	5	610	<0.30	all	all
trans- 1,2-Dichloroethylene	µg/L	0.2	1.6	1.6	<0.20	all	all
Methyl tert-butyl ether	µg/L	0.2	15	190	<0.20	all	all
1,1-Dichloroethane	µg/L	0.3	0.5	320	<0.30	all	all
Methyl Ethyl Ketone	µg/L	1	400	470000	<1.0	all	all
cis- 1,2-Dichloroethylene	µg/L	0.2	1.6	1.6	0.27	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
Chloroform	µg/L	0.2	2	2.4	<0.20	all	all
1,2-Dichloroethane	µg/L	0.2	0.5	1.6	<0.20	all	all
1,1,1-Trichloroethane	µg/L	0.3	0.5	640	<0.30	all	all
Carbon Tetrachloride	µg/L	0.2	0.2	0.79	<0.20	all	all
Benzene	µg/L	0.2	0.5	44	**0.85**	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
1,2-Dichloropropane	µg/L	0.2	0.5	16	<0.20	all	all
Trichloroethylene	µg/L	0.2	0.5	1.6	<0.20	all	all
Bromodichloromethane	µg/L	0.2	**2**	85000	<0.20	all	all
Methyl Isobutyl Ketone	µg/L	1	640	140000	<1.0	all	all
1,1,2-Trichloroethane	µg/L	0.2	0.5	4.7	<0.20	all	all
Toluene	µg/L	0.2	0.8	18000	0.32	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
Dibromochloromethane	µg/L	0.1	2	82000	<0.10	all	all
Ethylene Dibromide	µg/L	0.1	0.2	0.25	<0.10	all	all
Tetrachloroethylene	µg/L	0.2	0.5	1.6	<0.20	all	all
1,1,1,2-Tetrachloroethane	µg/L	0.1	1.1	3.3	<0.10	all	all
Chlorobenzene	µg/L	0.1	0.5	630	**1.3**	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
Ethylbenzene	µg/L	0.1	0.5	2300	<0.10	all	all
Bromoform	µg/L	0.1	5	380	<0.10	all	all
Styrene	µg/L	0.1	0.5	1300	**0.54**	MW4	MW4
1,1,2,2-Tetrachloroethane	µg/L	0.1	0.5	3.2	<0.10	all	all
1,3-Dichlorobenzene	µg/L	0.1	0.5	9600	<0.10	all	all
1,4-Dichlorobenzene	µg/L	0.1	0.5	8	**1.6**	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)
1,2-Dichlorobenzene	µg/L	0.1	0.5	4600	0.14	MW6 (dup. of MW3S)	MW6 (dup. of MW3S)

Table 5

Maximun Groundwater Parameter Concentrations
Phase Two Environmental Site Assessment
2831, 2851, and 2865 DuMaurier Avenue
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 Background	O.Reg.153/04 Table 3 Non-Porable Course grained	Maximum groundwater concentration	Sample ID	Location
1,3-Dichloropropene	µg/L	0.3	0.5	5.2	<0.30	all	all
Xylene Mixture	µg/L	0.2	72	4200	<0.20	all	all
n-Hexane	µg/L	0.2	5	51	<0.20	all	all
PHCs / BTEX							
F1 (C6 - C10)	µg/L	25	NA	NA	<25	MW3S	MW3S
F1 (C6 to C10) minus BTEX	µg/L	25	420	750	<25	MW3S	MW3S
F2 (C10 to C16)	µg/L	100	150	150	**170**	MW3S	MW3S
F3 (C16 to C34)	µg/L	100	500	500	**860**	MW3S	MW3S
F4 (C34 to C50)	µg/L	100	500	500	170	MW3S	MW3S
Gravimetric Heavy Hydrocarbons	µg/L	500	500	500	NA	MW3S	MW3S

Notes
BOLD - concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria
BOLD - concentration meets or exceeds O.Reg. 153/04 Table 3 (non-potable, any land use, fine grained soil) criteria

Appendices

Appendix A
Utility Clearances

Monique Larocque

From: Solutions@on1call.com
Sent: Wednesday, September 19, 2018 10:51 AM
To: moniquel@usl-1.com
Subject: Request 20183813706
Attachments: MapSelection_19092018_10492764.png; GHD.2831_Du_Maurier.png

<https://www.on1call.com/wp-content/themes/ooc/images/ooc-logo-2.png> LOCATE REQUEST CONFIRMATION

TICKET #: 20183813706 REQUEST PRIORITY: STANDARD REQUEST TYPE: REGULAR WORK TO BEGIN DATE: 09/26/2018
Update of Ticket # Project # Transmit date: 09/19/2018 10:51:00 AM

REQUESTOR'S CONTACT INFORMATION
Contractor ID#: 202 Company Phone #: (613) 226-8750
Contact Name: JACQUES DESJARDINS Cell #:
Alternate Contact Name: JEFF FORRESTER Fax #: (613) 226-8677
Company name: U S L Email: moniquel@usl-1.com
Address: 775 TAYLOR CREEK DR Alternate Contact #:

DIG INFORMATION
Region/County: OTTAWA Type of work: BORE HOLES Mark & Fax: NO
Community: Max Depth: 32.81 FT Area is not marked: NO
City: OTTAWA Machine Dig: YES Area is marked: YES
Address: 2831, DUMAURIER AVE To 2865 Hand Dig: NO Site Meet Req.: NO
Directional Drilling: NO Work being done for: GHD
Intersecting Street 1: RAMSEY CRES Public Property: YES
Intersecting Street 2: WATSON ST Private Property: YES

DETAILED DESCRIPTION OF WORK REMARKS
CORLOT=U Drilling trhourhout properties. Clear all of 2831 to 2865 DUmaurier Ave to all property lin es and to sidewalk edge on Dumaurier Ave. Civic # 2831, 2833, 2835, 2865.

MEMBERS NOTIFIED: The following owners of underground infrastructure in the area of your excavation site have been notified.

Member name	Station Code	Initial Status
HYDRO OTTAWA (HOT1)	HOT1	Notification sent
PROMARK FOR ENBRIDGE GAS (ENOE01)	ENOE01	Notification sent
CITY OF OTTAWA WATER/SEWER (OTWAWS01)	OTWAWS01	Notification sent
BLACK AND MC DONALD FOR CITY OF OTTAWA STREET LIGHTS (OTWASL01)	OTWASL01	Notification sent
CLI FOR ROGERS (ROGOTT01)	ROGOTT01	Notification sent
PROMARK FOR BELL CANADA (BCOE01)	BCOE01	Notification sent

MAP SELECTION: Map Selection provided by the excavator through Ontario One Call's map tool or through agent interpretation by phone

CONTRACTOR'S SKETCH: A file provided directly by the excavator, not generated by Ontario One Call:

IMPORTANT INFORMATION: Please read.

Defining "NC" - Non-Compliant
- Non-compliant members have not met their obligations under section 5 of the Ontario Underground Infrastructure Notification Act.ON1Call has notified these members to ensure they are aware of your excavation. In this circumstance, should the member not respond, the excavator should contact the member directly to obtain their locates or request a status. ON1Call will not be provided with a locate status from the member regarding this ticket and therefore, cannot provide further information at this time.For locate status contact information please refer to our website.

You have a valid locate when...
- You have reviewed your locate request information for accuracy. CONTACT Ontario One Call (ON1Call) IMMEDIATELY if changes are needed and obtain a corrected locate request confirmation.
- You have obtained locates or clearances from all ON1Call members listed in this ticket before beginning your dig.

You've met your obligations when...
- In addition to this locate request, you have DIRECTLY contacted all owners of infrastructure who ARE NOT current members of ON1Call (such as owned buried infrastructure on private property), as well as arranged for contract locates for your private lines on your private property - where applicable. For a list of locate status contacts visit www.on1call.com.
- You respect the marks and instructions provided by the locators and dig with care; the marks and locator instructions MUST MATCH.
- You have obtained any necessary permits from the municipality in whichyou are excavating.

What does "Cleared" mean in the "Initial Status" section?
1. The information that you have provided about your dig will not affect that member's underground infrastructure and they have provided you with a
clearance, if anything about your excavation changes, please ensure that you update your ticket immediately.

What are the images under "Map Selection":
1. A drawing created by an excavator directly within Ontario One Call's web ticket tool, this is expected to be an accurate rendition of the dig site, and it is the excavator's responsibility to ensure the location matches the information they provide under the 'Dig Location' section OR;

2. A drawing created by an Ontario One Call agent, this drawing is based on a verbal description by phone of the area by the excavator. Agents may create drawings that are larger than the proposed dig to minimize risk of interpretation. It is the excavator's responsibility to review these map selections for accuracy. Changes can be made by the excavator through the web ticket tool, to learn how visit www.on1call.com/contractors.

3. All drawings dictate which members are notified.

20183813706_HOT1

PROMARK TELECON

UNION GAS EMERGENCY # 1-877-969-0999

Primary Locate Sheet

Request # **20183813706**
NORMAL

Phone:	Fax:	Toll free:	Email:
613-723-9888	613-723-9277	1-800-371-8866	

Utilities Located:	Revised Excavation Date	Excavation Date	Status
● Bell ● Gas ● Hydro Ottawa ☐ Hydro One ☐ Videotron ☐ Lakefront Utilities ☐ Veridian Connections	N/A mm/dd/yyyy	10/01/2018 00:00:00 mm/dd/yyyy	STANDARD Homeowner ☐ Contractor ● Project ☐

Requested by:	Company:	Phone:	Fax/email:
JACQUES DESJARDINS	U S L	(613)-226-8750 ext.	(613)-226-8677 ext.

Appt Date:	Received Date:	Locate Address:
N/A mm/dd/yyyy	08/19/2018 mm/dd/yyyy	2831 to 2865, DUMAURIER AVE 1st Inters.: RAMSEY CRES 2nd Inters.: WATSON ST

Type of work: BORE HOLES

City: OTTAWA

Caller's Remarks:
CIVIC # 2831, 2833, 2835, 2865.
MACH. DIG
CORLOT=U DRILLING TRHOURHOUT PROPERTIES. CLEAR ALL OF 2831 TO 2865 DUMAURIER AVE TO ALL PROPERTY LINES AND TO SIDEWALK EDGE ON DUMAURIER AVE.

-75.793499, 45.350499, NB_SEGMENTS::2, NO_PLAN:613 628, BCOE01, ROGOTT01, OTWASL01, OTWAWS01, ENOB01, HOT1

Bell Mark | Clear	Enbridge Gas Mark | Clear	Hydro Ottawa Mark | Clear	Street Lighting Mark | Clear	Lakefront Mark | Clear	Hydro One Mark | Clear	Veridian Mark | Clear	Union Gas Mark | Clear	Videotron Mark | Clear
1	1	1						

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference:
_ Map _ Network X # ● G-MOBILE
_ Byers ● Datapak ● LAC Multiviewer
Field Notes: CPU1389 NE123
Other: 6N592-1, 6N4012-6
DPT Remarks:

_ Third Party Notification _____

*****DANGER DO NOT PROCEED*****
Buried high voltage cables within 1.5M of the located area. You MUST send locate to **HOLsupervisions@hydroottawa.com** or contact Hydro Ottawa at **613-738-6418** for further information.
AFTER HOURS *EMERGENCY* NUMBER IS 613-738-6422

Apply Sticker Here if Required

Excavator shall notify & receive a clearance from Utility prior to excavation for the following:
Telecon ☐ High Priority Cable ☐ Central Office Vicinity N/A

Method of Field Marking: ● Paint ☐ Stakes ● Flags ☐ Offset Flags ☐ Other (Telecom=Orange, Gas=Yellow, Hydro Ott. =Red)

Caution: Locates are VOID after 30 days. Hydro One valid for 60 days. See Disclaimer for the specific Facility Owner's Guidelines.

Caution: Any changes to location or nature of work require new locate. The Excavator must not work outside the Located Area without a new locate. Privately owned services within the located area have not been marked - check with service/property owner. For all Locate requests including remarks contact:
Ontario One Call at **1-800-400-2255** or **www.on1call.com**.

Locator Name: ROOTS DAN	Start Time: 9:00	_ Mark & Fax _ Left on Site ● Emailed
ID #: 1717	End Time: 14:00	Print: N/A
Date 09/28/2018	Total Hours: 5HR	Signature: N/A

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

This form revised December 2016

PROMARK TELECON Inc.

Auxiliary Locate Sheet

Union Gas Emergency # 1-877-969-0999

Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities Located: ● Bell ☐ Gas ☐ HydroOttawa ☐ Hydro One ☐ Videotron ☐ Peel Fibre ☐ Veridian connections

Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

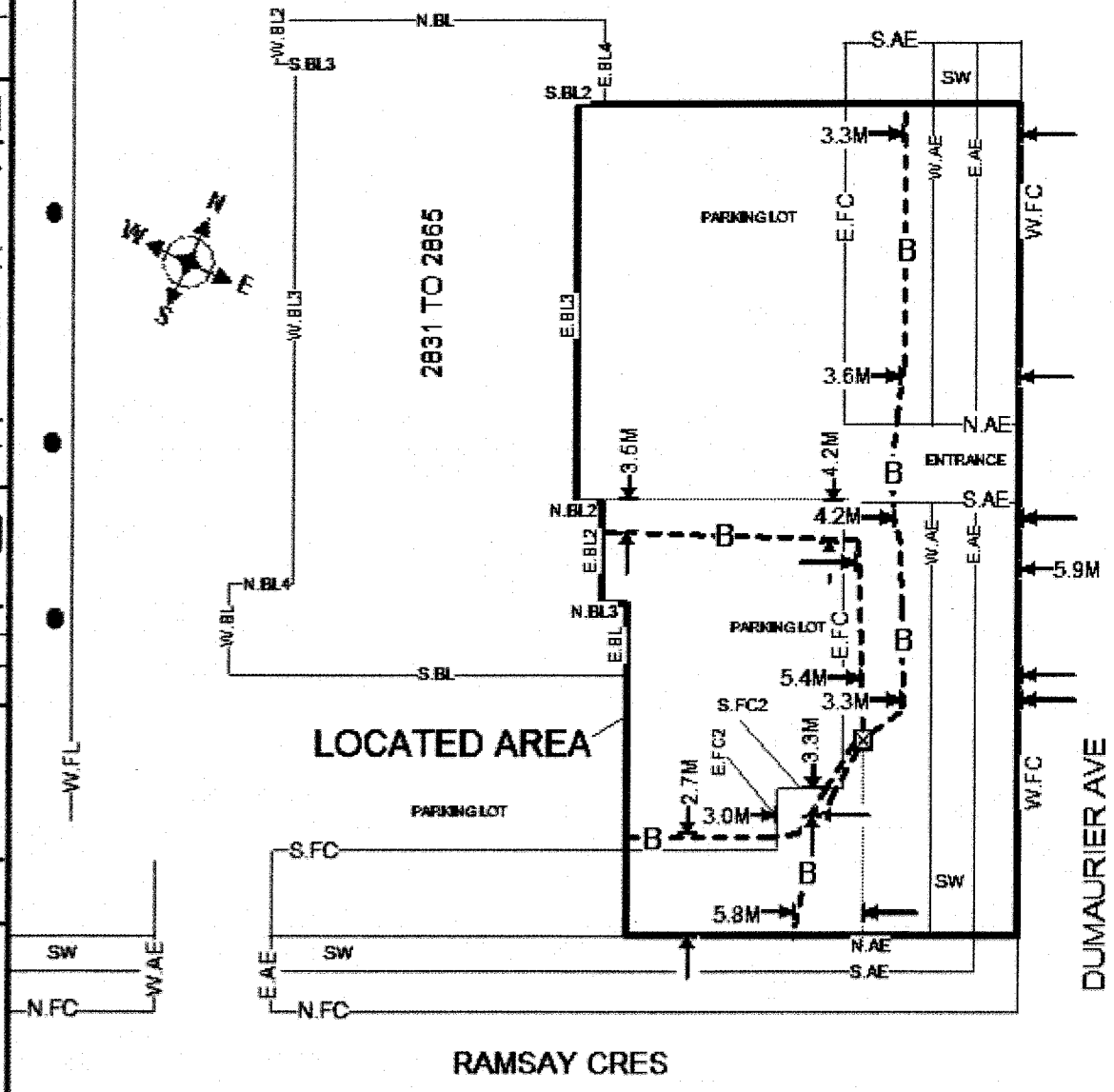
FROM: N.AE OF SW OF RAMSAY CRES
TO: S.BL2 OF 2831-2865 DUMAURIER AVE
FROM: E.BL3 OF 2831-2865 DUMAURIER AVE
TO: W.FC OF DUMAURIER AVE

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and MUST be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH

Legend

Building Line	— BL —
Fence Line	— FL —
Face of Curb	— FC —
Road Edge	— RE —
Property Line	— PL —
ASPHALT EDGE	-AE
Driveway	— DW —
Catch Basin	CB
Sidewalk	SW
Demarcation	DM
Railway	
Pole	●
Flush to Grade Pedestal	
Pedestal	X
Buried Cable	— B —
Conduit	— C —
Buried Service Wire	— BSW —
Manhole	MH
Fibre Optic Cable	— FO —
Bell Hydro Service	— HS —
Gas Main	— GM —
Gas Service	— GS —
Gas Valve	
Hydrant	
Transformer	
Hydro	— H —
Hydro Pole	X
Street Light Cable	— SL —
Street Light	
North	N.
South	S.
East	E.
West	W.



THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.

Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

PROMARK TELECON

Auxiliary Locate Sheet

Union Gas Emergency # 1-877-969-0999

Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities Located: ☐ Bell ● Gas ☐ HydroOttawa ☐ Hydro One ☐ Videotron ☐ Peel Fibre ☐ Veridian connections

Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) (0)

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

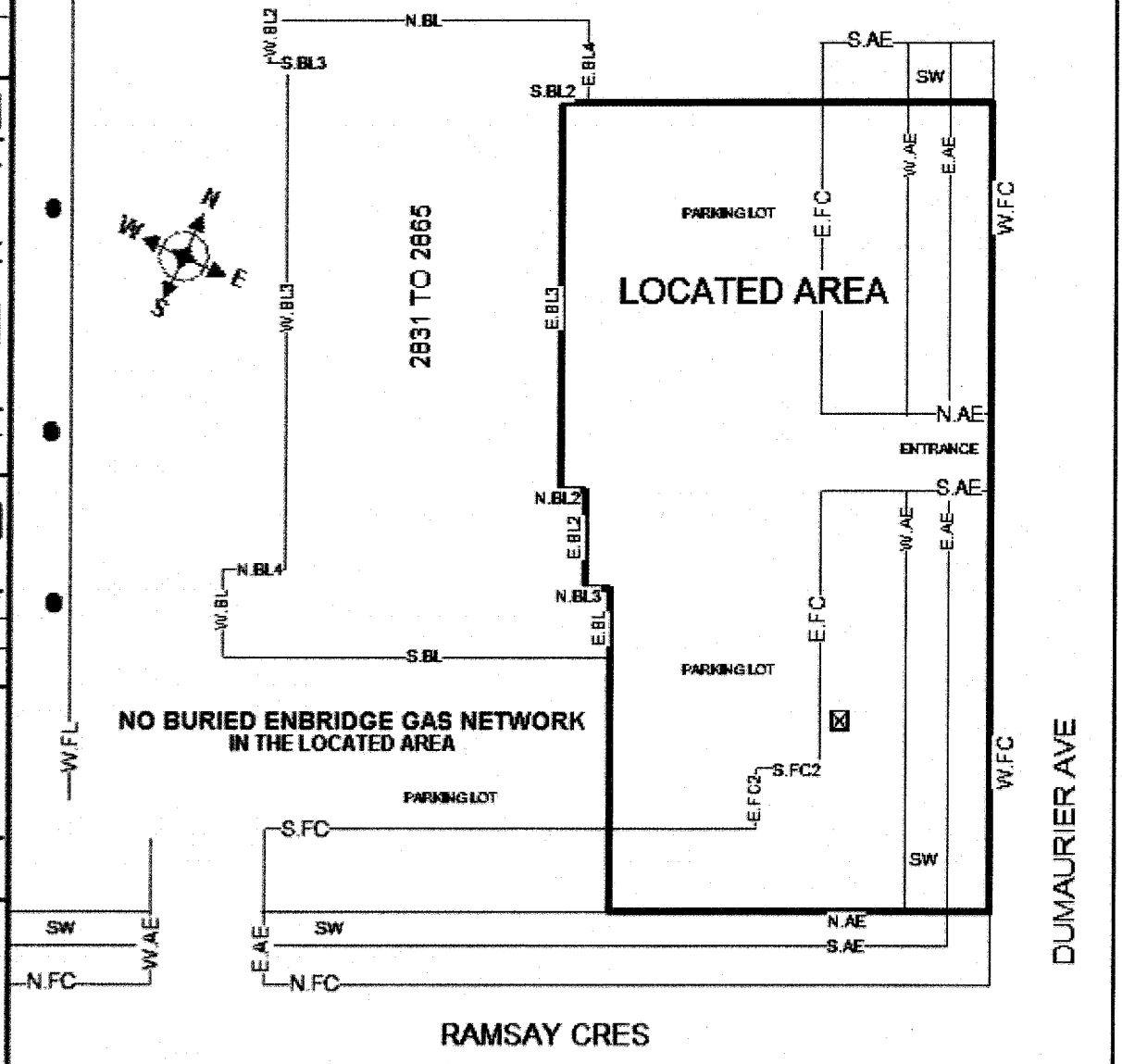
FROM: N.AE OF SW OF RAMSAY CRES
TO: S.BL2 OF 2831-2865 DUMAURIER AVE
FROM: E.BL3 OF 2831-2865 DUMAURIER AVE
TO: W.FC OF DUMAURIER AVE

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and MUST be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH

Legend

- Building Line — BL
- Fence Line — FL
- Face of Curb — FC
- Road Edge — RE
- Property Line — PL
- ASPHALT EDGE -AE
- Driveway — DW
- Catch Basin — CB
- Sidewalk — SW
- Demarcation — DM
- Railway
- Pole
- Flush to Grade Pedestal
- Pedestal — X
- Buried Cable — B
- Conduit — C
- Buried Service Wire — BSW
- Manhole — MH
- Fibre Optic Cable — FO
- Bell Hydro Service — HS
- Gas Main — GM
- Gas Service — GS
- Gas Valve
- Hydrant
- Transformer
- Hydro — H
- Hydro Pole — X
- Street Light Cable — SL
- Street Light
- North — N.
- South — S.
- East — E.
- West — W.



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PROMARK TELECON

Auxiliary Locate Sheet

Union Gas Emergency # 1-877-969-0999

Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities ☐ Bell ☐ Gas ● HydroOttawa ☐ Street Lighting
Located: ☐ Blink ☐ Peel Fibre ☐ ☐

Date Located (mm/dd/yyyy): 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: N.AE OF SW OF RAMSAY CRES
TO: S.BL2 OF 2831-2865 DUMAURIER AVE
FROM: E.BL3 OF 2831-2865 DUMAURIER AVE
TO: W.FC OF DUMAURIER AVE

Legend

- Building Line — BL
- Fence Line — FL
- Face of Curb — FC
- Road Edge — RE
- Property Line — PL
- ASPHALT EDGE -AE
- Driveway — DW
- Catch Basin — CB
- Sidewalk — SW
- Demarcation — DM
- Railway
- Pole
- Flush to Grade Pedestal
- Pedestal — X
- Buried Cable — B
- Conduit — C
- Buried Service Wire — BSW
- Manhole — MH
- Fibre Optic Cable — FO
- Gas Main — GM
- Gas Service — GS
- Gas Valve
- Hydrant
- Transformer
- Hydro Ottawa — H
- Hydro Pole — X
- Street Light Cable — SL
- Street Light
- North — N.
- South — S.
- East — E.
- West — W.

CAUTION: Hand dig within 1.5M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable.
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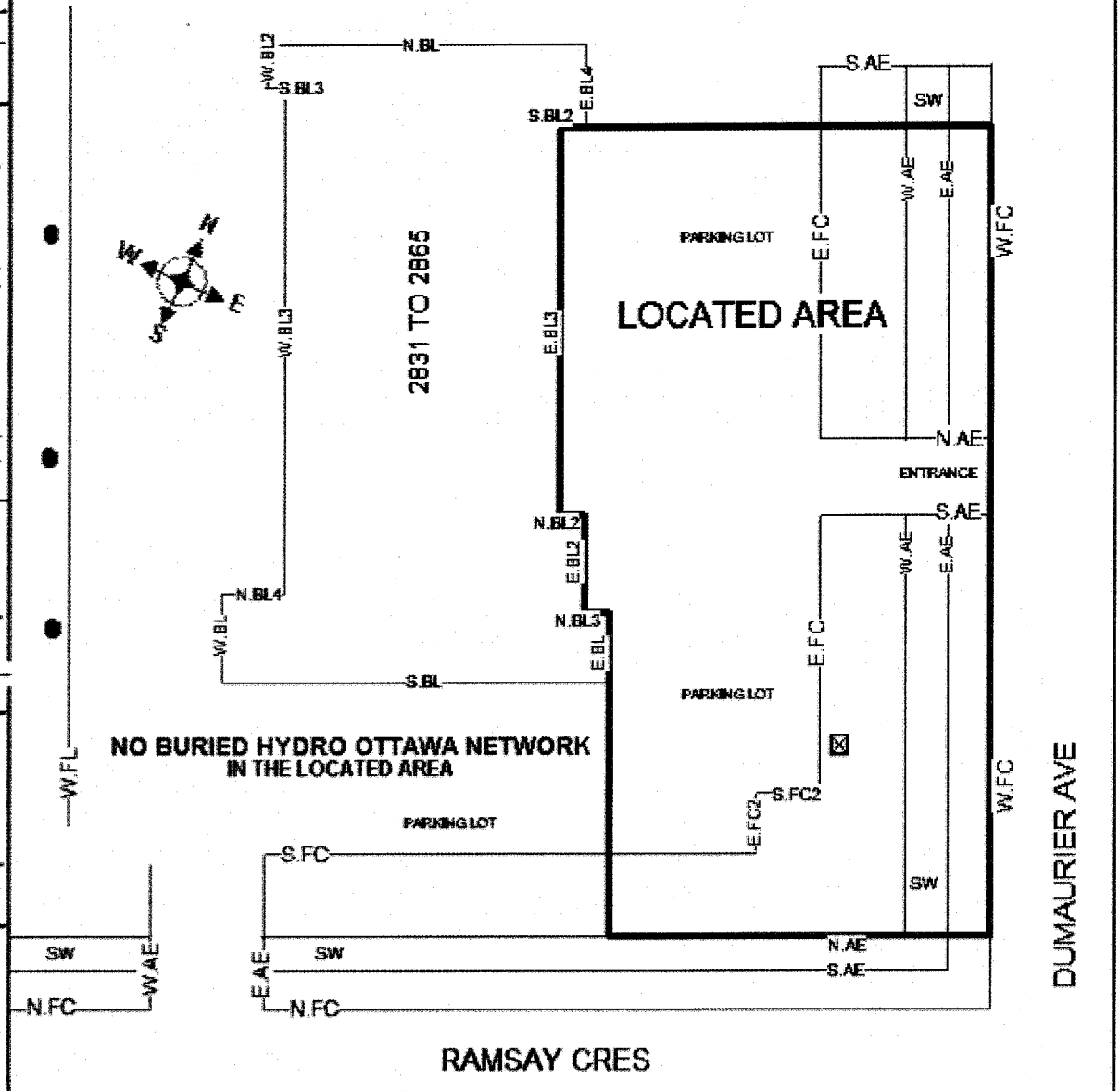
Depth varies and MUST be verified by hand digging or vacuum excavation.
LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH



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Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities Located: ●Bell ☐ Gas ☐ HydroOttawa ☐ Hydro One ☐ Videotron ☐ Peel Fibre ☐ Veridian connections

Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: W.FL OF 2831-2865 DUMAURIER AVE
TO: W.BL3 OF 2831-2865 DUMAURIER AVE
FROM: S.BL OF 2831-2865 DUMAURIER AVE
TO: S.BL3 OF 2831-2865 DUMAURIER AVE

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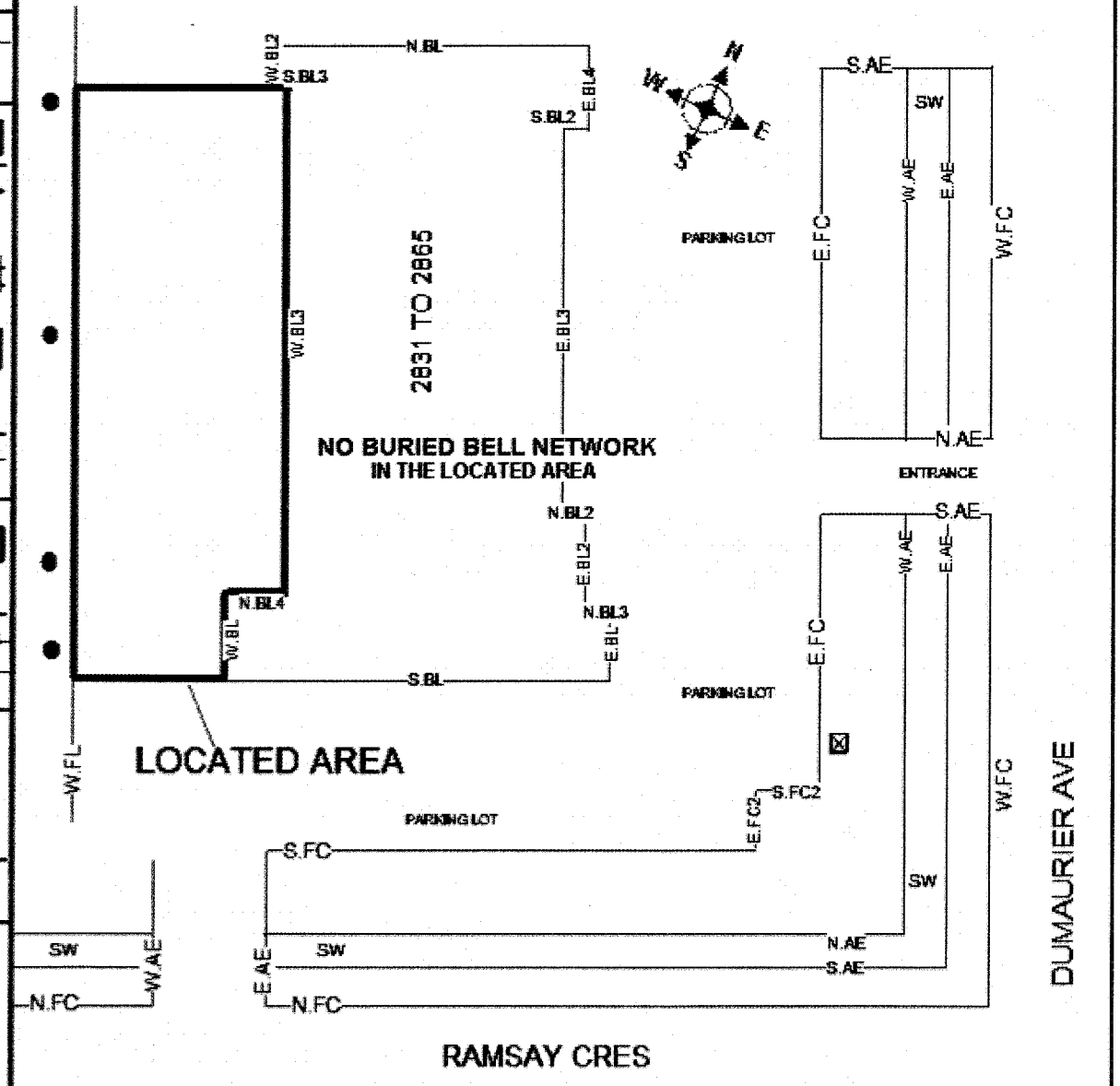
Legend
Building Line — BL
Fence Line — FL
Face of Curb — FC
Road Edge — RE
Property Line — PL
ASPHALT EDGE -AE
Driveway — DW
Catch Basin CB
Sidewalk SW
Demarcation DM
Railway
Pole
Flush to Grade Pedestal
Pedestal X
Buried Cable — B
Conduit — C
Buried Service Wire — BSW
Manhole MH
Fibre Optic Cable — FO
Bell Hydro Service — HS
Gas Main — GM
Gas Service — GS
Gas Valve
Hydrant
Transformer
Hydro — H
Hydro Pole X
Street Light Cable — SL
Street Light
North N.
South S.
East E.
West W.



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Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) (0)

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: W.FL OF 2831-2865 DUMAURIER AVE TO: W.BL3 OF 2831-2865 DUMAURIER AVE

FROM: S.BL OF 2831-2865 DUMAURIER AVE TO: S.BL3 OF 2831-2865 DUMAURIER AVE

Legend

- Building Line — BL
- Fence Line — FL
- Face of Curb — FC
- Road Edge — RE
- Property Line — PL
- ASPHALT EDGE -AE
- Driveway — DW
- Catch Basin — CB
- Sidewalk — SW
- Demarcation — DM
- Railway
- Pole
- Flush to Grade Pedestal
- Pedestal — X
- Buried Cable — B
- Conduit — C
- Buried Service Wire — BSW
- Manhole — MH
- Fibre Optic Cable — FO
- Bell Hydro Service — HS
- Gas Main — GM
- Gas Service — GS
- Gas Valve
- Hydrant
- Transformer
- Hydro — H
- Hydro Pole — X
- Street Light Cable — SL
- Street Light
- North — N.
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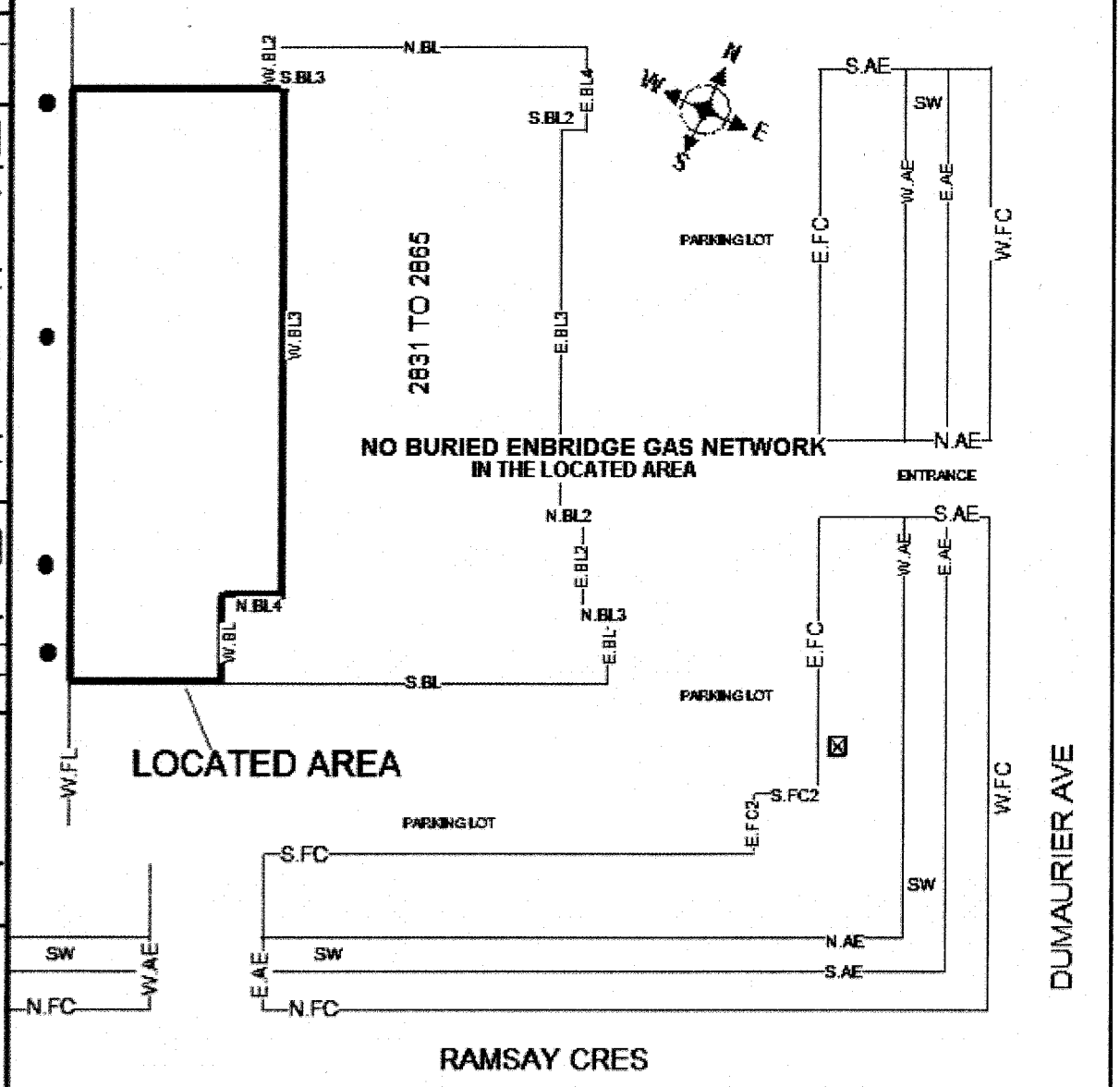

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Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities ☐ Bell ☐ Gas ● HydroOttawa ☐ Street Lighting
Located: ☐ Blink ☐ Peel Fibre ☐ ☐

Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) N/A

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FROM: W.FL OF 2831-2865 DUMAURIER AVE
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- Driveway — DW
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- Sidewalk — SW
- Demarcation — DM
- Railway
- Pole
- Flush to Grade Pedestal
- Pedestal — X
- Buried Cable — B
- Conduit — C
- Buried Service Wire — BSW
- Manhole — MH
- Fibre Optic Cable — FO
- Gas Main — GM
- Gas Service — GS
- Gas Valve
- Hydrant
- Transformer
- Hydro Ottawa — H
- Hydro Pole — X
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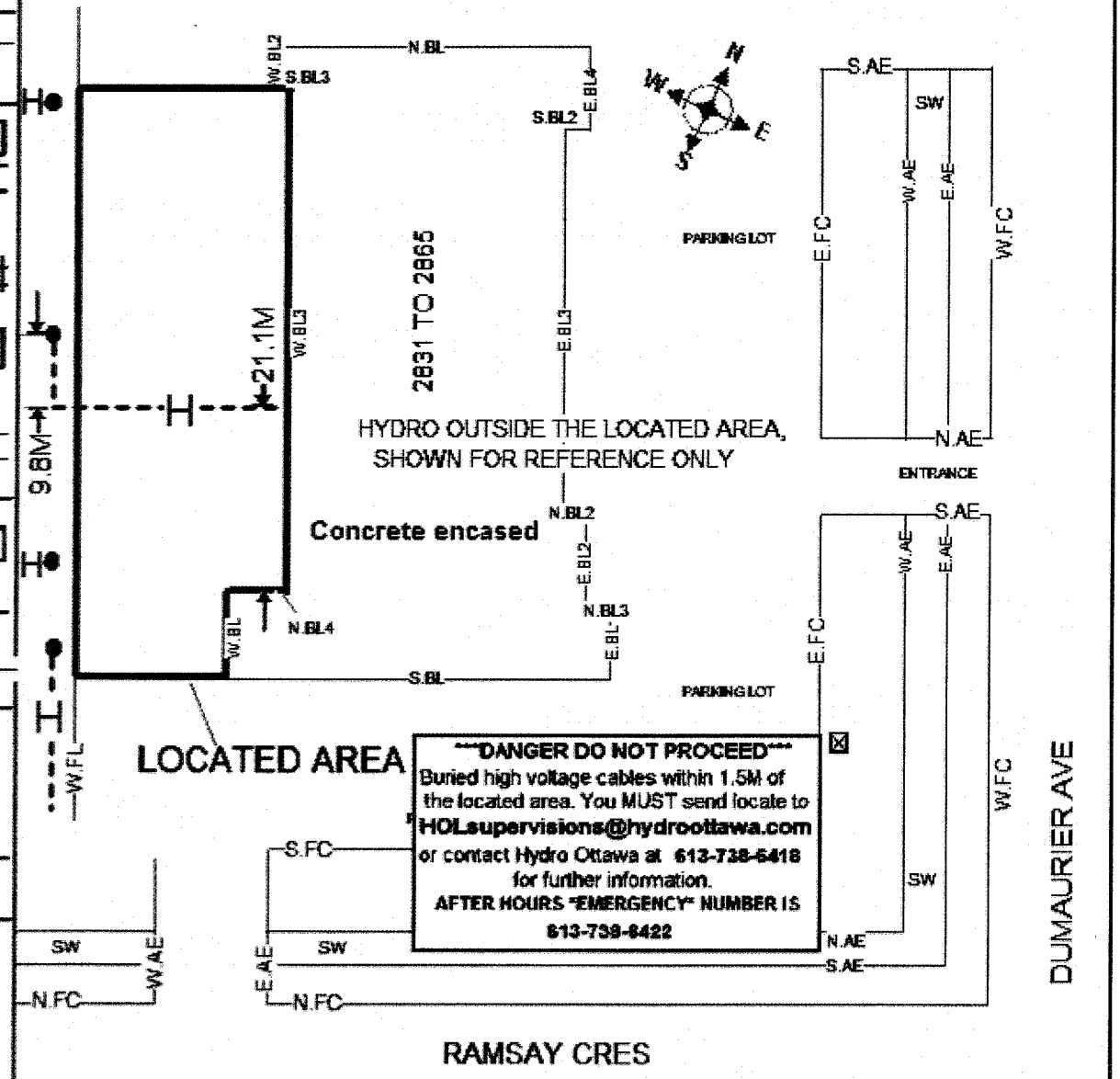

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PROMARK TELECON Inc.

Auxiliary Locate Sheet

Union Gas Emergency # 1-877-969-0999

Phone: 613-723-9888 Fax: 613-723-9277 Toll free: 1-800-371-8866 Email

Utilities Located: ● Bell ☐ Gas ☐ HydroOttawa ☐ Hydro One ☐ Videotron ☐ Peel Fibre ☐ Veridian connections

Date Located: mm/dd/yyyy 09/28/2018

Request # 20183813706

Number of Services marked: (Specify building/house numbers) N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: 27.0M SOUTH OF N.FL OF 2831-2865 DUMAURIER AVE
TO: 6.0M SOUTH OF N.FL OF 2831-2865 DUMAURIER AVE
FROM: W.FC OF DUMAURIER AVE
TO: 25.0M WEST OF W.FC OF DUMAURIER AVE

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- Fence Line — FL
- Face of Curb — FC
- Road Edge — RE
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- ASPHALT EDGE -AE-
- Driveway — DW
- Catch Basin — CB
- Sidewalk — SW
- Demarcation — DM
- Railway
- Pole
- Flush to Grade Pedestal
- Pedestal — X
- Buried Cable — B
- Conduit — C
- Buried Service Wire — BSW
- Manhole — MH
- Fibre Optic Cable — FO
- Bell Hydro Service -HS-
- Gas Main — GM
- Gas Service — GS
- Gas Valve
- Hydrant
- Transformer
- Hydro — H
- Hydro Pole — X
- StreetLightCable — SL
- Street Light
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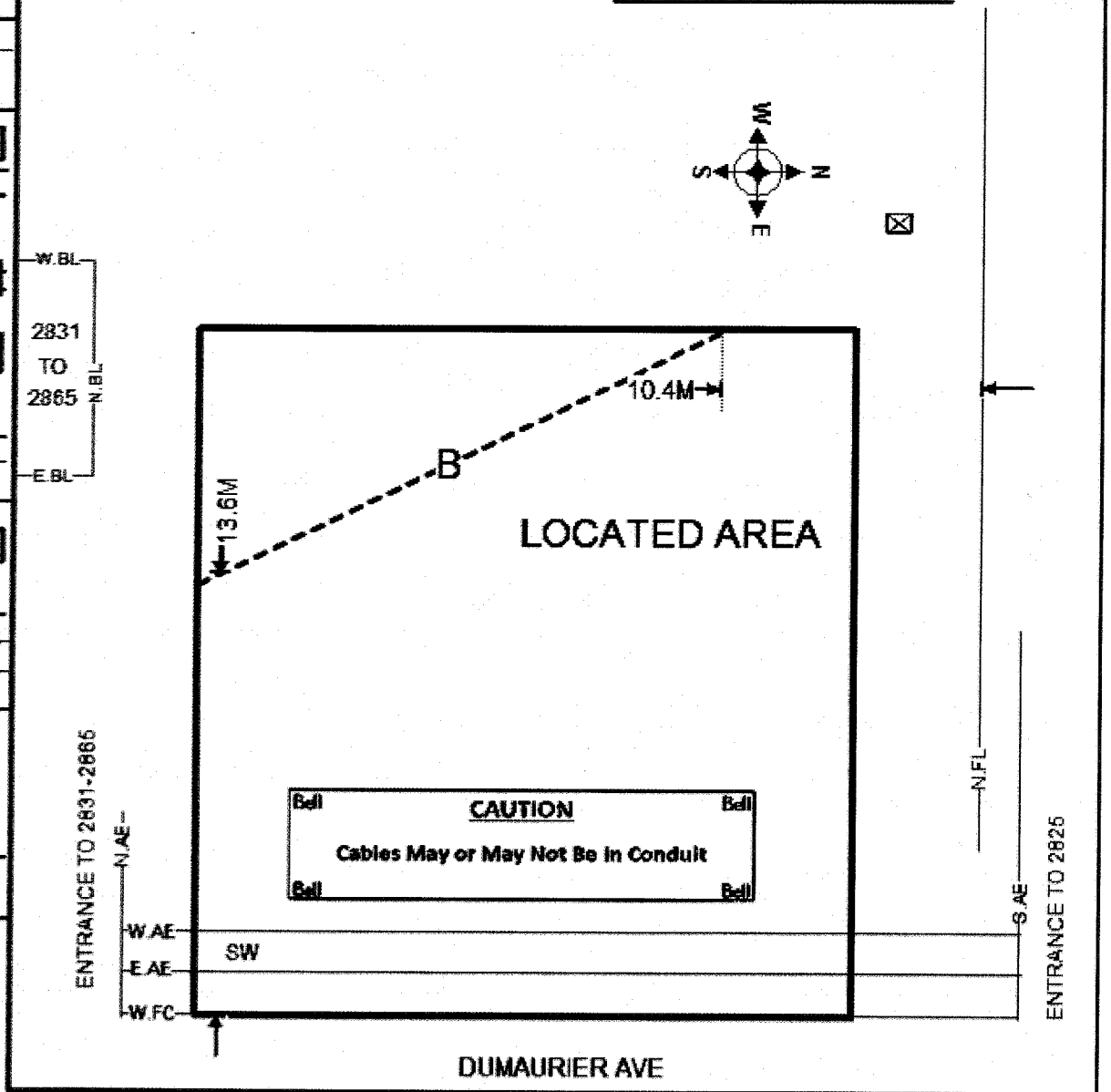

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- Sidewalk — SW
- Demarcation — DM
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- Pole — O
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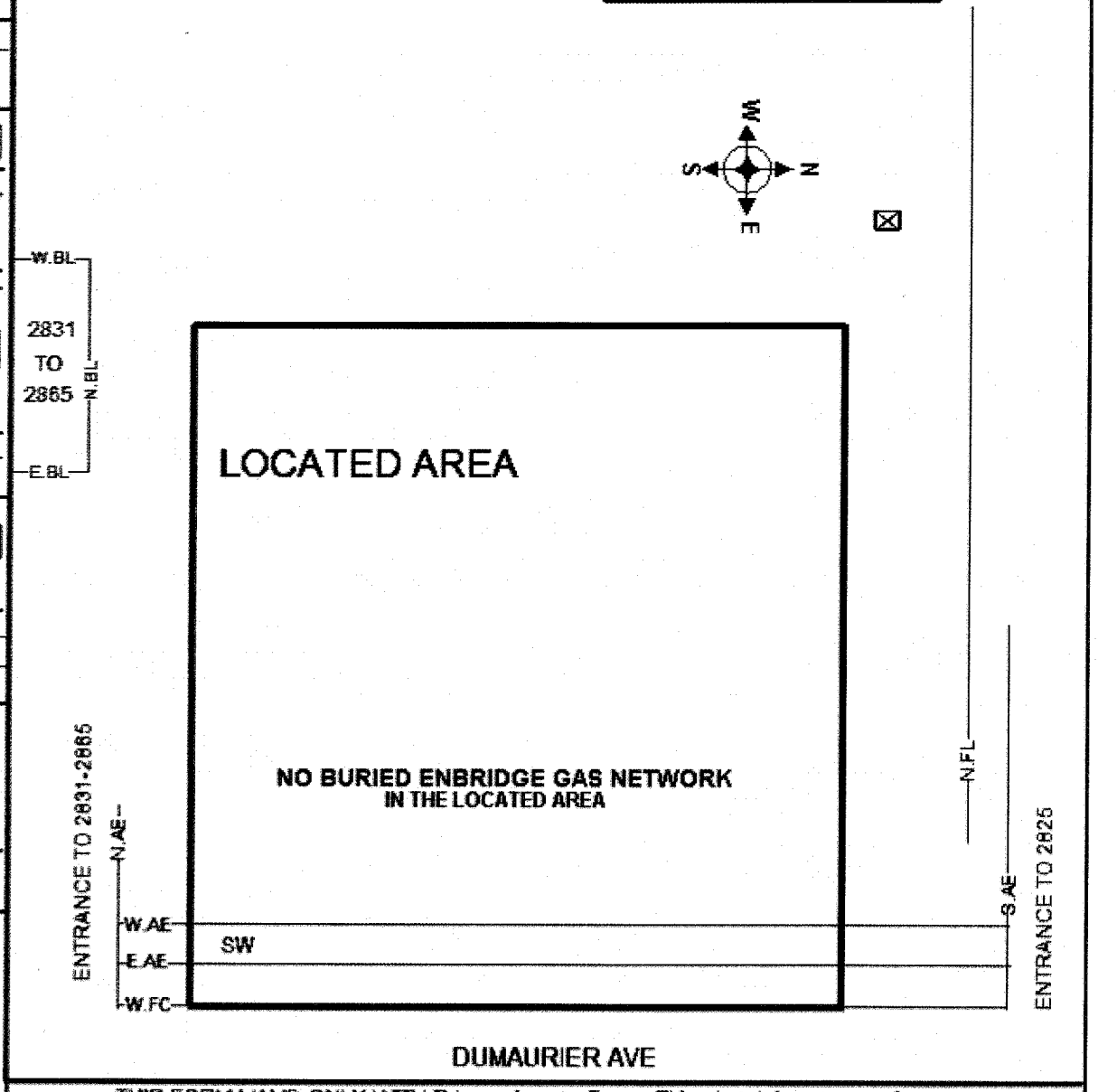

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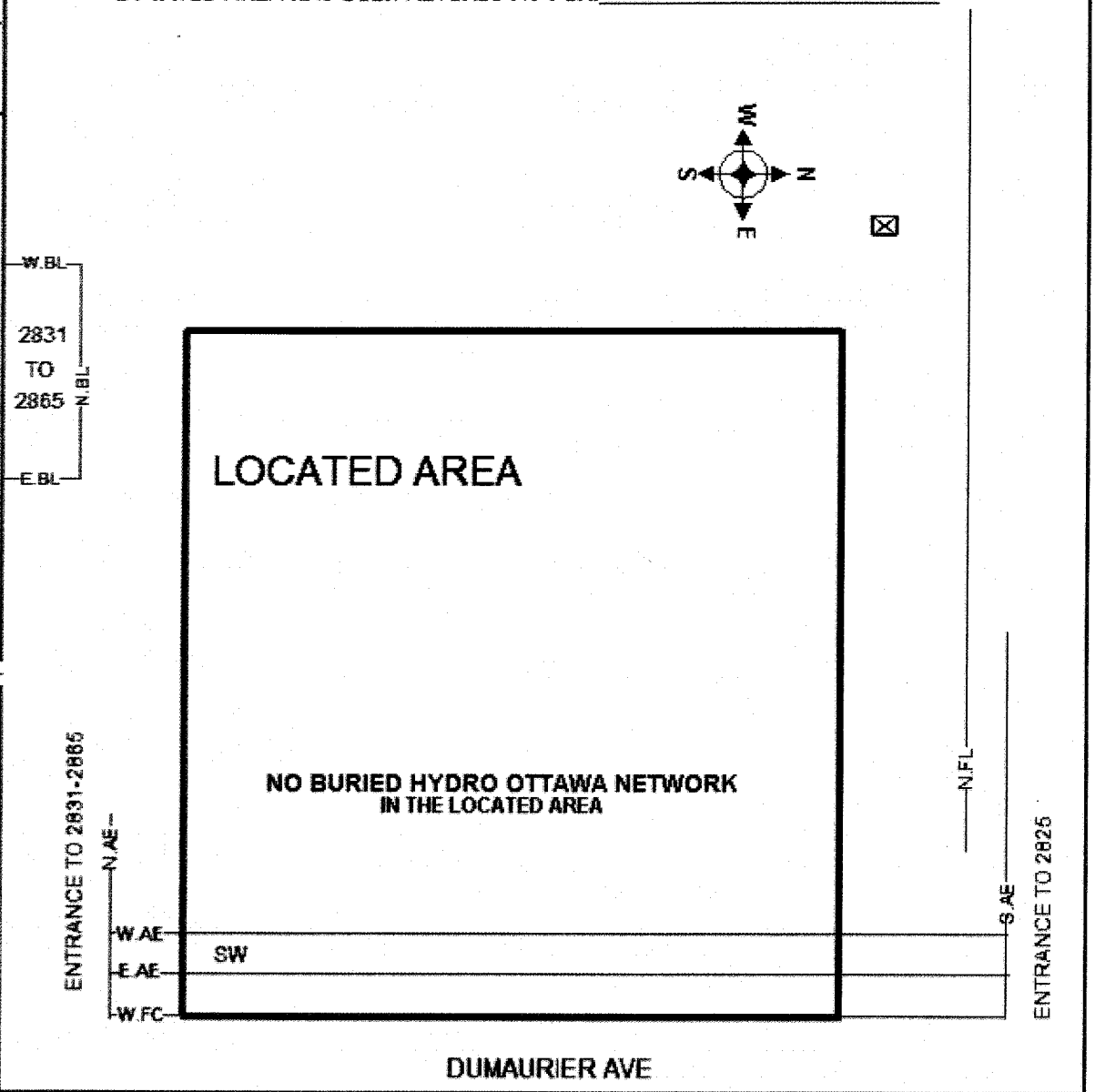

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MESSAGE REGARDING REQUESTED LOCATE

Dear Excavator,

Hydro One has completed your locate request based on the information you provided to Ontario One Call. The underground facility locate on our **Distribution system** is valid for **60 days** from the date shown on the Underground Cable Stakeout Report attached. The 60 day validity does not include Transmission locate requests. Please be aware new underground facilities can be installed any time after this locate was completed. It is your responsibility to contact Ontario One Call for a new locate if any changes are known or suspected or for a Relocate if excavation continues beyond 60 days.

Hydro One expects excavators to protect and preserve the paint marks and flags placed at the time of the original locate ticket. If markings are removed due to weather or excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate ticket. However, if an excavator would like Hydro One to refresh their markings, please contact Ontario One Call at 1-800-400-2255 to request a Remark.

WARNINGS AND DISCLAIMERS:

Hand dig cautiously 1 meter around Hydro One's Red Paint Markings as indicated on the Underground Cable Stakeout Report. It is understood that the attached information has been provided from our records, and represents our knowledge of the approximate location of **Hydro One** plant only: the contractor must request stakeouts from other utilities to establish the location of their plant. The company or contractor must exercise extreme caution where mechanical equipment is used in the vicinity of the underground cable plant and where necessary to locate by hand its actual position. Liability for damages rests with the company or contractor.

Thank you,
Hydro One

20183922522

Bell

Dear Excavator:

We are in receipt of your recent request for a Bell relocate.

Please be advised that the original locate(s) issued for the request in question will remain valid for the duration of your project. If any of the exceptions below apply and you would like the site remarked for Bell or you would like to discuss your relocate request, please contact us during business hours at **1-844-225-5550, Option # 8:**

- The excavator did not start their work within 60 days of the original locate completion date
- Tie in's/offsets used as measurements on the original Bell locate are no longer there
- The excavator suspects new Bell plant has been added in the locate area since the original locate
- The excavator has lost control of the site for an extended period of time (i.e. the excavation begins however the excavator has left site and did not return for 60 days or more)
- There is a sticker on your locate indicating there is a Bell Hydro line in the locate area and you're entitled to a Relocate of that area.

Bell expects excavators will protect and preserve the paint marks placed at the time of their original locate. If markings are removed due to weather or ongoing excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate sheet.

If an excavator would like their markings refreshed they can contact the Bell LSP (Locate Service Provider) directly and arrange for this at the excavator's expense. The LSP contact information is available on the original locate sheet.

Sincerely,

Bell Screening Centre

DISCLAIMER

Warning!

The Excavator must have a copy of this locate on the job site during excavation.

Located Area: The Excavator must not work outside the area indicated by the Located Area in the Diagram without a further locate by the Company

Locate the plant: The plant location information provided is the best we have available but constitutes only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Mechanical equipment must not be used within one metre of the estimated location of the plant.

Hydro Ottawa must be notified prior to excavation and inspector on site

Expose the plant: Once the plant has been located by hand digging, it must be exposed along its length adjacent to or in the immediate vicinity of the proposed excavation. For this purpose, mechanical equipment must not be used within 0.5 metres of the plant.

Digging around the exposed plant: When the plant has been exposed, any further excavation within 0.3 metres, must only be done by hand digging and not with mechanical equipment.

Support Requirements: If the underground plant is exposed over a distance of more than 1.25 metres, the Facility Owner must be notified. Underground plant must be supported at all times.

O. Reg. 210/01 Oil and Gas Pipeline systems EXCERPTS

9. (1) No person shall dig, bore, trench, grade, excavate or break ground with mechanical equipment or explosives without first ascertaining the location of any pipeline that may be interfered with.

10. No person shall interfere with or damage any pipeline without authority to do so.

Technical Standards & Safety Act 2000 EXCERPT

37 (1) Every person who contravenes or fails to comply with any provision of this act or the regulations; etc... is guility of an offense and on conviction is liable to a fine of not more than $50,000 or to imprisonment for a term of not more than one year, or to both.

Caution: The markings may disappear or be misplaced. Should sketch and markings not coincide, Excavator must obtain a new locate. This is based on information given at the time. Any changes to location or nature of work require a new locate. The Excavator must not work outside the indicated Located Area without a further locate.
Privately owned services within the located area have not been marked - check with service/property owner.

Locate is VOID after 30 days.

For remarks contact Ontario One Call 1-800-400-2255.
or www.on1call.com

ON1CALL
CALL BEFORE YOU DIG

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Locate is VOID after 30 days.

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or www.on1call.com

ON1CALL
CALL BEFORE YOU DIG

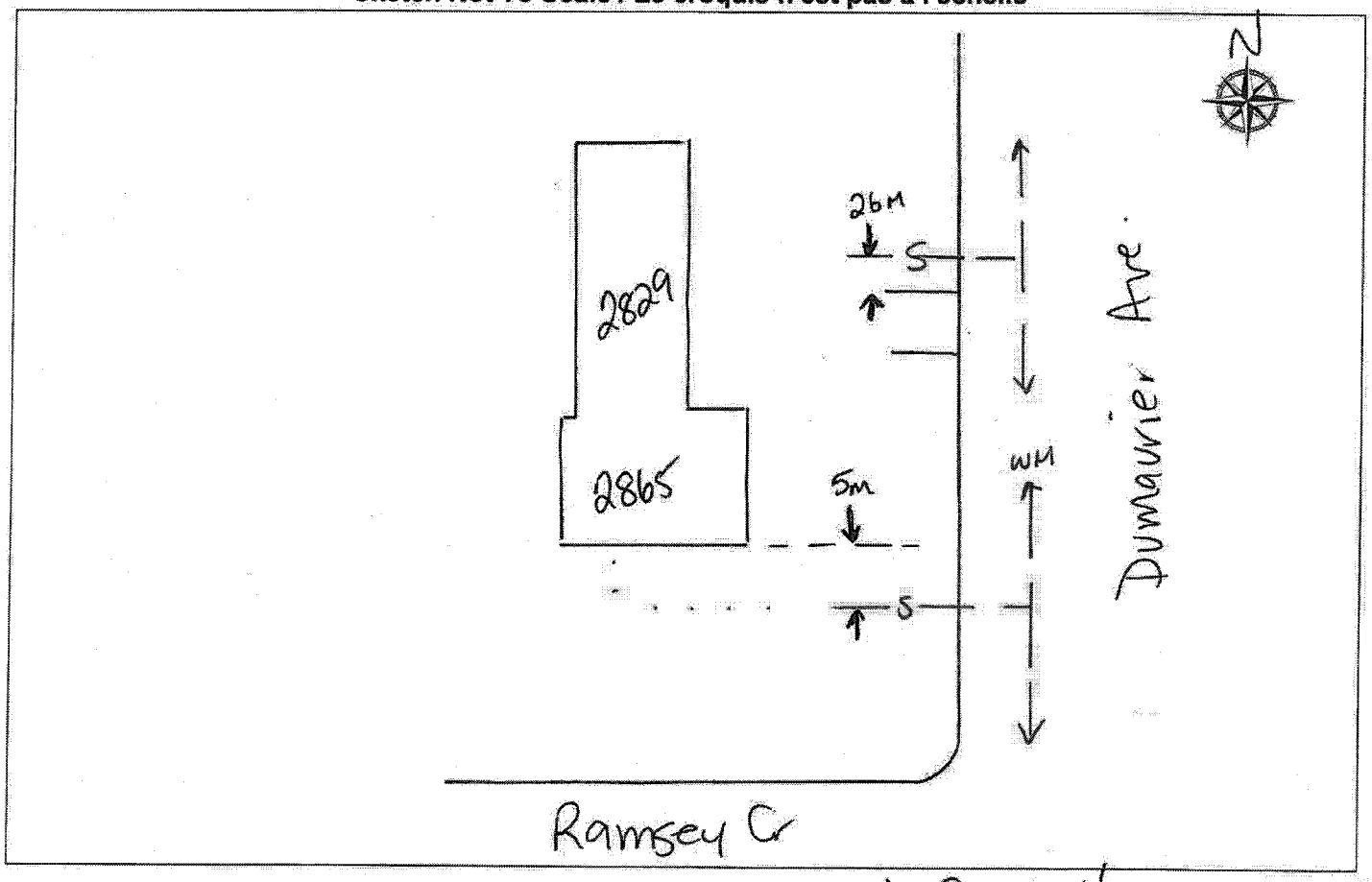
6 HD

City of Ottawa Locate Report – Water and Sewer Utilities
Rapport de localisation des conduites d'eau et d'égout d'Ottawa

For more information / Pour de plus amples renseignements : 3-1-1 or/ou (613) 580-2424, ext. (poste) 22336.

Date : 26/9/18	Work Order # / No d'ordre de travail : 11668505
Location of Work / Lieu de travail : 2865 Dumaurier Ave.	ON1CALL # / No d'appel ON1 : 20183813706 1
Type of Work / Type de travail : boreholes	☐ ArcView attached Plan ArcView ci-joint
Contractor / Entrepreneur : USL	Fax / Télécopieur :

Sketch Not To Scale / Le croquis n'est pas à l'échelle



Contractor signature
Signature de l'entrepreneur

J Riddell
Locator (please print)
Marqueurs [en lettres moulées]

Method of marking / Méthode de marquage

☐ Flags / Drapeaux ☒ Paint / Peinture ☐ Other (specify) / Autre [précisez] :

Remarks / Commentaires : Cars in lot blocking valves

Office copy : White
Copie du bureau : Blanc

Contractor copy: Yellow
Copie de l'entrepreneur : Jaune

Void after 60 days.
Périmé après 60 jours.

Monique Larocque

From: ESD-Locate / SE-Localiser <esd-locate@ottawa.ca>
Sent: Thursday, September 27, 2018 8:01 AM
To: 'moniquel@usl-1.com'
Cc: ESD-Locate / SE-Localiser
Subject: Locate: DUMAURIER AVE - 20183813706
Attachments: 11668505.pdf; City of Ottawa Disclaimer - ville d'Ottawa avis de non-responsabilité - Copy - Copy.pdf

Please find attached the locate for DUMAURIER AVE.

Thank you,

Axel Grissa

City of Ottawa

Technology, Innovation & Engineering Support Services Public Works & Environmental Services Department

(613)-580-2424 x22336

<http://ottawa.ca/en>

Please note: City of Ottawa locates are only valid for sixty (60) days.

DISCLAIMER

The excavator must have a copy of this locate on the job site during excavation.

Locate area: The excavator must not work outside the area indicated in the location of work or located area in the diagram without an updated locate. Stakes or markings may disappear or be displaced. If any delays occur in acting on the stakeout information, or if markings become unclear, a new locate must be obtained.

Locating the plant: The plant location information provided is only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Warning: Do not use mechanical equipment within one (1) metre of the estimated location of the water or sewer plant. If the plant is larger than 406mm, mechanical equipment must not be used within three (3) meters.

Digging around exposed plants: Must do any further excavation within 0.3 metres of an exposed water or sewer plant by hand.

Contractors are to perform all work in accordance with applicable City of Ottawa By-laws and any applicable federal and provincial legislation or regulations, including but not limited to the *Public Utilities Act, R.S.O. 1990, c. P.52, s. 56(1)*; *Ontario Regulation 210/01 under the Technical Safety Standards Act, 2000 , S.O. 2000 c. 16*; *Ontario Regulation 213/91 under the Occupational Health and Safety Act, R.S.O. 1990, c. O.1.*

AVIS DE NON-RESPONSABILITÉ

L'opérateur de l'excavatrice doit avoir en sa possession ce rapport de localisation pendant l'excavation.

Zone de localisation : l'opérateur de l'excavatrice ne doit pas creuser en dehors de la zone indiquée sur l'ordre de travail ni à l'extérieur de la zone indiquée sur le diagramme, à moins d'avoir en sa possession un rapport de localisation actualisé. Les piquets ou les marques peuvent disparaître ou être déplacés. S'il y a un retard à intervenir sur la base des données de surveillance ou si le marquage devient imprécis, il faut obtenir un nouveau rapport de localisation.

Déterminer l'emplacement des conduites : les renseignements sur l'emplacement des conduites sont approximatifs. Pour déterminer l'emplacement et la profondeur, on doit creuser manuellement avant d'utiliser une excavatrice.

Avertissement : n'utilisez pas d'équipement mécanique [excavatrice] à moins d'un [1] mètre de l'emplacement supposé de la conduite d'eau ou d'égout. Si la conduite compte plus de 406 mm de diamètre, aucun équipement mécanique ne doit être utilisé à moins [3] de trois mètres de celle-ci.

Creuser autour des conduites exposées : toute excavation à moins de 0,3 m d'une conduite d'eau ou d'égout doit se faire manuellement.

Les entrepreneurs doivent exécuter tous les travaux conformément aux règlements de la Ville d'Ottawa et aux lois et règlements fédéraux ou provinciaux applicables, y compris, mais sans s'y limiter, la *Loi sur les services publics, L.R.O. 1990, chap. P.52, art. 56[1]*; le *Règlement 210/01 de l'Ontario* en vertu de la *Loi de 2000 sur les normes techniques et la sécurité, L.O. 2000, chap. 16*; et le *Règlement 213/91 de l'Ontario* en vertu de la *Loi sur la santé et la sécurité au travail L.R.O. 1990, chap. O.1.*

GHD

CANADIAN LOCATORS INC.
Servicing the Utilities Industry

Ph: (905)479-5674 Email: ontario@canadianlocators.com

ROGERS
Primary Locate Sheet

ON 1 Call Ticket # : 20183813706

Contractor / Excavator : U S L			**Contact Name :** JACQUES DESJARDINS
Tel : 613-226-8750	**Alt. Phone :**	**Email :** moniquel@usl-l.com	
Received Date : Sep 20 2018	**Excavation Date :** Sep 26 2018	**Revised Excavation Date:**	**Type of Work :** BORE HOLES
Locate Address : 2831-2865 DUMAURIER AVE			**City / Municipality :** OTTAWA, ONTARIO

Nearest Intersection : RAMSEY CRES & WATSON ST

Method of Field Marking : ☑ Paint ☐ Stakes ☑ Flags

Caller's Remarks *(Additional Info)* **:**
COBLOT-U Drilling trhourhout properties. Clear all of 2831 to 2865 DUmaurier Ave to all property lines and to sidewalk edge on Dumaurier Ave.//Civic # 2831, 2833, 2835, 2865.

Utilities Marked :					
☑ Coaxial Plant	☑ Fibre Optics Plant				**This locate has multiple work areas which are greater than 100 m apart :** ☐ Yes ☑ No
Total Length : 205 m	**Total Length :** 5 m				

Field sketch and Located Area shown on auxiliary locate sheet(s)

This locate is for ROGERS plant infrastructure ONLY !

Apply sticker here if required

CAUTION : Locate is VOID after 60 days !

CAUTION : Hand dig within one (1) meter or 3.28 feet of markings. The Located Area defined on the Auxiliary Locate Sheet(s) contains all known ROGERS infrastructure. Any changes to excavation area or nature of work requires a new locate.

For all cut cable, please call :

1-800-265-9501

Locator's Comments : 160 X 50

Locator's Name : *(Please Print)* Jason Vanslyke

Date :	**Start Time :**	**End Time :**
Oct 2 2018	12:30 PM	1:30 PM

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. Should sketch and markings not coincide, a new locate MUST be obtained.

CANADIAN LOCATORS INC.
Servicing the Utilities Industry

Ph: (905)479-5674 Email: ontario@canadianlocators.com

ROGERS
Auxiliary Locate Sheet

ON 1 Call Ticket # : 20183813706

Utilities Marked :

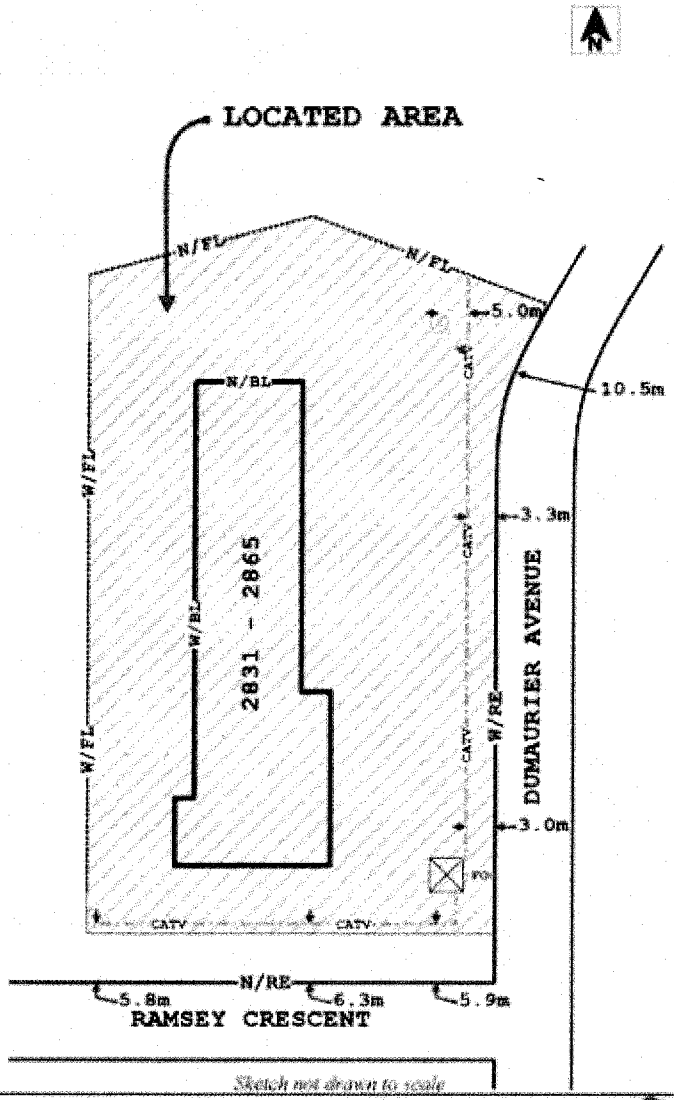
☑ Coaxial Plant 205 m ☑ Fibre Optics Plant 5 m

Number of Services Marked : (specify building/house numbers)

LOCATED AREA CONTAINS ALL KNOWN ROGERS INFRASTRUCTURE

FROM :	TO :
N/FL 2831-2865 DUMAURIER AVENUE	5m N/N/RE RAMSEY CRESCENT
FROM :	TO :
W/FL 2831-2865 DUMAURIER AVENUE	W/RE DUMAURIER AVENUE

Hand dig within 1 meter or 3.28 feet as measured horizontally from the field markings to avoid damaging the underground utilities.
If you damage the utilities, you may be held liable. **For all cut cable, please call: 1-800-265-9501 immediately!**
Depth of cable plant varies and **MUST** be determined by hand digging or vacuum excavation.
LOCATED AREA ALTERED AS PER :



LEGEND :

Fibre Optic	FO	Road Edge	RE	Property Line	PL	Tree		Transformer	TPR	Streetlight	SL
Cable / T.V.	CATV	Bldg Line	BL	Lot Line	LL	Pedestal		Manhole		Hand Hole	HH
Conduit	C	North Direction	N	Face of Curb	FC	Pole		Catch Basin	CB	Hydrant	H
Railway		Sidewalk	SW	Driveway	DW	Valve		North	N	East	E
Work Area		Measurement		Fence Line	FL	Vault		South	S	West	W

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. Should sketch and markings not coincide, a new locate MUST be obtained.

CHD

Ontario One Call TF

City of Ottawa
Street Light Locate

Black & McDonald

NOTICE OF INTENT TO EXCAVATE

Header Code: STANDARD

Request Type: NORMAL

Ticket No: 20183813706

Original Call Date: 09/19/2018 10:51:27 AM

Work To Begin Date: 09/26/2018

Company: U S L

Contact Name: JACQUES DESJARDINS Pager:

Contact Phone: (613)-226-8750 ext. Cell:

Fax: (613)-226-8677 ext.

Alternate Contact: JEFF FORRESTER Alt. Phone:

Place: OTTAWA

Street: 2831 DUMAURIER AVE

Nearest Intersecting Street: RAMSEY CRES

Second Intersecting Street: WATSON ST

Subdivision: OTTAWA

Additional Dig Information:

CIVIC # 2831, 2833, 2835, 2865. CORLOT=U DRILLING TRHOURHOUT PROPERTIES. CLEAR ALL OF 2831 TO 2865 DUMAURIER AVE TO ALL PROPERTY LINES AND TO SIDEWALK EDGE ON DUMAURIER AVE. NO_PLAN::613 828

WO/ JOB #: ANYTIME

Type Of Work: BORE HOLES

Remarks:

-75.793499 45.350499 NB_SEGMENTS::2 BCOE01 ROGOTT01 OTWASL01 OTWAWS01 ENOE01 HOT1

On1 Call #	20183813706
Date Requested	09/19/2018 10:51:27 AM

City of Ottawa Street Light Locate

Dispatcher: Lisa Bisaillon
Phone: 613-526-1226

Black & McDonald

Company	U S L
Name	JACQUES DESJARDINS
Phone	(613)-226-8750 ext.
FAX	(613)-226-8677 ext.
Site Contact	JEFF FORRESTER
Phone	

Instructions
2831 to 2865, DUMAURIER AVE
CIVIC # 2831, 2833, 2835, 2865. CORLOT=U DRILLING TRHOURHOUT PROPERTIES. CLEAR ALL OF 2831 TO 2865 DUMAURIER AVE TO ALL PROPERTY LINES AND TO SIDEWALK EDGE ON DUMAURIER AVE.
NO_PLAN::613 828

LOCATOR SKETCH

N

Clear

No City of Ottawa Street Light assets in dig area

CLEAR PAST SIDEWALK

—SL— Underground Street Light Cable
Street Light
—OH— Overhead/Aerial Wires
Globe/Decorative Light
Source/Transformer
Hydro Pole

Locator Notes/Comments:

Locate is valid for 60 days. If sketch is different from markings, location or nature of work changes, a new locate must be requested. Hand dig within 1m (3.28ft) on either side of markings. Depth of buried plant varies.

Cette fiche n'est pas valide 60 jours de calendrier apres le reperage. Si les marques ne concordent pas avec celles sur le croquis, un nouveau reperage est requis. Tout changement a l'emplacement ou a la nature du travail necessite un nouveau reperage. Creuser a la main un metre (3.28 pieds) du repere. La profondeur des installation varie d'un endroit a l'autre.

Date Located	09/21/2018
Time of day	
Located by	JUSTIN VAVROS
Signature	

Disclaimer

Warning!

The Excavator must have a copy of this locate on the job site during excavation.

Located Area: The Excavator must not work outside the area indicated, by the located area in the diagram, without a further locate completed by **Black & McDonald Limited.**

Locate the Plant: The plant location information provided is the best we have available, but constitutes only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Mechanical equipment must not be used within 1.0 meter of the estimated location of the plant.

Valid Documentation: This locate is valid only for the Agency accepting it. Other parties must obtain and accept their respective underground locate from **Ontario 1 Call.**

Excavator Alterations: Under no circumstance shall an Excavator touch or move an underground power cable. Arrangements must be made to have qualified personnel relocate any such cable.

Expose the plant: Once the plant has been located by hand digging, it must be exposed along its length adjacent to or in the immediate vicinity of the proposed excavation. For this purpose, mechanical equipment must not be used within 0.5 meters of the plant.

Digging around the Exposed Plant: When the plant has been exposed, any further excavation within 0.3 meters, must only be done by hand digging and not with mechanical equipment.

Support Requirements: If the underground plant is exposed over a distance of more than 1.25 meters, the Facility Owner must be notified. Underground plant must be supported at all times.

Private Cables: Please be advised that **Black & McDonald Limited** is not responsible for and does not locate private cables

New Cables: Be aware that new cables could be installed at any time after the locate has been completed. It is the Excavator's responsibility to call for new locates if any changes are known or suspected.

Caution: The markings may disappear or be misplaced. Should sketch and markings not coincide, the Excavator must obtain a new locate. This is based on the information given at the time. Any changes to location or nature of work require a new locate. The Excavator must not work outside the indicated located area without a further locate. Privately owned services within the located area have not been marked- check with service/property owner.

Liability: Any person or Excavator who interferes with or damages any underground electrical cable without having obtained a valid locate/clearance from **Black & McDonald Limited**, shall be liable for all cost incurred during the repair of the cable as well as any resulting legal actions.

This locate has been given as accurately as possible, but no locate is guaranteed. Excavators must always dig with extreme caution to prevent the possibility of damaging electrical cables and endangering safety.

Locate is void after 60 days

For remarks contact **Ontario One Call** 1-800-400-2255 or www.on1call.com

UNDERGROUND SERVICE LOCATORS - PRIVATE UTILITY REPORT DATE: 10-04-2018

1 OF 3

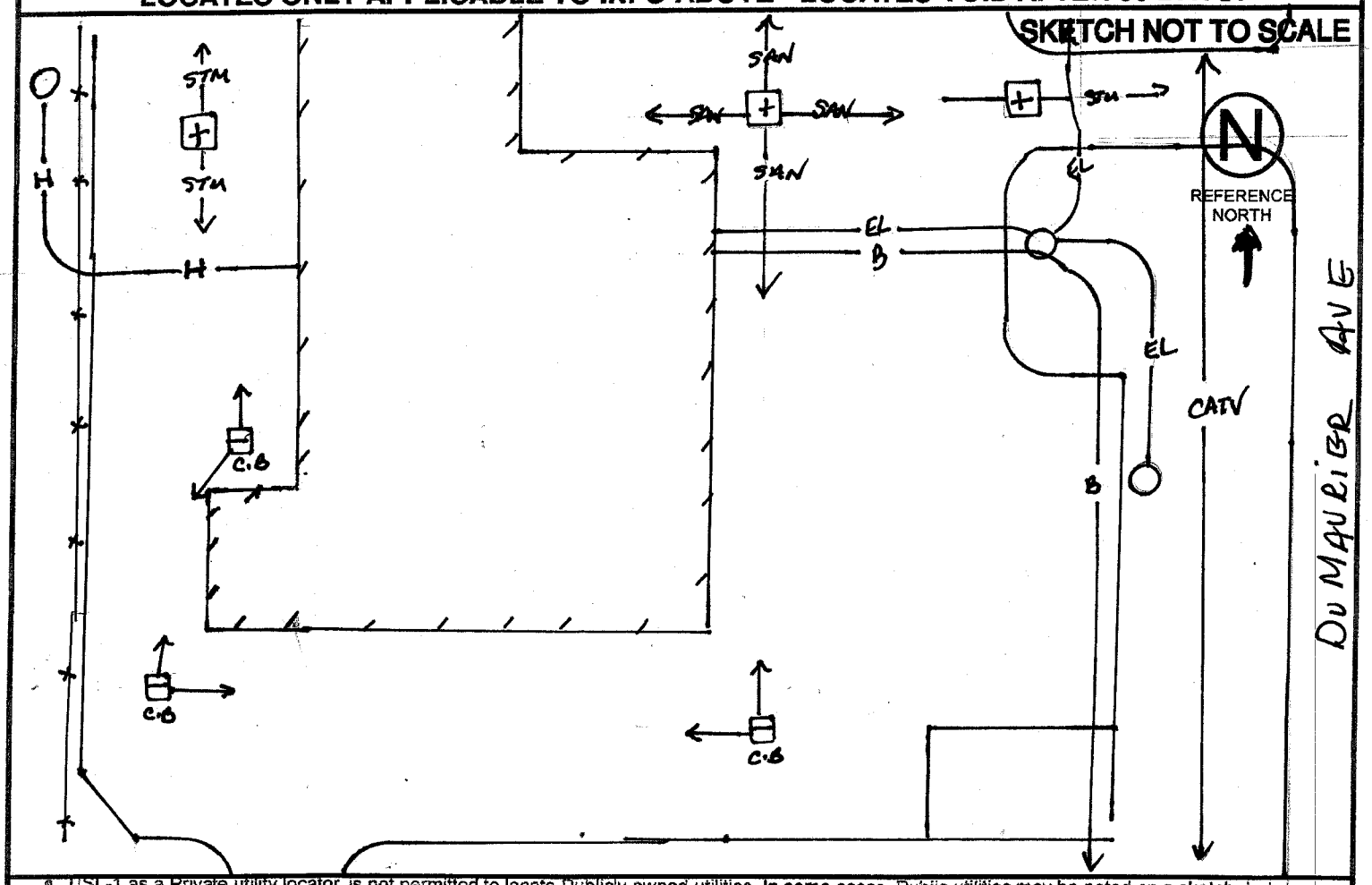
ONE-CALL SYSTEMS INC.
775 TAYLOR CREEK DRIVE
OTTAWA, ON, K4A 0Z9
PHONE (613) 226-8750
FAX (613) 226-8677

CUSTOMER: GHD	REQUESTED BY: RYAN
LOCATION OF WORK: 2865 DU MAURIER AVE	LIMITS OF WORK: AS PER MAP

HYDRO	-- H --	CABLE T.V.	-- T.V. --	STEAM	-- STEAM --
GAS	-- G --	SANITARY	-- SAN --	ELECTRICAL	-- EL --
BELL	-- B --	STORM	-- ST --	COMMUNICATIONS	-- COM --
UNIDENTIFIED CABLE	-- UC --	FIBER OPTIC	-- FOC --	OTHER:	
WATER	-- W --				

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 30 DAYS!

SKETCH NOT TO SCALE



- USL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excavation purposes. It is the contractor's responsibility to verify any Public utilities noted on the USL-1 sketch by referring to the Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NOT ASSUME LIABILITY FOR PUBLIC LOCATE INNACCURACIES.
- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of when you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates.

COMMENTS: NO OTHER PRIVATE UTILITIES DETECTED

THIS SKETCH IS NOT A PUBLIC UTILITY LOCATE/DOCUMENT. PUBLIC UTILITIES SHOWN ARE FOR REFERENCE ONLY. REFER TO USL-1 DISCLAIMER - FORM 101. CONTRACTOR IS RESPONSIBLE TO ENSURE THEY HAVE PUBLIC UTILITY LOCATES BEFORE COMMENCING WORK.

LOCATORS NAME: CHRIS WHARTON	SIGNATURE:

LOCATE RECEIVED AND REVIEWED BY _____ (Print Name) _____ (Signature)

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

White = Client Yellow = USL-1 Pink = USL-1 FORM #100

UNDERGROUND SERVICE LOCATORS - PRIVATE UTILITY REPORT DATE: 10-04-2018

ONE-CALL SYSTEMS INC. 2 OF 3

775 TAYLOR CREEK DRIVE PHONE (613) 226-8750

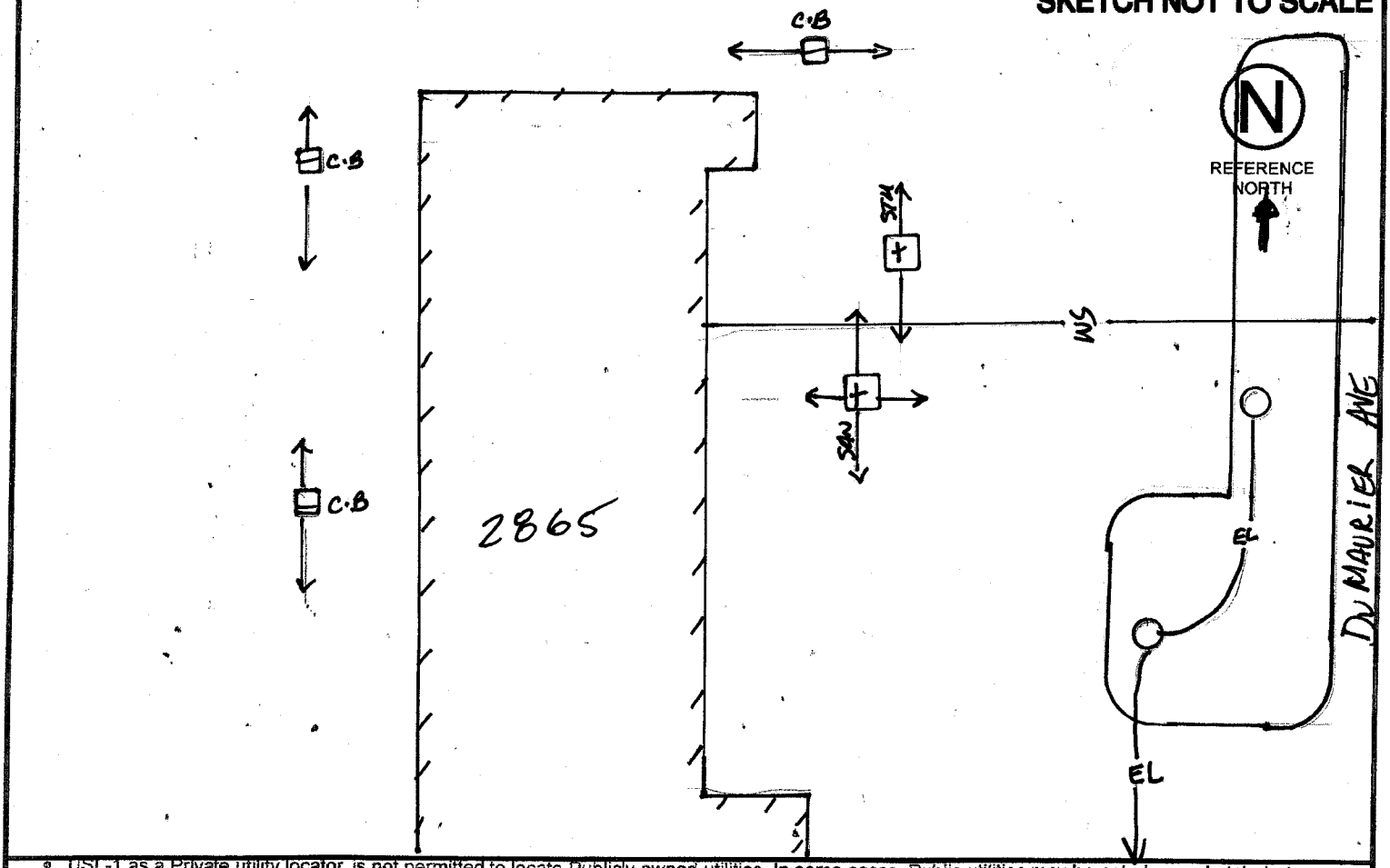
OTTAWA, ON, K4A 0Z9 FAX (613) 226-8677

CUSTOMER: GHD	REQUESTED BY: RYAN
LOCATION OF WORK: 2865 DU MAURIER AVE	LIMITS OF WORK: AS PER MAP

HYDRO	-- H --	CABLE T.V.	-- T.V. --	STEAM	-- STEAM --
GAS	-- G --	SANITARY	-- SAN --	ELECTRICAL	-- EL --
BELL	-- B --	STORM	-- ST --	COMMUNICATIONS	-- COM --
UNIDENTIFIED CABLE	-- UC --	FIBER OPTIC	-- FOC --	OTHER:	
WATER	-- W --				

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 30 DAYS!

SKETCH NOT TO SCALE



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LOCATORS NAME: CHRIS WHARTON	SIGNATURE:

LOCATE RECEIVED AND REVIEWED BY _____ (Print Name) _____ (Signature)

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

White = Client Yellow = USL-1 Pink = USL-1 FORM #100 ... 2018

UNDERGROUND SERVICE LOCATORS - PRIVATE UTILITY REPORT DATE: 10-04-2018

3 of 3

ONE-CALL SYSTEMS INC.
775 TAYLOR CREEK DRIVE
OTTAWA, ON, K4A 0Z9
PHONE (613) 226-8750
FAX (613) 226-8677

CUSTOMER: BHD	REQUESTED BY: RYAN
LOCATION OF WORK: 2865 DU MAURIER AVE	LIMITS OF WORK: AS PER MAP

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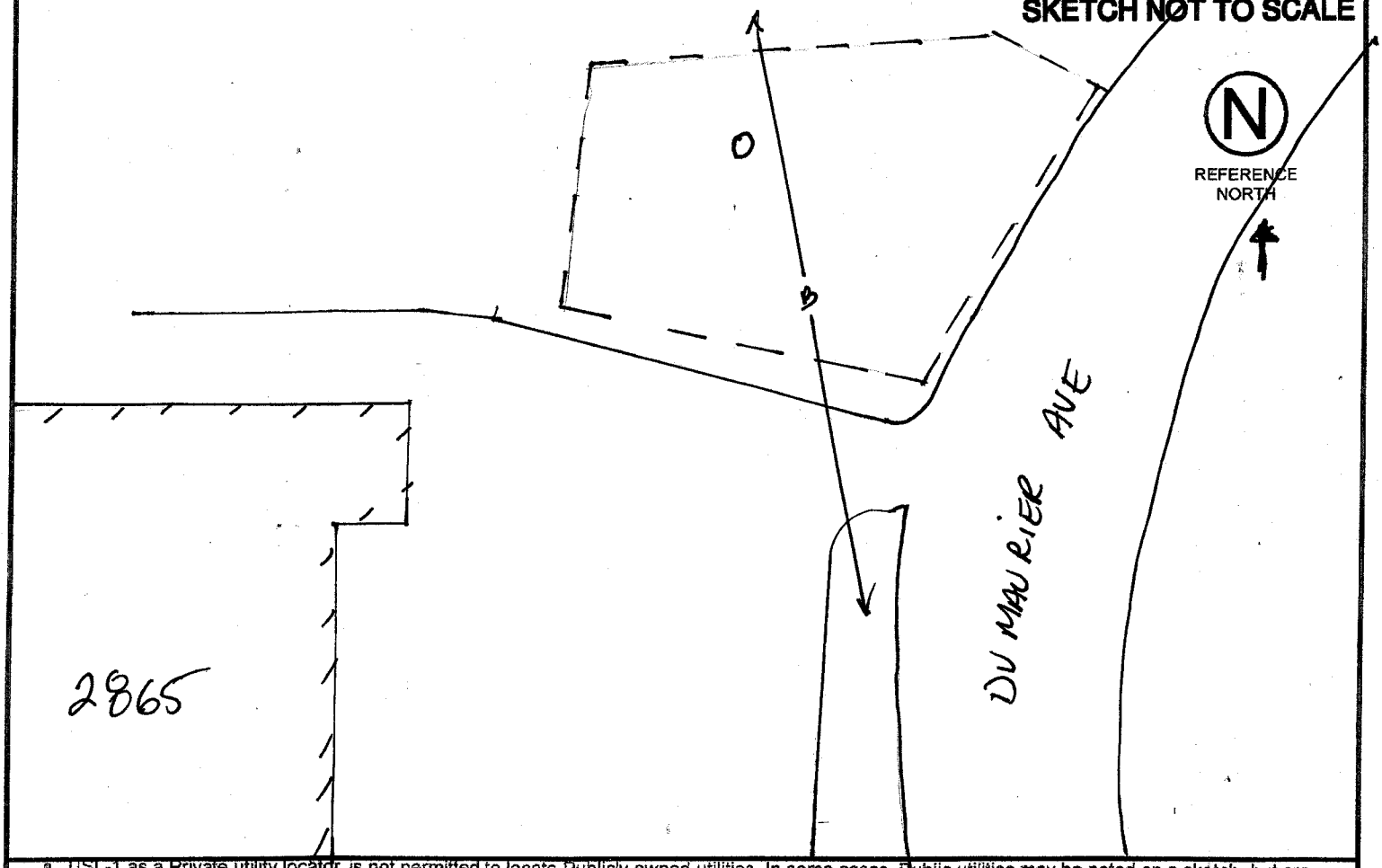
BELL	-- B --	STORM	-- ST --	COMMUNICATIONS	-- COM --
UNIDENTIFIED CABLE	-- UC --	FIBER OPTIC	-- FOC --	OTHER:	
WATER	-- W --				

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 30 DAYS!

SKETCH NOT TO SCALE



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- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of when you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates.

COMMENTS: NO OTHER PRIVATE UTILITIES DETECTED

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LOCATORS NAME: CHRIS WHARTON	SIGNATURE:

LOCATE RECEIVED AND REVIEWED BY _____ (Print Name) _____ (Signature)

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

White = Client Yellow = USL-1 Pink = USL-1 FORM #100 ... 2013

USL-1 DISCLAIMER - FORM 101

- It is our Clients responsibility to fully read and understand this document, prior to any ground disturbance taking place. Should any questions or clarifications be required, contact USL-1 before commencing work
- Locate is VOID after 30 days from the date the locate was completed. Contact USL-1 for remarks and/or new ticket requests, with a minimum notice of 5 business days
- If the scope of work, locate area, or site information changes, contact USL-1 before continuing work. In certain instances, a new ticket request may be required
- Any work within 1.5 metres laterally of a marked utility, must be hand dug or daylighted. Utility depths vary, as does the accuracy of the locate equipment, and therefore depths are typically not provided and should not be used for excavation purposes. Depth of utilities should also be verified by hand digging or daylighting. The best information is provided at the time of the locate, however the accuracy of field markings can vary with regard to equipment accuracy and external interference
- If the paint markings or flags on site differ from that of the sketch provided, please contact USL-1 before commencing work. If possible, the issue will be clarified by USL-1 and/or a site meet may be requested with the appropriate parties
- The "Excavator" is responsible for keeping a current copy of the locates on site, with the operators and in/on the excavation equipment AT ALL TIMES
- It is the "Excavator/Contractor's" responsibility to read ALL locate sheets, both public and private, to ensure they understand what potential hazards or buried utilities exist in their work area
- Special purpose locates such as sewer sondeing, locate surveys, tunnel identification, conduit identification, ground fault detections, ground penetrating radar, well cap location, concrete scanning, or anything else that requires use of more than Radiodetection equipment, must be identified at the time of the original locate request. Should a USL-1 locator identify any special needs services during a normal Private utility locate, the client will be notified for the appropriate course of action
- Not all buried utilities can be traced. In many instances, water and sewer lines, irrigation systems, grounding cables, fibre optic cables, heating cables, protection cables, and communication cables may not be traceable. Typically, sewer lines will be painted and lined up directionally from manhole to manhole where possible. It may not be possible to detect bends in the sewer lines between manholes. If tracer wires have been buried with the utility, they will be used to locate the buried utility where possible. If a buried utility cannot be traced, it will be noted on the USL-1 report. USL-1 is not liable for damage to untraceable utilities
- Public utility locators have maps, plans and as-built diagrams for reference to work from. Private utility locators, for the most part, do not. USL-1 will attempt to locate any Private utilities on a site, using as-built plans provided to them. Building access is mandatory and must be arranged by our client. Any conduits or utilities noted entering or exiting a building will be traced if possible, as well as any other visible utilities observed on site. It is the responsibility of the contractor to prpvide any and all buried utility information and site contacts that they have. There is no guarantee that USL-1 can find all buried utilities if the property owner does not have records or information regarding their own buried utilities
- USL- 1 cannot be held liable for damage to Private water and/or sewer laterals unless building access is granted, and the utility is locatable
- Thick snow and ice, frozen manhole lids, live traffic, parked cars, construction debris and activities etc, are all factors that can interfere with USL-1's ability to perform Private utility locates. USL-1 cannot guaranty location of all buried utilities when such factors impede the locate process. It is the contractor's responsibility to ensure that the work areas are safe and accessible for locates, prior to USL-1's arrival to site
- USL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excavation purposes. It is the contractor's responsibility to verify any Public utilities noted on the USL-1 sketch by referring to the Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NOT ASSUME LIABILTY FOR PUBLIC LOCATE INNACCURACIES
- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of where you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates
- NCC PROPERTY - assuming the contractor has been issued a Land Access Permit from the NCC, it is typically indicated within the permit that it is the contractor's responsibility to contact NCC for utility locates of their buried utilities

Appendix B
Sampling Analysis Plan

Table of Contents

Table Index

Attachment Index

1. Background

A Phase Two Environmental Site Assessment is to be completed for the mixed commercial/institutional property identified as 2831, 2851, and 2865 DuMaurier Avenue in Ottawa, Ontario ("Site") to investigate the areas of potential environmental concern (APECs) identified by the Phase One ESA.

The Phase One ESA identified

- PCA#1 / APEC#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill material of unknown environmental quality used for grading the Site, specifically, for infilling previously observed drainage features at the Site.
- PCA#2 / APEC#2 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners) | Off-Site, a former landfill Site was identified to the east of DuMaurier Avenue, approximately 20 m east of the Site.

The contaminants of potential concern (CPCs) to be assessed as part of the Phase Two Environmental Site Assessment in the soil and groundwater are:

- APEC#1 | VOCs, Metals, PAHs
- APEC#2 | VOCs, Metals, PAHs

Select boreholes/monitoring wells placed in locations of the Site will be sampled to provide an assessment of the Contaminants of Potential Concern (CPCs) in the vicinity of each APEC.

Should additional contaminants be suspected during the course of the drilling program, additional sampling should be discussed with the project manager to determine appropriate analytical testing.

2. Specific Objectives

The following are the specific objectives of the planning of the site investigation component this Phase Two Environmental Site Assessment, as stated in O. Reg. 153/04:

1. Plan an investigation that will achieve the general objectives of a Phase Two Environmental Site Assessment:
    - Through the use of appropriate and complete information base concerning the Phase Two property.
    - Through the conduct of an investigation based both on information obtained before the Phase Two Environmental Site Assessment begins and on the incorporation of information obtained during the Phase Two Environmental Site Assessment.
2. To develop a sampling and analysis plan that will adequately assess all areas of the Phase Two property where contaminants may be present in land or water on, in or under the property.

3. To develop a quality assurance program that is designed to effectively limit errors and bias in sampling and analysis through implementation of assessment and control measures that will ensure data are useful, appropriate and accurate in the determination of whether the Phase Two property, meets applicable site condition criteria.

3. Utility Service Clearances

Public and private utility service clearances will be provided to the field technician prior to commencing the drilling program. The project manager must be contacted immediately should any conflicts arise during the drilling program with the locations of underground services and the proposed borehole locations. Service clearances are included with the field instructions.

4. Specific Requirements

4.1 Media for Investigation

- Overburden soil sampling will be conducted on the day(s) of drilling.
- Groundwater monitoring wells will be installed during the drilling program to facilitate the collection of groundwater samples at a later date.
- No sediment is present on the Site, as such; sediment sampling will not be conducted as part of this investigation.
- No surface water bodies are present on the Site, as such; surface water sampling will not be conducted as part of this investigation.

4.2 Locations and Depths for Sampling

Locations

The proposed seven borehole locations are illustrated on the Proposed Borehole Location Plan sketch attached as Attachment A.

- Five boreholes advanced to practical auger refusal
- Approximately 1.5 m coring of bedrock at three borehole locations following refusal
- Install groundwater monitoring wells in all borehole locations including one nested well

The approximate locations and labelling of the boreholes/monitoring wells are indicated on the provided plan.

Depths

Continuous soil samples will be collected from the boreholes in 0.6 m intervals using stainless steel split spoons. Soil sampling will be conducted from ground surface down to proposed drilling depth (bedrock refusal).

Three of the groundwater monitoring wells will be screened screens within the upper layers of the bedrock. Two of the wells will be screened in the overburden material. Screens should be limited to a maximum wetted length of 3.0 m and a minimum total length of 1.5 m. The base of monitoring well screens used to assess PHCs should extend approximately 1.0 m below the expected groundwater table based on field observations. If additional drilling is required to intercept the groundwater table, please contact the project manager. Screens shall have a sand pack that extends a minimum of 0.15 m above the screen and must be sealed with a bentonite hole plug with a thickness of at least 0.6 m. If the depth of the groundwater and maximum screen length permits, monitoring well screens should straddle the groundwater table interface.

4.3 Parameters for Laboratory Analysis

Soil

A total of five original samples plus one duplicate sample will be selected for lab analysis. The following soil samples from the suggested depths below are suggestions for submittal for laboratory analysis of the specified analytical parameters:

Table 4.1 Soil Sampling

Location	Analytical Parameter	Approximate Depth/Stratigraphy
All Boreholes	Metals, PAHs, pH	Sample • Near water table interface, or • Just above impermeable layer or • Fill layer, or • Area of obvious contamination
Duplicate Sample	DUP-1	Any material sampled for Metals, PAHs, and pH
Worst Case	Reg. 558 – laflesche unknown petroleum package	Select 1 sample for leachate (TCLP) Metal, Flashpoint, PAH, VOC, and PAH testing from borehole with most evident contamination. Bulk sample from the same borehole should be worst case soil followed by TCLP sample.

Should contamination be detected in other locations or evident contamination requiring vertical delineation is suspected in any borehole, this should be discussed with the project manager immediately.

Soil Jarring requirements:

- Metals, PAHs, pH – one large soil jar and one vial
- Reg. 558 TCLP – three large soil jars

Should any visually or olfactory observations be made with respect to the potential presence of contaminants in the soil at a specific depth in a particular borehole location, the soil sample with the suspected contaminants will be submitted for laboratory analysis in lieu of the sample depth referenced in the table above.

Groundwater

The following groundwater samples from the screened intervals will be submitted for laboratory analysis of the specified analytical parameters:

Table 4.2 Groundwater Sampling

Location	Analytical Parameters	Approximate Depth of Sample
All wells	Metals, VOCs, BTEX, pH	Screened Interval
Duplicate	DUP-1-Duplicate of Metals, VOCs, BTEX, pH	1/10 samples
Trip Blank	VOC	1/cooler

Should contamination be detected in other locations or evident contamination, this should be discussed with the project manager immediately.

5. Quality Assurance/Quality Control

5.1 Decontamination of Sampling Equipment

All non-dedicated sampling equipment such as stainless steel split spoons will be washed between uses.

Water level monitoring equipment, including water level meters and interface probes will be decontaminated with Alconox and rinsed with deionized water between water level readings to prevent cross contamination.

5.2 Field Duplicates

Field duplicate samples shall be collected in each medium (soil and groundwater) being sampled. At least one field duplicate sample will be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.

Field duplicates will be selected from samples which have the greatest probability of environmental contamination (i.e., where field observations indicate potential contamination is present). A duplicate sample will be selected should the presence of contamination be suspected in any of the soil or groundwater samples.

5.3 Trip Blanks

One laboratory prepared trip blank shall be analyzed for VOC when submitting groundwater samples for analysis.

5.4 Soil Vapour Screening

All soil samples will be screened for organic vapours in the field using a Photoionization detector (PID) in the field. Soil samples with notably elevated combustible gas concentrations should be discussed with the Project Manager and may be selected for laboratory analysis.

6. Standard Operating Procedures

GHD standard operating procedures (SOP) shall be used during borehole drilling and soil sampling. Deviations to the SOP shall be discussed with the project manager.

6.1 Well Development

Groundwater monitoring wells will be developed on the day of drilling. At least three and up to ten well volumes will be removed from the monitoring wells in order to remove all sediment from the wells. In cases where the monitoring well goes dry prior to purging three well volumes, the well should be purged dry a minimum of three times, waiting approximately 30 minutes between purging events. Waterra tubing should be removed from the monitoring wells following well development.

6.2 Borehole Locating

The locations of all boreholes and monitoring wells must be measured in the field on the day of drilling. Borehole locations should be measured with respect to building corners or known property boundaries and shown on a plan.

6.3 Elevation Survey

An elevation survey of all boreholes and monitoring wells will be conducted following the completion of the drilling program. A fixed temporary benchmark should be used as a reference elevation; the top of the spindle of a fire hydrant is preferred for this purpose as geodetic elevations can be obtained for these points. The ground surface elevation of all boreholes should be surveyed. The top of riser of each monitoring well should also be surveyed; this will ensure maximum accuracy in the interpretation of groundwater elevations.

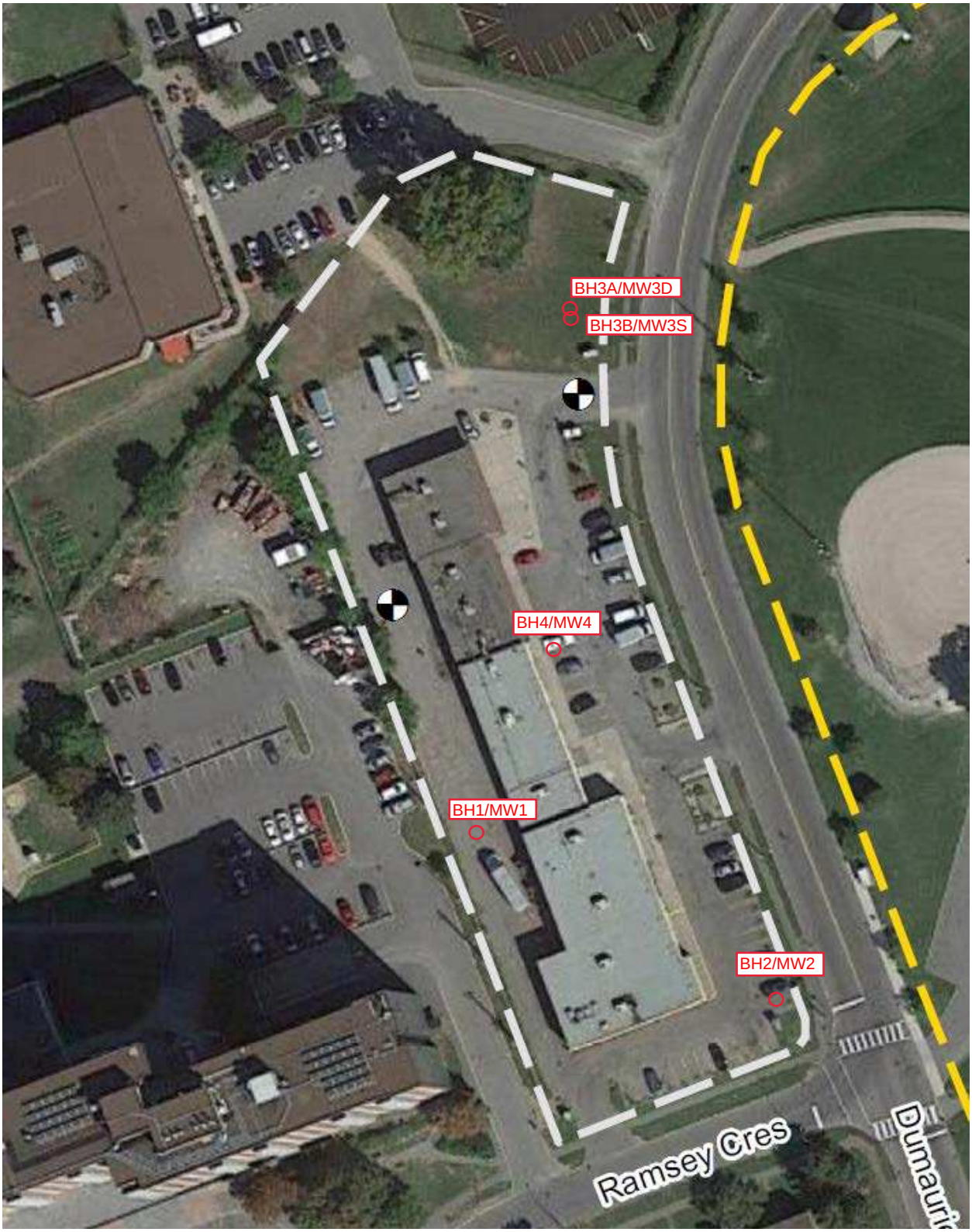
6.4 Groundwater Elevation Survey

Following a period of stabilization (one week is recommended) a groundwater elevation survey will be completed for all monitoring wells. The depth to groundwater is recorded prior to disturbance of the water column and is recorded with respect to the top of riser of the monitoring well.

6.5 Groundwater Sampling

Groundwater sampling is conducted following the collection of groundwater elevations. A peristaltic pump or Waterra tubing and footvalve are used for groundwater sampling. The wells are purged of standing water by removing at least one well volume. Samples are collected in dedicated bottles prepared by the laboratory. Samples are field filtered in the case of metals sampling.

Attachment A
Proposed Borehole/Monitoring Well Locations


BH3A/MW3D
BH3B/MW3S
BH4/MW4
BH1/MW1
BH2/MW2
Ramsey Cres

Appendix C
Borehole Logs

REFERENCE No.: 11181273-A1 ENCLOSURE No.: 1

BOREHOLE No.: BH1 / MW1

ELEVATION: 98.64 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: 3223701 Canada Inc.

PROJECT: Geotechnical Investigation

LOCATION: 2831, 2851, and 2865 DuMaurier Ave.

DESCRIBED BY: S. Wheeler CHECKED BY: L. Lopers

DATE (START): 5 October 2018 DATE (FINISH): 5 October 2018

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
meters	98.64		GROUND SURFACE				%	ppm	N	
	98.6		**ASPHALT**	98.54						
			FILL - Sand and gravel, grey, dry, compact	Sand						
0.5				0.41		SS1	67	2.2	32	
	97.8			Bentonite						
			FILL - Silty clay, grey, damp, loose	Riser						
1.0			Black staining encountered at 0.8 mbgs			SS2	17	1.9	6	
	97.3									
1.5			**SILTY CLAY**- grey, moist, very stiff	1.52						
			Black staining encountered from 1.4 to 2.2 mbgs	Sand		SS3	79	1.3	3	
2.0				1.88						
				WL 2.07 10/15/2018		SS4	92	1.7	10	
2.5	96.0									
			SANDY SILT- greyish brown, damp to moist, loose to very dense	Screen		SS5	83	1.6	9	
3.0										
			Spoon and auger refusal encountered at 3.5 mbgs	3.40		SS6	100	1.7	50+	
3.5	95.1		Borehole terminated at practical auger refusal							
4.0										
4.5										
5.0										
5.5										
6.0										

NOTES:
mbgs: meters below ground surface
Approximately 0.1 m of open borehole caved in prior to well installation. Well installed at 3.4 mbgs

BOREHOLE LOG 11181273-A1-BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 8/11/18

REFERENCE No.: 11181273-A1 ENCLOSURE No.: 2

BOREHOLE No.: BH2 / MW2

ELEVATION: 98.39 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: 3223701 Canada Inc.

PROJECT: Geotechnical Investigation

LOCATION: 2831, 2851, and 2865 DuMaurier Ave.

DESCRIBED BY: S. Wheeler CHECKED BY: L. Lopers

DATE (START): 5 October 2018 DATE (FINISH): 5 October 2018

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
meters	98.39		GROUND SURFACE				%	ppm	N	
0	98.3		**ASPHALT**	98.29						
	98.0		**FILL** - Sandy gravel, grey, dry, compact	Sand						
0.5			**FILL** - Gravelly sand, brown, damp, compact	0.46		SS1	100	3.0	17	
1.0			Becomes silty at 1.1 mbgs			SS2	58	3.9	11	
				Riser						
1.5						SS3	50	3.2	13	
	96.6		**FILL** - Silty sandy gravel, grey and brown, damp, compact							
2.0	96.3			Bentonite		SS4	79	4.0	27	
			FILL - Silty sand, trace gravel, dark brown to black, damp to moist, very loose to compact							
2.5			Black staining and organic odour encountered			SS5	54	4.5	3	
3.0	95.3		**HIGHLY WEATHERED AND FRACTURED LIMESTONE**- grey	WL 3.21 10/15/2018		SS6		1.4	50+	
	95.2		Spoon and auger refusal encountered at 3.2 mbgs							
3.5			**LIMESTONE**- grey, very poor to fair quality	3.61 Sand 3.81		RC1	68		11	
4.0										
				Screen						
4.5						RC2	100		74	
	93.5		End of borehole	4.88						
5.0										
5.5										
6.0										

NOTES:
mbgs: meters below ground surface

REFERENCE No.: 11181273-A1 ENCLOSURE No.: 3

BOREHOLE No.: BH3D / MW3D

ELEVATION: 99.25 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: 3223701 Canada Inc.

PROJECT: Geotechnical Investigation

LOCATION: 2831, 2851, and 2865 DuMaurier Ave.

DESCRIBED BY: S. Wheeler CHECKED BY: L. Lopers

DATE (START): 5 October 2018 DATE (FINISH): 5 October 2018

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA				
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD
meters	99.25		GROUND SURFACE				%	ppm	N
0	99.2		**TOPSOIL**	99.15 —					
	99.0		**FILL** - Gravelly silty sand, brown, damp, compact	Sand →		SS1	46	2.8	25
0.5			**FILL** - Sandy gravel, brown, damp, compact	0.46 —					
1.0						SS2	50	3.0	19
	98.0		**FILL** - Silty sand, grey, moist to wet, very loose to loose Black staining encountered	Riser → WL 1.37 — 10/15/2018					
1.5						SS3	71	3.9	10
2.0						SS4	13	2.8	2
				Bentonite →					
2.5	96.8		**PEAT** - black, organics and organic odour, wet, very loose			SS5	75	0	PH
3.0									
						SS6	83	0	3
3.5			Auger refusal encountered at 3.7 mbgs						
	95.6		**HIGHLY WEATHERED AND FRACTURED LIMESTONE**- grey	4.01 — Sand → 4.14 —		RC1	90		0
4.0									
4.5	94.8		**LIMESTONE**- grey, poor quality	Screen →					
5.0						RC2	100		35
	93.9		End of borehole	5.36 —					
5.5									
6.0									

SCALE FOR TEST RESULTS: 50kPa, 100kPa, 150kPa, 200kPa; 10 20 30 40 50 60 70 80 90

NOTES:
mbgs: meters below ground surface

BOREHOLE LOG 11181273-A1-BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 8/11/18

REFERENCE No.: 11181273-A1 ENCLOSURE No.: 4

BOREHOLE No.: BH3S / MW3S

ELEVATION: 99.33 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: 3223701 Canada Inc.

PROJECT: Geotechnical Investigation

LOCATION: 2831, 2851, and 2865 DuMaurier Ave.

DESCRIBED BY: S. Wheeler CHECKED BY: L. Lopers

DATE (START): 5 October 2018 DATE (FINISH): 5 October 2018

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
meters	99.33		GROUND SURFACE				%	ppm	N	
0.5				99.23 Sand 0.46 Riser						
1.0				Bentonite WL 1.26 10/15/2018						
1.5										
2.0				1.83 Sand 2.19						
2.5										
3.0				Screen						
3.5										
	95.6		Augered to practical refusal at 3.7 mbgs for direct well installation in overburden	3.71						
4.0										
4.5										
5.0										
5.5										
6.0										

NOTES:
mbgs: meters below ground surface

BOREHOLE LOG 11181273-A1-BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 8/11/18

REFERENCE No.: 11181273-A1 ENCLOSURE No.: 5

BOREHOLE No.: BH4 / MW4

ELEVATION: 98.53 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: 3223701 Canada Inc.

PROJECT: Geotechnical Investigation

LOCATION: 2831, 2851, and 2865 DuMaurier Ave.

DESCRIBED BY: S. Wheeler CHECKED BY: L. Lopers

DATE (START): 5 October 2018 DATE (FINISH): 5 October 2018

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
meters	98.53		GROUND SURFACE				%	ppm	N	10 20 30 40 50 60 70 80 90
	98.5		**ASPHALT**	98.43						
			FILL - Sand and gravel, grey, damp, loose	Sand		SS1	56	1.4	6	
0.5				0.46						
	97.8		**FILL** - Sandy silty clay, grey, damp, firm			SS2	83	2.7	9	
1.0										
				WL 1.28 10/15/2018						
1.5						SS3	75	3.5	2	
				Riser						
2.0						SS4	33	5.7	3	
				Bentonite						
2.5	96.1		**PEAT** - dark brown to black, damp, very loose to loose			SS5	79	2.5	3	
3.0										
	95.1		**SANDY SILT**- grey to brown, moist to wet, loose to very dense			SS6	88	3.4	6	
3.5			Spoon and auger refusal encountered at 3.9 mbgs			SS7	100	3.1	50+	
	94.6		**LIMESTONE**- grey, good quality							
4.0				4.22						
				4.32						
4.5				Sand		RC1	90		71	
				Screen						
5.0										
	93.1			5.39						
5.5										
6.0										

NOTES:
mbgs: meters below ground surface

BOREHOLE LOG 11181273-A1-BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 8/11/18

Appendix D
Laboratory Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: LUKE LOPERS

PROJECT: 11181273-E2 (PO#73513391)

AGAT WORK ORDER: 18Z394508

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Oct 15, 2018

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

						BH1	BH2	BH3	BH4	BH5
					SAMPLE DESCRIPTION:	SS3-10-5-18	SS5-10-5-18	SS3-10-5-18	SS2/3-10-5-18	SS3-10-5-18
					SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
					DATE SAMPLED:	2018-10-05	2018-10-05	2018-10-05	2018-10-05	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610083	9610085	9610086	9610087	9610088
Antimony	µg/g		0.8	2018-10-12	2018-10-12	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g		1	2018-10-12	2018-10-12	2	5	2	2	2
Barium	µg/g		2	2018-10-12	2018-10-12	94	118	56	91	91
Beryllium	µg/g		0.5	2018-10-12	2018-10-12	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g		5	2018-10-12	2018-10-12	6	9	<5	6	6
Boron (Hot Water Soluble)	µg/g		0.10	2018-10-11	2018-10-11	0.27	1.54	0.37	0.34	0.32
Cadmium	µg/g		0.5	2018-10-12	2018-10-12	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g		2	2018-10-12	2018-10-12	37	22	15	29	31
Cobalt	µg/g		0.5	2018-10-12	2018-10-12	8.2	6.1	4.7	6.9	7.3
Copper	µg/g		1	2018-10-12	2018-10-12	14	105	19	17	18
Lead	µg/g		1	2018-10-12	2018-10-12	11	61	28	5	6
Molybdenum	µg/g		0.5	2018-10-12	2018-10-12	<0.5	1.4	<0.5	<0.5	0.5
Nickel	µg/g		1	2018-10-12	2018-10-12	18	21	10	18	19
Selenium	µg/g		0.4	2018-10-12	2018-10-12	<0.4	0.5	<0.4	0.7	<0.4
Silver	µg/g		0.2	2018-10-12	2018-10-12	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g		0.4	2018-10-12	2018-10-12	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g		0.5	2018-10-12	2018-10-12	1.3	0.9	0.5	1.0	1.2
Vanadium	µg/g		1	2018-10-12	2018-10-12	41	21	21	32	33
Zinc	µg/g		5	2018-10-12	2018-10-12	58	183	124	36	36
Chromium VI	µg/g		0.2	2018-10-11	2018-10-11	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g		0.040	2018-10-11	2018-10-11	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g		0.10	2018-10-12	2018-10-12	<0.10	0.23	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm		0.005	2018-10-11	2018-10-11	1.87	1.01	0.372	0.929	0.913
Sodium Adsorption Ratio	NA		NA	2018-10-11	2018-10-11	15.5	11.2	1.88	13.6	8.98
pH, 2:1 CaCl2 Extraction	pH Units		NA	2018-10-11	2018-10-11	6.82	7.23	7.44	7.78	7.49

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

9610083-9610088 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 558 Metals and Inorganics

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

				SAMPLE DESCRIPTION:		BH3-10-5-18
				SAMPLE TYPE:		Soil
				DATE SAMPLED:		2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610090
Arsenic Leachate	mg/L	2.5	0.010	2018-10-13	2018-10-13	<0.010
Barium Leachate	mg/L	100	0.100	2018-10-13	2018-10-13	1.21
Boron Leachate	mg/L	500	0.050	2018-10-13	2018-10-13	0.102
Cadmium Leachate	mg/L	0.5	0.010	2018-10-13	2018-10-13	<0.010
Chromium Leachate	mg/L	5	0.010	2018-10-13	2018-10-13	<0.010
Lead Leachate	mg/L	5	0.010	2018-10-13	2018-10-13	0.196
Mercury Leachate	mg/L	0.1	0.01	2018-10-13	2018-10-13	<0.01
Selenium Leachate	mg/L	1	0.010	2018-10-13	2018-10-13	<0.010
Silver Leachate	mg/L	5	0.010	2018-10-13	2018-10-13	<0.010
Uranium Leachate	mg/L	10	0.050	2018-10-13	2018-10-13	<0.050
Fluoride Leachate	mg/L	150	0.05	2018-10-12	2018-10-12	0.08
Cyanide Leachate	mg/L	20	0.05	2018-10-12	2018-10-12	<0.05
(Nitrate + Nitrite) as N Leachate	mg/L	1000	0.70	2018-10-12	2018-10-12	<0.70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 558 TCLP Preparation

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	SAMPLE DESCRIPTION: BH3-10-5-18 SAMPLE TYPE: Soil DATE SAMPLED: 2018-10-05 9610090
Analysis Start Date						2018/10/11
pH (Initial)	pH Units		N/A			7.96
pH (Final)	pH Units		N/A			5.41
Extraction Fluid						1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

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AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

Flash Point Analysis

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

					SAMPLE DESCRIPTION:	BH3-10-5-18
					SAMPLE TYPE:	Soil
					DATE SAMPLED:	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610090
Flash point (Pensky Martin Closed Cup)	Deg C		NA	2018-10-12	2018-10-12	>100

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

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AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

						BH1	BH2	BH3	BH4	BH5
					SAMPLE DESCRIPTION:	SS3-10-5-18	SS5-10-5-18	SS3-10-5-18	SS2/3-10-5-18	SS3-10-5-18
					SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
					DATE SAMPLED:	2018-10-05	2018-10-05	2018-10-05	2018-10-05	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610083	9610085	9610086	9610087	9610088
Naphthalene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.16	0.06	0.06	0.06
Anthracene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.25	0.11	<0.05	<0.05
Pyrene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.21	0.09	<0.05	<0.05
Benz(a)anthracene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.11	0.06	<0.05	<0.05
Chrysene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.14	0.06	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.16	0.07	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.06	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.10	0.06	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	0.07	0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g		0.05	2018-10-15	2018-10-15	<0.05	<0.05	<0.05	0.09	0.10
Moisture Content	%		0.1	2018-10-15	2018-10-15	24.4	22.9	15.1	18.3	20.9
Surrogate	Unit	Acceptable Limits								
Chrysene-d12	%	50-140		2018-10-15	2018-10-15	109	106	106	110	91

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

9610083-9610088 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 558 - Benzo(a) pyrene

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

					SAMPLE DESCRIPTION:	BH3-10-5-18
					SAMPLE TYPE:	Soil
					DATE SAMPLED:	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610090
Benzo(a)pyrene	mg/L	0.001	0.001	2018-10-15	2018-10-15	<0.001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9610090 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 558 - PCBs

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

				SAMPLE DESCRIPTION:	BH3-10-5-18
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610090
Polychlorinated Biphenyls	mg/L	0.3	0.005	2018-10-12	2018-10-12	<0.005
Surrogate	Unit	Acceptable Limits				
Decachlorobiphenyl	%	60-130		2018-10-12	2018-10-12	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9610090 The soil sample was leached using the Regulation 558 procedure. Analysis was performed on the leachate.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

O. Reg. 558 - VOCs

DATE RECEIVED: 2018-10-07

DATE REPORTED: 2018-10-15

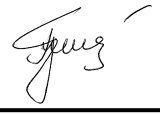
				SAMPLE DESCRIPTION:	BH3-10-5-18
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2018-10-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9610090
Vinyl Chloride	mg/L	0.2	0.030	2018-10-12	2018-10-15	<0.030
1,1 Dichloroethene	mg/L	1.4	0.020	2018-10-12	2018-10-15	<0.020
Dichloromethane	mg/L	5.0	0.030	2018-10-12	2018-10-15	<0.030
Methyl Ethyl Ketone	mg/L	200	0.090	2018-10-12	2018-10-15	<0.090
Chloroform	mg/L	10.0	0.020	2018-10-12	2018-10-15	<0.020
1,2-Dichloroethane	mg/L	0.5	0.020	2018-10-12	2018-10-15	<0.020
Carbon Tetrachloride	mg/L	0.5	0.020	2018-10-12	2018-10-15	<0.020
Benzene	mg/L	0.5	0.020	2018-10-12	2018-10-15	<0.020
Trichloroethene	mg/L	5.0	0.020	2018-10-12	2018-10-15	<0.020
Tetrachloroethene	mg/L	3.0	0.050	2018-10-12	2018-10-15	<0.050
Chlorobenzene	mg/L	8.0	0.010	2018-10-12	2018-10-15	<0.010
1,2-Dichlorobenzene	mg/L	20.0	0.010	2018-10-12	2018-10-15	<0.010
1,4-Dichlorobenzene	mg/L	0.5	0.010	2018-10-12	2018-10-15	<0.010
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	60-130		2018-10-12	2018-10-15	79

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9610090 Sample was prepared using Regulation 558 protocol and a zero headspace extractor.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11181273-E2 (PO#73513391)

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

AGAT WORK ORDER: 18Z394508

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Steven Wheeler

Soil Analysis

RPT Date: Oct 15, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	9610083	9610083	< 0.8	<0.8	NA	< 0.8	98%	70%	130%	107%	80%	120%	74%	70%	130%
Arsenic	9610083	9610083	2	2	NA	< 1	101%	70%	130%	112%	80%	120%	103%	70%	130%
Barium	9610083	9610083	94	90	4.3%	< 2	89%	70%	130%	99%	80%	120%	86%	70%	130%
Beryllium	9610083	9610083	< 0.5	<0.5	NA	< 0.5	80%	70%	130%	112%	80%	120%	105%	70%	130%
Boron	9610083	9610083	6	6	NA	< 5	101%	70%	130%	106%	80%	120%	90%	70%	130%
Boron (Hot Water Soluble)	9610083	9610083	0.27	0.31	NA	< 0.10	114%	60%	140%	101%	70%	130%	118%	60%	140%
Cadmium	9610083	9610083	< 0.5	<0.5	NA	< 0.5	102%	70%	130%	102%	80%	120%	97%	70%	130%
Chromium	9610083	9610083	37	36	2.7%	< 2	74%	70%	130%	97%	80%	120%	100%	70%	130%
Cobalt	9610083	9610083	8.2	8.0	2.5%	< 0.5	84%	70%	130%	102%	80%	120%	90%	70%	130%
Copper	9610083	9610083	14	13	7.4%	< 1	84%	70%	130%	113%	80%	120%	92%	70%	130%
Lead	9610083	9610083	11	11	0.0%	< 1	94%	70%	130%	100%	80%	120%	88%	70%	130%
Molybdenum	9610083	9610083	< 0.5	<0.5	NA	< 0.5	94%	70%	130%	102%	80%	120%	94%	70%	130%
Nickel	9610083	9610083	18	18	0.0%	< 1	89%	70%	130%	107%	80%	120%	93%	70%	130%
Selenium	9610083	9610083	< 0.4	<0.4	NA	< 0.4	111%	70%	130%	98%	80%	120%	98%	70%	130%
Silver	9610083	9610083	< 0.2	<0.2	NA	< 0.2	96%	70%	130%	102%	80%	120%	91%	70%	130%
Thallium	9610083	9610083	< 0.4	<0.4	NA	< 0.4	86%	70%	130%	93%	80%	120%	92%	70%	130%
Uranium	9610083	9610083	1.3	1.3	NA	< 0.5	83%	70%	130%	102%	80%	120%	94%	70%	130%
Vanadium	9610083	9610083	41	40	2.5%	< 1	78%	70%	130%	96%	80%	120%	74%	70%	130%
Zinc	9610083	9610083	58	57	1.7%	< 5	90%	70%	130%	110%	80%	120%	100%	70%	130%
Chromium VI	9610083	9610083	<0.2	<0.2	NA	< 0.2	74%	70%	130%	100%	80%	120%	98%	70%	130%
Cyanide	9613642		<0.040	<0.040	NA	< 0.040	99%	70%	130%	105%	80%	120%	107%	70%	130%
Mercury	9610083	9610083	< 0.10	<0.10	NA	< 0.10	97%	70%	130%	97%	80%	120%	91%	70%	130%
Electrical Conductivity	9610083	9610083	1.87	1.88	0.5%	< 0.005	94%	90%	110%	NA			NA		
Sodium Adsorption Ratio	9610083	9610083	15.5	16.0	3.2%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	9610083	9610083	6.82	6.77	0.7%	NA	101%	80%	120%	NA			NA		
O. Reg. 558 Metals and Inorganics															
Arsenic Leachate	9610090	9610090	<0.010	<0.010	NA	< 0.010	104%	90%	110%	105%	80%	120%	115%	70%	130%
Barium Leachate	9610090	9610090	1.21	1.20	0.8%	< 0.100	101%	90%	110%	102%	80%	120%	106%	70%	130%
Boron Leachate	9610090	9610090	0.102	0.107	NA	< 0.050	104%	90%	110%	94%	80%	120%	83%	70%	130%
Cadmium Leachate	9610090	9610090	<0.010	<0.010	NA	< 0.010	102%	90%	110%	103%	80%	120%	111%	70%	130%
Chromium Leachate	9610090	9610090	<0.010	<0.010	NA	< 0.010	101%	90%	110%	111%	80%	120%	114%	70%	130%
Lead Leachate	9610090	9610090	0.196	0.191	2.6%	< 0.010	102%	90%	110%	98%	80%	120%	103%	70%	130%
Mercury Leachate	9610090	9610090	<0.01	<0.01	NA	< 0.01	99%	90%	110%	101%	80%	120%	103%	70%	130%
Selenium Leachate	9610090	9610090	< 0.010	< 0.010	NA	< 0.010	105%	90%	110%	108%	80%	120%	112%	70%	130%
Silver Leachate	9610090	9610090	<0.010	<0.010	NA	< 0.010	102%	90%	110%	106%	80%	120%	102%	70%	130%
Uranium Leachate	9610090	9610090	<0.050	<0.050	NA	< 0.050	108%	90%	110%	101%	80%	120%	111%	70%	130%
Fluoride Leachate	9610090	9610090	0.08	0.08	NA	< 0.05	100%	90%	110%	108%	90%	110%	107%	70%	130%
Cyanide Leachate	9610090	9610090	<0.05	<0.05	NA	< 0.05	92%	90%	110%	104%	90%	110%	84%	70%	130%
(Nitrate + Nitrite) as N Leachate	9610090	9610090	<0.70	<0.70	NA	< 0.70	98%	80%	120%	97%	80%	120%	100%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11181273-E2 (PO#73513391)

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

AGAT WORK ORDER: 18Z394508

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Steven Wheeler

Soil Analysis (Continued)

RPT Date: Oct 15, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 11181273-E2 (PO#73513391)
SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

AGAT WORK ORDER: 18Z394508
ATTENTION TO: LUKE LOPERS
SAMPLED BY:Steven Wheeler

Trace Organics Analysis

RPT Date: Oct 15, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	98%	50%	140%	93%	50%	140%
Acenaphthylene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	98%	50%	140%	90%	50%	140%
Acenaphthene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	98%	50%	140%	89%	50%	140%
Fluorene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	94%	50%	140%	90%	50%	140%
Phenanthrene	9610086	9610086	0.06	0.06	NA	< 0.05	97%	50%	140%	97%	50%	140%	90%	50%	140%
Anthracene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	91%	50%	140%	89%	50%	140%
Fluoranthene	9610086	9610086	0.11	0.11	NA	< 0.05	98%	50%	140%	98%	50%	140%	98%	50%	140%
Pyrene	9610086	9610086	0.09	0.08	NA	< 0.05	98%	50%	140%	99%	50%	140%	100%	50%	140%
Benz(a)anthracene	9610086	9610086	0.06	0.06	NA	< 0.05	97%	50%	140%	95%	50%	140%	102%	50%	140%
Chrysene	9610086	9610086	0.06	0.06	NA	< 0.05	96%	50%	140%	94%	50%	140%	104%	50%	140%
Benzo(b)fluoranthene	9610086	9610086	0.07	0.07	NA	< 0.05	98%	50%	140%	97%	50%	140%	88%	50%	140%
Benzo(k)fluoranthene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	88%	50%	140%	97%	50%	140%
Benzo(a)pyrene	9610086	9610086	0.06	0.06	NA	< 0.05	97%	50%	140%	95%	50%	140%	91%	50%	140%
Indeno(1,2,3-cd)pyrene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	91%	50%	140%	96%	50%	140%
Dibenz(a,h)anthracene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	91%	50%	140%	90%	50%	140%
Benzo(g,h,i)perylene	9610086	9610086	0.05	0.05	NA	< 0.05	97%	50%	140%	96%	50%	140%	97%	50%	140%
2-and 1-methyl Naphthalene	9610086	9610086	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	91%	50%	140%	90%	50%	140%
O. Reg. 558 - PCBs															
Polychlorinated Biphenyls	9610090	9610090	< 0.005	< 0.005	NA	< 0.005	103%	60%	130%	95%	60%	130%	NA	60%	130%
O. Reg. 558 - VOCs															
Vinyl Chloride	9610090	9610090	< 0.030	< 0.030	NA	< 0.030	73%	60%	140%	79%	60%	140%	NA	60%	140%
1,1 Dichloroethene	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	85%	70%	130%	72%	70%	130%	NA	60%	140%
Dichloromethane	9610090	9610090	< 0.030	< 0.030	NA	< 0.030	96%	70%	130%	85%	70%	130%	NA	60%	140%
Methyl Ethyl Ketone	9610090	9610090	< 0.090	< 0.090	NA	< 0.090	117%	70%	130%	116%	70%	130%	NA	60%	140%
Chloroform	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	75%	70%	130%	85%	70%	130%	NA	60%	140%
1,2-Dichloroethane	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	96%	70%	130%	88%	70%	130%	NA	60%	140%
Carbon Tetrachloride	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	85%	70%	130%	94%	70%	130%	NA	60%	140%
Benzene	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	88%	70%	130%	87%	70%	130%	NA	60%	140%
Trichloroethene	9610090	9610090	< 0.020	< 0.020	NA	< 0.020	99%	70%	130%	74%	70%	130%	NA	60%	140%
Tetrachloroethene	9610090	9610090	< 0.050	< 0.050	NA	< 0.050	78%	70%	130%	71%	70%	130%	NA	60%	140%
Chlorobenzene	9610090	9610090	< 0.010	< 0.010	NA	< 0.010	89%	70%	130%	79%	70%	130%	NA	60%	140%
1,2-Dichlorobenzene	9610090	9610090	< 0.010	< 0.010	NA	< 0.010	94%	70%	130%	77%	70%	130%	NA	60%	140%
1,4-Dichlorobenzene	9610090	9610090	< 0.010	< 0.010	NA	< 0.010	97%	70%	130%	85%	70%	130%	NA	60%	140%
O. Reg. 558 - Benzo(a) pyrene															
Benzo(a)pyrene	9610090	9610090	< 0.001	< 0.001	NA	< 0.001	95%	70%	130%	94%	70%	130%	NA	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

Trace Organics Analysis (Continued)

RPT Date: Oct 15, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Flash Point Analysis															
Flash point (Pensky Martin Closed Cup)	2424	butanol	35	35	0.0%		100%	80%	120%						

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

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Arsenic Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Barium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Boron Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Cadmium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Chromium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Lead Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Mercury Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Selenium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Silver Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Uranium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Fluoride Leachate	INOR-93-6018	EPA SW-846-1311 & SM4500-F- C	ION SELECTIVE ELECTRODE
Cyanide Leachate	INOR-93-6052	EPA SW-846-1311 & MOE 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
(Nitrate + Nitrite) as N Leachate	INOR-93-6053	EPA SW 846-1311 & SM 4500 - NO3- I	LACHAT FIA
Analysis Start Date			N/A
pH (Initial)	LAB 4025	EPA SW-846 1311	PH METER
pH (Final)	LAB 4025	EPA SW-846 1311	PH METER
Extraction Fluid	LAB-93-4025	EPA SW-846 1311	N/A

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Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18Z394508

PROJECT: 11181273-E2 (PO#73513391)

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:DuMaurier Avenue, Ottawa, ON

SAMPLED BY:Steven Wheeler

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Flash point (Pensky Martin Closed Cup)	TO 2210	ASTM D93	Pensky Martin Closed Cup
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5114	EPA SW846 3540 & 8270	GC/MS
Polychlorinated Biphenyls	ORG-91-5112	Regulation 558, EPA SW846 3510C/8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW846 3510C/8082	GC/ECD
Vinyl Chloride	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,1 Dichloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Dichloromethane	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Trichloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS

AGAT Laboratories

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webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 1873945 08

Cooler Quantity: One - unice.

Arrival Temperatures: 10.6 | 9.8 | 10.1
96 | 94 | 89

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: GHD Ltd.
Contact: Luke Lopers
Address: 179 Colonnade Rd. Suite 400
Ottawa, ON
Phone: 613 288 1723 Fax:

Reports to be sent to:
1. Email: Luke.Lopers@GHD.com
2. Email: Steven.Wheeler@GHD.com

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*
☐ MISA

☒ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 1113273-E2
Site Location: Du Maurier Avenue, Ottawa, ON
Sampled By: Steven Wheeler
AGAT Quote #: PO# 7351339 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Invoice Information: Same as RPT info Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☒ M&I ☒ VOCs ☐ ABNs ☐ B(a)P ☒ PCBs	Sewer Use	Flashpoint (CTUP)
BH1 SS3-10-5-18	Oct 5, 18		2	S			X							X				X		
BH2 SS5-10-5-18	"		2	S			X							X				X		
BH3 SS3-10-5-18	"		2	S			X							X				X		
BH4 SS2/3-10-5-18	"		2	S			X							X				X		
BH5 SS3-10-5-18	"		2	S			X							X				X		
BH3-10-5-18	"		5	S			X							X			X	X	X	

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Steven Wheeler Steven Wheeler	Oct 5, 2018	6:15	(Beatrice)	18/10/07	16h00
LBIS to FedEx	18/10/09	16h00	Simon	18/10/10	935

Page 1 of 1

N°: T075943

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: LUKE LOPERS

PROJECT: 11181273 (PO# 73513391)

AGAT WORK ORDER: 18Z399894

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Nov 13, 2018

PAGES (INCLUDING COVER): 14

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES
VERSION 2:Revised report issued November 13, 2018.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW1-101918	MW2-101918	MW3S-101918	MW3D-101918	MW4-101918	MW6-101918
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-10-19	2018-10-19	2018-10-19	2018-10-19	2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641620	9641666	9641876	9641877	9641878	9641879
F1 (C6 - C10)	µg/L		25	2018-11-08	2018-11-09	<25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L		25	2018-11-08	2018-11-09	<25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L		100	2018-11-12	2018-11-12	<100	<100	170	<100	<100	<100
F3 (C16 to C34)	µg/L		100	2018-11-12	2018-11-12	<100	<100	860	<100	<100	<100
F4 (C34 to C50)	µg/L		100	2018-11-12	2018-11-12	<100	<100	170	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	2018-11-12	2018-11-12	NA	NA	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits									
Terphenyl	%	60-140		2018-11-12	2018-11-12	100	120	85	84	93	100

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

9641620-9641879 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW1-101918		MW2-101918		MW3S-101918	MW3D-101918
					SAMPLE TYPE:	Water		Water		Water	Water
					DATE SAMPLED:	2018-10-19		2018-10-19		2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641620	RDL	9641666	RDL	9641876	9641877
Dichlorodifluoromethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Vinyl Chloride	µg/L		0.17	2018-10-24	2018-10-25	<0.17	0.68	<0.68	0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	2018-10-24	2018-10-25	<0.40	1.60	<1.60	0.40	<0.40	<0.40
Acetone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	4.0	<4.0	1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L		0.30	2018-10-24	2018-10-25	<0.30	1.20	<1.20	0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	2018-10-24	2018-10-25	<0.30	1.20	<1.20	0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	2018-10-24	2018-10-25	<0.30	1.20	<1.20	0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	4.0	<4.0	1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Chloroform	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	2018-10-24	2018-10-25	<0.30	1.20	<1.20	0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Benzene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	0.49	<0.20
1,2-Dichloropropane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	4.0	<4.0	1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Toluene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Dibromochloromethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	0.64	<0.10
Ethylbenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW1-101918		MW2-101918		MW3S-101918	MW3D-101918
					SAMPLE TYPE:	Water		Water		Water	Water
					DATE SAMPLED:	2018-10-19		2018-10-19		2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641620	RDL	9641666	RDL	9641876	9641877
Bromoform	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
Styrene	µg/L		0.10	2018-10-24	2018-10-25	0.23	0.40	<0.40	0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	0.79	<0.10
1,2-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.40	<0.40	0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L		0.30	2018-10-24	2018-10-25	<0.30	1.20	<1.20	0.30	<0.30	<0.30
Xylene Mixture	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
n-Hexane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.80	<0.80	0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		2018-10-24	2018-10-25	77		79		80	73
4-Bromofluorobenzene	% Recovery	50-140		2018-10-24	2018-10-25	108		90		109	91

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AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW4-101918	MW6-101918	TRIP BLANK
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-10-19	2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641878	9641879	9641881
Dichlorodifluoromethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L		0.17	2018-10-24	2018-10-25	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	2018-10-24	2018-10-25	<0.40	<0.40	<0.40
Acetone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L		0.30	2018-10-24	2018-10-25	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	2018-10-24	2018-10-25	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	2018-10-24	2018-10-25	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.27	<0.20
Chloroform	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	2018-10-24	2018-10-25	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Benzene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.85	<0.20
1,2-Dichloropropane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	2018-10-24	2018-10-25	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	0.32	<0.20
Dibromochloromethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	1.3	<0.10
Ethylbenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW4-101918	MW6-101918	TRIP BLANK
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-10-19	2018-10-19	2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641878	9641879	9641881
Bromoform	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
Styrene	µg/L		0.10	2018-10-24	2018-10-25	0.54	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	1.6	<0.10
1,2-Dichlorobenzene	µg/L		0.10	2018-10-24	2018-10-25	<0.10	0.14	<0.10
1,3-Dichloropropene	µg/L		0.30	2018-10-24	2018-10-25	<0.30	<0.30	<0.30
Xylene Mixture	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
n-Hexane	µg/L		0.20	2018-10-24	2018-10-25	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits						
Toluene-d8	% Recovery	50-140		2018-10-24	2018-10-25	76	73	90
4-Bromofluorobenzene	% Recovery	50-140		2018-10-24	2018-10-25	107	107	81

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

9641666 Dilution factor=4
The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.

Analysis performed at AGAT Toronto (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW1-101918	MW2-101918		MW3S-101918		MW3D-101918
					SAMPLE TYPE:	Water	Water		Water		Water
					DATE SAMPLED:	2018-10-19	2018-10-19		2018-10-19		2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641620	9641666	RDL	9641876	RDL	9641877
Antimony	µg/L		1.0	2018-10-25	2018-10-25	<1.0	<1.0	1.0	<1.0	1.0	<1.0
Arsenic	µg/L		1.0	2018-10-25	2018-10-25	7.2	1.2	1.0	3.1	1.0	<1.0
Barium	µg/L		2.0	2018-10-25	2018-10-25	747	1190	2.0	680	2.0	493
Beryllium	µg/L		0.5	2018-10-25	2018-10-25	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Boron	µg/L		10.0	2018-10-25	2018-10-25	26.3	240	10.0	58.4	10.0	20.0
Cadmium	µg/L		0.2	2018-10-25	2018-10-25	<0.2	<0.2	0.2	<0.2	0.2	<0.2
Chromium	µg/L		2.0	2018-10-25	2018-10-25	31.4	5.9	2.0	12.6	2.0	14.5
Cobalt	µg/L		0.5	2018-10-25	2018-10-25	2.2	1.8	0.5	1.2	0.5	<0.5
Copper	µg/L		1.0	2018-10-25	2018-10-25	1.1	1.2	1.0	<1.0	1.0	2.2
Lead	µg/L		0.5	2018-10-25	2018-10-25	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Molybdenum	µg/L		0.5	2018-10-25	2018-10-25	0.6	0.8	0.5	1.5	0.5	1.3
Nickel	µg/L		1.0	2018-10-25	2018-10-25	1.5	1.1	1.0	<1.0	1.0	1.0
Selenium	µg/L		1.0	2018-10-25	2018-10-25	1.8	1.7	1.0	<1.0	1.0	<1.0
Silver	µg/L		0.2	2018-10-25	2018-10-25	<0.2	<0.2	0.2	<0.2	0.2	<0.2
Thallium	µg/L		0.3	2018-10-25	2018-10-25	<0.3	<0.3	0.3	<0.3	0.3	<0.3
Uranium	µg/L		0.5	2018-10-25	2018-10-25	0.8	<0.5	0.5	<0.5	0.5	1.5
Vanadium	µg/L		0.4	2018-10-25	2018-10-25	4.7	1.1	0.4	3.3	0.4	4.1
Zinc	µg/L		5.0	2018-10-25	2018-10-25	<5.0	6.3	5.0	<5.0	5.0	<5.0
Mercury	µg/L		0.02	2018-10-24	2018-10-24	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Chromium VI	µg/L		5	2018-10-25	2018-10-25	<5	<5	5	<5	5	<5
Cyanide	µg/L		2	2018-10-26	2018-10-26	<2	<2	2	<2	2	<2
Sodium	µg/L		5000	2018-10-29	2018-10-29	651000	1150000	2500	384000	2500	606000
Chloride	µg/L		5000	2018-10-25	2018-10-25	1830000	2350000	2000	1150000	5000	1400000
Electrical Conductivity	uS/cm		2	2018-10-25	2018-10-25	5560	7260	2	3630	2	4580
pH	pH Units		NA	2018-10-25	2018-10-25	6.80	7.26	NA	7.09	NA	7.57

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 18Z399894
PROJECT: 11181273 (PO# 73513391)

CLIENT NAME: GHD LIMITED
SAMPLING SITE:2865 DuMaurier

ATTENTION TO: LUKE LOPERS
SAMPLED BY:S. Wheeler

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2018-10-20

DATE REPORTED: 2018-11-13

					SAMPLE DESCRIPTION:	MW4-101918		MW6-101918
					SAMPLE TYPE:	Water		Water
					DATE SAMPLED:	2018-10-19		2018-10-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9641878	RDL	9641879
Antimony	µg/L		1.0	2018-10-25	2018-10-25	<1.0	1.0	<1.0
Arsenic	µg/L		1.0	2018-10-25	2018-10-25	<1.0	1.0	<1.0
Barium	µg/L		2.0	2018-10-25	2018-10-25	1110	2.0	688
Beryllium	µg/L		0.5	2018-10-25	2018-10-25	<0.5	0.5	<0.5
Boron	µg/L		10.0	2018-10-25	2018-10-25	76.9	10.0	62.8
Cadmium	µg/L		0.2	2018-10-25	2018-10-25	<0.2	0.2	<0.2
Chromium	µg/L		2.0	2018-10-25	2018-10-25	14.7	2.0	10.0
Cobalt	µg/L		0.5	2018-10-25	2018-10-25	0.5	0.5	1.3
Copper	µg/L		1.0	2018-10-25	2018-10-25	<1.0	1.0	<1.0
Lead	µg/L		0.5	2018-10-25	2018-10-25	<0.5	0.5	<0.5
Molybdenum	µg/L		0.5	2018-10-25	2018-10-25	1.0	0.5	1.8
Nickel	µg/L		1.0	2018-10-25	2018-10-25	<1.0	1.0	<1.0
Selenium	µg/L		1.0	2018-10-25	2018-10-25	<1.0	1.0	<1.0
Silver	µg/L		0.2	2018-10-25	2018-10-25	<0.2	0.2	<0.2
Thallium	µg/L		0.3	2018-10-25	2018-10-25	<0.3	0.3	<0.3
Uranium	µg/L		0.5	2018-10-25	2018-10-25	<0.5	0.5	<0.5
Vanadium	µg/L		0.4	2018-10-25	2018-10-25	4.7	0.4	2.8
Zinc	µg/L		5.0	2018-10-25	2018-10-25	<5.0	5.0	6.0
Mercury	µg/L		0.02	2018-10-24	2018-10-24	<0.02	0.02	<0.02
Chromium VI	µg/L		5	2018-10-25	2018-10-25	<5	5	<5
Cyanide	µg/L		2	2018-10-26	2018-10-26	<2	2	<2
Sodium	µg/L		2500	2018-10-29	2018-10-29	214000	2500	385000
Chloride	µg/L		1000	2018-10-25	2018-10-25	472000	2000	1130000
Electrical Conductivity	uS/cm		2	2018-10-25	2018-10-25	2000	2	3640
pH	pH Units		NA	2018-10-25	2018-10-25	7.34	NA	7.12

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

9641620-9641879 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 11181273 (PO# 73513391)
SAMPLING SITE:2865 DuMaurier

AGAT WORK ORDER: 18Z399894
ATTENTION TO: LUKE LOPERS
SAMPLED BY:S. Wheeler

Trace Organics Analysis

RPT Date: Nov 13, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	77%	50%	140%	104%	50%	140%	96%	50%	140%
Vinyl Chloride	9641620	9641620	< 0.17	< 0.17	NA	< 0.17	75%	50%	140%	81%	50%	140%	75%	50%	140%
Bromomethane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	79%	50%	140%	79%	50%	140%	71%	50%	140%
Trichlorofluoromethane	9641620	9641620	< 0.40	< 0.40	NA	< 0.40	71%	50%	140%	107%	50%	140%	87%	50%	140%
Acetone	9641620	9641620	< 1.0	< 1.0	NA	< 1.0	108%	50%	140%	111%	50%	140%	111%	50%	140%
1,1-Dichloroethylene	9641620	9641620	< 0.30	< 0.30	NA	< 0.30	81%	50%	140%	114%	60%	130%	119%	50%	140%
Methylene Chloride	9641620	9641620	< 0.30	< 0.30	NA	< 0.30	105%	50%	140%	114%	60%	130%	100%	50%	140%
trans- 1,2-Dichloroethylene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	105%	60%	130%	109%	50%	140%
Methyl tert-butyl ether	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	98%	60%	130%	83%	50%	140%
1,1-Dichloroethane	9641620	9641620	< 0.30	< 0.30	NA	< 0.30	110%	50%	140%	102%	60%	130%	115%	50%	140%
Methyl Ethyl Ketone	9641620	9641620	< 1.0	< 1.0	NA	< 1.0	75%	50%	140%	112%	50%	140%	115%	50%	140%
cis- 1,2-Dichloroethylene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	114%	60%	130%	108%	50%	140%
Chloroform	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	113%	60%	130%	107%	50%	140%
1,2-Dichloroethane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	110%	60%	130%	105%	50%	140%
1,1,1-Trichloroethane	9641620	9641620	< 0.30	< 0.30	NA	< 0.30	109%	50%	140%	116%	60%	130%	80%	50%	140%
Carbon Tetrachloride	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	114%	50%	140%	113%	60%	130%	102%	50%	140%
Benzene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	111%	50%	140%	109%	60%	130%	102%	50%	140%
1,2-Dichloropropane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	118%	60%	130%	98%	50%	140%
Trichloroethylene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	112%	60%	130%	87%	50%	140%
Bromodichloromethane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	116%	60%	130%	95%	50%	140%
Methyl Isobutyl Ketone	9641620	9641620	< 1.0	< 1.0	NA	< 1.0	106%	50%	140%	111%	50%	140%	107%	50%	140%
1,1,2-Trichloroethane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	92%	60%	130%	78%	50%	140%
Toluene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	98%	60%	130%	81%	50%	140%
Dibromochloromethane	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	100%	50%	140%	92%	60%	130%	79%	50%	140%
Ethylene Dibromide	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	101%	50%	140%	92%	60%	130%	81%	50%	140%
Tetrachloroethylene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	101%	60%	130%	83%	50%	140%
1,1,1,2-Tetrachloroethane	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	89%	60%	130%	74%	50%	140%
Chlorobenzene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	106%	50%	140%	93%	60%	130%	77%	50%	140%
Ethylbenzene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	100%	50%	140%	89%	60%	130%	72%	50%	140%
m & p-Xylene	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	95%	60%	130%	77%	50%	140%
Bromoform	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	78%	60%	130%	89%	50%	140%
Styrene	9641620	9641620	0.23	0.23	NA	< 0.10	116%	50%	140%	108%	60%	130%	88%	50%	140%
1,1,2,2-Tetrachloroethane	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	104%	60%	130%	92%	50%	140%
o-Xylene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	112%	50%	140%	96%	60%	130%	74%	50%	140%
1,3-Dichlorobenzene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	114%	50%	140%	94%	60%	130%	73%	50%	140%
1,4-Dichlorobenzene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	110%	50%	140%	91%	60%	130%	79%	50%	140%
1,2-Dichlorobenzene	9641620	9641620	< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	85%	60%	130%	70%	50%	140%
1,3-Dichloropropene	9641620	9641620	< 0.30	< 0.30	NA	< 0.30	95%	50%	140%	86%	60%	130%	81%	50%	140%
n-Hexane	9641620	9641620	< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	76%	60%	130%	109%	50%	140%

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11181273 (PO# 73513391)

SAMPLING SITE:2865 DuMaurier

AGAT WORK ORDER: 18Z399894

ATTENTION TO: LUKE LOPERS

SAMPLED BY:S. Wheeler

Trace Organics Analysis (Continued)

RPT Date: Nov 13, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)															
F1 (C6 - C10)	9641876	9641876	< 25	< 25	NA	< 25	96%	60%	140%	98%	60%	140%	94%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	104%	60%	140%	76%	60%	140%	72%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	102%	60%	140%	105%	60%	140%	85%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	92%	60%	140%	93%	60%	140%	90%	60%	140%

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.
When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)															
F1 (C6 - C10)	9641879	9641879	< 25	< 25	NA	< 25	99%	60%	140%	88%	60%	140%	94%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	92%	60%	140%	78%	60%	140%	77%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	94%	60%	140%	105%	60%	140%	95%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	86%	60%	140%	101%	60%	140%	90%	60%	140%

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11181273 (PO# 73513391)

SAMPLING SITE:2865 DuMaurier

AGAT WORK ORDER: 18Z399894

ATTENTION TO: LUKE LOPERS

SAMPLED BY:S. Wheeler

Water Analysis

RPT Date: Nov 13, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Antimony	9641620	9641620	<1.0	<1.0	NA	< 1.0	101%	70%	130%	101%	80%	120%	100%	70%	130%
Arsenic	9641620	9641620	7.2	8.2	13.0%	< 1.0	100%	70%	130%	103%	80%	120%	106%	70%	130%
Barium	9641620	9641620	747	706	5.6%	< 2.0	98%	70%	130%	104%	80%	120%	101%	70%	130%
Beryllium	9641620	9641620	<0.5	<0.5	NA	< 0.5	98%	70%	130%	96%	80%	120%	112%	70%	130%
Boron	9641620	9641620	26.3	25.1	NA	< 10.0	99%	70%	130%	99%	80%	120%	117%	70%	130%
Cadmium	9641620	9641620	<0.2	<0.2	NA	< 0.2	101%	70%	130%	103%	80%	120%	99%	70%	130%
Chromium	9641620	9641620	31.4	29.6	5.9%	< 2.0	99%	70%	130%	100%	80%	120%	103%	70%	130%
Cobalt	9641620	9641620	2.2	2.1	NA	< 0.5	101%	70%	130%	101%	80%	120%	98%	70%	130%
Copper	9641620	9641620	1.1	1.2	NA	< 1.0	100%	70%	130%	106%	80%	120%	94%	70%	130%
Lead	9641620	9641620	<0.5	<0.5	NA	< 0.5	104%	70%	130%	103%	80%	120%	94%	70%	130%
Molybdenum	9641620	9641620	0.6	0.6	NA	< 0.5	102%	70%	130%	101%	80%	120%	102%	70%	130%
Nickel	9641620	9641620	1.5	1.6	NA	< 1.0	99%	70%	130%	102%	80%	120%	93%	70%	130%
Selenium	9641620	9641620	1.8	5.3	NA	< 1.0	99%	70%	130%	99%	80%	120%	103%	70%	130%
Silver	9641620	9641620	<0.2	<0.2	NA	< 0.2	101%	70%	130%	110%	80%	120%	96%	70%	130%
Thallium	9641620	9641620	<0.3	<0.3	NA	< 0.3	102%	70%	130%	102%	80%	120%	93%	70%	130%
Uranium	9641620	9641620	0.8	0.7	NA	< 0.5	107%	70%	130%	100%	80%	120%	91%	70%	130%
Vanadium	9641620	9641620	4.7	4.4	6.6%	< 0.4	100%	70%	130%	100%	80%	120%	103%	70%	130%
Zinc	9641620	9641620	<5.0	<5.0	NA	< 5.0	101%	70%	130%	99%	80%	120%	92%	70%	130%
Mercury	9641620	9641620	<0.02	<0.02	NA	< 0.02	98%	70%	130%	99%	80%	120%	102%	70%	130%
Chromium VI	9641877	9641877	<5	<5	NA	< 5	102%	70%	130%	101%	80%	120%	101%	70%	130%
Cyanide	9641666	9641666	<2	<2	NA	< 2	97%	70%	130%	97%	80%	120%	79%	70%	130%
Sodium	9641879	9641879	385000	383000	0.5%	< 500	96%	70%	130%	96%	80%	120%	90%	70%	130%
Chloride	9641878	9641878	472000	460000	2.6%	< 100	95%	70%	130%	103%	70%	130%	95%	70%	130%
Electrical Conductivity	9641620	9641620	5560	5790	4.1%	< 2	97%	90%	110%						
pH	9641620	9641620	6.80	6.88	1.2%	NA	99%	90%	110%						

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Iris Verástegui

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Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 - C10)	VOL-91- 5010	MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

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Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18Z399894

PROJECT: 11181273 (PO# 73513391)

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:2865 DuMaurier

SAMPLED BY:S. Wheeler

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE METHOD CN- 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE

1 Large Black

AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: GHD
Contact: Luke Loopers
Address: 179 colonnade RD # 4000
Ottawa ON
Phone: Fax:
Reports to be sent to:
1. Email: Luke.Loopers@GHD.com
2. Email:

Project Information:

Project: 11181273
Site Location: 2865 Dumaurier
Sampled By: S. Wheeler
AGAT Quote #: PO: 73513391
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☒ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Laboratory Use Only

Work Order #: 18Z399894
Cooler Quantity: one
Arrival Temperatures: 11.1 | 11 | 10.9
I.T. 2.4 | 2.6 | 2.0
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: On ice.

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ C^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	O. Reg 153: Full Metals Scan	O. Reg 153: Regulation/Custom Metals	O. Reg 153: Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	O. Reg 153: Volatiles: ☒ VOC ☐ BTEX ☐ THM	O. Reg 153: PHCs F1 - F4	O. Reg 153: ABNs	O. Reg 153: PAHs	O. Reg 153: PCBs: ☐ Total ☐ Arocolors	O. Reg 153: Organochlorine Pesticides	O. Reg 153: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 153: Sewer Use
MW1 - 101918	10/19/18		12	GW	Cr(VI) Not Field Filtered		1					1							
MW2 - 101918	10/19/18		12	GW	only Hg Field filtered.		1					1							
MW35 - 101918	10/19/18		12	GW	Cr(VI) Not Field Filtered		1					1	1						
MW30 - 101918	10/19/18		12	GW	Cr(VI) Not Field Filtered		1					1							
MW 4 - 101918	10/19/18		12	GW	"		1					1							
MW 6 - 10-19-18	10/19/18		12	GW	"		1					1							
* Do not analyze for PHCs. *																			
* except for MW35 - 101918 *																			

Samples Relinquished By (Print Name and Sign): Anthony O'Brien	Date 10/19/18	Time 6:03	Samples Received By (Print Name and Sign): Jeff Soares	Date 20 00 18	Time 1500
Samples Relinquished By (Print Name and Sign): UPS FedEx	Date 18/10/22	Time 16h00	Samples Received By (Print Name and Sign): RUPINDER KAUR	Date Oct 23/18	Time 9:40 Am
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

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Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 16, 2018

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Appendix F DRAWINGS