



Phase Two Environmental Site Assessment

811 Gladstone Avenue Complex
Ottawa, Ontario

Ottawa Community Housing Corporation

GHD | 179 Colonnade Road Suite 400 South Ottawa Ontario K2E 7J4 Canada
11140575 | E2 | Report No 3 | December 11 2017



Executive Summary

GHD (Consultant) was retained by Ottawa Community Housing Corporation (OCHC or Client) represented by Mr. Barron Meyerhoffer, to complete a Phase Two Environmental Site Assessment (Phase One ESA) in general accordance with the O. Reg. 153/04 Phase Two ESA format for the residential property identified as the 811 Gladstone Avenue Complex in Ottawa, Ontario (Site or Phase Two Property). GHD has previously prepared a Phase One Environmental Site Assessment (Phase One ESA) (Ref No: 11140575-E1-RPT-2, dated August 25, 2017) for OCHC. The Phase One ESA was conducted for environmental due diligence as part of the local municipal planning department requirement associated with redevelopment of the Site.

The Phase One 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 residential buildings. This PCA was considered to represent an area of potential environmental concern (APEC) for the Site. There were 25 PCAs identified at neighboring properties in the Phase One Study Area as part of this assessment. Of the identified off-Site PCAs, four are considered to represent APECs for the subject Site. The two automotive garages located at 414 and 388 Booth Street, a former paving company located at 394 Booth Street, and a former dry cleaners located at 263 Rochester are considered to represent APECs for the Site. Off-Site PCAs identified as part of the Phase One ESA which were not considered to represent APECs for the Site were located at significant distances and/or down- or cross-gradient orientations to the Site and are not expected to have impacted the subject Property.

GHD was provided historical construction drawings as the drilling program was initiated and there was an additional potentially contaminating activity identified during their review, potential presence of heating oil storage tanks (PCA#27). This PCA#27 also represents an area of potential environmental concern for the Site. As the locations of the Oil Tanks, as depicted on the Client drawings, are shown within the boundary for APEC#1, and the contaminants of concern associated with this PCA#27 were also considered CPCs for the previously identified PCA within APEC#1, no additional APECs were identified for the Site.

The Phase Two Environmental Site Assessment (Phase Two ESA) was recommended based on the APECs identified in the Phase One ESA and the scope of work did not require modification based on PCA#27. The purpose of the Phase Two ESA is to assess the soil and groundwater quality at the Site. The investigation involved the advancement of eight boreholes which were sampled for environmental and/or geotechnical purposes. Three of the boreholes were completed with groundwater monitoring well screens set within the unconfined upper aquifer, in the upper fractured layers of the limestone bedrock. One additional monitoring well, which was present prior to this investigation, was also used for the Phase Two ESA.

Four soil samples were submitted for laboratory analysis of Metals, petroleum hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs) and pH. One duplicate soil sample was submitted for analysis of Metals, PHCs, the fuel additives Benzene, Toluene, Ethylbenzene, and Xylenes (BTEXs), and PAH parameters. One soil sample was also submitted for toxicity characteristic leaching procedure (TCLP) analysis to determine options for



off-Site disposal. Five groundwater samples, including one duplicate sample, were submitted for laboratory analysis of a combination of Metals, PHCs, VOCs, PAHs, and pH. Two trip blank water samples were submitted for analysis of VOCs.

Based on the soil depths, Site setting, and the existing land uses in the vicinity of the Site, the Generic Criteria provided in O. Reg. 153/04 Table 7 (shallow soil, 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, but is a shallow soil Site since more than 1/3 of the Site has less than 2 m of overburden soil cover.

Site Compliance

There were O. Reg. 153/04 Table 7 (residential land use, coarse soil texture) criteria exceedances in two of the four submitted soil samples, plus the duplicate QA/QC soil sample.

There were no O. Reg. 153/03 Table 7 exceedances in the analysed groundwater samples.

It should also be noted, given the period of initial development (1880s) and redevelopment (1960s) of the Site, that there is suspected to have been undocumented additional heating oil storage tanks, either ASTs or USTs, present at the Site as part of residential historical heating systems. No documentation or physical evidence of additional aboveground storage tanks (ASTs) or underground storage tanks (USTs) was discovered as part of the Phase One ESA or Phase Two ESA, however, there is the potential that USTs remain at the Site and/or have associated localised pockets of contaminated soil and/or groundwater.

The Site is not considered to be in compliance with the O. Reg. 153/04 criteria for the existing and proposed land use and requires soil remediation/removal or a risk assessment.

Note that a remedial action plan that includes a soil 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 Property is described as Civic Nos. 811 Gladstone Avenue Complex in Ottawa, Ontario (Site or Property). The Site is legally described as Lots 263 to 265, 271, 272 and Part of Lots 262, 266, 267, 270 and 273, on the North Side of Gladstone Avenue on registered plan 16, in the City of Ottawa in the Province of Ontario. The property identification numbers associated with the Site are 041080285 and 041080289. The center of the Site has Latitude and Longitude coordinates of 45° 24' 21" N, 75° 42' 34" W and UTM coordinates of zone 18T, 444481 m E, 5028279 m N). The location of the Site within the City of Ottawa is shown on Figure 1, Site Location Map, in the Figures Section following the text of this report. 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 approximately rectangular in shape and covers an area of approximately 4725 m² (0.47 hectares). The Site is located within an urban area, which is developed predominantly for residential use, with some historical commercial and institutional uses. The Site is bordered by Balsam Street followed by residential properties to the north, by Rochester Street followed by residential properties to the west, by Gladstone Avenue followed by residential properties to the south, and by an institutional property followed by Booth Street to the east.

The boundaries of the Site and location of the existing buildings are shown on Figure 2, Borehole Location Plan, in the Figures Section following the text of this report.

1.2 Property Ownership

The Site is currently owned by Ottawa Community Housing Corporation (OCHC), which has a corporate address of 39 Auriga Drive, Ottawa, Ontario, K2E 7Y8. The Client is represented by Mr. Barron Meyerhoffer.

1.3 Current and Proposed Future Uses

The current property use is multi-unit residential. The north, west, and south limits of the Site are developed with three multi-unit residential buildings respectively addressed as 22 through 34 (even) Balsam Avenue on the north portion of the Site; 38, 40 Balsam Avenue and 275 through 285 (odd) Rochester Street on the west portion of the Site; and 289 Rochester Street and 811 through 829 Gladstone Avenue on the south portion of the Site. The central portion of the Site is paved with an asphalt parking area that is accessed from Balsam Avenue to the north. The east limit of the Site is landscaped area for recreation use of the tenants. Under Ottawa Bylaw 2008-250, the Site has a municipal zoning designation of R4A "Residential Fourth Density Zone" for the north portion of the property and TM "Traditional Mainstreet Zone" for the south portion of the Site.



GHD understands that the Client intends to demolish the existing buildings and construct a six-storey residential building without a basement with associated surface parking areas and access roads. The Property is currently used for residential purposes and will remain residential and therefore does not require a Record of Site Condition (RSC), required for a change in land use to more sensitive land uses. However, it is understood that the Client may file a RSC to document Site conditions prior to redevelopment. This report will also be used to support a submission to the local municipal planning department.

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. The nearest area designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) is located approximately 1.4 kilometres (km) south of the Site, on the west of Dows Lake. Under O. Reg. 153/04, a municipal EP zone is classified as an "area of natural significance". 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 less than 2 m of soil in seven of the eight boreholes advanced on the Site. As more than 1/3 of the area consists of soil (excluding any non-soil surface treatment such as asphalt, concrete or aggregate) less than 2 m in depth, the Property would be considered a Shallow Soil site (O. Reg. 153/04, s43.1[3]).

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 km to the North of the Site. Dows Lake is located approximately 1 km south 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 residential. The proposed property use will remain 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 coarse 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 generic O. Reg 153/04 Table 7 (shallow soil property, 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 km to the North of the Site. Dows Lake, a manmade surface water body, is located approximately 1 km south of the Site.

Topography and Drainage

The Site is relatively flat, grading away from the Site buildings, 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 north, west and south. This grading is engineered to. The Site is approximately level with the adjacent property to the east.

The regional topography in the general area of the Site is generally flat, sloping down to the west-southwest.

The Phase Two ESA drilling program identified limestone bedrock between 0.5 and 2.6 meters below grade (mBG), with an upper surface described as ranging from poor to good quality that become good to excellent with depth. This material was overlain with a shallow layer of till, covered with coarse grained fill to provide engineered grading. The shallow nature of the bedrock implies that underground services bedded in coarse grained fill will be placed below the bedrock surface; the bedding and fractured bedrock surrounding the services will provide a preferred hydraulic pathway.

Hard surfaces at the Site includes the paved parking area on the central portion of the Site with a laneway that extends north to Balsam Street, concrete walkways leading from the residential units to the off-Site municipal sidewalks on the north, west, and south margins of the Property, and concrete sidewalks at the rear of the residential units leading to the paved parking area. 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 One Environmental Site Assessment, 811 Gladstone Avenue, Ottawa, Ontario" Reference No. 11140575-E1-RPT-2, prepared by GHD, dated August 25, 2017 (Phase One ESA).

The Phase One ESA was completed for the entire Site which contains three multi-unit residential buildings, a central paved parking area and laneway, and a landscaped common area.

According to the historical research, the earliest developed use of the site is approximately 1889, based on ownership details from the land title search, listings from the City directories and observations from the aerial photographs. Based on the historical research, the Site has been used for residential purposes since 1989 to the time of report preparation, with portions of the Site being used for institutional purposes between 1918 to 1964. The Site was reportedly redeveloped with the present day residential buildings in the mid-1960s.

At the time of the Phase One ESA, the Site was developed with three multi-unit residential buildings on the north, south and west portions of the Site, while the central portion of the Site consisted of a paved parking area and the east portion of the Site was landscaped. The buildings were two storey slab-on-grade structures with concrete foundations and central basement level mechanical rooms.

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 was done during the construction of pre-existing buildings on 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). Since environmental management was not a concern in the 1960s and previous heating oil and other fuels may have been used and mixed with on-Site soil during the 1960s redevelopment, PHCs, PAHs and metals may be CPCs from the fill.

The 25 off-Site PCAs were identified in the Phase One Study Area. Four of the identified off-Site PCAs are considered to represent APECs for the subject Site; 414 Booth Street formerly operated as an automotive garage (PCA#2, APEC#2), 394 Booth Street formerly operated as a paving company (PCA#3, APEC#3), 388 Booth Street formerly operated as an automotive service garage (PCA#4, APEC#4), and 263 Rochester Street formerly operated as a Dry Cleaners (PCA#5, APEC#5). The remaining identified off-Site PCAs were not considered to represent APECs for the subject Site given that they are all located significant distances and/or down or cross gradient with respect to the Site.

A Phase Two ESA was recommended for the Phase One 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 August 22 and 25, 2017, four boreholes (BH1-17 through BH4-17) 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. On August 28 and 29, 2017, four boreholes (BH5-17 through BH8-17) were advanced by means of a Beaver portable drill rig equipped for environmental 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. Boreholes BH1-17, BH2-17, and BH5-17 were outfitted with groundwater monitoring wells respectively identified as MW1-17, MW2-17, and MW3-17 to measure the groundwater levels and collect representative groundwater samples.

- BH1-17 was advanced to a depth of approximately 6.2 metres below grade (mBG), located near the northwest limit of the central paved parking area, approximately 0.5 m southeast of 32 Balsam Street. The borehole was equipped with a groundwater monitoring well identified as MW1-17. The monitoring well was screened in the bedrock 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)
- Borehole BH2-17 was advanced to a depth of approximately 6.2 mBG, located on the east side of the laneway accessing the central parking area, approximately 2.5 m southwest of 34 Balsam Street. The borehole was equipped with a groundwater monitoring well identified as MW2-17. The monitoring well was screened in the bedrock 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 drycleaners (APEC#5).
- Borehole BH3-17 was advanced to a depth of approximately 5.9 mBG, near the southeast limit of the central paved parking area, approximately 9 m northwest of 823 Gladstone Avenue. This borehole was located to assess the environmental soil quality of the imported fill materials (APEC#1).
- Borehole BH4-17 was advanced to a depth of approximately 2.7 mBG, located near the centre of the laneway into the central parking area, approximately 14 m northeast of 281 Rochester Street. This borehole was located to assess the environmental soil quality of the imported fill materials (APEC#1).
- Borehole BH5-17 was advanced to a depth of approximately 2.7 mBG, located near the northeast limit of the Site, approximately 3.2 m northwest of 24 Balsam Avenue. The borehole was equipped with a groundwater monitoring well identified as MW3-17. The monitoring well was screened in the bedrock to intercept the shallow groundwater table. This borehole/monitoring well was located to assess the environmental soil and groundwater quality near the northeast corner of the Site in the vicinity of APEC#2, APEC#3 and APEC#4.
- Borehole BH6-17 was advanced to a depth of approximately 2.9 mBG, located near the northwest limit of the Site, approximately 3 m northwest of 275 Rochester Street. This borehole was located to assess the environmental soil quality near the northwest corner of the Site in APEC#5.



- Borehole BH7-17 was advanced to a depth of approximately 2.9 mBG near the southeast limit of the Site, located approximately 2.2 m southeast of 811 Gladstone Avenue. This borehole was located to assess the environmental soil quality at the southeast corner of the Site in APEC#2.
- Borehole BH8-17 was advanced to a depth of approximately 3.9 mBG near the southwest limit of the Site, located approximately 2.5 m southeast of 289 Rochester Street. This borehole was located to assess the environmental soil quality at the southwest corner of the Site.
- An existing monitoring well (installed by others) was identified near the northwest limit of the Site, in close proximity to BH6-17. While well construction details are not known, this well (identified in this report as MW4) was included in the groundwater sampling program to assess if groundwater contamination was present originating from the off-Site former drycleaners (APEC#5).

The following soil samples were submitted to the laboratory: BH2/MW2(SS1), DUP (a blind duplicate sample of BH2/MW2[SS1]), BH5/MW3(SS1), BH6(SS1), and BH7(SS1). The samples were submitted to Paracel Laboratories Ltd. in Ottawa, Ontario under Chain of Custody (CoC) 113609 and 38489 on August 25 and 29, and October 31, 2017.

- Soil samples BH2/MW2, BH5/MW3, BH6, BH7 were analysed according to O. Reg. 153/04 requirements. The samples were tested for a combination of Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals and pH.
- Soil sample DUP was analysed according to O. Reg. 153/04 requirements. The sample was tested for PHCs, BTEXs, PAHs, and metals.
- Soil sample BH2/MW2 was also analysed for flashpoint and Toxicity Characteristic Leaching Procedure (TCLP) analysis for metals and inorganics on leachate, VOCs on leachate, PAHs on leachate, and PCBs on leachate, for comparison to Ontario Regulation 558/00 to provide a waste classification of the soil.

On September 8, 2017, GHD returned to the Site to measure the static groundwater levels in monitoring wells BH1-17/MW1-17, BH2-17/MW2-17, BH5-17/MW3-17, and MW4. The monitoring wells were then developed, with GHD purging the wells dry at least twice. Groundwater samples were then collected from BH1-17/MW1-17, BH2-17/MW2-17, and BH5-17/MW3-17. A duplicate groundwater sample was collected from BH5-17/MW3-17. The groundwater samples to be analysed for metals were filtered using dedicated 45um filters, the remainder of the samples were unfiltered. The following groundwater samples were submitted to the laboratory on September 8, 2017: BH1/MW1, BH2/MW2, BH5/MW3, DUP, a trip blank provided by the laboratory on September 7, 2017.

On September 12, 2017, GHD returned to the Site to collect a sample from MW4. On September 12, 2017 the groundwater sample MW4 and a trip blank prepared by the laboratory on September 11, 2017 were submitted to the laboratory.

The groundwater samples were submitted to Paracel Laboratories Ltd. in Ottawa, Ontario under Chain of Custody (CoC) 112293 and 38677 on September 8 and 12, 2017, respectively. The samples were analysed according to O. Reg. 153/04 requirements.



- Groundwater samples BH1/MW1, BH2/MW2, BH5/MW3, and sample DUP were analysed for PHC, VOCs, PAHs, metals, and pH.
- Groundwater sample MW4 was analysed for VOCs.
- Trip Blank (prepared by the laboratory on September 7, 2017), and Trip Blank (prepared by the laboratory on September 11, 2017) were analysed for VOCs.

On September 12, 2017 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 southwest corner of Rochester Street and Balsam Street (City of Ottawa Hydrant No.FM175067M).

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), a former automotive service garage to the southeast of the Site (PCA/APEC#2), a former asphalt manufacturer to the northeast (PCA/APEC#3), a former retail fuel outlet and automotive service garage to the northeast (PCA/APEC#4) and a former dry cleaner to the north (PCA/APEC#5). 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, three of the boreholes advanced at the Site were outfitted with groundwater monitoring wells, which was screened in the shallow bedrock to intercept the groundwater table. 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 following a period of stabilization, well development, and purging 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 immediately surrounded by residential, commercial and institutional properties.

The Property is commonly referred to as Civic No. 811 Gladstone Avenue in Ottawa, Ontario (Site or Property) and is approximately 4725 m² (0.47 hectares) in area. The Property is currently occupied by three multi-unit residential buildings, the individual units in these three buildings are civically addressed as 811-829 Gladstone Avenue, 275-289 Rochester Street, and 22-38 Balsam Street. The Site has been used for residential and institutional purposes since the first developed use of the Property in approximately 1889.



No water bodies, areas of natural significance or drinking water wells are present at the Site. The nearest surface water body indicated on the mapping is the Ottawa River, located approximately 1 km north of the Site, while Dow's Lake was observed approximately 1 km south of the Site; the location of these water bodies are indicated in the Conceptual Site Model. The topography of the Site is generally flat and level with respect to adjacent properties. The soil conditions in the vicinity of the Site are expected to consist of glacial till type soil over limestone bedrock at 1 to 2 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 250 m of the subject land were considered from an environmental perspective for the purposes of this report. Properties located outside of the Phase One Study Area (250 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 placed in the central portion of the Property during redevelopment of the Site with the present day residential buildings. This PCA is considered to represent an area of potential environmental concern (APEC) for the Site.

There were 25 PCAs identified at surrounding properties in the Phase One Study Area as part of this assessment. Four of the identified off Site PCAs are considered to represent APECs for the subject Site. The two automotive garages located at 414 and 388 Booth Street, a former paving company located at 394 Booth Street, and a former dry cleaners located at 263 Rochester are considered to represent APECs for the 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 Booth Street. Natural gas is supplied to the Site buildings from underground service trenches leading from Gladstone Avenue to the south of the Site, and Balsam Street to the north of the Site. These service trenches are considered to have the potential to act as conduits for contaminant migration.

According to the information obtained from the Geological Survey of Canada map 1425A titled *Surficial Materials and Terrain features Ottawa Hull* the natural soil conditions in the region appear to consist of "pre-Champlain Sea deposits consisting of glacial deposits of till; heterogeneous mixture of material ranging from clay to large boulders, generally sandy, grades downwards into unmodified till; surface is generally modified by wave or river action and the topography is flat to hummocky". The thickness of overburden is expected to be approximately 1 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 consist of a



mixture of sand and gravel type soils. The overburden soil was reportedly underlain by limestone bedrock at an approximate depth of 1.0 m below ground surface.

Regional groundwater flow direction in the overburden within the Study Area was expected to be towards the west, 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 25 off-Site PCAs identified in the Study Area.

- PCA#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill materials and possible underground storage tanks (USTs) and related petroleum hydrocarbon contamination within the fill from pre-1960 uses at the Property.
- PCA#2 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage and service station with USTs historically operated at 414 Booth Street, approximately 6 m east of the Site.
- PCA#3 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former paving company historically operated at 394 Booth Street, approximately 25 m northeast of the Site.
- PCA#4 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 388 Booth Street, approximately 40 m northeast of the Site.
- PCA#5 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 263 Rochester Street, approximately 20 m north of the Site.
- PCA#6 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 204 Rochester Street, approximately 180 m northwest of the Site.
- PCA#7 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 201 Rochester Street, approximately 180 m north of the Site.
- PCA#8 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former gasoline service station with USTs, and currently an automotive service garage operates at 779 Gladstone Avenue, approximately 200 m east of the Site.
- PCA#9 (Item 10: Commercial Autobody Shops) | Off-Site, a former commercial autobody shop historically operated at 773 Gladstone Avenue, approximately 215 m east of the Site.
- PCA#10 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former gasoline service station with USTs, and currently an automotive service garage operates at 241 Preston Street, approximately 165 m east of the Site.



- PCA#11 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former gasoline service station with USTs, and a former heating oil supplier historically operated at 215 Preston Street, approximately 180 m west of the Site.
- PCA#12 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 225 Preston Street, approximately 175 m west of the Site.
- PCA#13 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, an automotive service garage currently operates at 54 Louisa Street, approximately 145 m southeast of the Site.
- PCA#14 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, an automotive service garage currently operates at 66 Lebreton Street, approximately 245 m northeast of the Site.
- PCA#15 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former transportation company with automotive service historically operated at 93 Lebreton Street, approximately 230 m northeast of the Site.
- PCA#16 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former Ambulance Service garage historically operated at 71 Lebreton Street, approximately 250 m northeast of the Site.
- PCA#17 (Item 10: Commercial Autobody Shops) | Off-Site, a commercial autobody shop currently operates at 167 Lebreton Street, approximately 110 m east of the Site.
- PCA#18 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former heating oil supplier historically operated at 174 Lebreton Street, approximately 160 m east of the Site.
- PCA#19 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 436 Arlington Avenue, approximately 180 m southeast of the Site.
- PCA#20 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage and former commercial autobody shop historically operated at 347 Booth Street, approximately 200 m northeast of the Site.
- PCA#21 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 20 Willow Street, approximately 200 m northeast of the Site.
- PCA#22 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 457 Booth Street, approximately 135 m southeast of the Site.
- PCA#23 (Item 8: Chemical Manufacturing, Processing and Bulk Storage) | Off-Site, chemical manufacturing, processing, and bulk storage was reported at 300 Rochester Street, approximately 45 m southwest of the Site.



- PCA#24 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former vehicle repair historically operated at 23 Poplar Street, approximately 185 m north of the Site
- PCA#25 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 112 Lebreton Street, approximately 160 m northeast of the Site.
- PCA#26 (Item 53: Tannery) | Off-Site, a former tannery historically operated at 187 Preston Street, approximately 235 m northwest 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 | On-Site, importation of Fill materials with potential petroleum within the fill and on-Site fuel storage tanks.
- APEC#2 | Off-Site, a former automotive service garage and service station with USTs historically operated at 414 Booth Street, approximately 6 m east of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.
- APEC#3 | Off-Site, a former paving company historically operated at 394 Booth Street, approximately 25 m northeast of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.
- APEC#4 | Off-Site, a former automotive service garage historically operated at 388 Booth Street, approximately 40 m northeast of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.
- APEC#5 | Off-Site, a former dry cleaners historically operated at 263 Rochester Street, approximately 20 m north of the Site. This historical activity has the potential to have impacted soil and groundwater at 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, off-Site automotive service garages and retail fuel outlets, an off-Site paving company and an off-Site dry cleaner:

1. Petroleum Hydrocarbons ranges F1-F4 (PHCs) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEXs)
2. Volatile Organic Compounds (VOCs)
3. Metals
4. Polycyclic Aromatic Hydrocarbons (PAHs)



Additional Considerations for Conceptual Site Model on the date of the drilling program component of the fieldwork for this Phase Two ESA, the Client provided construction drawings for the Site. One of the drawings shows the presence of two "Oil Tanks", one to the north of the Gladstone Avenue building and one to the south of the Balsam Street building. The construction drawings are presented as part of the Utility Clearances in Appendix A. Despite their indicated presence on the drawings, the Client was not aware of the presence of any oil storage tanks at the Site and stated that the buildings and auxiliary features may not have been constructed as indicated on the drawings.

The heating oil storage tanks, if present, at the Site would be a potentially contaminating activity (PCA#27). As the locations of the Oil Tanks, as depicted on the Client drawings, are shown within the boundary for APEC#1, and the contaminants of concern associated with this PCA were also considered CPCs for the previously identified PCA within APEC#1, no additional APECs were identified for the Site.

It should also be noted, given the period of initial development (1880s) and redevelopment (1960s) of the Site, that there may have been additional heating oil storage tanks, either aboveground storage tanks (ASTs) or USTs, present at the Site as part of historical heating systems. No documentation or physical evidence of additional ASTs or USTs was discovered as part of the Phase One ESA or Phase Two ESA, however, there is the potential that USTs remain at the Site and have associated isolated pockets of contaminated soil and/or groundwater. It is expected that this unknown will be further addressed at the time of construction for subsequent redevelopment of the Site.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan (SAP) proposed

- Seven boreholes were proposed to be completed to a depth of at least 1.5 m below ground surface. GHD advanced an additional borehole to provide additional Site coverage. This modification is not expected to adversely affect the results of this assessment.
- Five boreholes were proposed to be equipped with groundwater monitoring wells, to a maximum depth between 3 to 6 mBG. GHD installed three groundwater monitoring wells at the Site. There was one monitoring well (identified as MW4 in this report) that was installed by others which was incorporated into the groundwater sampling program. The monitoring well installations were considered sufficient to assess the APECs identified.
- 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. 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. GHD installed screens up to 4.57 m in length based on uncertainty of the elevation of the static groundwater table in the weathered bedrock aquifer. The water table was higher than anticipated, resulting in a wetted screen length greater than 3 m. This modification to the SAP did not adversely affect this assessment.
- All soil samples were to be screened for organic vapours in the field using a RKI Eagle Combustible Gas Detector (Gastech) in the field. Samples were screened in the field using



visual and olfactory observations and then were screened for organic vapours upon return to GHD's laboratory. This modification is not expected to affect the results of the investigation.

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 PCA and APEC identified for the Site. Based upon these conditions, GHD determined that boreholes with split spoon soil sampling, installation and sampling of three new groundwater monitoring wells and sampling one existing monitoring well 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. Three 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 fire hydrant #FM175067M, located on the southwest corner of the intersection of Rochester Street and Balsam Street.

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 BH1-17 through BH4-17 was conducted on August 22 and 25, 2017 by George Downing Estate Drilling Ltd. of Grenville Sur La Rouge, Quebec, using a truck mounted CME 55 power drill rig, and on August 28 and 29, 2017 using a Beaver portable 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 BH1-17 through BH8-17 on August 22, 25, 28, and 29, 2017 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 five main materials above the limestone bedrock:

- Asphalt
- Grass vegetation and Topsoil
- Fill (Gravelly Sand) or (Sand and Gravel) or (Silty Sand)
- Native Till (Silty Sand) or (Sand and Gravel)
- Concrete

The subsurface soil encountered in the eight 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 BH1-17, BH2-17, BH3-17, and BH4-17. This layer was found at the ground surface extending down approximately 0.1 mBG.

Topsoil

A surface layer of topsoil and grass was encountered in boreholes BH5-17, BH6-17, BH7-17, and BH8-17. This material was described as silty sand with organics, loose, dark brown, moist to damp, with grass and roots. This layer was found at the ground surface extending down approximately 0.1 to 0.2 mBG.

No petroleum odours or visible evidence of staining were noted within any of the topsoil materials.

Fill

A layer fill material was found in all boreholes advanced at the Site.

Gravelly Sand was encountered underlying the asphalt pavement in BH1-17, BH2-17, BH3-17, BH4-17. This material was described as grey, dense to loose, and damp. This material was found to be 0.3 meters in thickness.

Sand and gravel fill, or sand with some gravel, was identified in BH5-17, BH7-17, and BH8-17. This material was described as brown, loose, and damp to moist. This layer was generally found to be 0.6 meters in thickness. This same type of fill was encountered with an approximate thickness of



2.1 m in BH8-17; it was suspected that fill was used to backfill a former foundation in this area of the Site.

Silty sand fill was encountered in BH6-17. The material was described as containing trace organics, dark brown, loose, and moist. This material was found to be 0.9 m thickness.

No petroleum odours or visible evidence of staining were noted within any of the fill materials encountered as part of this assessment.

Native Silty Sand or Sand and Gravel (Till)

A layer of sand and gravel was encountered resting on the limestone bedrock in BH1-17. It was described as loose, brown, and damp. This layer was approximately 0.1 meters in thickness.

A layer of silty sand was encountered resting on the limestone bedrock in BH2-17, BH3-17, and BH4-17. It was described as compact, grey (occasionally with red-brown staining), and damp to moist. This layer was found to be between approximately 0.1 and 0.4 meters in thickness.

No petroleum odors were noted within these materials.

Concrete

A layer of concrete was encountered resting directly on the bedrock in BH8-17; it is suspected that the concrete was part of a foundation system for a historical structure at the Site.

4.4 Field Screening Measurements

The limited depth of overburden materials at the Site restricted the selection of soil samples for laboratory analysis. The soil samples were field screened for the olfactory and visible presence of CPCs.

4.5 Ground Water: Monitoring Well Installation

Advancement of BH1-17, BH2-17, and BH5-17 was conducted on August 22, 25, and 28, 2017 by George Downing Estate Drilling Ltd. of Grenville Sur La Rouge, Quebec.

All three of the aforementioned boreholes were equipped with 51 mm diameter temporary groundwater monitoring wells respectively identified as MW1-17, MW2-17, and MW3-17. The well screens consisted of slotted No. 10, 4.57 m long, 51 mm diameter PVC, installed at the finished depth of the borehole. 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. Between 0.3 m and 0.7 m of 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. All three monitoring wells were observed to go dry during development, each well was left for a period of at least 30 minutes and was subsequently purged dry two times. A period of stabilization of approximately one to two weeks was allowed to pass prior to sampling. 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 two times 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 MW1-17, MW2-17, and MW3-17 using a peristaltic pump with dedicated 6 mm LDPE tubing. The pump was set to low-flow during sampling to minimize volatilization. An existing well on-Site that was installed by others (identified in this report as MW4) was sampled with the dedicated 12 mm LDPE tubing and a Waterra© footvalve; this well could not be sampled with the peristaltic pump as the water column was lower than the maximum hydraulic head differential capability of the pump.

All groundwater samples were collected in dedicated amber glass bottles and vials prepared by the laboratory. The groundwater samples for metal analysis was field filtered; the samples for PHC, VOC, PAH, 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 Paracel Laboratories Ltd. (Paracel). Paracel is a member of the Standards Council of Canada (SCC) and Canadian Association of Environmental Analytical Laboratories (CAEAL).

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 7 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. Upon receipt of laboratory analytical results, the purge water was disposed of in the municipal sanitary sewer system.

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 on the top of spindle of fire hydrant #FM175067M, located on the southwest corner of the intersection of Rochester Street and Balsam Street. The assumed elevations were as follows:

Table 4.1 Elevations

| Location | Relative Grade Elevation (m) | Relative Top Of Piezometer (TOP) Elevation (m) | Remarks |
|---------------------------|------------------------------|--|-------------------------|
| TBM Hydrant FM175 Spindle | 100.00 | | Assumed elevation 100 m |
| BH1-17/MW1-17 | 101.28 | 101.23 | |
| BH2-17/MW2-17 | 101.50 | 101.45 | |
| BH5-17/MW3-17 | 102.39 | 102.34 | |
| MW4 | 101.49 | 101.44 | Pre-existing well |

4.12 Quality Assurance and Quality Control Measures

All soil sample jars were provided by Paracel. 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 four submitted soil samples. Duplicate sample DUP was submitted for laboratory analysis of pH, PHCs, and BTEXs. 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 Paracel. 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, VOC, PAH, 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 four collected groundwater samples. One field duplicate (DUP) was submitted for laboratory analysis of PHCs, BTEXs, and pH in groundwater for BH3-GW1. 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.

There were no deviations from the original sampling plan as discussed in Section 4.4 of this report.

5. Review and Evaluation

5.1 Geology

Asphalt

A surface layer of asphalt was encountered in boreholes BH1-17, BH2-17, BH3-17, and BH4-17. This layer was found at the ground surface extending down approximately 0.1 mBG.

No soil samples from this layer were submitted for chemical analysis of CPCs, as asphalt is not considered to be a soil.

Topsoil

A surface layer of topsoil and grass was encountered in boreholes BH5-17, BH6-17, BH7-17, and BH8-17. This material was described as silty sand with organics, loose, dark brown, moist to damp, with grass and roots. This layer was found at the ground surface extending down approximately 0.1 to 0.2 mBG.

No petroleum odours or visible evidence of staining were noted within any of the topsoil materials.

No soil samples from this layer were submitted for chemical analysis of CPCs, as it was at a higher elevation than the APECs identified for the property.

Fill

A layer fill material was found in all boreholes advanced at the Site.



Gravelly Sand was encountered underlying the asphalt pavement in BH1-17, BH2-17, BH3-17, and BH4-17. This material was described as grey, dense to loose, and damp. This material was found to be 0.3 meters in thickness.

Sand and gravel fill, or sand with some gravel, was identified in BH5-17, BH7-17, and BH8-17. This material was described as brown, loose, and damp to moist. This layer was generally found to be 0.6 meters in thickness. This same type of fill was encountered with an approximate thickness of 2.1 m in BH8-17; it was suspected that fill was used to backfill a former foundation in this area of the Site. Soil samples of this layer were submitted from BH5-17 (SS1) and BH7-17 (SS1) for chemical analysis of CPCs.

Silty sand fill was encountered in BH6-17. The material was described as containing trace organics, dark brown, loose, and moist. This material was found to be 0.9 m thickness. Soil samples of this layer were submitted from BH6-17 (SS1) for chemical analysis of CPCs.

No petroleum odours or visible evidence of staining were noted within any of the fill materials encountered as part of this assessment.

Native Silty Sand or Sand and Gravel (Till)

A layer of sand and gravel was encountered resting on the limestone bedrock in BH1-17. It was described as loose, brown, and damp. This layer was approximately 0.1 meters in thickness.

A layer of silty sand was encountered resting on the limestone bedrock in BH2-17, BH3-17, and BH4-17. It was described as compact, grey (occasionally with red-brown staining), and damp to moist. This layer was found to be between approximately 0.1 and 0.4 meters in thickness. Soil samples of this layer were submitted from BH2-17 (SS1) for chemical analysis of CPCs.

No petroleum odors were noted within these materials.

Concrete

A layer of concrete was encountered resting directly on the bedrock in BH8-17; it is suspected that the concrete was part of a foundation system or floor slab for a historical structure at the Site.

5.2 Ground Water - Elevations and Flow Direction

Overburden Aquifer

In order to assess the environmental quality of the groundwater at the Site, three groundwater monitoring wells (MW1-17, MW2-17, MW3-17) were installed on the subject Property as part of this assessment. All wells were screened in the upper surface of the bedrock aquifer (the aquifer of interest). A bentonite seal above the monitoring well screen/sandpack was formed during all monitoring well installations. In addition, an existing groundwater monitoring well identified as MW4 in this report was included in the groundwater sampling program; this well was installed by others and well construction details are unknown. 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) |
|-------------------|---------------------|-------------------|-------------------------------|----------------------|-------------------------|------------------------------|-------------------------|
| BH1-17/ MW1-17 | 101.28 | 101.23 | 95.13 | 99.80 to 95.23 | 100.01 to 95.13 | 100.62 to 100.01 | 6.05 |
| BH2-17/ MW2-17 | 101.50 | 101.45 | 95.37 | 99.95 to 95.28 | 100.15 to 95.37 | 100.89 to 100.15 | 6.22 |
| BH5-17/ MW3-17 | 102.39 | 102.34 | 96.52 | 101.09 to 96.52 | 101.30 to 96.52 | 101.78 to 101.30 | 5.87 |
| MW4 | 101.49 | 101.44 | unknown | 86.01 to unknown | Unknown | Unknown | 15.48 |

Following a period of stabilization of the groundwater in the overburden wells, water levels were collected on September 8, 2017. Groundwater elevations were determined based on the assumed elevation of the surveyed benchmark (fire hydrant FM175067M, located on the southwest corner of the intersection of Rochester Street and Balsam Street), 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) (Sept 8, 2017) |
|---------------|---------------------|-------------------|--------------------------------------|------------------------------------|--|
| BH1-17/MW1-17 | 101.28 | 101.23 | 1.84 | 1.79 | 99.44 |
| BH2-17/MW2-17 | 101.50 | 101.45 | 2.74 | 2.69 | 98.76 |
| BH5-17/MW3-17 | 102.39 | 102.34 | 2.17 | 2.12 | 100.22 |
| MW4 | 101.49 | 101.44 | 14.49 | 14.44 | 86.99 |

Free product was not identified during any monitoring. The results of the LNAPL/DNAPL investigation are presented in Table 1, following the body of this report.

Three groundwater monitoring wells are required to triangulate groundwater elevations and provide a direction of groundwater flow. Three wells were installed in the upper surface of the bedrock as part of this investigation; MW1-17, MW2-17, and MW3-17. The three wells were used to determine a direction of groundwater flow and hydraulic gradient. Based on the water table elevations recorded in these three 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 west (project west-northwest). This direction of groundwater flow is logical based on the surficial topography observed at the Site and neighbouring properties and the location of the nearest significant surface water body.

Municipal water and sewer services are supplied by underground service trenches on the east portion of the Site leading to Booth Street. Natural gas is supplied to the Site buildings from underground service trenches leading from Gladstone Avenue to the south of the Site, and Balsam



Street to the north of the Site. The presence of buried utilities is not expected to impact measurements of the groundwater table.

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 0.04 m/m.

5.4 Fine-Medium or Coarse Soil Texture

Borehole advancement has identified a layer of silty sand or sand and gravel till, and field observations indicate the native soils are not fine textured soils as defined in O. Reg. 153/04. Accordingly, the Site soil is considered to be coarse grain size; which was used for comparison to the O. Reg. 153/04 criteria. It should be noted that coarse grain soil considerations are a more conservative comparison for analytical results.

5.5 Soil Field Screening

The limited depth of overburden materials at the Site restricted the selection of soil samples for laboratory analysis. The soil samples were field screened for the olfactory and visible presence of CPCs. A combustible vapour survey completed at GHD's laboratory indicated that 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, VOCs, PAHs, PHCs, and pH as follows:

Table 5.3 Soil Sample Details

| Sample ID | Submitted Sample | Sample depth | Parameters |
|-----------|------------------|--------------|------------------------------|
| BH2/MW2 | BH2-17, SS1 | 0.4-0.6 | metals, VOCs, PAHs, PHCs |
| DUP | BH2-17, SS1 | 0.4-0.6 | metals, BTEX, PAHs, PHCs |
| BH5/MW3 | BH5-17, SS1 | 0.09-0.69 | metals, VOCs, PAHs, PHCs, pH |
| BH6 | BH6-17, SS1 | 0.3-0.6 | metals, VOCs, PAHs, PHCs, pH |
| BH7 | BH7-17, SS1 | 0.06-0.66 | metals, VOCs, PAHs, PHCs |

Comparison of Analytical Results to O. Reg. 153/04 Criteria

As determined in Section 1.4 (Applicable Site Class), generic O. Reg. 153/04 Table 7 (residential/institutional land use, non-potable groundwater use, coarse 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 7 criteria (residential/institutional, coarse texture):

- BH2/MW2
 - Lead and various PAH parameters (Acenaphthylene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene)
- DUP (a duplicate sample of BH2-MW2)
 - Lead and various PAH parameters (Acenaphthylene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene)
- BH6
 - Various PAH parameters (Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene)

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, following the text of this report. 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, PHCs, BTEXs, and PAHs
- PCA#2 (off-Site, a former automotive service garage and service station with fuel in underground storage tanks)/APEC #2 (southeast portion of Site) | PHCs, metals, and VOCs
- PCA#3 (off-Site, a former asphalt and bitumen manufacturing site)/APEC #3 (northeast portion of Site) | metals, PHCs, and PAHs
- PCA#4 (off-Site, a former automotive service garage)/APEC #4 (northeast portion of Site) | PHCs, metals, and VOCs
- PCA#5 (off-Site, a former drycleaner)/APEC #5 (northwest portion of Site) | VOCs
- PCA#27 (on-Site, suspected heating oil storage tanks)/APEC#1 (central portion of Site) | PHCs and BTEXs

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 – Paracel #1735029 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) were considered to have the potential to be present in the groundwater at the Site as a result of PCA/APEC #s 1 to 4. Low concentrations of PHCs were detected only in the sample from BH2-17(SS1) near the unknown fill placement at concentrations which were in compliance with the Site criteria (O. Reg. 153/04 Table 7 residential land use). Dense Non Aqueous Phase Liquids (DNAPL) were considered to have the potential to be present in the groundwater at the Site as a result of PCA/APEC#5. Free product was not detected in the groundwater at the Site.

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, 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 um 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, PHCs, BTEXs, and PAHs
- PCA#2 (off-Site, a former automotive service garage and service station with fuel in underground storage tanks)/APEC #2 (southeast portion of Site) | PHCs, metals, and VOCs
- PCA#3 (off-Site, a former asphalt and bitumen manufacturing site)/APEC #3 (northeast portion of Site) | metals, PHCs, and PAHs



- PCA#4 (off-Site, a former automotive service garage)/APEC #4 (northeast portion of Site) | PHCs, metals, and VOCs
- PCA#5 (off-Site, a former drycleaner)/APEC #5 (northwest portion of Site) | VOCs
- PCA#27 (on-Site, suspected heating oil storage tanks)/APEC#1 (central portion of Site) | PHCs and BTEXs

Comparison of Analytical Results to O. Reg. 153/04 Criteria

As discussed in Section 1.4 (Applicable Site Class), generic O. Reg. 153/04 Table 7 (shallow soil, non-potable groundwater use, coarse soil texture) criteria is considered the applicable Site comparison.

Analytical testing of the groundwater samples indicated that all analysed groundwater sample results were in compliance with the O. Reg. 153/04 Table 7 criteria (shallow soil, non-potable water use, coarse texture).

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

There were detections of PHCs (F3 range) in the analyzed groundwater sample collected from BH5-17/MW3-17, which was reported at concentrations in compliance with the O. Reg. 153/04 Table 7 Site criteria. BTEX (ethylbenzene and xylenes) were detected in the duplicate sample "DUP" from BH5-17/MW3-17, at concentrations which were in compliance with the O. Reg. 153/04 Table 7 Site criteria.

The presence of VOC parameters, which would be indicative of the presence of DNAPL at the Site, were not detected in any of the groundwater samples.

The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

Therefore, the presence of Light (LNAPL) or Dense Non Aqueous Phase Liquids (DNAPL) are not suspected at the Site.

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 (sample DUP, a duplicate of sample BH2-17/MW2-17[SS1]) was submitted for laboratory analysis of metals, BTEX, PHCs, and PAHs. This duplicate analysis provides quality assurance and quality control of parameter sets analysed in the four 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 (DUP, a duplicate of MW3-17) was submitted for laboratory analysis of pH, metals, VOCs, PHCs, and PAHs. This duplicate provides quality assurance and quality control of parameter sets analysed in the four groundwater samples submitted as part of this assessment. The relative percent differences (RPDs) were less than 100 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.

Two trip blank samples (one for each day of groundwater sampling) were 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

Laboratory report 1735029 (soil sample BH2/MW2) and 1735030 (soil sample DUP, the duplicate sample of BH2/MW2) identified that 'Duplicate results exceeds RPD limits due to non-homogeneous matrix' for a number of the PAH compounds. Generally, fill material is highly heterogeneous; based on GHD's review of the samples BH2/MW2 and DUP, there is acceptable consistency between these analytical results.



Laboratory report 1735234 (soil sample BH6) identified 'Elevated detection limit due to dilution required because of high target analyte concentration' for the parameters Acenaphthylene and Methylnaphthalene. Given that the analytical results for this sample exceed the O. Reg. Table 7 criteria for various PAH parameters, this qualifies for Acenaphthylene and Methylnaphthalene are not considered to represent uncertainty in the laboratory results.

Laboratory report 1737017 (groundwater sample BH2/MW2) identified 'Elevated Reporting Limits due to limited sample volume' for the PAH compounds. Given that the analytical results for this sample were in compliance with the O. Reg. Table 7 criteria, this qualifier is not considered to represent uncertainty in the laboratory results.

Laboratory report 1744078 (soil samples BH5 and BH6) identified that samples were received past their holding times for pH. Given that it is not suspected that holding time would have significantly impacted the soil pH, which were both reported at relatively neutral pH, this qualifier is not considered to represent uncertainty in the laboratory results.

No analytical qualifiers were reported on laboratory report 1737231 (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 25 off-Site PCAs identified in the Study Area.

- PCA#1 (Item 30: Importation of Fill Material of Unknown Quality) | On-Site, importation of Fill materials was identified at various locations on the Property interior.
- PCA#2 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage and service station with USTs historically operated at 414 Booth Street, approximately 6 m east of the Site.
- PCA#3 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former paving company historically operated at 394 Booth Street, approximately 25 m northeast of the Site.
- PCA#4 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 388 Booth Street, approximately 40 m northeast of the Site.



- PCA#5 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 263 Rochester Street, approximately 20 m north of the Site.
- PCA#6 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 204 Rochester Street, approximately 180 m northwest of the Site.
- PCA#7 (Item 37: Operation of Dry Cleaning Equipment [where chemicals are used]) | Off-Site, a former dry cleaners historically operated at 201 Rochester Street, approximately 180 m north of the Site.
- PCA#8 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former gasoline service station with USTs, and currently an automotive service garage operates at 779 Gladstone Avenue, approximately 200 m east of the Site.
- PCA#9 (Item 10: Commercial Autobody Shops) | Off-Site, a former commercial autobody shop historically operated at 773 Gladstone Avenue, approximately 215 m east of the Site.
- PCA#10 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks, Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former gasoline service station with USTs, and currently an automotive service garage operates at 241 Preston Street, approximately 165 m east of the Site.
- PCA#11 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former gasoline service station with USTs, and a former heating oil supplier historically operated at 215 Preston Street, approximately 180 m west of the Site.
- PCA#12 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 225 Preston Street, approximately 175 m west of the Site.
- PCA#13 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, an automotive service garage currently operates at 54 Louisa Street, approximately 145 m southeast of the Site.
- PCA#14 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, an automotive service garage currently operates at 66 Lebreton Street, approximately 245 m northeast of the Site.
- PCA#15 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former transportation company with automotive service historically operated at 93 Lebreton Street, approximately 230 m northeast of the Site.
- PCA#16 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former Ambulance Service garage historically operated at 71 Lebreton Street, approximately 250 m northeast of the Site.
- PCA#17 (Item 10: Commercial Autobody Shops) | Off-Site, a commercial autobody shop currently operates at 167 Lebreton Street, approximately 110 m east of the Site.



- PCA#18 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a former heating oil supplier historically operated at 174 Lebreton Street, approximately 160 m east of the Site.
- PCA#19 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage historically operated at 436 Arlington Avenue, approximately 180 m southeast of the Site.
- PCA#20 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former automotive service garage and former commercial autobody shop historically operated at 347 Booth Street, approximately 200 m northeast of the Site.
- PCA#21 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 20 Willow Street, approximately 200 m northeast of the Site.
- PCA#22 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 457 Booth Street, approximately 135 m southeast of the Site.
- PCA#23 (Item 8: Chemical Manufacturing, Processing and Bulk Storage) | Off-Site, chemical manufacturing, processing, and bulk storage was reported at 300 Rochester Street, approximately 45 m southwest of the Site.
- PCA#24 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-Site, a former vehicle repair historically operated at 23 Poplar Street, approximately 185 m north of the Site.
- PCA#25 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site, a heating oil spill (suggesting petroleum storage in fixed tanks) was reported at 112 Lebreton Street, approximately 160 m northeast of the Site.
- PCA#26 (Item 53: Tannery) | Off-Site, a former tannery historically operated at 187 Preston Street, approximately 235 m northwest of the Site.
- PCA#27 (on-Site, suspected heating oil storage tanks)/APEC#1 (central portion of Site) | PHCs and BTEXs

Areas of Potential Environmental Concern (APECs)

The potentially contaminating activities considered to represent areas of potential environmental concern for the Site are:

- APEC#1 | On-Site, importation of Fill materials was identified at various locations at the Site and suspected presence of heating oil storage tanks at the Site.
- APEC#2 | Off-Site, a former automotive service garage and service station with USTs historically operated at 414 Booth Street, approximately 6 m east of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.



- APEC#3 | Off-Site, a former paving company historically operated at 394 Booth Street, approximately 25 m northeast of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.
- APEC#4 | Off-Site, a former automotive service garage historically operated at 388 Booth Street, approximately 40 m northeast of the Site. This historical activity has the potential to have impacted soil and groundwater at the Site.
- APEC#5 | Off-Site, a former dry cleaners historically operated at 263 Rochester Street, approximately 20 m north of the Site. This historical activity has the potential to have impacted soil and groundwater at 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, off-Site automotive service garages and retail fuel outlets, an off-Site paving company and an off-Site dry cleaner:

1. Petroleum Hydrocarbons ranges F1-F4 (PHCs) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEXs)
2. Volatile Organic Compounds (VOCs)
3. Metals
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 dependant 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 Booth Street. Natural gas is supplied to the Site buildings from underground service trenches leading from Gladstone Avenue to the south of the Site, and Balsam Street to the north of the Site. These service trenches are considered to have the potential to act as conduits for contaminant migration.

Based on geological mapping of the region and the Ontario Water Well Information System, the natural soil conditions in the region appear to consist of "pre-Champlain Sea deposits consisting of glacial deposits of till; heterogeneous mixture of material ranging from clay to large boulders, generally sandy, grades downwards into unmodified till; surface is generally modified by wave or river action and the topography is flat to hummocky". The thickness of overburden is expected to be approximately 1 m and the bedrock in the general area of the Site is expected to be limestone.



Physical Setting - Stratigraphy

As presented in the Borehole Logs in Appendix C, the investigation identified six materials within the depth investigated, namely:

- Asphalt
- Grass vegetation and Topsoil
- Fill (Gravelly Sand) or (Sand and Gravel) or (Silty Sand)
- Native Till (Silty Sand) or (Sand and Gravel)
- Concrete
- 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 west-northwest. 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 0.04 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 all advanced boreholes at the Site, generally at depths ranging between 0.5 and 1.1 mBG. Bedrock was observed at approximately 2.6 mBG, below a layer of concrete in the southwest portion of the Site; it is suspected that deeper bedrock in this area of the Site is part of a former foundation system. In general, the upper surface (top 0.5-1.5 m) of the bedrock was revealed to be poor to fair quality, improving to good to excellent rock quality with increasing depth.

Physical Setting – Groundwater Table

The static groundwater table in the shallow bedrock wells installed by GHD, considered to be representative of the unconfined (upper) aquifer, was measured at depths ranging from approximately 1.8 to 2.7 mBG on September 8, 2017. Groundwater flow direction was interpreted to be towards the west-northwest with a calculated hydraulic gradient of 0.04 m/m, based on measured relative groundwater elevations.

The existing deeper bedrock well installed by others at the northwest corner of the Site (identified as MW4 in this report) was measured at the same time at a depth of approximately 14.5 mBG; this water level suggests that the screen for MW4 is located within a (semi) confined aquifer.

The water table details are summarized in Table 5.2 (Water Table Elevations). 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. The nearest area designated by the municipality in its current official plan (Bylaw 2008-250 – Zoning) as 'EP' (Environmentally Protected zoning) is located approximately 1.4 kilometres (km) south of the Site, on the west of Dows Lake. Under O. Reg. 153/04, a municipal EP zone is classified as an "area of natural significance". 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) hence the generic criteria of Table 1 of O. Reg. 153 (Sensitive Site) would not be considered applicable.

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 km to the North of the Site. The manmade Dows Lake is located approximately 1 km south 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 includes 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 generic criteria of Tables 8 and 9 of O. Reg. 153/04 (Surface Water) would not be considered applicable.

Drilling conducted as part of this investigation revealed that there is less than 2 m of overburden soil in seven of the eight boreholes advanced on the Site. As less than 2/3 of the Site consists of soil (excluding any non-soil surface treatment such as asphalt, concrete or aggregate) less than 2 m in depth, the Property is considered a Shallow Soil site (O. Reg. 153/04, s43.1[3]). The generic criteria of Tables 6 and 7 of O. Reg. 153/04 (Shallow Soil) are 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 residential. The proposed property use will remain 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 generic non-potable shallow soil residential land use (O. Reg. 153/04, Table 7).

Physical Setting – Fill

A layer fill material was found in all boreholes advanced at the Site. No petroleum odours or visible evidence of staining were noted within any of the fill materials.



- Gravelly Sand was encountered underlying the asphalt pavement in BH1-17, BH2-17, BH3-17, BH4-17. This material was described as grey, dense to loose, and damp. This material was found to be 0.3 meters in thickness.
- Sand and gravel fill, or sand with some gravel, was identified in BH5-17, BH7-17, and BH8-17. This material was described as brown, loose, and damp to moist. This layer was generally found to be 0.6 meters in thickness. This same type of fill was encountered with an approximate thickness of 2.1 m in BH8-17; it was suspected that fill was used to backfill a former foundation in this area of the Site. Silty sand fill was encountered in BH6-17. The material was described as containing trace organics, dark brown, loose, and moist. This material was found to be 0.9 m thickness. A layer of concrete 0.3 m thick was encountered resting directly on the bedrock in BH8-17 extending from 2.3 to 2.6 mBG, near the southwest corner of the Property. It is suspected that this concrete is the remnants of a former building foundation.

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 and demolition of the foundations and/or basements of both the existing and previously demolished on-Site buildings 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 multi-unit residential.
- The north, west, and south portions of the Site are developed with three multi-unit residential buildings, respectively addressed as:
 - 22 through 34 (even) Balsam Avenue on the north portion of the Site
 - 38, 40 Balsam Avenue and 275 through 285 (odd) Rochester Street on the west portion of the Site
 - 289 Rochester Street and 811 through 829 Gladstone Avenue on the south portion of the Site
- The central portion of the Site is surfaced with an asphalt paved parking area that is accessed from Balsam Avenue to the north.
- The east portion of the Site, extending to east limit of the Site, is landscaped and contains a children's play-structure for the tenants.

GHD understands that the Client intends to demolish the existing buildings at the Site and construct a single six-storey residential building without a basement and with associated parking areas and access roads. The Property is currently used for residential purposes and therefore will not require a Record of Site Condition (RSC), required for a change in land use to more sensitive land uses.



Contamination

Soil samples were collected from the boreholes advanced on August 25 and August 29, 2017 and were analysed for a combination of PHCs, BTEXs, VOCs, PAHs, metals and pH.

Three soil samples BH2/MW2 and DUP (a duplicate sample of BH2-MW2) (0.4-0.6 mBG) and BH6 (0.3-0.6 mBG) presented O. Reg. 153/04 Table 7 exceedances of the lead and various Polycyclic Aromatic Hydrocarbons (PAHs) (specifically Acenaphthylene, Anthracene, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenzo[a,h]anthracene, Fluoranthene, Indeno[1,2,3-cd]pyrene, and Phenanthrene). The samples were collected from fill material on the north portion of 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. Based on the period for first development (late 1800s) and redevelopment (1960s) of the Site, it is suspected that there may be additional contaminated soil present in other localised areas of the Site.

A remedial action plan and soil management program will be developed for the Client in order to manage and dispose of the contaminated soil at the time of redevelopment.

Groundwater was sampled and analysed for PHCs, VOCs (including BTEXs), PAHs, metals and pH on September 8 and September 12, 2017. All of analysed groundwater sample results were in compliance with the O. Reg. 153/04 Table 7 criteria.

6. Conclusions

Soil samples were collected from the boreholes advanced on August 25 and August 29, 2017 and were analysed for a combination of PHCs, BTEXs, VOCs, PAHs, metals and pH.

Three soil samples BH2/MW2 and DUP (a duplicate sample of BH2-MW2) (0.4-0.6 mBG) and BH6 (0.3-0.6 mBG) presented O. Reg. 153/04 Table 7 exceedances of the lead and various Polycyclic Aromatic Hydrocarbons (PAHs) (specifically Acenaphthylene, Anthracene, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenzo[a,h]anthracene, Fluoranthene, Indeno[1,2,3-cd]pyrene, and Phenanthrene). The samples were collected from fill material on the north portion of 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. Based on the period for first development (late 1800s) and redevelopment (1960s) of the Site, it is suspected that there may be additional contaminated soil present in other localised areas of the Site.

A remedial action plan and soil management program will be developed for the Client in order to manage and dispose of the contaminated soil at the time of redevelopment.

Groundwater was sampled and analysed for PHCs, VOCs (including BTEXs), PAHs, metals and pH on September 8 and September 12, 2017. All of analysed groundwater sample results were in compliance with the O. Reg. 153/04 Table 7 criteria.



Site Compliance

There were O. Reg. 153/04 Table 7 (residential land use, coarse soil texture) criteria exceedances in two of the four submitted soil samples, plus the duplicate QA/QC soil sample.

There were no O. Reg. 153/03 Table 7 exceedances in the analysed groundwater samples.

It should also be noted, given the period of initial development (1880s) and redevelopment (1960s) of the Site, that there may have been additional heating oil storage tanks, either ASTs or USTs, present at the Site as part of historical heating systems. No documentation or physical evidence of additional ASTs or USTs was discovered as part of the Phase One ESA or Phase Two ESA, however, there is the potential that USTs remain at the Site and/or have associated isolated pockets of contaminated soil and/or groundwater. It is expected that this unknown will be further addressed at the time of construction for subsequent redevelopment of the Site.

The Site is not considered to be in compliance with the O. Reg. 153/04 criteria for the existing and proposed land use and requires soil remediation/removal or a risk assessment.



7. References

Ontario Regulation 153/04

Phase One Environmental Site Assessment, 811 Gladstone Avenue, Ottawa, Ontario. Reference No. 11140575-E1 (2), prepared by GHD Ltd., dated August 25, 2017

Certificate of Analysis – Paracel #1735029 – Soil and TCLP– September 1, 2017

Certificate of Analysis – Paracel #1735030 – Soil – August 31, 2017

Certificate of Analysis – Paracel #1735234 – Soil – August 29, 2017

Certificate of Analysis – Paracel #1737017 – Groundwater – September 14, 2017

Certificate of Analysis – Paracel #1737231 – Groundwater – September 18, 2017



All of Which is Respectfully Submitted,

GHD

A handwritten signature in blue ink, appearing to read 'Luke Lopers'.

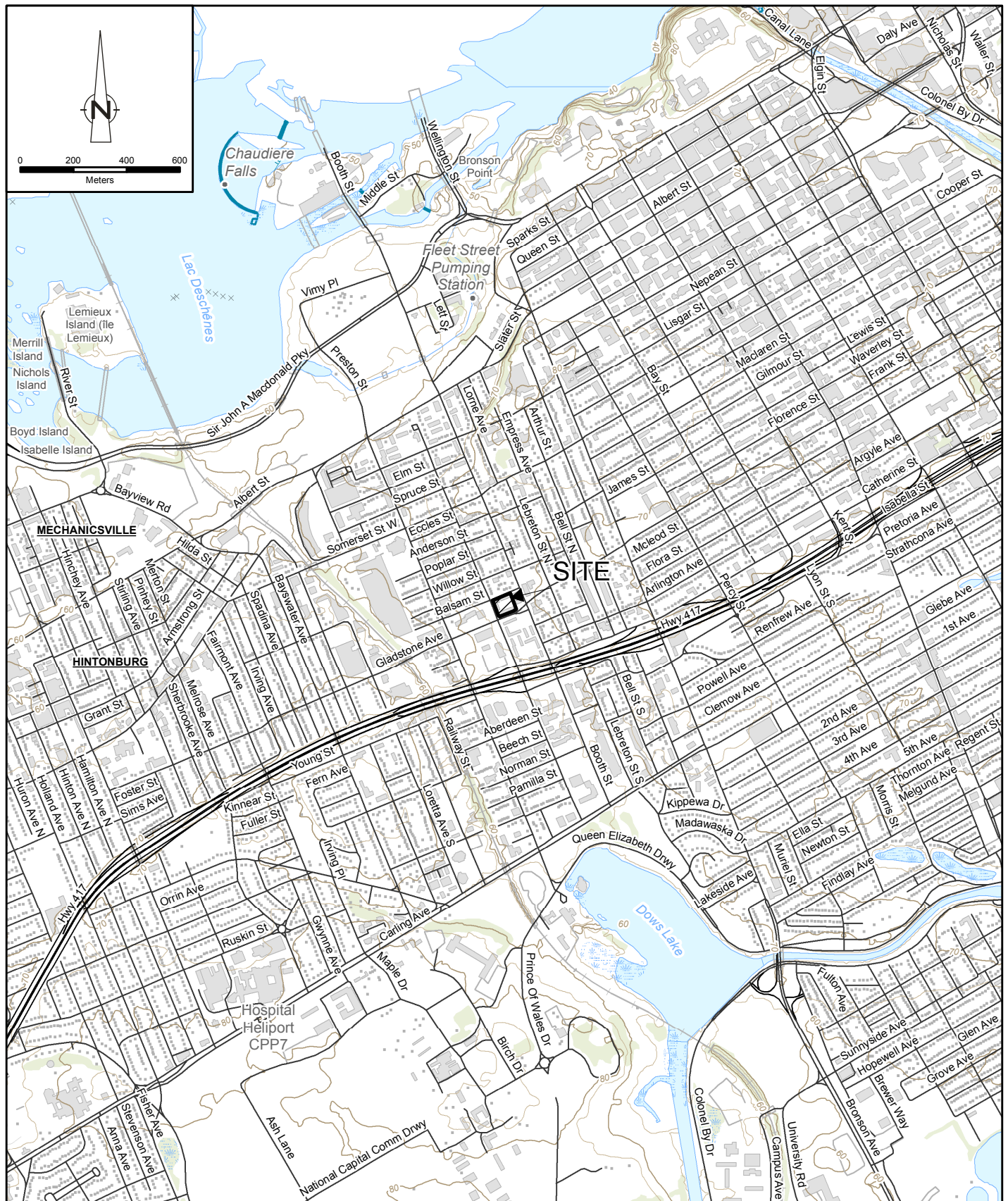
Luke Lopers, P. Eng.



A handwritten signature in blue ink, appearing to read 'Joseph B. Bennett'.

Joseph B. Bennett, 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.



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017
 Coordinate System: NAD 1983 UTM Zone 18N



OTTAWA COMMUNITY HOUSING
 811 GLADSTONE AVENUE COMPLEX, OTTAWA, ON
 PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

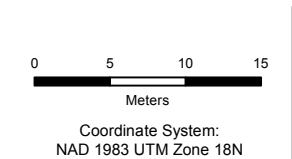
11140575-E2
 Oct 25, 2017

SITE LOCATION MAP

FIGURE 1



Source: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, July 2013



OTTAWA COMMUNITY HOUSING
811 GLADSTONE AVENUE COMPLEX, OTTAWA, ON
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

BOREHOLE LOCATION PLAN

11140575-E2
Oct 25, 2017

FIGURE 2

DNAPL / LNAPL Layers
Phase Two Environmental Site Assessment
811 Gladstone Avenue Complex
Ottawa Ontario

| WELL ID | Grade Elevation (m) | TOP Elevation (m) | Bottom Depth (mBG) | 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) |
|-----------------|---------------------|-------------------|--------------------|----------------------|---|--|------------------------|------------------------|
| BH1-17 / MW1-17 | 101.28 | 101.23 | 6.05 | 95.23 | 1.84 | 99.44 | 0.00 | 0.00 |
| BH2-17 / MW2-17 | 101.50 | 101.45 | 6.13 | 95.38 | 2.74 | 98.76 | 0.00 | 0.00 |
| BH5-17 / MW3-17 | 102.39 | 102.34 | 5.88 | 96.52 | 2.17 | 100.22 | 0.00 | 0.00 |
| MW4 | 101.49 | 101.44 | 15.48 | 86.01 | 14.49 | 87.00 | 0.00 | 0.00 |

Elevation relative to Site BM=100.00 m, assigned to Top of Spindle of Hydrant FM175067M

Summary of Soil Analysis
Phase Two Environmental Site Assessment
811 Gladstone Avenue Complex
Ottawa, Ontario

| | | | O.Reg.153/04 Table 1 | O.Reg.153/04 Table 7 | BH2 / MW2 | DUP (BH2/MW2) | BH5 / MW3 | BH6 | BH7 |
|------------------------------------|--|------|-------------------------|---|------------------------------|------------------------------|------------|-------------|------------|
| | | | Background | non-potable, shallow soil (coarse texture) | 0.4-0.6mBG | 0.4-0.4mBG | 0.1-0.7mBG | 0.3-0.6 mBG | 0.1-0.7mBG |
| Parameter | Units | MDL | non-agricultural | residential/ parkland/ institutional | native clayey sand (till) | native clayey sand (till) | fill | fill | fill |
| Metals | | | | | | | | | |
| Antimony | ug/g dry | 1.0 | 1.3 ug/g dry | 7.5 ug/g dry | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Arsenic | ug/g dry | 1.0 | 18 ug/g dry | 18 ug/g dry | 8.0 | 7.5 | ND (1.0) | ND (1.0) | ND (1.0) |
| Barium | ug/g dry | 1.0 | 220 ug/g dry | 390 ug/g dry | 296 | 235 | 94.9 | 85.2 | 31.9 |
| Beryllium | ug/g dry | 1.0 | 2.5 ug/g dry | 4 ug/g dry | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Boron | ug/g dry | 1.0 | 36 ug/g dry | 120 ug/g dry | 8.3 | 7.5 | 6.3 | 6.0 | 2.8 |
| Cadmium | ug/g dry | 0.5 | 1.2 ug/g dry | 1.2 ug/g dry | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Chromium | ug/g dry | 1.0 | 70 ug/g dry | 160 ug/g dry | 32.7 | 24.7 | 21.1 | 14.4 | 13.1 |
| Cobalt | ug/g dry | 1.0 | 21 ug/g dry | 22 ug/g dry | 8.5 | 7.7 | 6.0 | 3.4 | 2.4 |
| Copper | ug/g dry | 1.0 | 92 ug/g dry | 140 ug/g dry | 54.1 | 39.8 | 15.4 | 25.4 | 6.5 |
| Lead | ug/g dry | 1.0 | 120 ug/g dry | 120 ug/g dry | 486 | 363 | 42.9 | 58.2 | 42.4 |
| Molybdenum | ug/g dry | 1.0 | 2 ug/g dry | 6.9 ug/g dry | 1.2 | 1.6 | ND (1.0) | ND (1.0) | ND (1.0) |
| Nickel | ug/g dry | 1.0 | 82 ug/g dry | 100 ug/g dry | 17.5 | 15.7 | 13.4 | 9.0 | 6.0 |
| Selenium | ug/g dry | 1.0 | 1.5 ug/g dry | 2.4 ug/g dry | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Silver | ug/g dry | 0.5 | 0.5 ug/g dry | 20 ug/g dry | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Thallium | ug/g dry | 1.0 | 1 ug/g dry | 1 ug/g dry | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Uranium | ug/g dry | 1.0 | 2.5 ug/g dry | 23 ug/g dry | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Vanadium | ug/g dry | 1.0 | 86 ug/g dry | 86 ug/g dry | 32.3 | 29.3 | 28.0 | 20.0 | 18.4 |
| Zinc | ug/g dry | 1.0 | 290 ug/g dry | 340 ug/g dry | 216 | 152 | 59.0 | 265 | 32.3 |
| Volatiles | | | | | | | | | |
| Acetone | ug/g dry | 0.50 | 0.5 ug/g dry | 16 ug/g dry | ND (0.50) | N/A | ND (0.50) | ND (0.50) | ND (0.50) |
| Benzene | ug/g dry | 0.02 | 0.02 ug/g dry | 0.21 ug/g dry | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) |
| Bromodichloromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 13 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Bromoform | ug/g dry | 0.05 | 0.05 ug/g dry | 0.27 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Bromomethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Carbon Tetrachloride | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Chlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 2.4 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Chloroform | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Dibromochloromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 9.4 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Dichlorodifluoromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 16 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 3.4 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,3-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 4.8 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,4-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.083 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1-Dichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 3.5 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| cis-1,2-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 3.4 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| trans-1,2-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.084 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichloropropane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| cis-1,3-Dichloropropylene | ug/g dry | 0.05 | | | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| trans-1,3-Dichloropropylene | ug/g dry | 0.05 | | | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,3-Dichloropropene, total | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Ethylbenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 2 ug/g dry | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Ethylene dibromide (dibromoethane) | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Hexane | ug/g dry | 0.05 | 0.05 ug/g dry | 2.8 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Methyl Ethyl Ketone (2-Butanone) | ug/g dry | 0.50 | 0.5 ug/g dry | 16 ug/g dry | ND (0.50) | N/A | ND (0.50) | ND (0.50) | ND (0.50) |
| Methyl Isobutyl Ketone | ug/g dry | 0.50 | 0.5 ug/g dry | 1.7 ug/g dry | ND (0.50) | N/A | ND (0.50) | ND (0.50) | ND (0.50) |
| Methyl tert-butyl ether | ug/g dry | 0.05 | 0.05 ug/g dry | 0.75 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Methylene Chloride | ug/g dry | 0.05 | 0.05 ug/g dry | 0.1 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Styrene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.7 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,1,2-Tetrachloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.058 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,2,2-Tetrachloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Tetrachloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.28 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Toluene | ug/g dry | 0.05 | 0.2 ug/g dry | 2.3 ug/g dry | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,1-Trichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.38 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,2-Trichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Trichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.061 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Trichlorofluoromethane | ug/g dry | 0.05 | 0.25 ug/g dry | 4 ug/g dry | ND (0.05) | N/A | ND (0.05) | ND (0.05) | ND (0.05) |
| Vinyl Chloride | ug/g dry | 0.02 | 0.02 ug/g dry | 0.02 ug/g dry | ND (0.02) | N/A | ND (0.02) | ND (0.02) | ND (0.02) |
| m/p-Xylene | ug/g dry | 0.05 | | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| o-Xylene | ug/g dry | 0.05 | | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Xylenes, total | ug/g dry | 0.05 | 0.05 ug/g dry | 3.1 ug/g dry | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ug/g dry | 7 | 25 ug/g dry | 55 ug/g dry | ND (7) | ND (7) | ND (7) | ND (7) | ND (7) |
| F2 PHCs (C10-C16) | ug/g dry | 4 | 10 ug/g dry | 98 ug/g dry | ND (4) | ND (4) | ND (4) | ND (4) | ND (4) |
| F3 PHCs (C16-C34) | ug/g dry | 8 | 240 ug/g dry | 300 ug/g dry | 109 | 56 | ND (8) | ND (8) | ND (8) |
| F4 PHCs (C34-C50) | ug/g dry | 6 | 120 ug/g dry | 2800 ug/g dry | 148 | 174 | ND (6) | ND (6) | ND (6) |
| F4G PHCs (gravimetric) | ug/g dry | 50 | 120 ug/g dry | 2800 ug/g dry | NA | 882 | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ug/g dry | 0.02 | 0.072 ug/g dry | 7.9 ug/g dry | 0.17 | 0.17 | 0.03 | 2.83 | ND (0.02) |
| Acenaphthylene | ug/g dry | 0.02 | 0.093 ug/g dry | 0.15 ug/g dry | 0.24 | 0.35 | ND (0.02) | ND (0.40) | ND (0.02) |
| Anthracene | ug/g dry | 0.02 | 0.16 ug/g dry | 0.67 ug/g dry | 0.55 | 0.64 | 0.06 | 5.61 | 0.04 |
| Benzo[a]anthracene | ug/g dry | 0.02 | 0.36 ug/g dry | 0.5 ug/g dry | 1.12 | 1.31 | 0.18 | 6.34 | 0.11 |
| Benzo[a]pyrene | ug/g dry | 0.02 | 0.3 ug/g dry | 0.3 ug/g dry | 1.19 | 1.43 | 0.22 | 4.91 | 0.15 |
| Benzo[b]fluoranthene | ug/g dry | 0.02 | 0.47 ug/g dry | 0.78 ug/g dry | 1.28 | 1.40 | 0.25 | 5.30 | 0.16 |
| Benzo[g,h,i]perylene | ug/g dry | 0.02 | 0.68 ug/g dry | 6.6 ug/g dry | 0.68 | 0.89 | 0.17 | 2.85 | 0.12 |
| Benzo[k]fluoranthene | ug/g dry | 0.02 | 0.48 ug/g dry | 0.78 ug/g dry | 0.74 | 0.83 | 0.14 | 3.06 | 0.09 |
| Chrysene | ug/g dry | 0.02 | 2.8 ug/g dry | 7 ug/g dry | 1.13 | 1.32 | 0.23 | 7.03 | 0.13 |
| Dibenzo[a,h]anthracene | ug/g dry | 0.02 | 0.1 ug/g dry | 0.1 ug/g dry | 0.20 | 0.26 | 0.04 | 0.93 | 0.03 |
| Fluoranthene | ug/g dry | 0.02 | 0.56 ug/g dry | 0.69 ug/g dry | 2.72 | 2.83 | 0.50 | 17.4 | 0.28 |
| Fluorene | ug/g dry | 0.02 | 0.12 ug/g dry | 62 ug/g dry | 0.20 | 0.20 | 0.02 | 3.04 | ND (0.02) |
| Indeno[1,2,3-cd]pyrene | ug/g dry | 0.02 | 0.23 ug/g dry | 0.38 ug/g dry | 0.67 | 0.84 | 0.15 | 2.92 | 0.10 |
| 1-Methylnaphthalene | ug/g dry | 0.02 | 0.59 ug/g dry | 0.99 ug/g dry | 0.06 | 0.04 | ND (0.02) | ND (0.40) | ND (0.02) |
| 2-Methylnaphthalene | ug/g dry | 0.02 | 0.59 ug/g dry | 0.99 ug/g dry | 0.07 | 0.05 | ND (0.02) | ND (0.40) | ND (0.02) |
| Methylnaphthalene (1&2) | ug/g dry | 0.04 | 0.59 ug/g dry | 0.99 ug/g dry | 0.13 | 0.10 | ND (0.04) | ND (0.80) | ND (0.04) |
| Naphthalene | ug/g dry | 0.01 | 0.09 ug/g dry | 0.6 ug/g dry | 0.17 | 0.13 | ND (0.01) | 0.57 | ND (0.01) |
| Phenanthrene | ug/g dry | 0.02 | 0.69 ug/g dry | 6.2 ug/g dry | 2.02 | 1.94 | 0.28 | 23.2 | 0.16 |
| Pyrene | ug/g dry | 0.02 | 1 ug/g dry | 78 ug/g dry | 2.30 | 2.49 | 0.41 | 13.7 | 0.24 |
| Lab ID | | | | | 1735029-01 | 1735030-01 | 1735234-01 | 1735234-02 | 1735234-03 |
| Sample Date | | | | | 25-Aug-17 | 25-Aug-17 | 29-Aug-17 | 29-Aug-17 | 29-Aug-17 |
| 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 7 (non-potable, shallow soil, residential land use, coarse grained soil) criteria | | | | | | | | |
| ND | - concentration not detected above Method Detection Limit | | | | | | | | |
| N/A | - Parameter not Analysed by laboratory | | | | | | | | |

Summary of Groundwater Analysis
Phase Two Environmental Site Assessment
811 Gladstone Avenue Complex
Ottawa, Ontario

| Parameter | Units | MDL | O.Reg.153/04 Table 1 background | O.Reg.153/04 Table 7 shallow soil, nonpotable | BH1 / MW1 | BH2 / MW2 | BH5 / MW3 | DUP | TRIP BLANK | MW4 | TRIP BLANK |
|-------------------------------------|----------|------|---------------------------------------|--|------------|------------|------------|------------|------------|------------|------------|
| General Inorganics | | | | | | | | | | | |
| pH | pH Units | 0.1 | | | 8.0 | 8.3 | 7.3 | 7.3 | N/A | N/A | N/A |
| Metals | | | | | | | | | | | |
| Antimony | ug/L | 0.5 | 1.5 ug/L | 16000 ug/L | ND (0.5) | ND (0.5) | 0.7 | 0.7 | N/A | N/A | N/A |
| Arsenic | ug/L | 1 | 13 ug/L | 1500 ug/L | ND (1) | 2 | ND (1) | ND (1) | N/A | N/A | N/A |
| Barium | ug/L | 1 | 610 ug/L | 23000 ug/L | 65 | 43 | 75 | 71 | N/A | N/A | N/A |
| Beryllium | ug/L | 0.5 | 0.5 ug/L | 53 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | N/A | N/A | N/A |
| Boron | ug/L | 10 | 1700 ug/L | 36000 ug/L | 394 | 454 | 117 | 97 | N/A | N/A | N/A |
| Cadmium | ug/L | 0.1 | 0.5 ug/L | 2.1 ug/L | ND (0.1) | ND (0.1) | ND (0.1) | ND (0.1) | N/A | N/A | N/A |
| Chromium | ug/L | 1 | 11 ug/L | 640 ug/L | ND (1) | ND (1) | ND (1) | ND (1) | N/A | N/A | N/A |
| Cobalt | ug/L | 0.5 | 3.8 ug/L | 52 ug/L | ND (0.5) | ND (0.5) | 0.6 | ND (0.5) | N/A | N/A | N/A |
| Copper | ug/L | 0.5 | 5 ug/L | 69 ug/L | 1.5 | 2.7 | 2.3 | 5.8 | N/A | N/A | N/A |
| Lead | ug/L | 0.1 | 1.9 ug/L | 20 ug/L | 0.3 | 0.1 | ND (0.1) | ND (0.1) | N/A | N/A | N/A |
| Molybdenum | ug/L | 0.5 | 23 ug/L | 7300 ug/L | 4.9 | 39.9 | 3.9 | 1.5 | N/A | N/A | N/A |
| Nickel | ug/L | 1 | 14 ug/L | 390 ug/L | ND (1) | 2 | 2 | 2 | N/A | N/A | N/A |
| Selenium | ug/L | 1 | 5 ug/L | 50 ug/L | ND (1) | ND (1) | ND (1) | ND (1) | N/A | N/A | N/A |
| Silver | ug/L | 0.1 | 0.3 ug/L | 1.2 ug/L | ND (0.1) | ND (0.1) | ND (0.1) | ND (0.1) | N/A | N/A | N/A |
| Sodium | ug/L | 200 | 490000 ug/L | 1800000 ug/L | 32900 | 25700 | 87200 | 50000 | N/A | N/A | N/A |
| Thallium | ug/L | 0.1 | 0.5 ug/L | 400 ug/L | ND (0.1) | ND (0.1) | ND (0.1) | ND (0.1) | N/A | N/A | N/A |
| Uranium | ug/L | 0.1 | 8.9 ug/L | 330 ug/L | 1.8 | 1.9 | 1.0 | 0.7 | N/A | N/A | N/A |
| Vanadium | ug/L | 0.5 | 3.9 ug/L | 200 ug/L | ND (0.5) | 0.6 | ND (0.5) | ND (0.5) | N/A | N/A | N/A |
| Zinc | ug/L | 5 | 160 ug/L | 890 ug/L | ND (5) | ND (5) | 16 | 6 | N/A | N/A | N/A |
| Volatiles | | | | | | | | | | | |
| Acetone | ug/L | 5.0 | 2700 ug/L | 100000 ug/L | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Benzene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Bromodichloromethane | ug/L | 0.5 | 2 ug/L | 67000 ug/L | ND (0.5) | ND (0.5) | 2.9 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Bromoforn | ug/L | 0.5 | 5 ug/L | 5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Bromomethane | ug/L | 0.5 | 0.89 ug/L | 0.89 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Carbon Tetrachloride | ug/L | 0.2 | 0.2 ug/L | 0.2 ug/L | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) |
| Chlorobenzene | ug/L | 0.5 | 0.5 ug/L | 140 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Chloroform | ug/L | 0.5 | 2 ug/L | 2 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Dibromochloromethane | ug/L | 0.5 | 2 ug/L | 65000 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Dichlorodifluoromethane | ug/L | 1.0 | 590 ug/L | 3500 ug/L | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| 1,2-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 150 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,3-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 7600 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,4-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethane | ug/L | 0.5 | 0.5 ug/L | 11 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,2-Dichloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| cis-1,2-Dichloroethylene | ug/L | 0.5 | 1.6 ug/L | 1.6 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| trans-1,2-Dichloroethylene | ug/L | 0.5 | 1.6 ug/L | 1.6 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,2-Dichloropropane | ug/L | 0.5 | 0.5 ug/L | 0.58 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| cis-1,3-Dichloropropylene | ug/L | 0.5 | | | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| trans-1,3-Dichloropropylene | ug/L | 0.5 | | | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,3-Dichloropropene, total | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Ethylbenzene | ug/L | 0.5 | 0.5 ug/L | 54 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | 3.5 | ND (0.5) | ND (0.5) | ND (0.5) |
| Ethylene dibromide (dibromomethane) | ug/L | 0.2 | 0.2 ug/L | 0.2 ug/L | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) |
| Hexane | ug/L | 1.0 | 5 ug/L | 5 ug/L | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Methyl Ethyl Ketone (2-Butanone) | ug/L | 5.0 | 400 ug/L | 21000 ug/L | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Methyl Isobutyl Ketone | ug/L | 5.0 | 640 ug/L | 5200 ug/L | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Methyl tert-butyl ether | ug/L | 2.0 | 15 ug/L | 15 ug/L | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) |
| Methylene Chloride | ug/L | 5.0 | 5 ug/L | 26 ug/L | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Styrene | ug/L | 0.5 | 0.5 ug/L | 43 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,1,2-Tetrachloroethane | ug/L | 0.5 | 1.1 ug/L | 1.1 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,2,2-Tetrachloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Tetrachloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Toluene | ug/L | 0.5 | 0.8 ug/L | 320 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,1-Trichloroethane | ug/L | 0.5 | 0.5 ug/L | 23 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,2-Trichloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Trichloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Trichlorofluoromethane | ug/L | 1.0 | 150 ug/L | 2000 ug/L | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Vinyl Chloride | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| m/p-Xylene | ug/L | 0.5 | | | ND (0.5) | ND (0.5) | ND (0.5) | 13.6 | ND (0.5) | ND (0.5) | ND (0.5) |
| o-Xylene | ug/L | 0.5 | | | ND (0.5) | ND (0.5) | ND (0.5) | 3.5 | ND (0.5) | ND (0.5) | ND (0.5) |
| Xylenes, total | ug/L | 0.5 | 72 ug/L | 72 ug/L | ND (0.5) | ND (0.5) | ND (0.5) | 17.1 | ND (0.5) | ND (0.5) | ND (0.5) |
| Hydrocarbons | | | | | | | | | | | |
| F1 PHCs (C6-C10) | ug/L | 25 | 420 ug/L | 420 ug/L | ND (25) | ND (25) | ND (25) | ND (25) | N/A | N/A | N/A |
| F2 PHCs (C10-C16) | ug/L | 100 | 150 ug/L | 150 ug/L | ND (100) | ND (100) | ND (100) | ND (100) | N/A | N/A | N/A |
| F3 PHCs (C16-C34) | ug/L | 100 | 500 ug/L | 500 ug/L | ND (100) | ND (100) | 203 | ND (100) | N/A | N/A | N/A |
| F4 PHCs (C34-C50) | ug/L | 100 | 500 ug/L | 500 ug/L | ND (100) | ND (100) | ND (100) | ND (100) | N/A | N/A | N/A |
| Semi-Volatiles | | | | | | | | | | | |
| Acenaphthene | ug/L | 0.05 | 4.1 ug/L | 17 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Acenaphthylene | ug/L | 0.05 | 1 ug/L | 1 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Anthracene | ug/L | 0.01 | 0.1 ug/L | 1 ug/L | ND (0.01) | ND (0.02) | ND (0.01) | ND (0.01) | N/A | N/A | N/A |
| Benzo[a]anthracene | ug/L | 0.01 | 0.2 ug/L | 1.8 ug/L | ND (0.01) | ND (0.02) | ND (0.01) | ND (0.01) | N/A | N/A | N/A |
| Benzo[a]pyrene | ug/L | 0.01 | 0.01 ug/L | 0.81 ug/L | ND (0.01) | ND (0.02) | ND (0.01) | ND (0.01) | N/A | N/A | N/A |
| Benzo[b]fluoranthene | ug/L | 0.05 | 0.1 ug/L | 0.75 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Benzo[k]fluoranthene | ug/L | 0.05 | 0.2 ug/L | 0.2 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Benzo[e]pyrene | ug/L | 0.05 | 0.1 ug/L | 0.4 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Chrysene | ug/L | 0.05 | 0.1 ug/L | 0.7 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Dibenzo[a,h]anthracene | ug/L | 0.05 | 0.2 ug/L | 0.4 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Fluoranthene | ug/L | 0.01 | 0.4 ug/L | 44 ug/L | ND (0.01) | 0.12 | ND (0.01) | ND (0.01) | N/A | N/A | N/A |
| Fluorene | ug/L | 0.05 | 120 ug/L | 290 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Indeno[1,2,3-cd]pyrene | ug/L | 0.05 | 0.2 ug/L | 0.2 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| 1-Methylnaphthalene | ug/L | 0.05 | 2 ug/L | 1500 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| 2-Methylnaphthalene | ug/L | 0.05 | 2 ug/L | 1500 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Methylnaphthalene (1&2) | ug/L | 0.10 | 2 ug/L | 1500 ug/L | ND (0.10) | ND (0.20) | ND (0.10) | ND (0.10) | N/A | N/A | N/A |
| Naphthalene | ug/L | 0.05 | 7 ug/L | 7 ug/L | ND (0.05) | 0.16 | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Phenanthrene | ug/L | 0.05 | 0.1 ug/L | 380 ug/L | ND (0.05) | ND (0.10) | ND (0.05) | ND (0.05) | N/A | N/A | N/A |
| Pyrene | ug/L | 0.01 | 0.2 ug/L | 5.7 ug/L | ND (0.01) | 0.10 | ND (0.01) | ND (0.01) | N/A | N/A | N/A |
| Lab ID | | | | | 1737071-01 | 1737071-02 | 1737071-03 | 1737071-04 | 1737071-05 | 1737231-01 | 1737231-02 |
| Sample Date | | | | | 8-Sep-17 | 8-Sep-17 | 8-Sep-17 | 8-Sep-17 | 8-Sep-17 | 12-Sep-17 | 11-Sep-17 |
| Notes | | | | | | | | | | | |
| BOLD | | | | | | | | | | | |
| BOLD | | | | | | | | | | | |
| ND | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

- concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria

- concentration meets or exceeds O.Reg. 153/04 Table 7 (non-potable, shallow soil, any land use, coarse grained soil) criteria

- concentration not detected above Method Detection Limit

- Parameter not Analysed by laboratory

**Maximum Soil Parameter Concentrations
Phase Two Environmental Site Assessment
811 Gladstone Avenue Complex
Ottawa, Ontario**

| Parameter | Units | MDL | O.Reg.153/04 Table 1 Background non-agricultural | O.Reg.153/04 Table 7 non-potable, shallow soil (coarse texture) residential/ parkland/ institutional | Maximum Soil Concentration | sample location | sample depth (mBG) |
|------------------------------------|----------|------|--|---|----------------------------|---------------------------------|-----------------------|
| Metals | | | | | | | |
| Antimony | ug/g dry | 1.0 | 1.3 ug/g dry | 7.5 ug/g dry | ND | all | |
| Arsenic | ug/g dry | 1.0 | 18 ug/g dry | 18 ug/g dry | 8.0 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Barium | ug/g dry | 1.0 | 220 ug/g dry | 390 ug/g dry | 296 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Beryllium | ug/g dry | 1.0 | 2.5 ug/g dry | 4 ug/g dry | ND | all | |
| Boron | ug/g dry | 1.0 | 36 ug/g dry | 120 ug/g dry | 8.3 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Cadmium | ug/g dry | 0.5 | 1.2 ug/g dry | 1.2 ug/g dry | ND | all | |
| Chromium | ug/g dry | 1.0 | 70 ug/g dry | 160 ug/g dry | 32.7 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Cobalt | ug/g dry | 1.0 | 21 ug/g dry | 22 ug/g dry | 8.5 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Copper | ug/g dry | 1.0 | 92 ug/g dry | 140 ug/g dry | 54.1 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Lead | ug/g dry | 1.0 | 120 ug/g dry | 120 ug/g dry | 486 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Molybdenum | ug/g dry | 1.0 | 2 ug/g dry | 6.9 ug/g dry | 1.6 | DUP (duplicate of BH2/MW2(SS1)) | 0.4-0.6 mBG |
| Nickel | ug/g dry | 1.0 | 82 ug/g dry | 100 ug/g dry | 17.5 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Selenium | ug/g dry | 1.0 | 1.5 ug/g dry | 2.4 ug/g dry | ND | all | |
| Silver | ug/g dry | 0.5 | 0.5 ug/g dry | 20 ug/g dry | ND | all | |
| Thallium | ug/g dry | 1.0 | 1 ug/g dry | 1 ug/g dry | ND | all | |
| Uranium | ug/g dry | 1.0 | 2.5 ug/g dry | 23 ug/g dry | ND | all | |
| Vanadium | ug/g dry | 1.0 | 86 ug/g dry | 86 ug/g dry | 32.3 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Zinc | ug/g dry | 1.0 | 290 ug/g dry | 340 ug/g dry | 265 | BH6 | |
| Volatiles | | | | | | | |
| Acetone | ug/g dry | 0.50 | 0.5 ug/g dry | 16 ug/g dry | ND | all | |
| Benzene | ug/g dry | 0.02 | 0.02 ug/g dry | 0.21 ug/g dry | ND | all | |
| Bromodichloromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 13 ug/g dry | ND | all | |
| Bromoform | ug/g dry | 0.05 | 0.05 ug/g dry | 0.27 ug/g dry | ND | all | |
| Bromomethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Carbon Tetrachloride | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Chlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 2.4 ug/g dry | ND | all | |
| Chloroform | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Dibromochloromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 9.4 ug/g dry | ND | all | |
| Dichlorodifluoromethane | ug/g dry | 0.05 | 0.05 ug/g dry | 16 ug/g dry | ND | all | |
| 1,2-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 3.4 ug/g dry | ND | all | |
| 1,3-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 4.8 ug/g dry | ND | all | |
| 1,4-Dichlorobenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.083 ug/g dry | ND | all | |
| 1,1-Dichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 3.5 ug/g dry | ND | all | |
| 1,2-Dichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| 1,1-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| cis-1,2-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 3.4 ug/g dry | ND | all | |
| trans-1,2-Dichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.084 ug/g dry | ND | all | |
| 1,2-Dichloropropane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| cis-1,3-Dichloropropylene | ug/g dry | 0.05 | | | ND | all | |
| trans-1,3-Dichloropropylene | ug/g dry | 0.05 | | | ND | all | |
| 1,3-Dichloropropene, total | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Ethylbenzene | ug/g dry | 0.05 | 0.05 ug/g dry | 2 ug/g dry | ND | all | |
| Ethylene dibromide (dibromoethane) | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Hexane | ug/g dry | 0.05 | 0.05 ug/g dry | 2.8 ug/g dry | ND | all | |
| Methyl Ethyl Ketone (2-Butanone) | ug/g dry | 0.50 | 0.5 ug/g dry | 16 ug/g dry | ND | all | |
| Methyl Isobutyl Ketone | ug/g dry | 0.50 | 0.5 ug/g dry | 1.7 ug/g dry | ND | all | |
| Methyl tert-butyl ether | ug/g dry | 0.05 | 0.05 ug/g dry | 0.75 ug/g dry | ND | all | |
| Methylene Chloride | ug/g dry | 0.05 | 0.05 ug/g dry | 0.1 ug/g dry | ND | all | |
| Styrene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.7 ug/g dry | ND | all | |
| 1,1,1,2-Tetrachloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.058 ug/g dry | ND | all | |
| 1,1,2,2-Tetrachloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Tetrachloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.28 ug/g dry | ND | all | |
| Toluene | ug/g dry | 0.05 | 0.2 ug/g dry | 2.3 ug/g dry | ND | all | |
| 1,1,1-Trichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.38 ug/g dry | ND | all | |
| 1,1,2-Trichloroethane | ug/g dry | 0.05 | 0.05 ug/g dry | 0.05 ug/g dry | ND | all | |
| Trichloroethylene | ug/g dry | 0.05 | 0.05 ug/g dry | 0.061 ug/g dry | ND | all | |
| Trichlorofluoromethane | ug/g dry | 0.05 | 0.25 ug/g dry | 4 ug/g dry | ND | all | |
| Vinyl Chloride | ug/g dry | 0.02 | 0.02 ug/g dry | 0.02 ug/g dry | ND | all | |
| m/p-Xylene | ug/g dry | 0.05 | | | ND | all | |
| o-Xylene | ug/g dry | 0.05 | | | ND | all | |
| Xylenes, total | ug/g dry | 0.05 | 0.05 ug/g dry | 3.1 ug/g dry | ND | all | |
| Hydrocarbons | | | | | | | |
| F1 PHCs (C6-C10) | ug/g dry | 7 | 25 ug/g dry | 55 ug/g dry | ND | all | |
| F2 PHCs (C10-C16) | ug/g dry | 4 | 10 ug/g dry | 98 ug/g dry | ND | all | |
| F3 PHCs (C16-C34) | ug/g dry | 8 | 240 ug/g dry | 300 ug/g dry | 109 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| F4 PHCs (C34-C50) | ug/g dry | 6 | 120 ug/g dry | 2800 ug/g dry | 174 | DUP | 0.4-0.6 mBG |
| Semi-Volatiles | | | | | | | |
| Acenaphthene | ug/g dry | 0.02 | 0.072 ug/g dry | 7.9 ug/g dry | 2.83 | BH6 | |
| Acenaphthylene | ug/g dry | 0.02 | 0.093 ug/g dry | 0.15 ug/g dry | 0.35 | DUP (duplicate of BH2/MW2(SS1)) | 0.4-0.6 mBG |
| Anthracene | ug/g dry | 0.02 | 0.16 ug/g dry | 0.67 ug/g dry | 5.61 | BH6 | |
| Benzo[a]anthracene | ug/g dry | 0.02 | 0.36 ug/g dry | 0.5 ug/g dry | 6.34 | BH6 | |
| Benzo[a]pyrene | ug/g dry | 0.02 | 0.3 ug/g dry | 0.3 ug/g dry | 4.91 | BH6 | |
| Benzo[b]fluoranthene | ug/g dry | 0.02 | 0.47 ug/g dry | 0.78 ug/g dry | 5.30 | BH6 | |
| Benzo[g,h,i]perylene | ug/g dry | 0.02 | 0.68 ug/g dry | 6.6 ug/g dry | 2.85 | BH6 | |
| Benzo[k]fluoranthene | ug/g dry | 0.02 | 0.48 ug/g dry | 0.78 ug/g dry | 3.06 | BH6 | |
| Chrysene | ug/g dry | 0.02 | 2.8 ug/g dry | 7 ug/g dry | 7.03 | BH6 | |
| Dibenzo[a,h]anthracene | ug/g dry | 0.02 | 0.1 ug/g dry | 0.1 ug/g dry | 0.93 | BH6 | |
| Fluoranthene | ug/g dry | 0.02 | 0.56 ug/g dry | 0.69 ug/g dry | 17.4 | BH6 | |
| Fluorene | ug/g dry | 0.02 | 0.12 ug/g dry | 62 ug/g dry | 3.04 | BH6 | |
| Indeno[1,2,3-cd]pyrene | ug/g dry | 0.02 | 0.23 ug/g dry | 0.38 ug/g dry | 2.92 | BH6 | |
| 1-Methylnaphthalene | ug/g dry | 0.02 | 0.59 ug/g dry | 0.99 ug/g dry | 0.06 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| 2-Methylnaphthalene | ug/g dry | 0.02 | 0.59 ug/g dry | 0.99 ug/g dry | 0.07 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Methylnaphthalene (1&2) | ug/g dry | 0.04 | 0.59 ug/g dry | 0.99 ug/g dry | 0.13 | BH2 / MW2(SS1) | 0.4-0.6 mBG |
| Naphthalene | ug/g dry | 0.01 | 0.09 ug/g dry | 0.6 ug/g dry | 0.57 | BH6 | |
| Phenanthrene | ug/g dry | 0.02 | 0.69 ug/g dry | 6.2 ug/g dry | 23.2 | BH6 | |
| Pyrene | ug/g dry | 0.02 | 1 ug/g dry | 78 ug/g dry | 13.7 | BH6 | |

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 7 (non-potable, shallow soil, residential land use, coarse grained soil) criteria

ND - concentration not detected above Method Detection Limit

Table 5
Maximum Groundwater Parameter Concentrations
Phase Two Environmental Site Assessment
811 Gladstone Avenue Complex
Ottawa, Ontario

| Parameter | Units | MDL | O.Reg.153/04 Table 1 background any | O.Reg.153/04 Table 7 shallow soil, nonpotable any | Maximum groundwater concentration | Sample ID | Location |
|-------------------------------------|----------|------|---|---|-----------------------------------|-------------------------|-------------------------------------|
| General Inorganics | | | | | | | |
| pH | pH Units | 0.1 | | | 8.3 | BH2 / MW2 | BH2-17 / MW2-17 |
| Metals | | | | | ND | | all |
| Antimony | ug/L | 0.5 | 1.5 ug/L | 16000 ug/L | 0.7 | BH5 / MW3 | BH5-17 / MW3-17 |
| Arsenic | ug/L | 1 | 13 ug/L | 1500 ug/L | 2 | BH2 / MW2 | BH2-17 / MW2-17 |
| Barium | ug/L | 1 | 610 ug/L | 23000 ug/L | 75 | BH5 / MW3 | BH5-17 / MW3-17 |
| Beryllium | ug/L | 0.5 | 0.5 ug/L | 53 ug/L | ND | | all |
| Boron | ug/L | 10 | 1700 ug/L | 36000 ug/L | 454 | BH2 / MW2 | BH2-17 / MW2-17 |
| Cadmium | ug/L | 0.1 | 0.5 ug/L | 2.1 ug/L | ND | | all |
| Chromium | ug/L | 1 | 11 ug/L | 640 ug/L | ND | | all |
| Cobalt | ug/L | 0.5 | 3.8 ug/L | 52 ug/L | 0.6 | BH5 / MW3 | BH5-17 / MW3-17 |
| Copper | ug/L | 0.5 | 5 ug/L | 69 ug/L | 5.8 | DUP | duplicate sample of BH5-17 / MW3-17 |
| Lead | ug/L | 0.1 | 1.9 ug/L | 20 ug/L | 0.3 | BH1 / MW1 | BH1-17 / MW1-17 |
| Molybdenum | ug/L | 0.5 | 23 ug/L | 7300 ug/L | 39.9 | BH2 / MW2 | BH2-17 / MW2-17 |
| Nickel | ug/L | 1 | 14 ug/L | 390 ug/L | 2 | BH2 / MW2 and BH5 / MW3 | BH2-17 / MW2-17 and BH5-17 / MW3-17 |
| Selenium | ug/L | 1 | 5 ug/L | 50 ug/L | ND | | all |
| Silver | ug/L | 0.1 | 0.3 ug/L | 1.2 ug/L | ND | | all |
| Sodium | ug/L | 200 | 490000 ug/L | 1800000 ug/L | 329000 | BH1 / MW1 | BH1-17 / MW1-17 |
| Thallium | ug/L | 0.1 | 0.5 ug/L | 400 ug/L | ND | | all |
| Uranium | ug/L | 0.1 | 8.9 ug/L | 330 ug/L | 1.9 | BH2 / MW2 | BH2-17 / MW2-17 |
| Vanadium | ug/L | 0.5 | 3.9 ug/L | 200 ug/L | 0.6 | BH2 / MW2 | BH2-17 / MW2-17 |
| Zinc | ug/L | 5 | 160 ug/L | 890 ug/L | 16 | BH5 / MW3 | BH5-17 / MW3-17 |
| Volatiles | | | | | | | |
| Acetone | ug/L | 5.0 | 2700 ug/L | 100000 ug/L | ND | | all |
| Benzene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Bromodichloromethane | ug/L | 0.5 | 2 ug/L | 67000 ug/L | 2.9 | BH5 / MW3 | BH5-17 / MW3-17 |
| Bromoform | ug/L | 0.5 | 5 ug/L | 5 ug/L | ND | | all |
| Bromomethane | ug/L | 0.5 | 0.89 ug/L | 0.89 ug/L | ND | | all |
| Carbon Tetrachloride | ug/L | 0.2 | 0.2 ug/L | 0.2 ug/L | ND | | all |
| Chlorobenzene | ug/L | 0.5 | 0.5 ug/L | 140 ug/L | ND | | all |
| Chloroform | ug/L | 0.5 | 2 ug/L | 2 ug/L | ND | | all |
| Dibromochloromethane | ug/L | 0.5 | 2 ug/L | 65000 ug/L | ND | | all |
| Dichlorodifluoromethane | ug/L | 1.0 | 590 ug/L | 3500 ug/L | ND | | all |
| 1,2-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 150 ug/L | ND | | all |
| 1,3-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 7600 ug/L | ND | | all |
| 1,4-Dichlorobenzene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| 1,1-Dichloroethane | ug/L | 0.5 | 0.5 ug/L | 11 ug/L | ND | | all |
| 1,2-Dichloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| 1,1-Dichloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| cis-1,2-Dichloroethylene | ug/L | 0.5 | 1.6 ug/L | 1.6 ug/L | ND | | all |
| trans-1,2-Dichloroethylene | ug/L | 0.5 | 1.6 ug/L | 1.6 ug/L | ND | | all |
| 1,2-Dichloropropane | ug/L | 0.5 | 0.5 ug/L | 0.58 ug/L | ND | | all |
| cis-1,3-Dichloropropylene | ug/L | 0.5 | | | ND | | all |
| trans-1,3-Dichloropropylene | ug/L | 0.5 | | | ND | | all |
| 1,3-Dichloropropene, total | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Ethylbenzene | ug/L | 0.5 | 0.5 ug/L | 54 ug/L | 3.5 | DUP | duplicate sample of BH5-17 / MW3-17 |
| Ethylene dibromide (dibromomethane) | ug/L | 0.2 | 0.2 ug/L | 0.2 ug/L | ND | | all |
| Hexane | ug/L | 1.0 | 5 ug/L | 5 ug/L | ND | | all |
| Methyl Ethyl Ketone (2-Butanone) | ug/L | 5.0 | 400 ug/L | 21000 ug/L | ND | | all |
| Methyl Isobutyl Ketone | ug/L | 5.0 | 640 ug/L | 5200 ug/L | ND | | all |
| Methyl tert-butyl ether | ug/L | 2.0 | 15 ug/L | 15 ug/L | ND | | all |
| Methylene Chloride | ug/L | 5.0 | 5 ug/L | 26 ug/L | ND | | all |
| Styrene | ug/L | 0.5 | 0.5 ug/L | 43 ug/L | ND | | all |
| 1,1,1,2-Tetrachloroethane | ug/L | 0.5 | 1.1 ug/L | 1.1 ug/L | ND | | all |
| 1,1,1,2,2-Tetrachloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Tetrachloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Toluene | ug/L | 0.5 | 0.8 ug/L | 320 ug/L | ND | | all |
| 1,1,1-Trichloroethane | ug/L | 0.5 | 0.5 ug/L | 23 ug/L | ND | | all |
| 1,1,2-Trichloroethane | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Trichloroethylene | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| Trichlorofluoromethane | ug/L | 1.0 | 150 ug/L | 2000 ug/L | ND | | all |
| Vinyl Chloride | ug/L | 0.5 | 0.5 ug/L | 0.5 ug/L | ND | | all |
| m/p-Xylene | ug/L | 0.5 | | | 13.6 | DUP | duplicate sample of BH5-17 / MW3-17 |
| o-Xylene | ug/L | 0.5 | | | 3.5 | DUP | duplicate sample of BH5-17 / MW3-17 |
| Xylenes, total | ug/L | 0.5 | 72 ug/L | 72 ug/L | 17.1 | DUP | duplicate sample of BH5-17 / MW3-17 |
| Hydrocarbons | | | | | | | |
| F1 PHCs (C6-C10) | ug/L | 25 | 420 ug/L | 420 ug/L | ND | | all |
| F2 PHCs (C10-C16) | ug/L | 100 | 150 ug/L | 150 ug/L | ND | | all |
| F3 PHCs (C16-C34) | ug/L | 100 | 500 ug/L | 500 ug/L | 203 | BH5 / MW3 | BH5-17 / MW3-17 |
| F4 PHCs (C34-C50) | ug/L | 100 | 500 ug/L | 500 ug/L | ND | | all |
| Semi-Volatiles | | | | | | | |
| Acenaphthene | ug/L | 0.05 | 4.1 ug/L | 17 ug/L | ND | | all |
| Acenaphthylene | ug/L | 0.05 | 1 ug/L | 1 ug/L | ND | | all |
| Anthracene | ug/L | 0.01 | 0.1 ug/L | 1 ug/L | ND | | all |
| Benzo[a]anthracene | ug/L | 0.01 | 0.2 ug/L | 1.8 ug/L | ND | | all |
| Benzo[a]pyrene | ug/L | 0.01 | 0.01 ug/L | 0.81 ug/L | ND | | all |
| Benzo[b]fluoranthene | ug/L | 0.05 | 0.1 ug/L | 0.75 ug/L | ND | | all |
| Benzo[g,h,i]perylene | ug/L | 0.05 | 0.2 ug/L | 0.2 ug/L | ND | | all |
| Benzo[k]fluoranthene | ug/L | 0.05 | 0.1 ug/L | 0.4 ug/L | ND | | all |
| Chrysene | ug/L | 0.05 | 0.1 ug/L | 0.7 ug/L | ND | | all |
| Dibenzo[a,h]anthracene | ug/L | 0.05 | 0.2 ug/L | 0.4 ug/L | ND | | all |
| Fluoranthene | ug/L | 0.01 | 0.4 ug/L | 44 ug/L | 0.12 | BH2 / MW2 | BH2-17 / MW2-17 |
| Fluorene | ug/L | 0.05 | 120 ug/L | 290 ug/L | ND | | all |
| Indeno[1,2,3-cd]pyrene | ug/L | 0.05 | 0.2 ug/L | 0.2 ug/L | ND | | all |
| 1-Methylnaphthalene | ug/L | 0.05 | 2 ug/L | 1500 ug/L | ND | | all |
| 2-Methylnaphthalene | ug/L | 0.05 | 2 ug/L | 1500 ug/L | ND | | all |
| Methylnaphthalene (1&2) | ug/L | 0.10 | 2 ug/L | 1500 ug/L | ND | | all |
| Naphthalene | ug/L | 0.05 | 7 ug/L | 7 ug/L | 0.16 | BH2 / MW2 | BH2-17 / MW2-17 |
| Phenanthrene | ug/L | 0.05 | 0.1 ug/L | 380 ug/L | ND | | all |
| Pyrene | ug/L | 0.01 | 0.2 ug/L | 5.7 ug/L | 0.10 | BH2 / MW2 | BH2-17 / MW2-17 |

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 7 (non-potable, shallow soil, any land use, coarse grained soil) criteria

ND - concentration not detected above Method Detection Limit

Appendices

Appendix A

Utility Clearances



UNDERGROUND SERVICE LOCATORS INC.

DATE: Aug 14 / 2017

Stan Pedlar
Locate Technician
stanp@usl-1.com
cell 613-986-7226

775 Taylor Creek Drive,
Ottawa ON K1C 1T1
tel 613-226-8750
fax 613-226-8677
toll-free 877-248-3444
www.usl-1.com

Client Name: GHD

Job Location: 811 GADSTONE AV.

Nature of work: BH's

DESCRIPTION OF PUBLIC LOCATES

TELEPHONE: Utility in work area: Yes / No - Located ☒ - Marked ☒ - See attached sketch ☒
Notes: BELL IS IN WORK ZONE, SEE PROMARK REPORT.

GAS: Utility in work area: Yes / No - Located ☒ - Marked ☒ - See attached sketch ☒
Notes: GAS IS IN WORK ZONE, SEE PROMARK REPORT.

HYDRO: Utility in work area: Yes / No - Located ☒ - Marked ☒ - See attached sketch ☒
OTTAWA Notes: HYDRO OTTAWA IS IN WORK ZONE, SEE PROMARK REPORT.

WATER: Utility in work area: Yes / No - Located ☐ - Marked ☐ - See attached sketch ☒
Notes: CITY WATER + SEWER ARE CLEAR, ON PRIVATE PROPERTY
SEE CITY REPORT.

CABLE: Utility in work area: Yes / No - Located ☒ - Marked ☒ - See attached sketch ☒
Notes: ROGERS IS IN WORK ZONE, SEE CANADIAN LOCATORS REPORT.

TRAFFIC
+ STREET
LIGHTS: Utility in work area: Yes / No - Located ☐ - Marked ☐ - See attached sketch ☒
Notes: TRAFFIC + STREET LIGHTS ARE CLEAR, SEE REPORTS

Utility in work area: Yes / No - Located ☐ - Marked ☐ - See attached sketch ☐
Notes: _____

Notes: SANITARY SERVICES NOT LOCATED - GAS AT 275-285? NOT LOCATED.

Locators Name: Stan Pedlar

Signature: [Signature]

*** IF THERE ARE ANY QUESTIONS WITH REGARDAS TO THIS OR ANY OTHER CLEARANCE SHEET PLEASE
CONTACT US IMMEDIATELY ***

PR MARK
TELECOM
Primary Locate Sheet
 LINCOLN GAS EMERGENCY #
 1-877-968-0999

 Phone:
 613-723-9888

 Fax:
 613-723-9277

 Toll free:
 1-800-371-8866

Email:

 Request #
20172915820
 NORMAL

 UTILITIES LOCATED: ☒ BELL ☒ GAS ☒ HYDRO OTTAWA ☐ ZAYO
☐ BELL 360 ☐ VIDEOTRON ☐ BIRCH HILL ☐ HYDRO ONE

 Revised Excavation Date
 N/A

 Excavation Date
 07/28/2017 08:00:00

 Status
 NEGOTIATED

 Homeowner ☐

 Contractor ☒

 Project ☐

 Requested by:
 MONIQUE LAROCQUE

 Company:
 USL

 Phone:
 (613)-226-8750 ext.

 Fax/email:
 (613)-226-8677 ext.

Appt Date:

 Received Date:
 07/19/2017

Locate Address: 811, GLADSTONE AVE

1st Inters.: BOOTH ST

2nd Inters.: ROCHESTER ST

 Type of work:
 BORE HOLES

 City:
 OTTAWA

Caller's Remarks:

MACH.DIG

CORLOT-U DRILLING BOREHOLES THROUGHOUT PROPERTY. CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BOOTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDEWALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE.

-75.769239, 45.405567, NO_SEGMENTS:1, NO_PLAN:613 587, BC0E01, ENVMOB01, OTWASL01, OTWATS01, OTWAWNS01, ROGOTT01, ENOE01, HOT1

| | | | | | | | | |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|
| Bell Mark Clear 1 | Enbridge Gas Mark Clear 1 | Hydro Ottawa Mark Clear 1 | BIRCH HILL Mark Clear N/A | ZAYO Mark Clear N/A | Hydro One Mark Clear N/A | BELL 360 Mark Clear N/A | Union Gas Mark Clear N/A | Videotron Mark Clear N/A |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference: G MOBILE, PROVIDER

Map Network X # PMOTT01738

 Byers ☒ Datapak ☒ LAC Multiviewer

Field Notes: NE185, THP252, 6N86-2

Other: FN-3056-3

OPT 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

 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.

ALL MEASUREMENTS ARE TAKEN WITH MEASURING WHEEL

Locator Name: DENNY EMMA-LEE

Start Time: 11:00

☐ Mark & Fax ☐ Left on Site ☒ Emailed

ID #: 1880

End Time: 14:00

Print: N/A

Date 08/02/2017

Total Hours: 3.0 HOURS

Signature:

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.

**PR MARK
TELECON****Auxiliary Locate Sheet**Union Gas Emergency #
1-877-968-0999Phone:
613-723-9888Fax:
613-723-9277Toll free:
1-800-371-8866

Email

UTILITIES ☒ BELL ☐ GAS ☐ HYDRO OTTAWA ☐ VIDEOTRON
 LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

Date Located:
mm/dd/yyyy 08/02/2017

Request #
20172915820

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: E.F.C OF ROCHESTER STREET

TO: W.B.L OF 10 BALSAM STREET

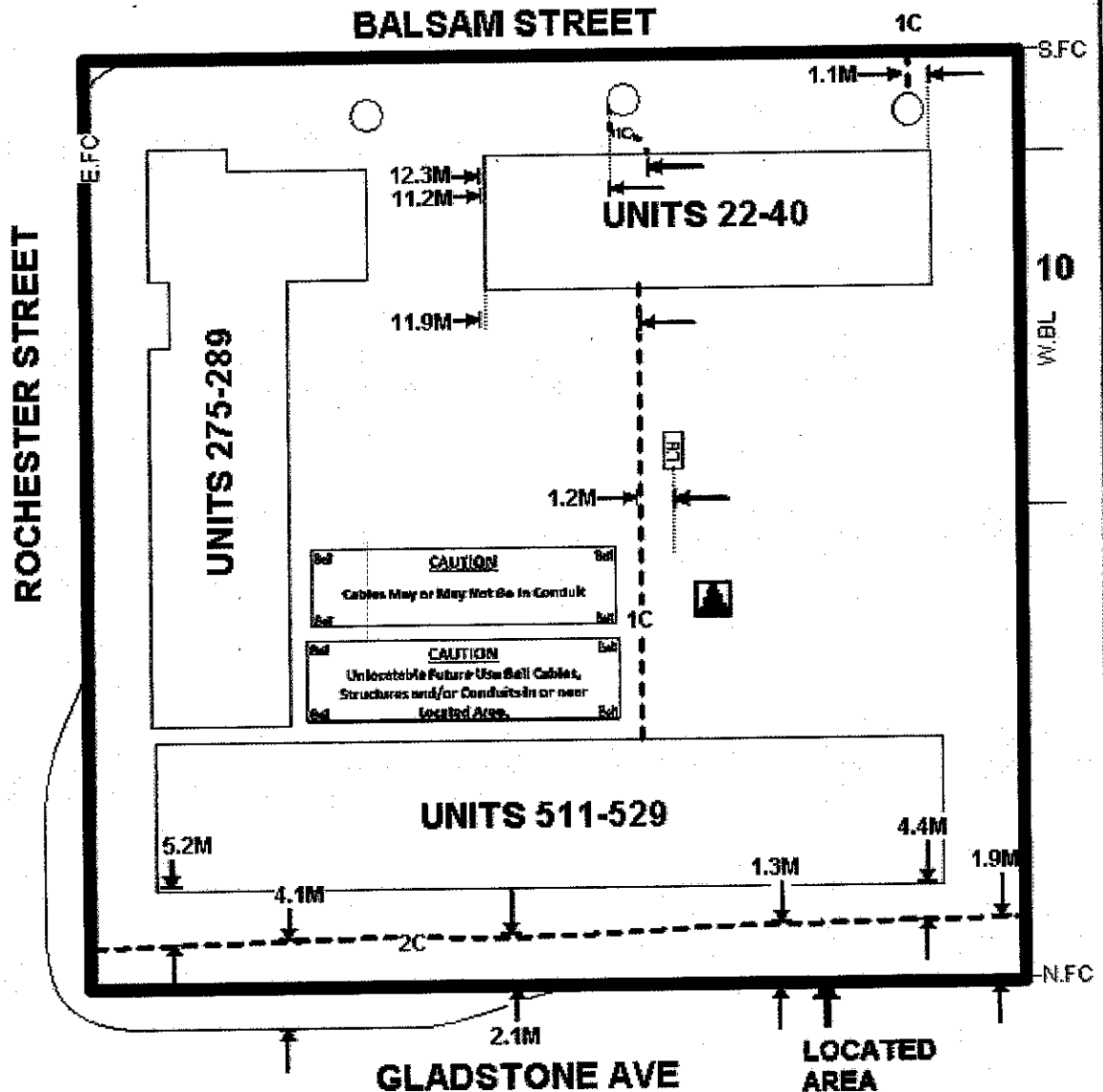
FROM: S.F.C OF BALSAM STREET

TO: N.F.C OF GLADSTONE AVE

CAUTION: Hand dig within 1M 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: N/A



- Legend**
- Building Line — BL
 - Fence Line — FL
 - Face of Curb — FC
 - Road Edge — RE
 - Property Line — PL
 - ASHPALT EDGE — AE
 - Driveway — DW
 - Catch Basin
 - Sidewalk
 - Demarcation
 - Railway
 - Pole
 - Flush to Grade
 - Pedestal
 - Pedestal
 - Buried Cable — B
 - Conduit — C
 - Buried Service Wire — BSW
 - Manhole
 - 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.

PR MARK
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 ☐ HYDRO OTTAWA ☐ VIDEOTRON
LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

Date Located: 08/02/2017

Request #
20172915820

Number of Services marked: (Specify building/house numbers) (2) - 30 BALSAM STREET, 819 GLADSTONE AVE

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: E.F.C OF ROCHESTER STREET

TO: W.B.L OF 10 BALSAM STREET

FROM: S.F.C OF BALSAM STREET

TO: N.F.C OF GLADSTONE 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: N/A



BALSAM STREET

ROCHESTER STREET

UNITS 275-289

AT UNIT 30

UNITS 22-40

GS1= 2" PE
GS2= 1.25" PE

UNITS 811-829

AT UNIT 819

GLADSTONE AVE

**LOCATED
AREA**

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.

**PR MARK
TELECON**

Auxiliary Locate Sheet

Union Gas Emergency #
1-877-888-0998Phone:
613-723-9888Fax:
613-723-9277Toll free:
1-800-371-8866

Email

UTILITIES ☐ BELL ☐ GAS ☒ HYDRO OTTAWA ☐ VIDEOTRON
LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360Date Located:
mm/dd/yyyy 08/02/2017

Request # 20172915820

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: E.F.C OF ROCHESTER STREET

TO: W.B.L OF 10 BALSAM STREET













FROM: S.F.C OF BALSAM STREET

TO: N.F.C OF GLADSTONE AVE

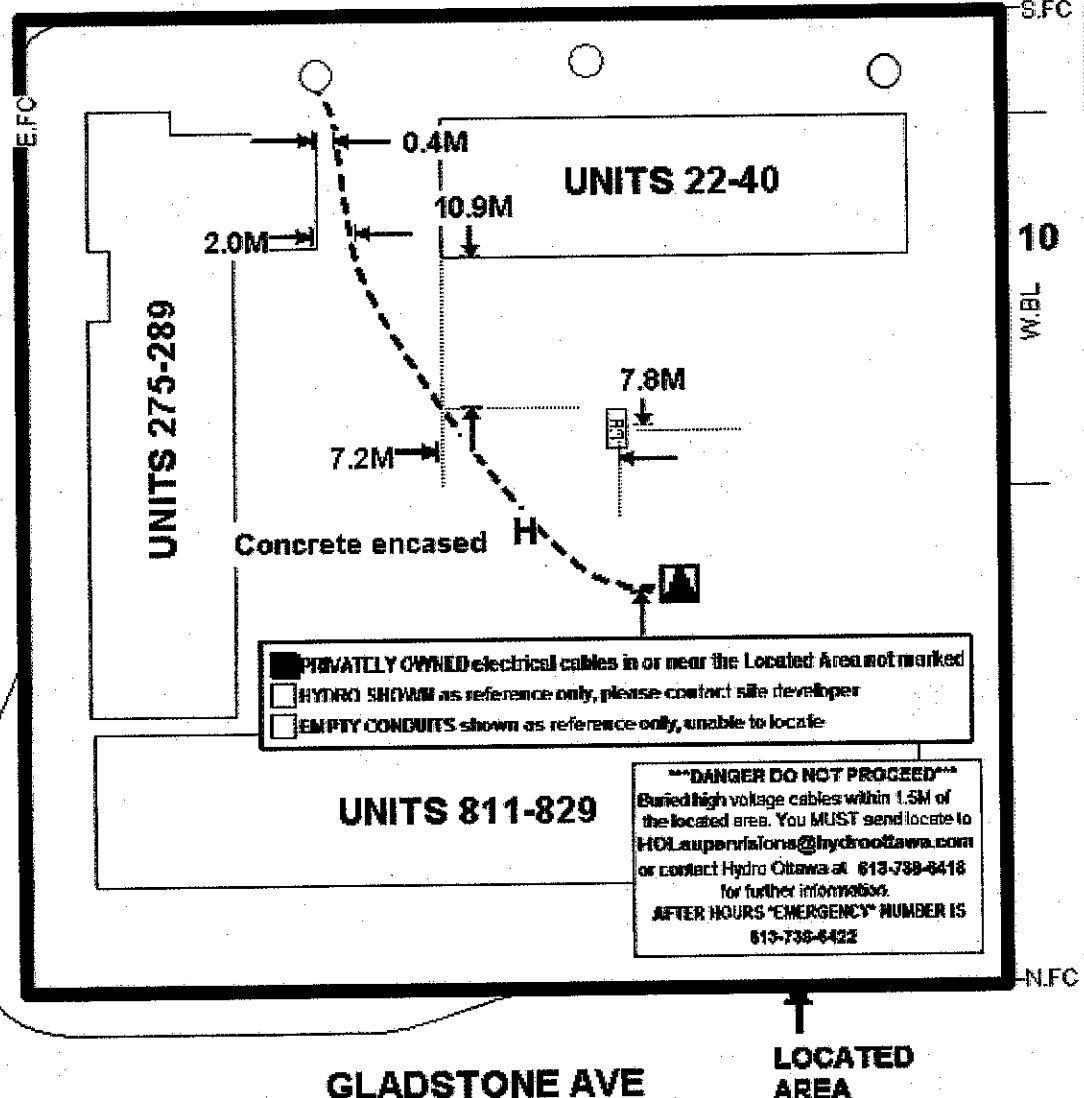
CAUTION: Hand dig within 1.5M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and MUST be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: N/A



- Legend**
- Building Line — BL —
 - Fence Line — FL —
 - Face of Curb — FC —
 - Road Edge — RE —
 - Property Line — PL —
 - ASHPALT EDGE — AE —
 - Driveway — DW —
 - Catch Basin  CB
 - Sidewalk  SW
 - Demarcation  DM
 - Railway 
 - Pole  O
 - 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.

ROCHESTER STREET



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.



February 9 2015

To all Excavators:

Bell locates are now valid for the life of the excavation project and will not automatically be relocated every 60 days.

Please note the following for the above to apply:

- a) Construction within the located area begins within 60 days of the "locate completed" date on the original ticket.**
- b) The construction company named on the locate remains active on the site.**

Bell expects excavators will protect and preserve the paint marks put down on 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.

If an excavator would like their markings freshened up they can contact Promark (the Bell Canada Locate Service Provider in this area) directly to arrange for them to place fresh markings on the ground however this will be at the excavators expense. Promark can be reached at 613-723-9888.

The locate will be considered officially expired one day after the final day of construction.

Thank you,

Bell Canada

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 guilty 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



Service Request Details

Service Request

1107213

Lagan Case ID: 201729158201

Source: Contractor

Created By: Ga Maxpusr

Priority:

Reported By:

Status: RESOLVED

Initiated: 2017-Jul-19 4:45 PM

Location Information

Address: 811 GLADSTONE AVE

Range:

Unit:

Between Streets: BOOTH ST / ROCHESTER ST

Municipality: 00

Description: The work area is clear of underground water and sewer pipes owned by the City of Ottawa if the excavation is not in the road.

Street Range: 811-

Street: GLADSTONE AVE

Intersect 1: BOOTH ST

Intersect 2: ROCHESTER ST

Door Numbers: -

Municipality:

Requestor Information

Name: MONIQUE LAROCQUE

Phones

Address: 775 TAYLOR CREEK DR

Res:

Cell:

City: ORLEANS

Bus: 6132268750

Ext:

Postal Code: K4A0Z9

Unit:

Fax:

Call Back & Other Assignments

Responsibilities

Service Request

Work Order #

Work Order

Request Details

Start Date:

Appointment Time:

Service: ESD

Finish Date: 2017-Jul-20

Classification: LOCATES - PROVIDE

Amount Charge to Customer:

Category:

Structures

| Structure ID | District | Description | Location | Qualifier | Unit |
|--------------|----------|-------------|----------|-----------|------|
|--------------|----------|-------------|----------|-----------|------|



**CANADIAN
LOCATORS INC.**
Serving the Utilities Industry

**ROGERS
Primary Locate Sheet**

ON 1 Call Ticket # :
20172915820

Ph: (905) 479-5674 Email: ontario@canadianlocators.com

Contractor / Excavator :

U S L

Contact Name :

MONIQUE LAROCQUE

Tel :

613-226-8750

Alt. Phone :

Email :

moniquel@usl-1.com

Received Date :

Jul 19 2017

Excavation Date :

Jul 26 2017

Revised Excavation Date:

Type of Work :

BORE HOLES

Locate Address :

811 GLADSTONE AVE

City / Municipality :

OTTAWA, ONTARIO

Nearest Intersection :

BOOTH ST & ROCHESTER ST

Method of Field Marking :



Paint



Stakes



Flags

Caller's Remarks (Additional Info) :

CORLOT=U DRILLING BOREHOLES THROUGHOUT PROPERTY. CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BOOTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDEWALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE.

Utilities Marked :



Coaxial Plant



Fibre Optics Plant

Length :

110 m

Length :

m

LOCATED AREA : EXCAVATOR MUST NOT WORK OUTSIDE THE LOCATED AREA AS SHOWN ON THE SKETCH PAGE(S) WITHOUT OBTAINING ANOTHER LOCATE !

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. Excavator must not work outside of the "Located Area" shown on the sketch. 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 :

ROGERS MARKED IN ORANGE

Locator's Name : (Please Print)

David Stoddard

Date :

Jul 27 2017

Start Time :

10:30 AM

End Time :

11:15 AM

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.
Serving the Utilities Industry

ROGERS Auxiliary Locate Sheet

ON 1 Call Ticket #: **20172915820**

Ph: (905) 479-5674 Email: ontario@canadianlocators.com

Utilities Marked:

☒ Coaxial Plant ☐ Fibre Optics Plant

Number of Services Marked: (specify building/house numbers)

NA

LOCATED AREA: EXCAVATOR MUST NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE!

FROM:
S FC OF BALSAM ST

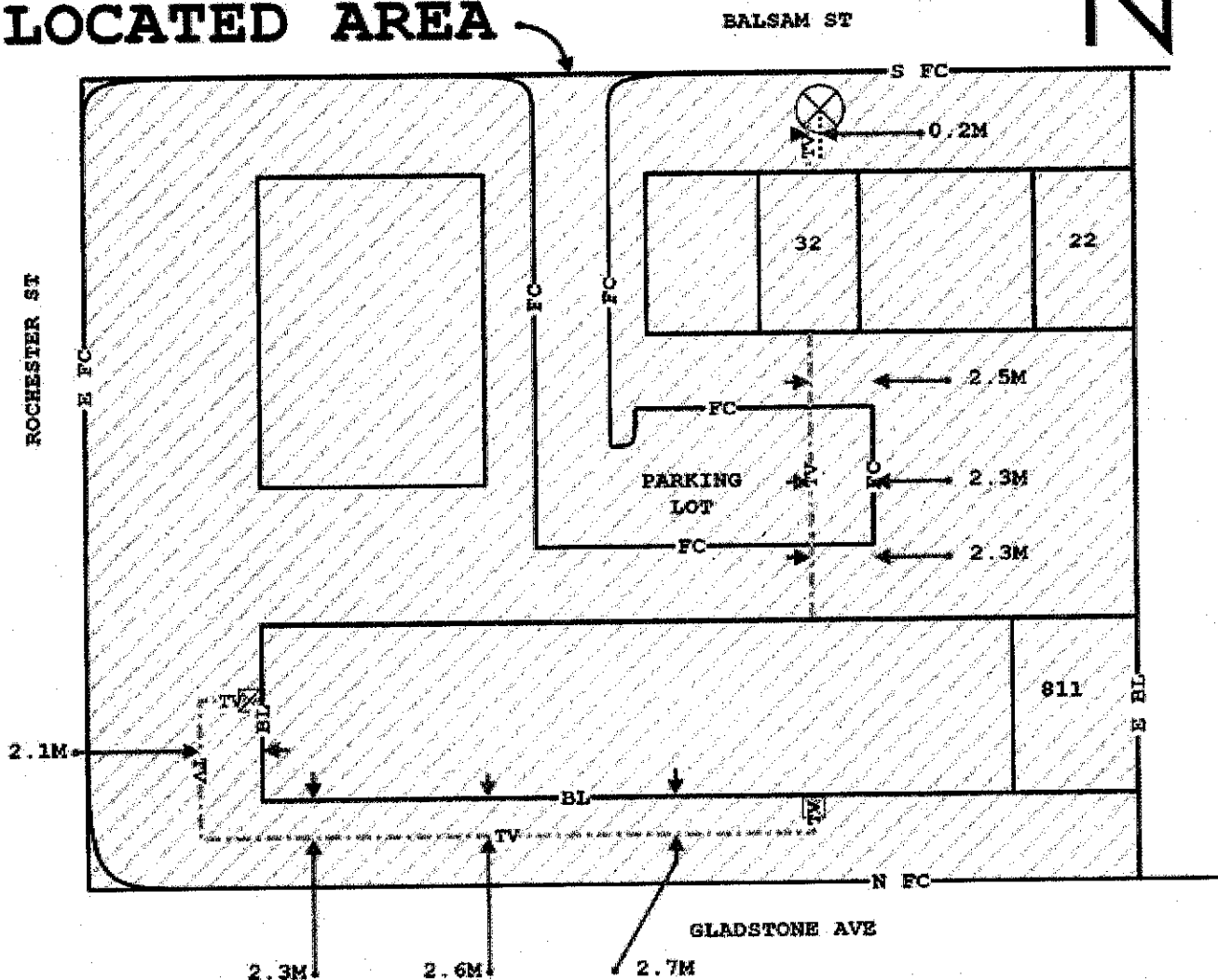
TO:
N FC OF GLADSTONE AVE

FROM:
E FC OF ROCHESTER ST

TO:
E BL OF 811 GLADSTONE AVE

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



Sketch not drawn to scale

LEGEND:

Fibre Optic — FO —
Cable / T.V. — CATV —
Conduit — C —
Railway — —
Work Area — —

Road Edge — RE —
Bldg Line — BL —
North Direction N
Sidewalk — SW —
Measurement — —

Property Line — PL —
Lot Line — LL —
Face of Curb — FC —
Driveway — DW —
Fence Line — FL —

Tree —
Pedestal —
Pole —
Valve —
Vault —

Transformer —
Manhole —
Catch Basin —
North N
South S

Streetlight —
Hand Hole —
Hydrant —
East E
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.

City of Ottawa
Street Light Locate

Black & McDonald

Ontario One Call TF

NOTICE OF INTENT TO EXCAVATE

Header Code: STANDARD
Request Type: NORMAL

Ticket No: 20172915820

Original Call Date: 07/19/2017 4:45:13 PM

Work To Begin Date: 07/26/2017

Company: U S L

Contact Name: MONIQUE LAROCQUE

Pager:

Contact Phone: (613)-226-8750 ext.

Cell:

Fax: (613)-226-8877 ext.

Alternate Contact: JEFF FORRESTER

Alt. Phone:

Place: OTTAWA

Street: 811 GLADSTONE AVE

Nearest Intersecting Street: BOOTH ST

Second Intersecting Street: ROCHESTER ST

Subdivision: OTTAWA

Additional Dig Information:

CORLOT=U DRILLING BOREHOLES THROUGHOUT PROPERTY. CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BOOTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDEWALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE. NO_PLAN: 613 587

WO/ JOB #: ANYTIME

Type Of Work: BORE HOLES

Remarks:

-75.709239 45.405567 NB_SEGMENTS::1 BCOE01 ENVMOE01 OTWASLD1 OTWATS01 OTWAWS01 ROGOTT01 ENOE01
HOT1

| | |
|-----------------------|-----------------------|
| Ont Call # | 20172915820 |
| Date Requested | 07/19/2017 4:45:13 PM |

City of Ottawa Street Light Locate

Dispatcher: Lisa Bisailon
Phone: 613-526-1226

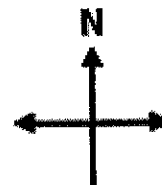
Black & McDonald

| | |
|---------------------|---------------------|
| Company | U S L |
| Name | MONIQUE LAROCQUE |
| Phone | (613)-226-8750 ext. |
| FAX | (613)-226-8677 ext. |
| Site Contact | JEFF FORRESTER |
| Phone | |

Instructions

811, GLADSTONE AVE
 CORLOT=U DRILLING BOREHOLES THROUGHOUT PROPERTY. CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BOOTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDEWALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE. NO_PLAN: 613 557

LOCATOR SKETCH



**Clear
Private Property**

No City of Ottawa street light
assets in dig area

—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 reperege. Si les marques ne concordent pas avec celles sur le croquis, un nouveau reperege est requis. Tout changement a l'emplacement ou a la nature du travail necessite un nouveau reperege. Creuser a la main un metre (3.28 pieds) du repere. La profondeur des installation varie d'un endroit a l'autre.

| | |
|---------------------|-----------------|
| Date Located | 07/24/2017 |
| Time of day | |
| Located by | MIKE LESPERANCE |
| Signature | |
| Page | 2 of 2 |

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



Monique Larocque

From: Sigouin, Francois <Francois.Sigouin@ottawa.ca>
Sent: Thursday, July 20, 2017 10:12 AM
To: 'moniquel@usl-1.com'
Subject: 20172915820

Ticket# 20172915820

****Clear of Underground Traffic Ducts in Proposed Work Area****

Frank Sigouin

Utility Plant Locator: Traffic Signals

Work Cell #(613)229-0580

Traffic Signals Locates # (613)797-8534

Email: francois.sigouin@ottawa.ca <mailto:francois.sigouin@ottawa.ca>

2017.07.19 16:45:31 EST CSM PI service user (SVC_CSM_PI)

ON1Call locate address provided Street Range:811- | Street:GLADSTONE AVE

| Intersect 1:BOOTH ST | Intersect 2:ROCHESTER ST | Door Nu

mbers:- | Municipality:

What type of request, if not original?

If not original, the previous request id.

If there is an address range, what is the ending address number?

Are you a homeowner, contractor or agent? CONTRACTOR

Who are you working for? GHD

Monique Larocque

From: Solutions@on1call.com
Sent: Wednesday, July 19, 2017 4:45 PM
To: moniquel@usl-1.com
Subject: Request 20172915820

ONTARIO ONE CALL Locate Request Confirmation

Ticket #:20172915820 Reason Code:STANDARD
Work to Begin Date: 07/26/2017
WAP No:

CALLER INFORMATION

MONIQUE LAROCQUE Tel.:(613)226-8750
Contractor ID: 202
U S L Cell:
WORK BEING DONE FOR:GHD Fax:(613)226-8677
moniquel@usl-1.com
ALT CONTACT:JEFF FORRESTER Tel.:

DIG LOCATION

City: OTTAWA , OTTAWA
Community:
Address :811 To: Lot/Unit#:
Street : GLADSTONE AVE
Nearest Intersecting Street :
BOOTH ST
Second Intersecting Street :
ROCHESTER ST
Nb of Segments: 1

Type of Work: BORE HOLES Max Depth: 30.00 FT

Machine Dig: X Hand Dig:
Public Property: X Private Property: X
Mark & Fax: Site Meet Req.: Area is Not Marked:
Area is Marked: X
Directional Drilling:

Detailed Description of the work:
CORLOT=U DRILLING BOREHOLES THROUGHOUT PROPERTY.
CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BO OTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDE
WALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE.

Remarks:

The Ontario One Call members who have underground infrastructure in the area of your excavation site have been notified and their status is noted below:

BCOE01 PROMARK FOR BELL CAN ENOE01 PROMARK FOR ENBRIDGE
ENVMOE01 PROMARK FOR ENBRIDGE HOT1 HYDRO OTTAWA (HOT1)
OTWASL01 BLACK AND MC DONALD OTWATS01 CITY OF OTTAWA TRAFF
OTWAWS01 CITY OF OTTAWA WATER ROGOTT01 CLI FOR ROGERS (ROGO

These members have been removed due to the relocate:

Note: -C = Cleared, -S = Supressed, -L = Lookup center cleared, -A = Alternate Locate,
-R = Existing locate valid - maintain marks

IMPORTANT INFORMATION:

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 which you are excavating.

WHAT DOES (-C) MEAN?

1. The information that you have provided about your dig will not affect that member's underground infrastructure OR,
2. The member has identified that they do not have buried infrastructure in the immediate area and wish to inform the excavator by providing a (-C).

IF THE (-C) IS NOT PRESENT:

- Not all members of ON1Call identify the absence of infrastructure in their registration with ON1Call, in which case the member's name will not appear on your request confirmation. The absence of (-C) indicates the ON1Call system has returned no results for the presence of a particular member's infrastructure in the immediate vicinity. See www.on1call.com for a current list of locate status contacts.

ONE-CALL SYSTEMS INC.

775 TAYLOR CREEK DRIVE

OTTAWA, ON, K4A 0Z9

Map 106 3

PHONE (613) 226-8750

FAX (613) 226-8677

CUSTOMER: GHD

REQUESTED BY: RYAN VANDEN TILLAERT

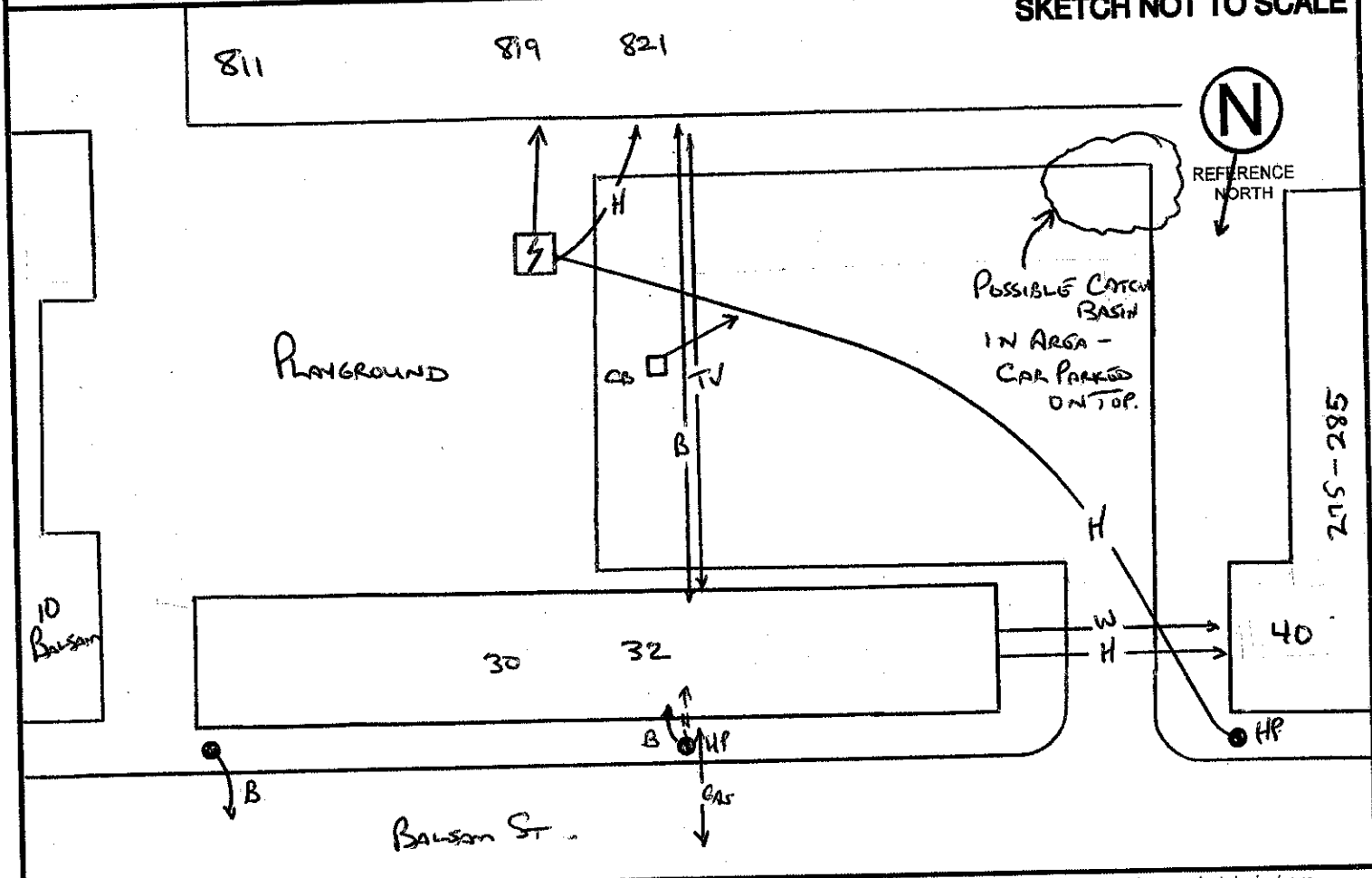
LOCATION OF WORK: 811 Gladstone Av -

LIMITS OF WORK: BH's

| | | | | | |
|--------------------|----------|-------------|------------|----------------|-------------|
| HYDRO | -- H -- | CABLE TV. | -- T.V. -- | STEAM | -- STEAM -- |
| GAS | -- G -- | SANITARY | -- SAN -- | ELECTRICAL | -- E -- |
| 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: Sanitary Services Not Located - No Access To 275 - BH's Not Laid Out - Gas Services To 275-285 (40) Not Located

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: STAN PEDER

SIGNATURE: [Signature]

LOCATE RECEIVED AND REVIEWED BY

Print Name

Signature

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

ONE-CALL SYSTEMS INC.

775 TAYLOR CREEK DRIVE

OTTAWA, ON, K4A 0Z9

Map 2 of 3

PHONE (613) 226-8750

FAX (613) 226-8677

CUSTOMER: GND

REQUESTED BY: RYAN VANDEN TILLART

LOCATION OF WORK: 811 Gladstone Av.

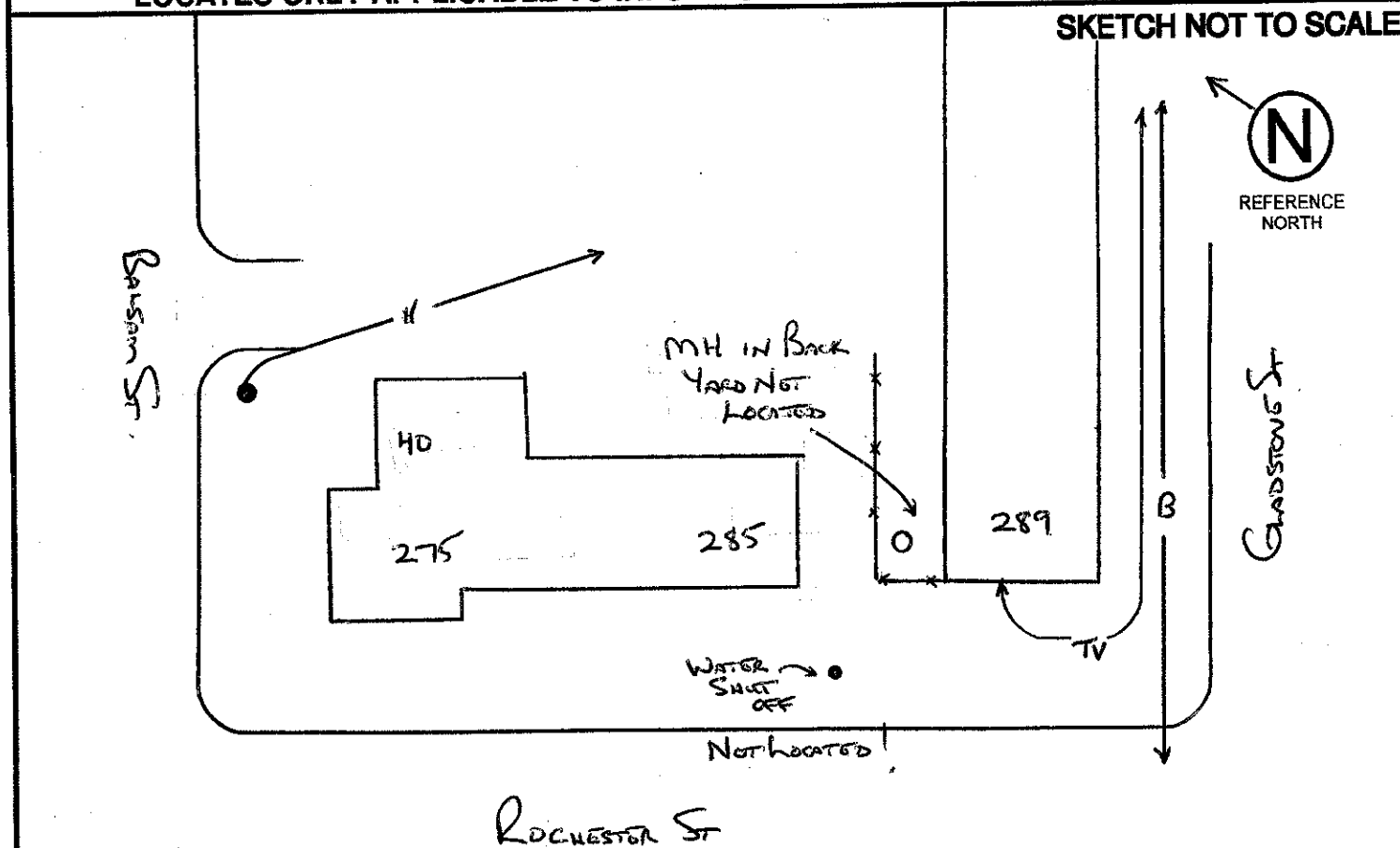
LIMITS OF WORK: BH's

HYDRO -- H --
GAS -- G --
BELL -- B --
UNIDENTIFIED CABLE -- UC --
WATER -- W --

CABLE T.V. -- T.V. --
SANITARY -- SAN --
STORM -- ST --
FIBER OPTIC -- FOC --

STEAM -- STEAM --
ELECTRICAL -- E --
COMMUNICATIONS -- COM --
OTHER:

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 30 DAYS!



- 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: GAS TO 275-285 (40) NOT LOCATED. SANITARY SERVICES NOT LOCATED. No Access To 275-285.

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: Stan Pedar

SIGNATURE: [Signature]

LOCATE RECEIVED AND REVIEWED BY

Print Name

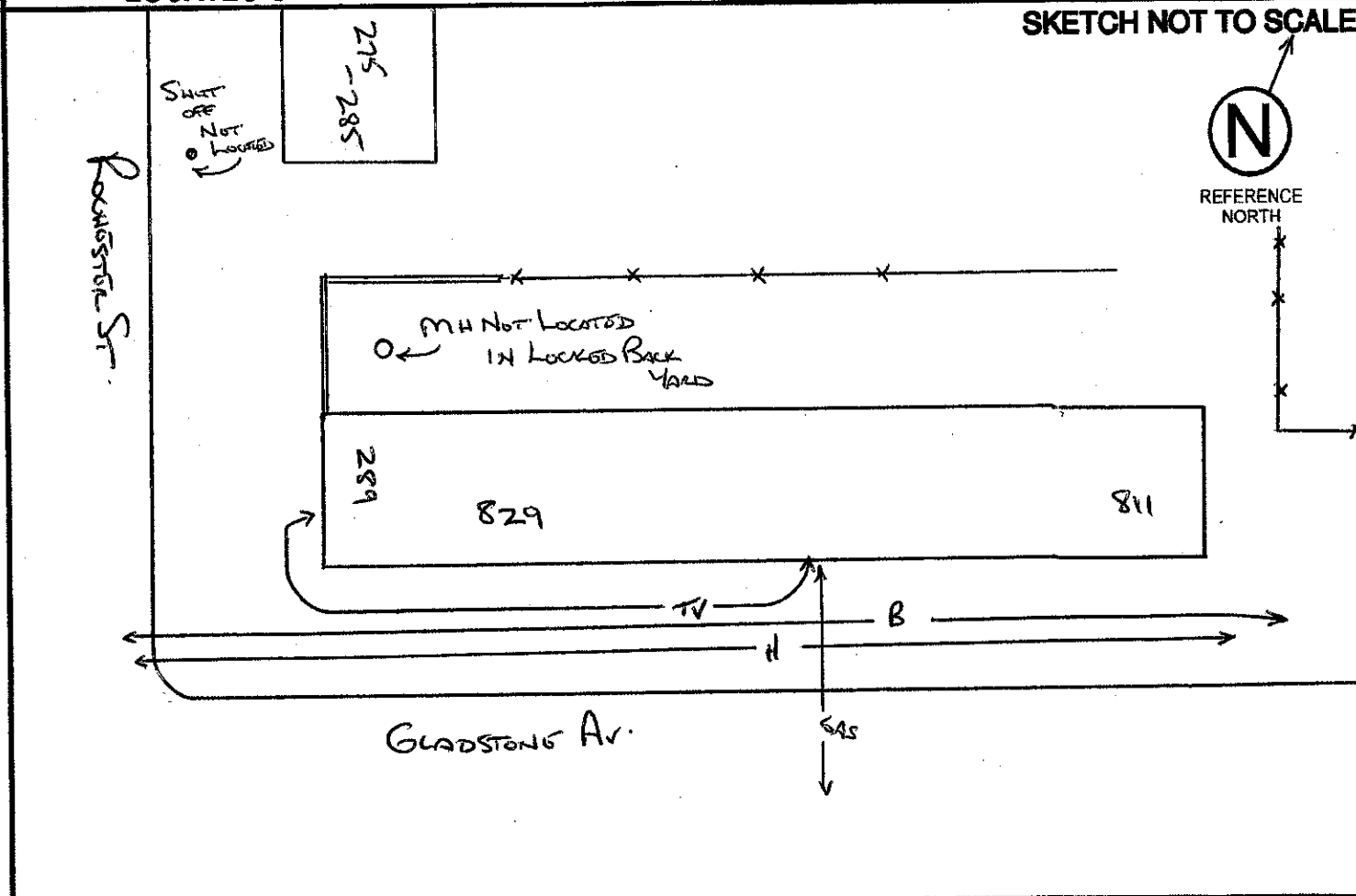
Signature

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

CUSTOMER: GND REQUESTED BY: RYAN VANDEN TILLART
 LOCATION OF WORK: 811 Gladstone Av. LIMITS OF WORK: BH's

| | | | | | |
|--------------------|--------|-------------|----------|----------------|-----------|
| HYDRO | - H - | CABLE T.V. | - T.V. - | STEAM | - STEAM - |
| GAS | - G - | SANITARY | - SAN - | ELECTRICAL | - E - |
| 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!



- 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: SANITARY SERVICES NOT LOCATED - NO ACCESS TO 275-285.

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: STAN PODAR SIGNATURE: [Signature]

LOCATE RECEIVED AND REVIEWED BY _____ Print Name _____ Signature _____

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

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 provide 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 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 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



Primary Locate Sheet

 UNION GAS EMERGENCY #
1-877-969-0999

 Phone:
613-723-9888

 Fax:
613-723-9277

 Toll free:
1-800-371-8866

Email:

 Request #
20172915820
NORMAL

| | | | |
|---|--|--|--|
| UTILITIES LOCATED: <input checked="" type="checkbox"/> BELL <input checked="" type="checkbox"/> GAS <input checked="" type="checkbox"/> HYDRO OTTAWA <input type="checkbox"/> ZAYO <input type="checkbox"/> BELL 360 <input type="checkbox"/> VIDEOTRON <input type="checkbox"/> BIRCH HILL <input type="checkbox"/> HYDRO ONE | Revised Excavation Date N/A mm/dd/yyyy | Excavation Date 07/28/2017 08:00:00 mm/dd/yyyy | Status NEGOTIATED Homeowner <input type="checkbox"/> Contractor <input checked="" type="checkbox"/> Project <input type="checkbox"/> |
| Requested by: MONIQUE LAROCQUE | Company: USL | Phone: (613)-226-8750 ext. | Fax/email: (613)-226-8677 ext. |

| | | |
|-----------------------------|--|---|
| Appt Date: mm/dd/yyyy | Received Date: 07/19/2017 mm/dd/yyyy | Locate Address: 811, GLADSTONE AVE 1st Inters.: BOOTH ST 2nd Inters.: ROCHESTER ST |
| Type of work: BORE HOLES | | City: OTTAWA |

Caller's Remarks:

MACH. DIG

CORLOT=U DRILLING BOREHOLES THROUGHOUT PROPERTY. CLEAR FROM THE WEST BUILDING LINE OF 404 TO 414 BOOTH ST, TO SIDEWALK ON ROCHESTER ST, AND FROM SIDEWALK ON BALSAM ST TO SIDEWALK ON GLADSTONE AVE.

-75.709239, 45.405567, NO_SEGMENTS::1, NO_PLAN:613 567, BCOE01, ENVMOE01, OTWASL01, OTWATS01, OTWAWWS01, ROGOTT01, ENOE01, HOT1

| | | | | | | | | |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|
| Bell Mark Clear 1 | Enbridge Gas Mark Clear 1 | Hydro Ottawa Mark Clear 1 | BIRCH HILL Mark Clear N/A | ZAYO Mark Clear N/A | Hydro One Mark Clear N/A | BELL 360 Mark Clear N/A | Union Gas Mark Clear N/A | Videotron Mark Clear N/A |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference: G MOBILE, PROVIEWER

_ Map _ Network X # PMOTT01738

 _ Byers ☒ Datapak: ☒ LAC Multiviewer

Field Notes: NE185, THP252, 6N86-2

Other: FN-3056-3

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

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.

ALL MEASUREMENTS ARE TAKEN WITH MEASURING WHEEL

| | | |
|------------------------------|------------------------|---|
| Locator Name: DENNY EMMA-LEE | Start Time: 11:00 | <input type="checkbox"/> Mark & Fax <input type="checkbox"/> Left on Site <input checked="" type="checkbox"/> Emailed |
| ID #: 1880 | End Time: 14:00 | Print: N/A |
| Date: 08/02/2017 | Total Hours: 3.0 HOURS | Signature: |

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.



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



February 9 2015

To all Excavators:

Bell locates are now valid for the life of the excavation project and will not automatically be relocated every 60 days.

Please note the following for the above to apply:

- a) Construction within the located area begins within 60 days of the "locate completed" date on the original ticket.
- b) The construction company named on the locate remains active on the site.

Bell expects excavators will protect and preserve the paint marks put down on 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.

If an excavator would like their markings freshened up they can contact Promark (the Bell Canada Locate Service Provider in this area) directly to arrange for them to place fresh markings on the ground however this will be at the excavators expense. Promark can be reached at 613-723-9888.

The locate will be considered officially expired one day after the final day of construction.

Thank you,

Bell Canada

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 guilty 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





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 ☐ HYDRO OTTAWA ☐ VIDEOTRON
 LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

 Date Located:
mm/dd/yyyy 08/02/2017

 Request #
20172915820

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: E.FC OF ROCHESTER STREET

TO: W.BL OF 10 BALSAM STREET

FROM: S.FC OF BALSAM STREET

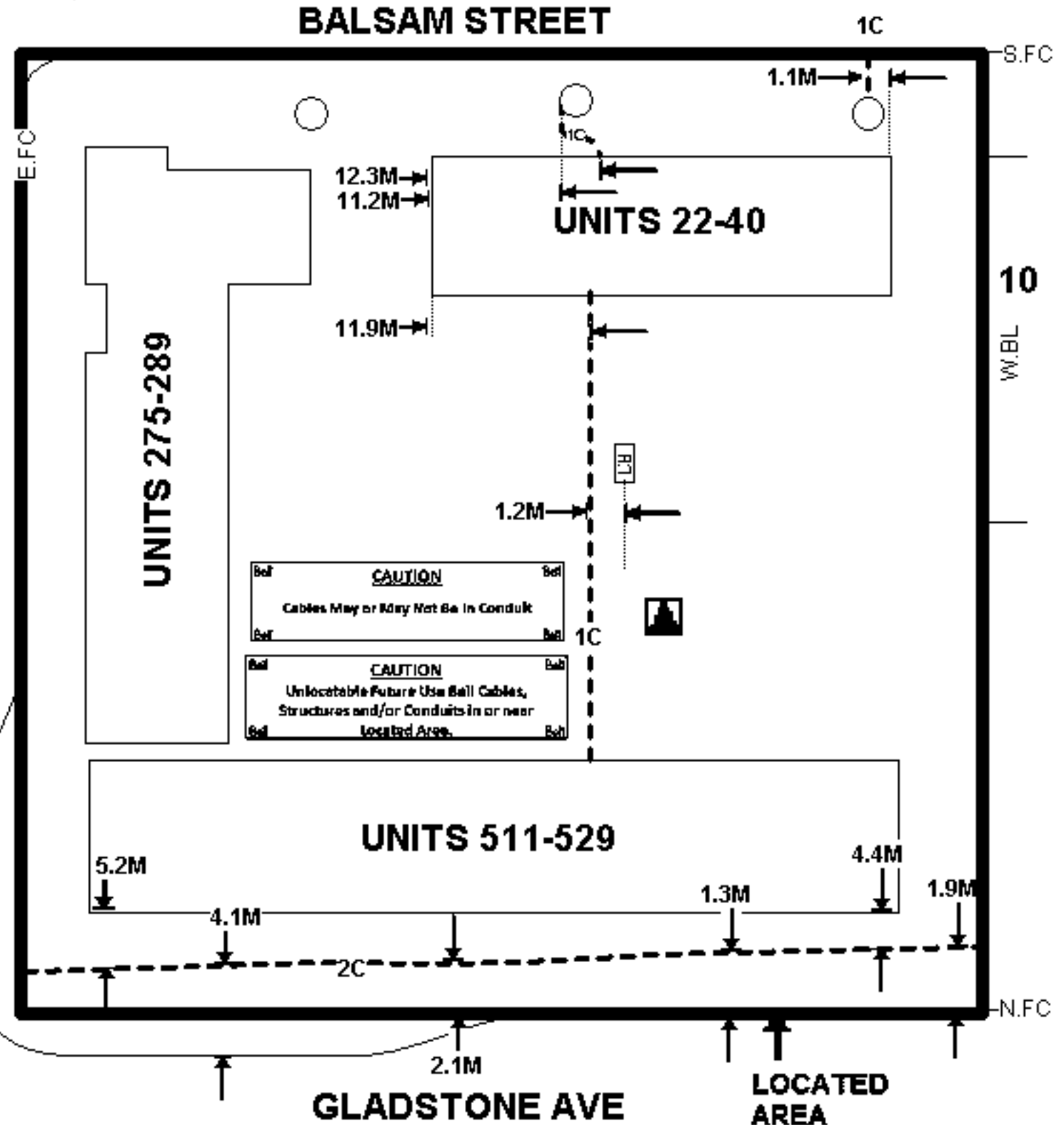
TO: N.FC OF GLADSTONE AVE

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: N/A



| Legend | |
|-------------------------|---------|
| Building Line | — BL — |
| Fence Line | — FL — |
| Face of Curb | — FC — |
| Road Edge | — RE — |
| Property Line | — PL — |
| ASHPALT EDGE | — AE — |
| Driveway | — DW — |
| Catch Basin | |
| Sidewalk | |
| Demarcation | |
| Railway | |
| Pole | |
| Flush to Grade Pedestal | |
| Pedestal | |
| Buried Cable | — B — |
| Conduit | — C — |
| Buried Service Wire | — BSW — |
| Manhole | |
| 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. |

ROCHESTER STREET



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.



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 ☐ HYDRO OTTAWA ☐ VIDEOTRON
 LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

 Date Located:
mm/dd/yyyy 08/02/2017

 Request #
20172915820

Number of Services marked: (Specify building/house numbers) (2) - 30 BALSAM STREET, 819 GLADSTONE AVE

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: E.FC OF ROCHESTER STREET

TO: W.BL OF 10 BALSAM STREET

FROM: S.FC OF BALSAM STREET

TO: N.FC OF GLADSTONE AVE

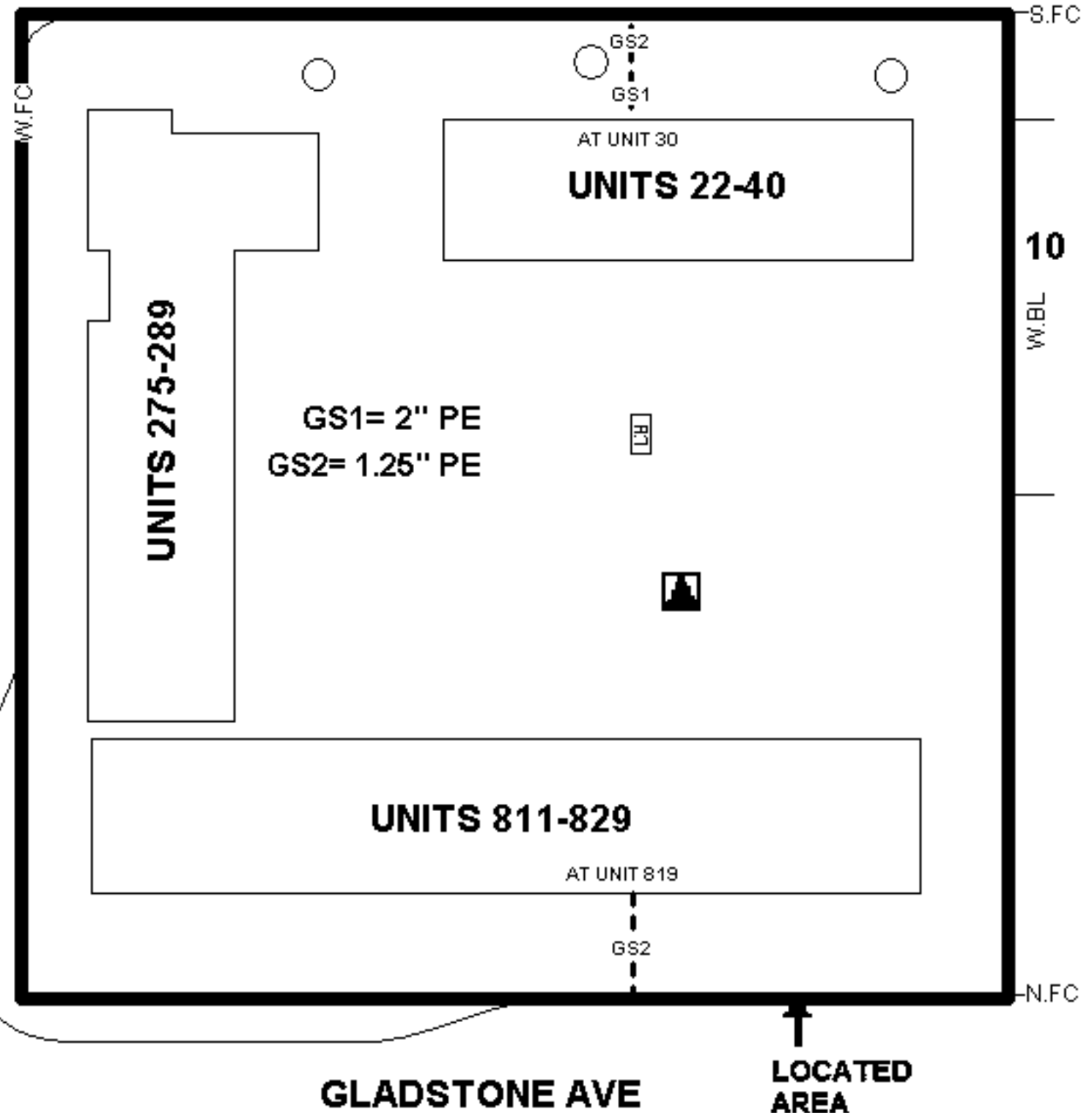
CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and MUST be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: N/A



| Legend | |
|-------------------------|---------|
| Building Line | — BL — |
| Fence Line | — FL — |
| Face of Curb | — FC — |
| Road Edge | — RE — |
| Property Line | — PL — |
| ASHPALT EDGE | -AE- |
| Driveway | — DW — |
| Catch Basin | |
| Sidewalk | — SW — |
| Demarcation | |
| Railway | |
| Pole | O |
| Flush to Grade Pedestal | |
| Pedestal | |
| Buried Cable | — B — |
| Conduit | — C — |
| Buried Service Wire | — BSW — |
| Manhole | |
| 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. |

ROCHESTER STREET



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.

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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 ☒ HYDRO OTTAWA ☐ VIDEOTRON
 LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

 Date Located:
mm/dd/yyyy 08/02/2017

Request # 20172915820

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: E.FC OF ROCHESTER STREET

TO: W.BL OF 10 BALSAM STREET

FROM: S.FC OF BALSAM STREET

TO: N.FC OF GLADSTONE AVE

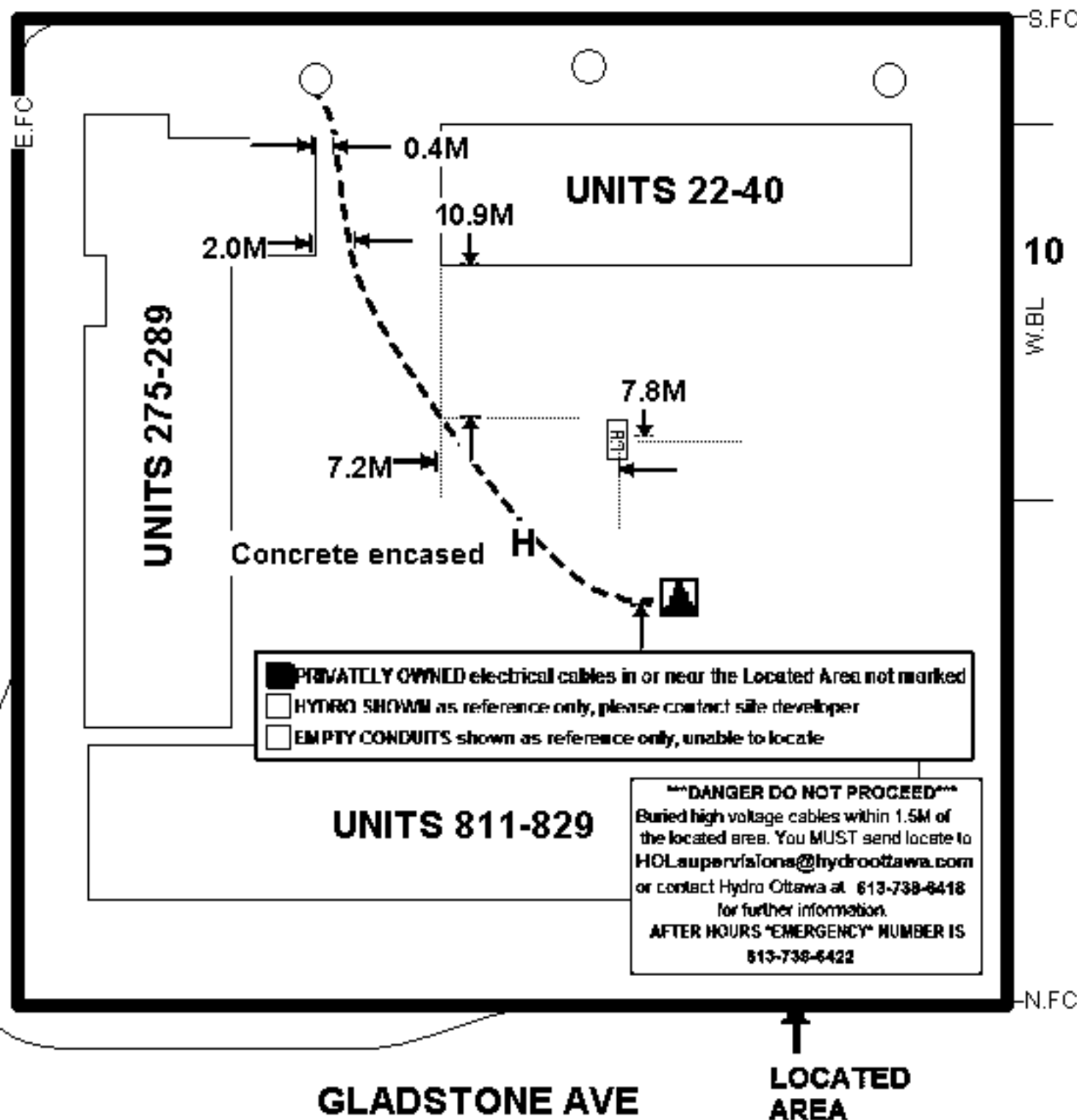
CAUTION: Hand dig within 1.5M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and MUST be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: N/A



| Legend | |
|---------------------|---------|
| Building Line | — BL — |
| Fence Line | — FL — |
| Face of Curb | — FC — |
| Road Edge | — RE — |
| Property Line | — PL — |
| ASHPALT EDGE | — AE — |
| Driveway | — DW — |
| Catch Basin | |
| Sidewalk | |
| Demarcation | |
| Railway | |
| Pole | |
| Flush to Grade | |
| Pedestal | |
| Pedestal | |
| Buried Cable | — B — |
| Conduit | — C — |
| Buried Service Wire | — BSW — |
| Manhole | |
| 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. |

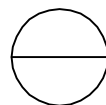
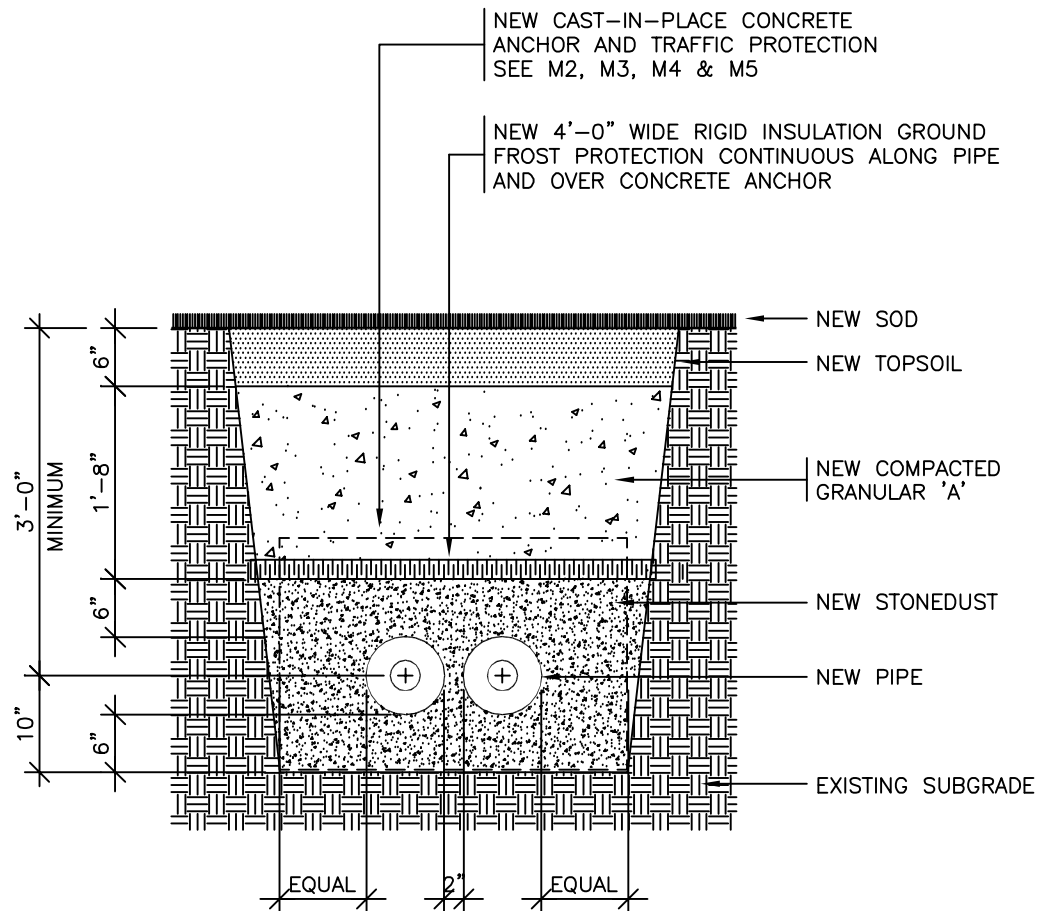
ROCHESTER STREET



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.



TYPICAL HEATING PIPE TRENCH DETAIL

SCALE: 3/4" = 1'-0"

FILE NAME F:\COMMON\PROJMAN\97\018PHEA\DWG\AC04E-D2.DWG



Ottawa-Carleton Housing
Logement d'Ottawa-Carleton

| | | |
|---|---------------------|-------------------|
| PROJECT FP4 ROCHESTER HEIGHTS - PIPING REPLACEMENT | | |
| DESIGN B.B. | CHECKED | SCALE AS SHOWN |
| DRAWN B.B. | DATE MAY 2, 1997 | TENDER 97018P |

DWG. #

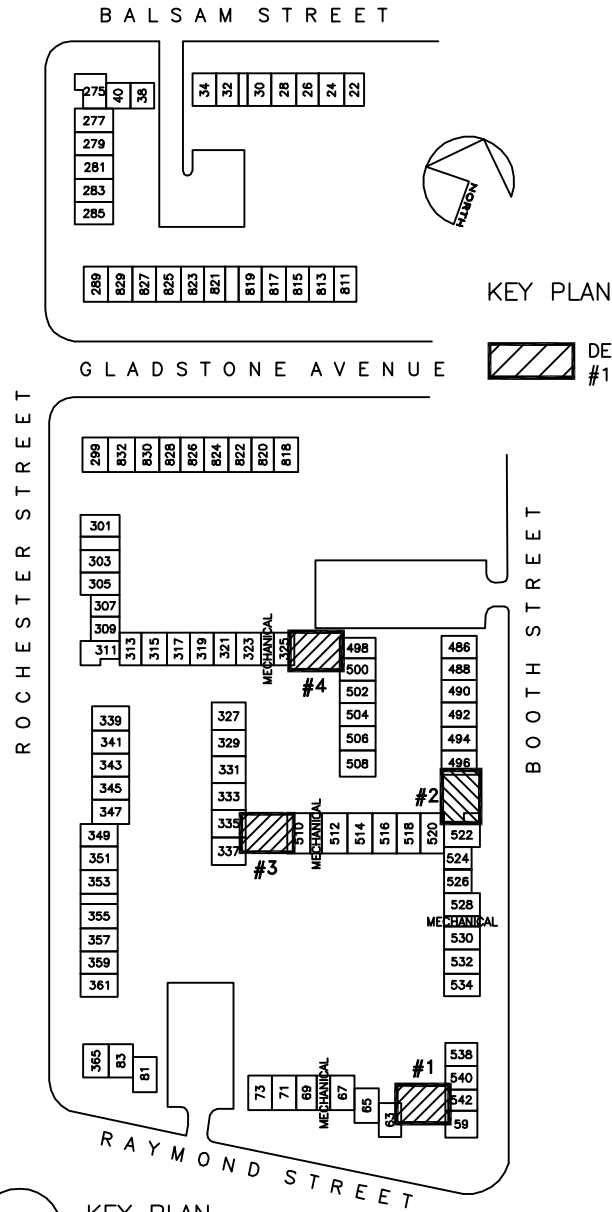
D2

OF 3




KEY PLAN
















SCALE: N.T.S.



KEY PLAN

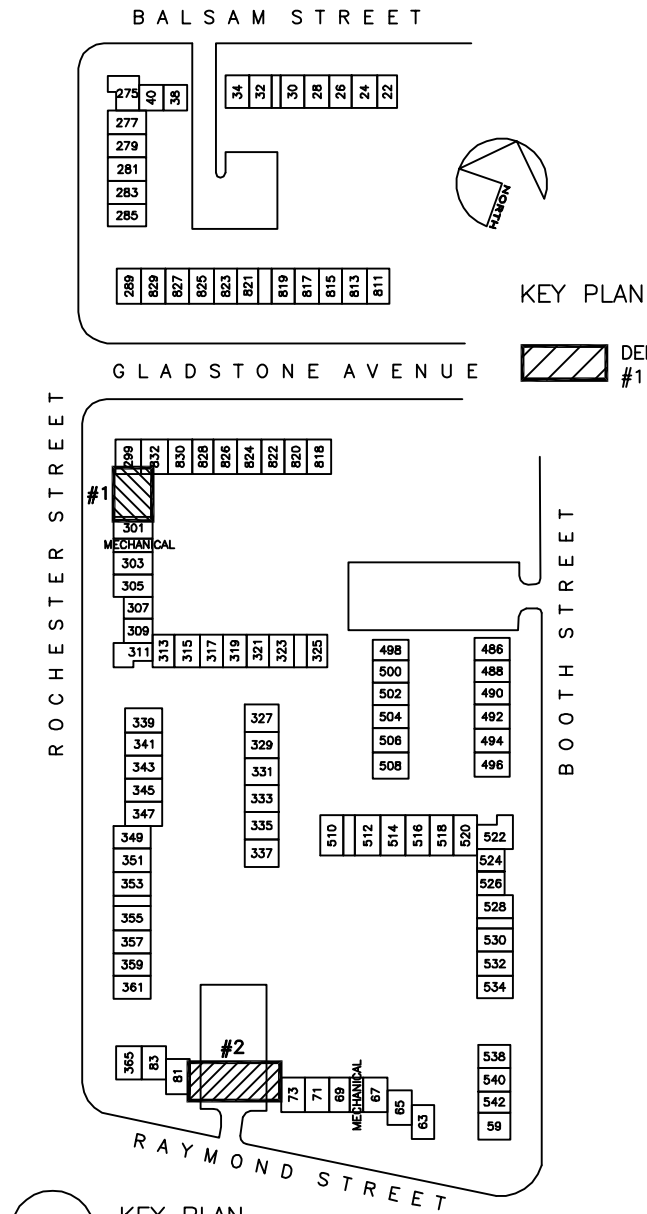
 DENOTES LOCATIONS OF WORK - #1, #2, #3 & #4

LEGEND:


-  EXISTING LIGHT DUTY ASPHALT PAVING
-  EXISTING UNIT PAVING
-  EXISTING TOPSOIL WITH SOD OVER
-  EXISTING SOIL PLANTING BED
-  EXISTING CHAINLINK FENCE
-  EXISTING CONCRETE CURB WITH STEEL TUBING FENCE
-  EXISTING WOOD PRIVACY SCREEN
-  EXISTING CONCRETE PAVERS
-  EXISTING CLOTHES LINE
-  EXISTING PARKING BOLLARD WITH CHAIN
-  EXISTING TREE TO REMAIN / BE PROTECTED
-  EXISTING SHRUB
-  EXISTING SUPPLY AND RETURN PIPING, CONDUIT AND ANCHORAGE TO REMAIN
-  NEW PRE-INSULATED PLASTIC SUPPLY AND RETURN PIPE WITH RIGID INSULATION GROUND FROST PROTECTION OVER
-  NEW 3'-0" LONG X 3'-0" WIDE X 2'-0" DEEP CAST-IN-PLACE CONCRETE ANCHOR AT MID SPAN OF PIPE

FILE NAME F:\COMMON\PROJMAN\97\018PHEA\DWG\ACO4E-01.DWG















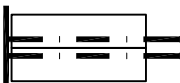
| | | | | |
|---|-------------|---------|-------------|---------------|
| PROJECT FP4 ROCHESTER HEIGHTS - PIPING REPLACEMENT | | | | DWG. # |
| | | | | M1 |
| | | CHECKED | SCALE | AS SHOWN |
| DESIGN | B.B. / J.N. | | | |
| DRAWN | B.B. | DATE | MAY 2, 1997 | TENDER 97018P |
| TECHNICAL SERVICES | | | | |
| Ottawa-Carlton Housing Logement d'Ottawa-Carlton | | | | |
| 2187 Riverside Drive, Ottawa, Ontario K1H 1A8 Tel. 731-7223 | | | | |
| OF 5 | | | | |



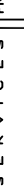
KEY PLAN

 DENOTES LOCATIONS OF WORK - #1 & #2

LEGEND:

-  SAWCUT
-  EXISTING LIGHT DUTY ASPHALT PAVING
-  EXISTING HEAVY DUTY ASPHALT PAVING
-  EXISTING TOPSOIL WITH SOD OVER
-  EXISTING CHAINLINK FENCE
-  EXISTING METAL FRAME / WOOD PRIVACY SCREEN
-  EXISTING CONCRETE PAVERS
-  EXISTING CLOTHES LINE
-  EXISTING CATCH BASIN
-  EXISTING MANHOLE
-  EXISTING PARKING BOLLARD WITH WIRING
-  EXISTING SUPPLY AND RETURN PIPING, CONDUIT AND ANCHORAGE TO REMAIN
-  NEW PRE-INSULATED PLASTIC SUPPLY AND RETURN PIPE
-  NEW POURED-IN-PLACE CONCRETE
-  NEW RIGID INSULATION GROUND FROST PROTECTION ADJACENT TO BUILDING

FILE NAME F:\COMMON\PROJMAN\98\006PHEA\DWG\MFP4-01.DWG

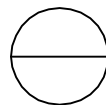
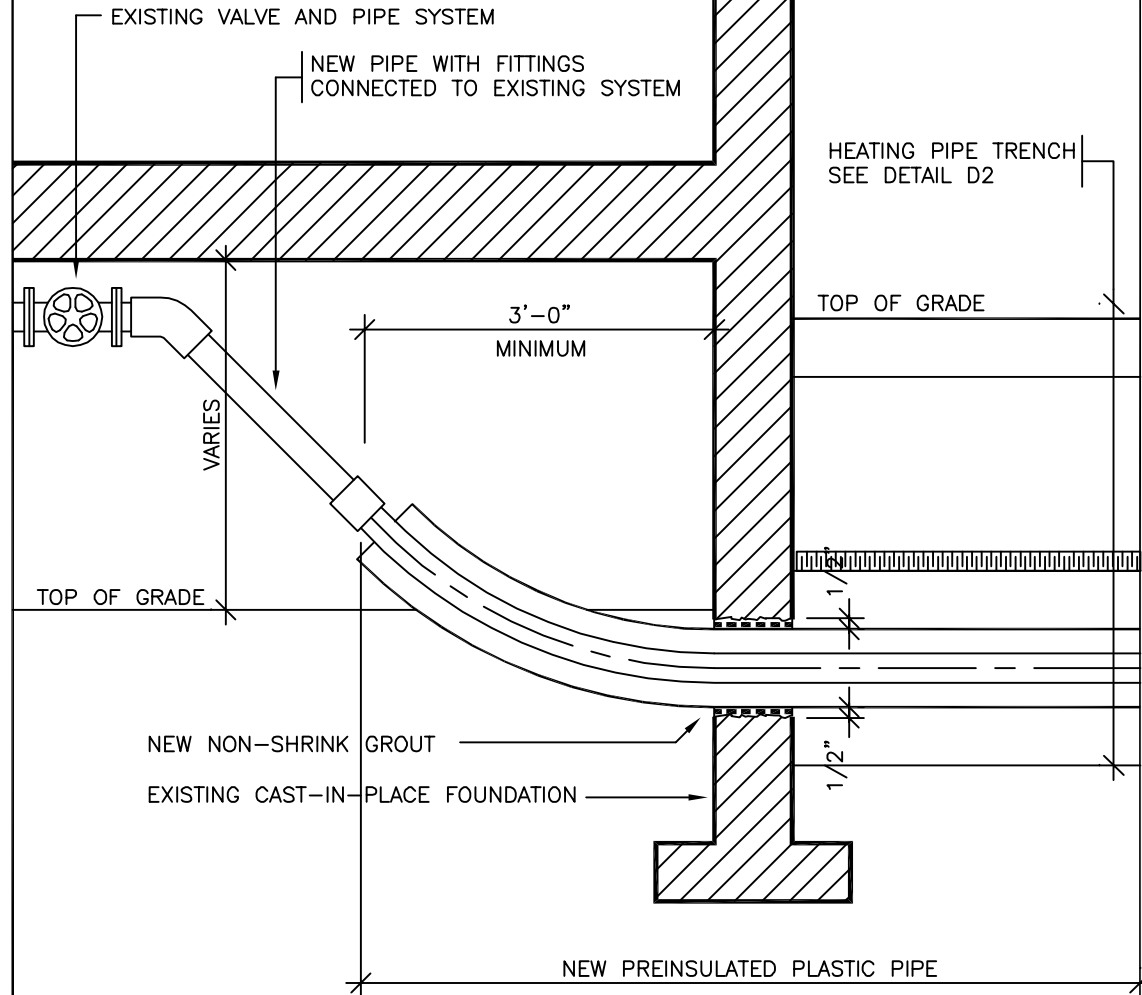
| | | | | | | | |
|--|--|--|--|--|--|---------|---------------|
| T E C H N I C A L S E R V I C E S | | | | | DWG. # | | |
|  | | | | | PROJECT FP4 ROCHESTER HEIGHTS — PIPING REPLACEMENT | | M1 |
| | | | | | | | |
| | | | | | DESIGN | CHECKED | SCALE |
| | | | | | B.B. / J.N. | | AS SHOWN |
| | | | | | DRAWN | DATE | TENDER |
| | | | | | B.B. | | JULY 21, 1998 |
| 2197 Riverside Drive, Ottawa, Ontario K1H 1A8 Tel. 731-7223 | | | | | | | |

TECHNICAL SERVICES

Ottawa-Carlton Housing
Logement d'Ottawa-Carlton

2187 Riverside Drive, Ottawa, Ontario K1H 1A8 Tel. 731-7223

PROVIDE PIPE ELBOWS AND OFFSETS TO SUIT
PIPE LOCATION AND EXPANSION CHARACTERISTICS.
OBTAIN AND FOLLOW INSTALLATION DETAILS FROM
MANUFACTURER AND SUBMIT DETAILS TO O.C.H..



TYPICAL HEATING PIPE / FOUNDATION WALL DETAIL

SCALE: 3/4" = 1'-0"

FILE NAME F:\COMMON\PROJMAN\97\018PHEA\DWG\AC04E-D1.DWG



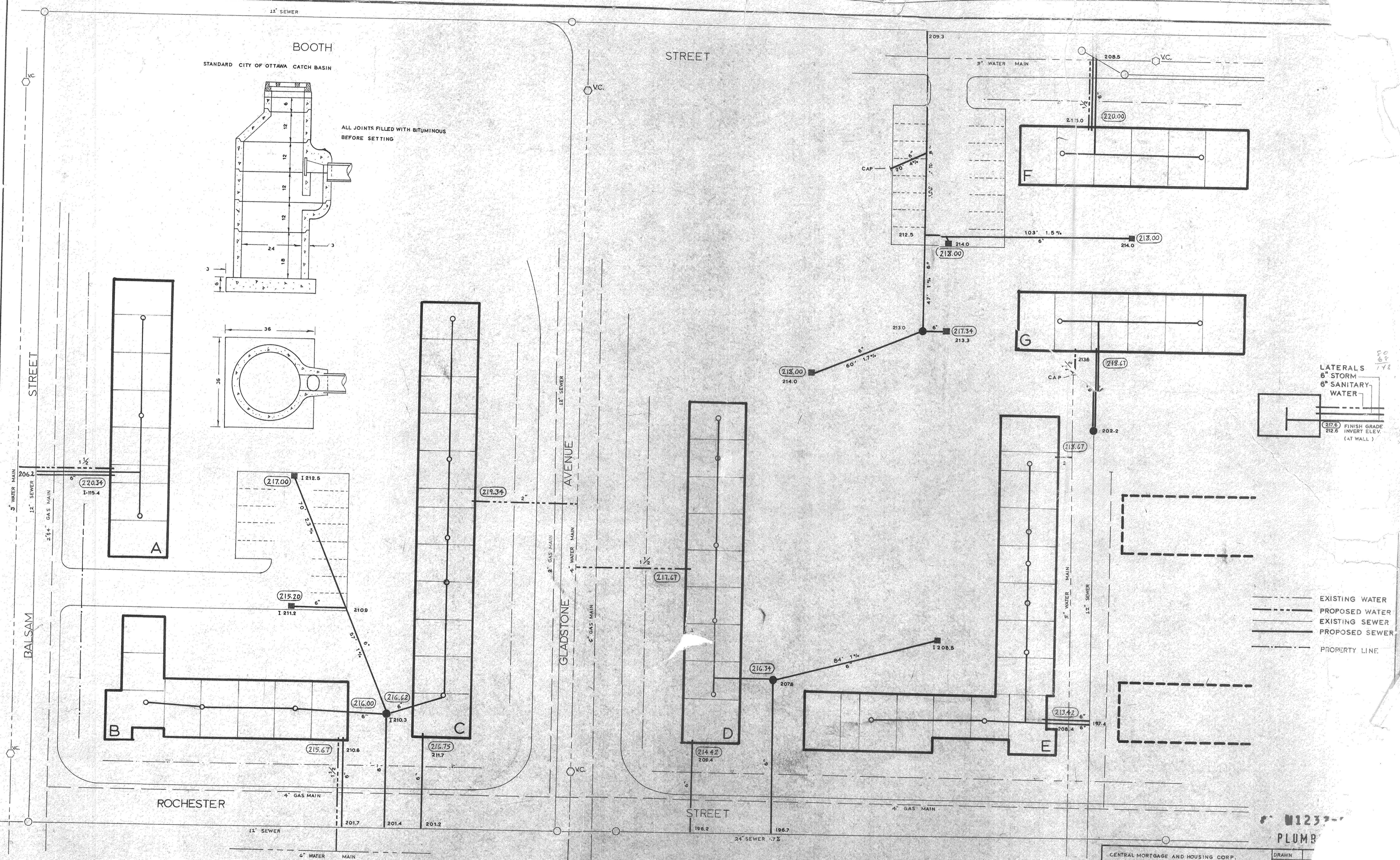
Ottawa-Carleton Housing
Logement d'Ottawa-Carleton

| | | |
|---|---------------------|-------------------|
| PROJECT FP4 ROCHESTER HEIGHTS - PIPING REPLACEMENT | | |
| DESIGN B.B. | CHECKED | SCALE AS SHOWN |
| DRAWN B.B. | DATE MAY 2, 1997 | TENDER 97018P |

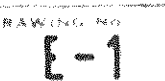
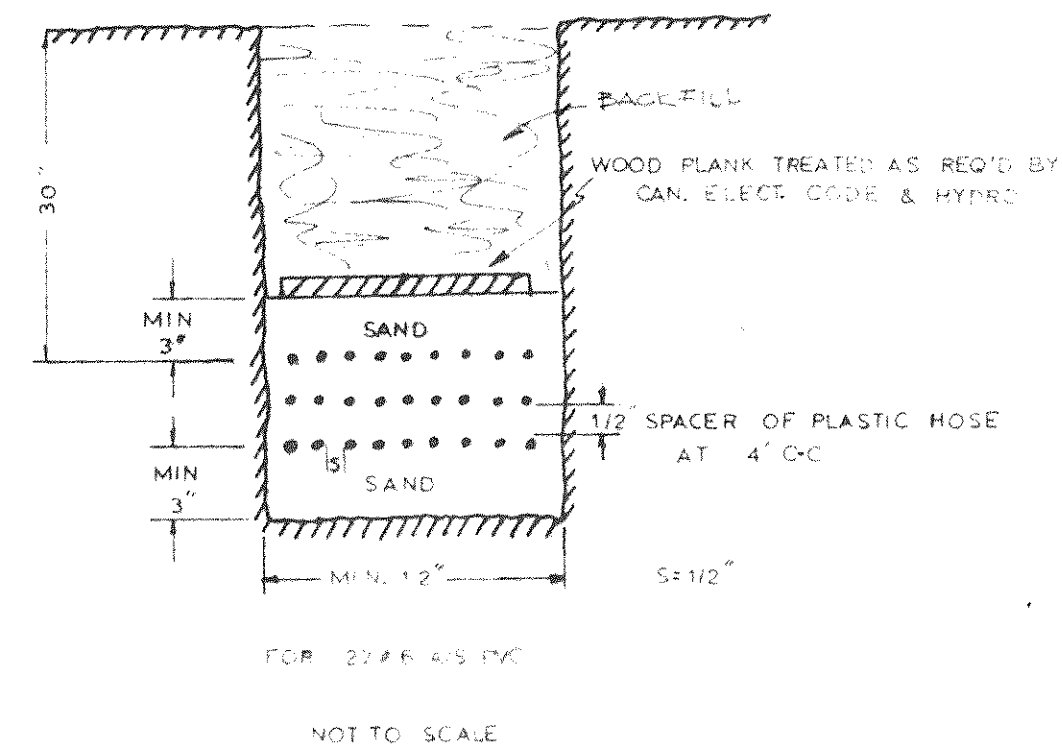
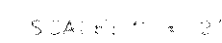
DWG. #

D1

OF 3



STREET



1233-E 01

OTTAWA
F. P. 4/64

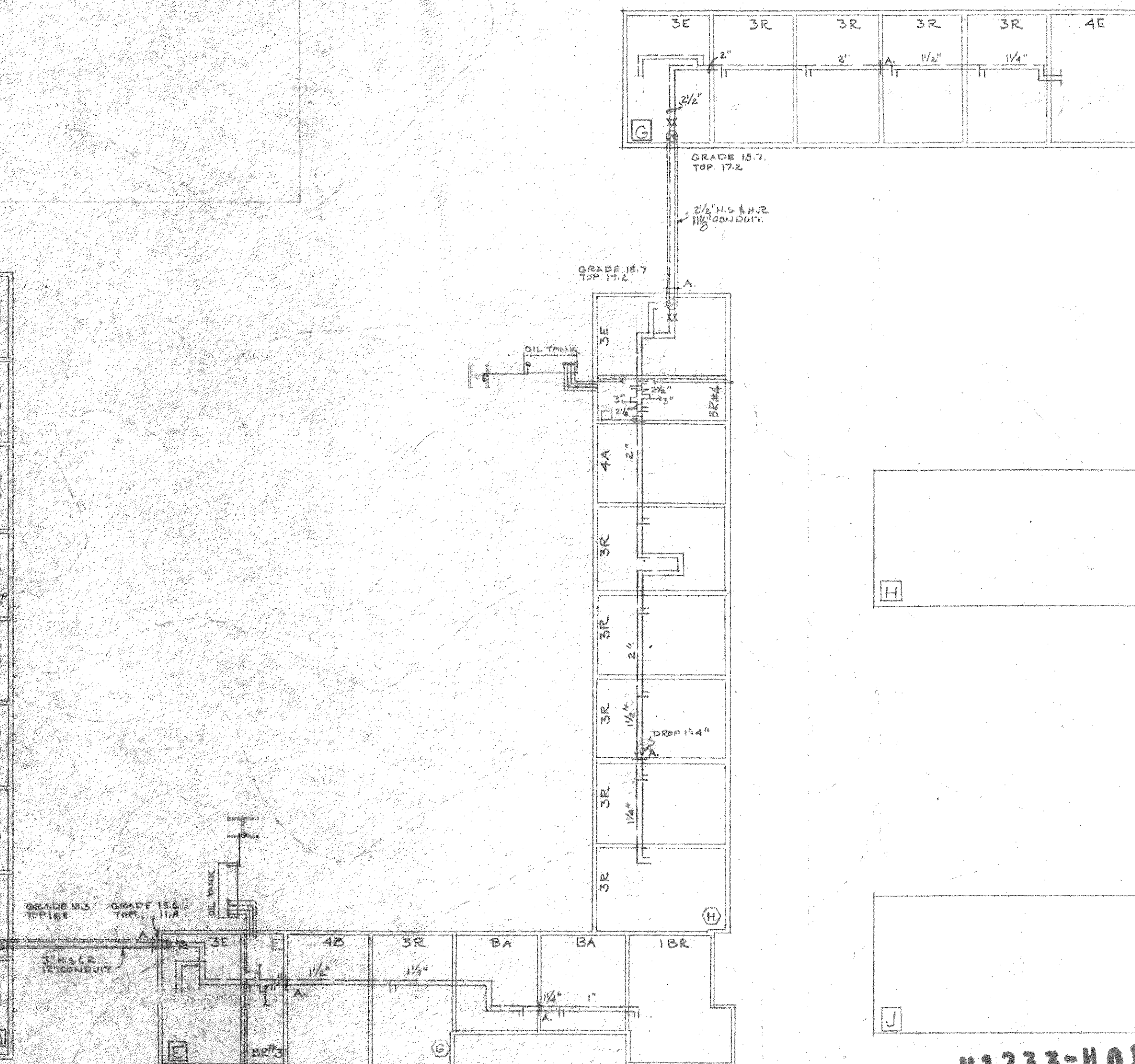
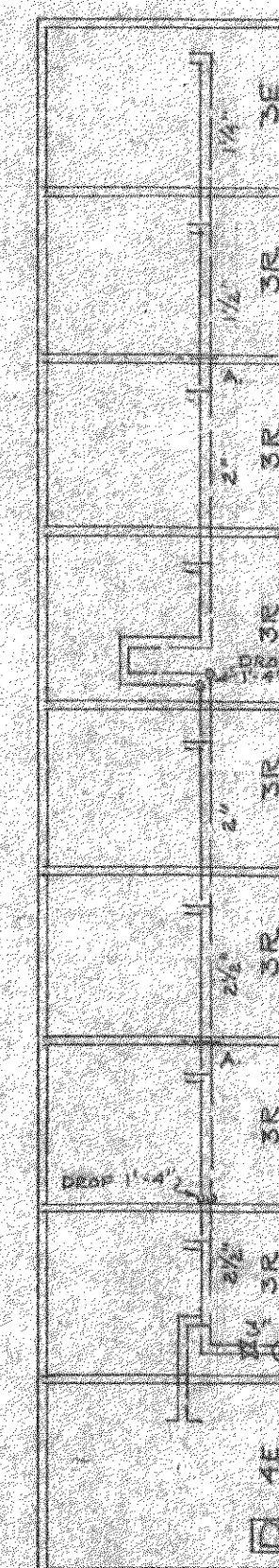
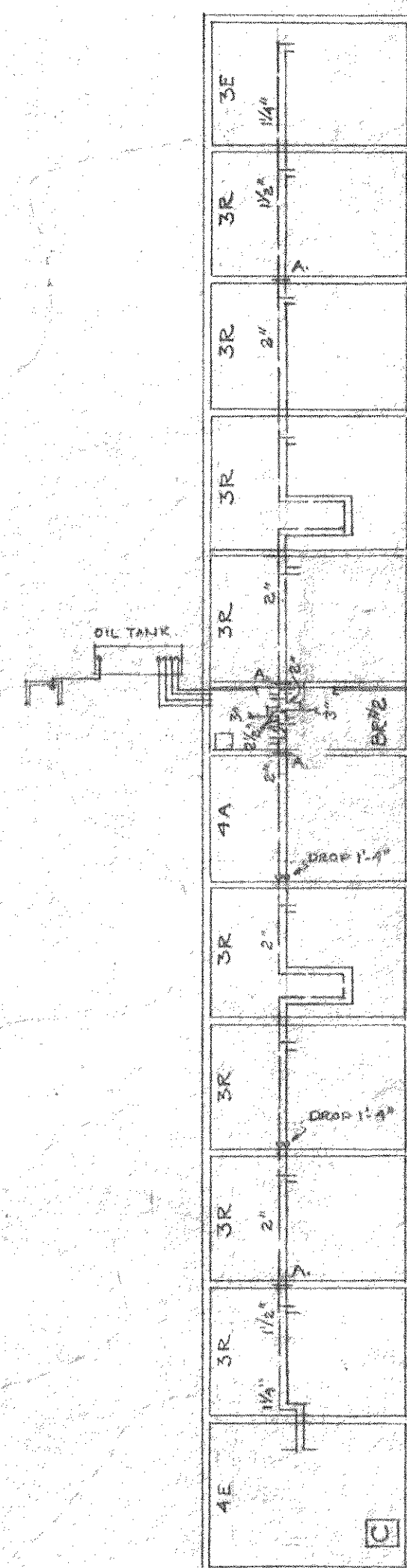
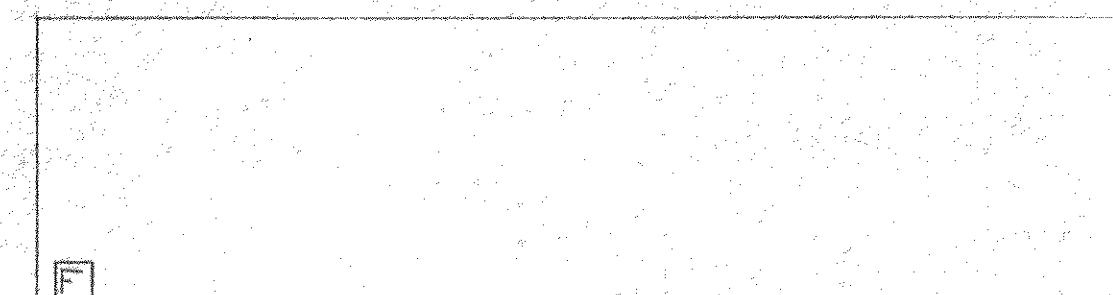
ELECTRICAL

CENTRAL MORTGAGE AND HOUSING CORPORATION
ARCHITECTURAL AND PLANNING DIVISION
IAN MACLENNAN CHIEF ARCHITECT

OFFICE HEAD OFFICE

| | |
|----------|--------------------|
| DRAWN | P.N.G. |
| CHECKED | |
| APPROVED | <i>[Signature]</i> |
| SCALE | |
| DATE | 24/1/85 |

DRAWING NO
E-1



HEATING
OTTAWA
F. P. 4/64

CENTRAL MORTGAGE AND HOUSING CORPORATION
ARCHITECTURAL AND PLANNING DIVISION
IAN MACLENNAN CHIEF ARCHITECT
OFFICE HEAD OFFICE

| | | |
|----------|--------------------|--------------|
| DRAWN | M.C.R. | SITE PLAN |
| CHECKED | <i>[Signature]</i> | |
| APPROVED | <i>[Signature]</i> | |
| SCALE | | DRAWING NO. |
| DATE | 24/10/63 | H-1 |

Appendix B

Sampling Analysis Plan



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| Appendix A | Proposed Borehole/Monitoring Well Locations |
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1. Background

A Phase Two Environmental Site Assessment is to be completed for the residential property identified as 811 Gladstone Avenue Complex in Ottawa, Ontario ("Site") to investigate the areas of potential environmental concern (APECs) identified by the Phase One ESA.

The Phase One ESA identified

- APEC#1 | Portions of the Site that had evidence of imported fill placement (PCA#1).
- APEC#2 | The southeast portion of the Site is 6 m west of 414 Booth Street (a former automotive service garage and service station with fuel in underground storage tanks (USTs) identified as PCA#2).
- APEC#3 | The northeast portion of the Site is 25 m south of 394 Booth Street (a former asphalt and bitumen manufacturing site, identified as PCA#3).
- APEC#4 | The northeast portion of the Site is 40 m south of 388 Booth Street (a former automotive garage, identified as PCA#4).
- APEC#5 | The northwest portion of the Site is 20 m south of 263 Rochester Street (a former drycleaner, identified as PCA#5).

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 | metals, VOCs, PAHs
- APEC#2 | metals, PHCs, VOCs
- APEC#3 | metals, VOCs, PAHs
- APEC#4 | metals, PHCs, VOCs, PAHs
- APEC#5 | VOCs

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 Appendix A.



Five boreholes advanced to (refusal + 1.5 m coring)

- Install groundwater monitoring wells in 3 boreholes

Two boreholes advanced to (maximum 6 m)

- Install groundwater monitoring wells in 2 boreholes

The approximate locations and labelling of the boreholes/monitoring wells are indicated on the provided plan.

Should contamination be encountered or suspected in a location which has not been proposed to be equipped with a monitoring well, one of the proposed monitoring well installations should be changed to allow for an assessment of the groundwater in this area. This should be discussed with the project manager.

Depths

Soil samples from the boreholes will be collected in 0.6 m intervals using stainless steel split spoons, with 0.15 m spacing between samples. Soil sampling will be conducted from ground surface down to proposed drilling depth (bedrock refusal) or (maximum 6 m overburden).

Groundwater monitoring well screens will be installed within the shallow bedrock. 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 four 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 |
|--|------------------------|--|
| APEC#1 BH1, BH3, BH4, BH8 and others containing fill | metals, PHCs, VOCs, pH | Sample - fill materials |
| APEC#2 BH7 | metals, PHCs, VOCs, pH | Sample - near water table interface, or - just above impermeable layer or - fill layer, or - area of obvious contamination |



Table 4.1 Soil Sampling

| Location | Analytical Parameter | Approximate Depth/Stratigraphy |
|----------------------------------|--|--|
| APEC#3 BH5 (One Sample) | Metals, PHCs, VOCs, PAHs, pH | Sample - near water table interface, or - just above impermeable layer or - fill layer - area of obvious contamination |
| APEC#5 BH6 | VOCs, pH | Sample - near water table interface, or - just above impermeable layer or - fill layer - area of obvious contamination |
| Duplicate Sample | DUP-1 | Any material sampled for metals, PHCs, BTEX/VOCs, PAHs |
| Worst Case | Reg. 558 – laflesche unknown petroleum package | Select 1 sample for leachate (TCLP) 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:

- PHCs, VOCs, PAH, metals, pH – one large soil jar and one vial
- Reg. 558 TCLP – two 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:

| Location | Analytical Parameters | Approximate Depth of Sample |
|-----------|---------------------------------|-----------------------------|
| MW1 | PHCs, VOCs, PAH, pH | Screened Interval |
| MW2 | PHCs, VOCs, PAH, pH | Screened Interval |
| MW3 | PHCs, VOCs, PAH, pH | Screened Interval |
| MW4 | PHCs, VOCs, PAH, pH | Screened Interval |
| MW5 | PHCs, VOCs, PAH, pH | Screened Interval |
| Duplicate | DUP-GW1 Duplicate of PHCs/BTEXs | 1/10 samples |



| Location | Analytical Parameters | Approximate Depth of Sample |
|------------|-----------------------|-----------------------------|
| Trip Blank | VOC | 1/cooler |

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 RKI Eagle Combustible Gas Detector (Gastech) 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. To avoid mixture of sediment into the groundwater column and prevent volatilization during sampling, a peristaltic pump is used for groundwater sampling. The wells are purged of standing water by removing at least one well volume using the peristaltic pump. Sampling is conducted on a low flow setting following the stabilization of groundwater quality parameters. Samples are collected in dedicated bottles prepared by the laboratory. Samples are field filtered in the case of metals sampling.

Appendices

Appendix A

Borehole Location Plan



40 m

Appendix C

Borehole logs



BOREHOLE No.: BH1-17/MW1-17

ELEVATION: 101.28 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Ottawa Community Housing Corporation

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 811 Gladstone Avenue., Ottawa Ontario

DESCRIBED BY: R. Vandentillaart

CHECKED BY: S. Wallis

DATE (START): 22 August 2017

DATE (FINISH): 22 August 2017

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- 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 |
| meters | 101.28 | | GROUND SURFACE | | | | % | ppm |
| 0.5 | 101.2 | | ASPHALT (Approximately 0.1 m thick) | 0.05 | | Auger | | |
| | 100.9 | | FILL - Gravel, dense, brown, dry. | 0.20 | | SS1 | 5/15 | |
| | 100.8 | | TILL - Sand and gravel, loose, brown, dry. | 0.66 | | | | |
| 1.0 | | | *Auger refusal at 0.475 m, continued with rock coring | Bentonite Seal | | RC1 | 36/41 | 60 |
| 1.5 | | | LIMESTONE - Grey, weathered and fractured, fair quality. | 1.27 | | | | |
| | | | *Becoming good | 1.48 | | | | |
| 2.0 | | | | WL 1.84 | | | | |
| | | | | 9/8/2017 | | RC2 | 60/60 | 82 |
| 3.0 | | | | | | | | |
| 3.5 | | | | Sand | | | | |
| 4.0 | | | | Screen | | RC3 | 57/60 | 89 |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | *Becoming excellent | | | RC4 | 60/60 | 93 |
| 6.0 | | | | | | | | |
| 6.5 | 95.1 | | Borehole ended at approximately 6.15 m in limestone | 6.05 | | | | |
| | | | | 6.15 | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)

BOREHOLE LOG 11140575-E2, BH LOGS, SW, SEPT. 20, 2017, GPJ INSPEC. SOL. GDT 23/10/17

**BOREHOLE No.:** BH2-17/MW2-17**ELEVATION:** 101.50 m**BOREHOLE LOG**

Page: 1 of 1

CLIENT: Ottawa Community Housing Corporation

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 811 Gladstone Avenue., Ottawa Ontario

DESCRIBED BY: R. Vandentillaart

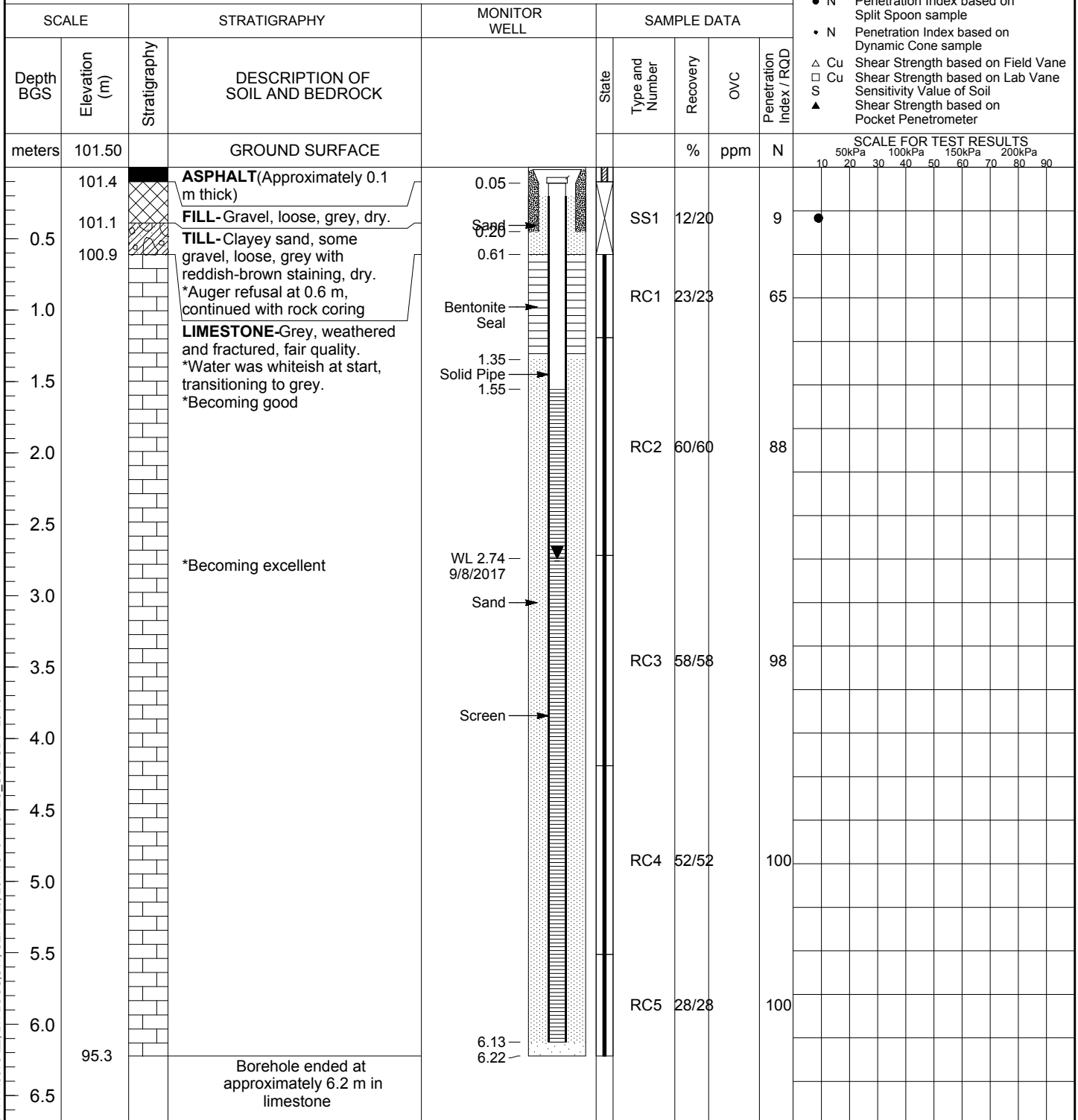
CHECKED BY: S. Wallis

DATE (START): 25 August 2017

DATE (FINISH): 25 August 2017

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
- Δ 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

**NOTES:**

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)















ELEVATION: 102.39 m

BOREHOLE LOG

Page: 1 of 1

DATE (FINISH): 28 August 2017

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 |

[illegible]

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)

BOREHOLE LOG 11140575-E2, BH LOGS,SW, SEPT. 20, 2017.GPJ INSPEC SOL.GDT 23/10/17



BOREHOLE No.: BH3-17
ELEVATION: 101.08 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Ottawa Community Housing Corporation

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 811 Gladstone Avenue., Ottawa Ontario

DESCRIBED BY: R. Vandentillaart

CHECKED BY: S. Wallis

DATE (START): 25 August 2017

DATE (FINISH): 25 August 2017

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 | | | SAMPLE DATA | | | |
|-----------|---------------|--------------|--|-------|-----------------|----------|-----|-------------------------|
| Depth BGS | Elevation (m) | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK | State | Type and Number | Recovery | OVC | Penetration Index / RQD |
| meters | 101.08 | | GROUND SURFACE | | | % | ppm | N |
| | 101.0 | | ASPHALT (Approximately 0.1 m thick) | | | | | |
| | | | FILL - Gravel, loose, grey, dry. | | | | | |
| 0.5 | 100.7 | | TILL - Sand, some clay, some gravel, loose, grey, wet. | | SS1 | 11/25 | | 9 |
| | 100.3 | | *Auger refusal at 0.76 m, continued with rock coring | | | | | |
| 1.0 | | | LIMESTONE - Grey, weathered and fractured, fair quality. | | RC1 | 22/22 | | 64 |
| 1.5 | | | *Becoming excellent | | | | | |
| 2.0 | | | | | RC2 | 57/57 | | 93 |
| 2.5 | | | | | | | | |
| | 98.3 | | Borehole ended at approximately 2.7 m in limestone | | | | | |
| 3.0 | | | | | | | | |
| 3.5 | | | | | | | | |
| 4.0 | | | | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6.0 | | | | | | | | |
| 6.5 | | | | | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)



BOREHOLE No.: BH4-17
ELEVATION: 101.08 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Ottawa Community Housing Corporation

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 811 Gladstone Avenue., Ottawa Ontario

DESCRIBED BY: R. Vandentillaart

CHECKED BY: S. Wallis

DATE (START): 25 August 2017

DATE (FINISH): 25 August 2017

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 | | | SAMPLE DATA | | | |
|-----------|---------------|--------------|--|-------|-----------------|----------|-----|-------------------------|
| Depth BGS | Elevation (m) | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK | State | Type and Number | Recovery | OVC | Penetration Index / RQD |
| meters | 101.08 | | GROUND SURFACE | | | % | ppm | N |
| | 101.0 | | ASPHALT (Approximately 0.1 m thick) | | | | | |
| | 100.7 | | FILL - Gravel, compact, grey, dry. | | SS1 | 10/16 | | 19 |
| 0.5 | 100.6 | | TILL - Sand, some clay, some gravel, loose, greyish brown, dry. *Auger refusal at 0.5 m, continued with rock coring | | | | | |
| 1.0 | | | LIMESTONE - Grey, weathered and fractured, good quality. | | RC1 | 27/27 | | 78 |
| 1.5 | | | | | | | | |
| 2.0 | | | | | RC1 | 60/60 | | 85 |
| 2.5 | | | | | | | | |
| 3.0 | 98.4 | | Borehole ended at approximately 2.7 m in limestone | | | | | |
| 3.5 | | | | | | | | |
| 4.0 | | | | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6.0 | | | | | | | | |
| 6.5 | | | | | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)



BOREHOLE No.: BH6-17
ELEVATION: 101.70 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Ottawa Community Housing Corporation

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 811 Gladstone Avenue., Ottawa Ontario

DESCRIBED BY: R. Vandentillaart

CHECKED BY: S. Wallis

DATE (START): 28 August 2017

DATE (FINISH): 28 August 2017

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 | | | SAMPLE DATA | | | |
|-----------|---------------|--------------|---|-------|-----------------|----------|-----|-------------------------|
| Depth BGS | Elevation (m) | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK | State | Type and Number | Recovery | OVC | Penetration Index / RQD |
| meters | 101.70 | | GROUND SURFACE | | | % | ppm | N |
| 0.5 | 101.5 | | TOPSOIL -Silty sand with organics (grass), very loose, dark brown, damp. (Approximately 0.18 m thick) | | SS1 | 7/24 | | 4 |
| 1.0 | | | FILL -Silty sand, trace organics, loose, dark brown, moist. | | SS2 | 5/20 | | 22 |
| 1.5 | 100.6 | | *Auger refusal at 1.1 m, continued with rock coring LIMESTONE -Grey, weathered and fractured, poor quality. | | RC1 | 25/25 | | 30 |
| 2.0 | | | *Becoming excellent | | | | | |
| 2.5 | | | | | RC2 | 47/47 | | 96 |
| 3.0 | 98.8 | | Borehole ended at approximately 2.9 m in limestone | | | | | |
| 3.5 | | | | | | | | |
| 4.0 | | | | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6.0 | | | | | | | | |
| 6.5 | | | | | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)



BOREHOLE No.: BH7-17
ELEVATION: 101.66 m

BOREHOLE LOG

Page: 1 of 1

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 | | | SAMPLE DATA | | | |
|-----------|---------------|--------------|---|-------|-----------------|----------|-----|-------------------------|
| Depth BGS | Elevation (m) | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK | State | Type and Number | Recovery | OVC | Penetration Index / RQD |
| meters | 101.66 | | GROUND SURFACE | | | % | ppm | N |
| | 101.6 | | TOPSOIL -Silty sand with organics (grass), very loose, dark brown, damp. (Approximately 0.1 m thick) | | SS1 | 12/20 | | 10 |
| 0.5 | | | FILL -Sand some gravel, loose, light brown, moist. | | | | | |
| | 101.0 | | *Auger refusal at 0.66 m, continued with rock coring | | | | | |
| 1.0 | | | LIMESTONE -Grey, weathered and fractured, poor quality. | | RC1 | 14/19 | | 29 |
| 1.5 | | | | | RC2 | 15/15 | | 40 |
| 2.0 | | | *Becoming excellent | | | | | |
| 2.5 | | | | | RC3 | 57/56 | | 93 |
| 3.0 | 98.7 | | Borehole ended at approximately 2.9 m in limestone | | | | | |
| 3.5 | | | | | | | | |
| 4.0 | | | | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6.0 | | | | | | | | |
| 6.5 | | | | | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)

BOREHOLE LOG 11140575-E2.BH LOGSS.SW. SEPT. 20, 2017.GPJ INSPEC. SOL.GDT 23/10/17



BOREHOLE No.: BH8-17
ELEVATION: 100.65 m

BOREHOLE LOG

Page: 1 of 1

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 | | | SAMPLE DATA | | | |
|-----------|---------------|--------------|--|-------|-----------------|----------|-----|-------------------------|
| Depth BGS | Elevation (m) | Stratigraphy | DESCRIPTION OF SOIL AND BEDROCK | State | Type and Number | Recovery | OVC | Penetration Index / RQD |
| meters | 100.65 | | GROUND SURFACE | | | % | ppm | N |
| 0.5 | 100.5 | | TOPSOIL -Silty sand with organics (grass), loose, dark brown, moist. (Approximately 0.18 m thick) | | SS1 | 10/24 | | 4 |
| 1.0 | 99.6 | | FILL -Sand and gravel, loose, dark brown, moist. | | SS2 | 6/24 | | 10 |
| 1.5 | | | FILL -Gravel some sand trace silt and clay, loose, greyish brown, dry. | | SS3 | 3/24 | | 34 |
| 2.0 | | | | | SS4 | 3/18 | | |
| 2.5 | 98.4 | | CONCRETE | | | | | |
| 3.0 | 98.1 | | LIMESTONE -Grey, weathered and fractured, poor quality. *Becoming good | | RC1 | 12/24 | | 25 |
| 3.5 | | | | | RC2 | 39/39 | | 82 |
| 4.0 | 96.8 | | Borehole ended at approximately 3.9 m in limestone | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6.0 | | | | | | | | |
| 6.5 | | | | | | | | |

NOTES:

*Surveyed elevations are relative to Fire Hydrant FM175067M (SW Corner of Rochester/Balsam)

BOREHOLE LOG 11140575-E2, BH LOGS.SW, SEPT. 20, 2017.GPJ INSPEC. SOL.GDT 23/10/17

Appendix D

Laboratory Certificates of Analysis

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400
Ottawa, ON K2E7S4
Attn: Luke Lopers

Client PO: 73508783
Project: 11140575-E2
Custody: 113609

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017

Order #: 1735030

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID
1735030-01

Client ID
DUP

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------------------------------|-------------------------------------|-----------------|---------------|
| BTEX by P&T GC-MS | EPA 8260 - P&T GC-MS | 30-Aug-17 | 31-Aug-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 30-Aug-17 | 31-Aug-17 |
| PHC F4G (gravimetric) | CWS Tier 1 - Extraction Gravimetric | 31-Aug-17 | 31-Aug-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 26-Aug-17 | 29-Aug-17 |
| REG 153: Metals by ICP/OES, soil | based on MOE E3470, ICP-OES | 30-Aug-17 | 30-Aug-17 |
| REG 153: PAHs by GC-MS | EPA 8270 - GC-MS, extraction | 25-Aug-17 | 30-Aug-17 |
| Solids, % | Gravimetric, calculation | 29-Aug-17 | 29-Aug-17 |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: **11140575-E2**

| | | | | |
|--------------|------------|---|---|---|
| Client ID: | DUP | - | - | - |
| Sample Date: | 25-Aug-17 | - | - | - |
| Sample ID: | 1735030-01 | - | - | - |
| MDL/Units | Soil | - | - | - |

Physical Characteristics

| | | | | | |
|----------|--------------|------|---|---|---|
| % Solids | 0.1 % by Wt. | 88.4 | - | - | - |
|----------|--------------|------|---|---|---|

Metals

| | | | | | |
|------------|--------------|------|---|---|---|
| Antimony | 1.0 ug/g dry | <1.0 | - | - | - |
| Arsenic | 1.0 ug/g dry | 7.5 | - | - | - |
| Barium | 1.0 ug/g dry | 235 | - | - | - |
| Beryllium | 1.0 ug/g dry | <1.0 | - | - | - |
| Boron | 1.0 ug/g dry | 7.5 | - | - | - |
| Cadmium | 0.5 ug/g dry | <0.5 | - | - | - |
| Chromium | 1.0 ug/g dry | 24.7 | - | - | - |
| Cobalt | 1.0 ug/g dry | 7.7 | - | - | - |
| Copper | 1.0 ug/g dry | 39.8 | - | - | - |
| Lead | 1.0 ug/g dry | 363 | - | - | - |
| Molybdenum | 1.0 ug/g dry | 1.6 | - | - | - |
| Nickel | 1.0 ug/g dry | 15.7 | - | - | - |
| Selenium | 1.0 ug/g dry | <1.0 | - | - | - |
| Silver | 0.5 ug/g dry | <0.5 | - | - | - |
| Thallium | 1.0 ug/g dry | <1.0 | - | - | - |
| Uranium | 1.0 ug/g dry | <1.0 | - | - | - |
| Vanadium | 1.0 ug/g dry | 29.3 | - | - | - |
| Zinc | 1.0 ug/g dry | 152 | - | - | - |

Volatiles

| | | | | | |
|----------------|---------------|-------|---|---|---|
| Benzene | 0.02 ug/g dry | <0.02 | - | - | - |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene | 0.05 ug/g dry | <0.05 | - | - | - |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | - | - |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene-d8 | Surrogate | 95.4% | - | - | - |

Hydrocarbons

| | | | | | |
|------------------------|-------------|---------|---|---|---|
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | - | - | - |
| F2 PHCs (C10-C16) | 4 ug/g dry | <4 | - | - | - |
| F3 PHCs (C16-C34) | 8 ug/g dry | 56 | - | - | - |
| F4 PHCs (C34-C50) | 6 ug/g dry | 174 [1] | - | - | - |
| F4G PHCs (gravimetric) | 50 ug/g dry | 882 | - | - | - |

Semi-Volatiles

| | | | | | |
|--------------|---------------|------|---|---|---|
| Acenaphthene | 0.02 ug/g dry | 0.17 | - | - | - |
|--------------|---------------|------|---|---|---|

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: **11140575-E2**

| | MDL/Units | Client ID: | DUP | - | - | - |
|--------------------------|---------------|--------------|------------|---|---|---|
| | | Sample Date: | 25-Aug-17 | - | - | - |
| | | Sample ID: | 1735030-01 | - | - | - |
| | | | Soil | - | - | - |
| Acenaphthylene | 0.02 ug/g dry | | 0.35 | - | - | - |
| Anthracene | 0.02 ug/g dry | | 0.64 | - | - | - |
| Benzo [a] anthracene | 0.02 ug/g dry | | 1.31 | - | - | - |
| Benzo [a] pyrene | 0.02 ug/g dry | | 1.43 | - | - | - |
| Benzo [b] fluoranthene | 0.02 ug/g dry | | 1.40 | - | - | - |
| Benzo [g,h,i] perylene | 0.02 ug/g dry | | 0.89 | - | - | - |
| Benzo [k] fluoranthene | 0.02 ug/g dry | | 0.83 | - | - | - |
| Chrysene | 0.02 ug/g dry | | 1.32 | - | - | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g dry | | 0.26 | - | - | - |
| Fluoranthene | 0.02 ug/g dry | | 2.83 | - | - | - |
| Fluorene | 0.02 ug/g dry | | 0.20 | - | - | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g dry | | 0.84 | - | - | - |
| 1-Methylnaphthalene | 0.02 ug/g dry | | 0.04 | - | - | - |
| 2-Methylnaphthalene | 0.02 ug/g dry | | 0.05 | - | - | - |
| Methylnaphthalene (1&2) | 0.04 ug/g dry | | 0.10 | - | - | - |
| Naphthalene | 0.01 ug/g dry | | 0.13 | - | - | - |
| Phenanthrene | 0.02 ug/g dry | | 1.94 | - | - | - |
| Pyrene | 0.02 ug/g dry | | 2.49 | - | - | - |
| 2-Fluorobiphenyl | Surrogate | | 86.4% | - | - | - |
| Terphenyl-d14 | Surrogate | | 101% | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g | | | | | | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g | | | | | | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g | | | | | | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g | | | | | | |
| F4G PHCs (gravimetric) | ND | 50 | ug/g | | | | | | |
| Metals | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g | | | | | | |
| Arsenic | ND | 1.0 | ug/g | | | | | | |
| Barium | ND | 1.0 | ug/g | | | | | | |
| Beryllium | ND | 1.0 | ug/g | | | | | | |
| Boron | ND | 1.0 | ug/g | | | | | | |
| Cadmium | ND | 0.5 | ug/g | | | | | | |
| Chromium | ND | 1.0 | ug/g | | | | | | |
| Cobalt | ND | 1.0 | ug/g | | | | | | |
| Copper | ND | 1.0 | ug/g | | | | | | |
| Lead | ND | 1.0 | ug/g | | | | | | |
| Molybdenum | ND | 1.0 | ug/g | | | | | | |
| Nickel | ND | 1.0 | ug/g | | | | | | |
| Selenium | ND | 1.0 | ug/g | | | | | | |
| Silver | ND | 0.5 | ug/g | | | | | | |
| Thallium | ND | 1.0 | ug/g | | | | | | |
| Uranium | ND | 1.0 | ug/g | | | | | | |
| Vanadium | ND | 1.0 | ug/g | | | | | | |
| Zinc | ND | 1.0 | ug/g | | | | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g | | | | | | |
| Acenaphthylene | ND | 0.02 | ug/g | | | | | | |
| Anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] pyrene | ND | 0.02 | ug/g | | | | | | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g | | | | | | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Chrysene | ND | 0.02 | ug/g | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g | | | | | | |
| Fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Fluorene | ND | 0.02 | ug/g | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g | | | | | | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.04 | ug/g | | | | | | |
| Naphthalene | ND | 0.01 | ug/g | | | | | | |
| Phenanthrene | ND | 0.02 | ug/g | | | | | | |
| Pyrene | ND | 0.02 | ug/g | | | | | | |
| Surrogate: 2-Fluorobiphenyl | 1.15 | | ug/g | | 86.3 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.50 | | ug/g | | 113 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| Surrogate: Toluene-d8 | 8.75 | | ug/g | | 54.7 | 50-140 | | | |

Certificate of Analysis
 Client: **GHD Limited (Ottawa)**
 Client PO: **73508783**

Report Date: 31-Aug-2017
 Order Date: 25-Aug-2017
 Project Description: **11140575-E2**

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g dry | ND | | | | 40 | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g dry | ND | | | | 30 | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g dry | ND | | | | 30 | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g dry | ND | | | | 30 | |
| Metals | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Arsenic | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Barium | 120 | 1.0 | ug/g dry | 120 | | | 0.1 | 30 | |
| Beryllium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Boron | 8.90 | 1.0 | ug/g dry | 9.56 | | | 7.2 | 30 | |
| Cadmium | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Chromium | 18.1 | 1.0 | ug/g dry | 18.5 | | | 2.4 | 30 | |
| Cobalt | 6.38 | 1.0 | ug/g dry | 6.53 | | | 2.4 | 30 | |
| Copper | 14.2 | 1.0 | ug/g dry | 14.2 | | | 0.2 | 30 | |
| Lead | 7.52 | 1.0 | ug/g dry | 7.58 | | | 0.9 | 30 | |
| Molybdenum | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Nickel | 13.6 | 1.0 | ug/g dry | 13.0 | | | 4.3 | 30 | |
| Selenium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Silver | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Thallium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Uranium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Vanadium | 27.2 | 1.0 | ug/g dry | 27.1 | | | 0.2 | 30 | |
| Zinc | 42.6 | 1.0 | ug/g dry | 41.8 | | | 1.9 | 30 | |
| Physical Characteristics | | | | | | | | | |
| % Solids | 82.9 | 0.1 | % by Wt. | 83.1 | | | 0.3 | 25 | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | 0.034 | 0.02 | ug/g dry | 0.036 | | | 6.3 | 40 | |
| Acenaphthylene | 0.051 | 0.02 | ug/g dry | 0.082 | | | 45.8 | 40 | QR-04 |
| Anthracene | 0.121 | 0.02 | ug/g dry | 0.162 | | | 28.9 | 40 | |
| Benzo [a] anthracene | 0.231 | 0.02 | ug/g dry | 0.500 | | | 73.4 | 40 | QR-04 |
| Benzo [a] pyrene | 0.253 | 0.02 | ug/g dry | 0.502 | | | 66.0 | 40 | QR-04 |
| Benzo [b] fluoranthene | 0.294 | 0.02 | ug/g dry | 0.634 | | | 73.3 | 40 | QR-04 |
| Benzo [g,h,i] perylene | 0.194 | 0.02 | ug/g dry | 0.350 | | | 57.6 | 40 | QR-04 |
| Benzo [k] fluoranthene | 0.151 | 0.02 | ug/g dry | 0.332 | | | 75.1 | 40 | QR-04 |
| Chrysene | 0.266 | 0.02 | ug/g dry | 0.481 | | | 57.4 | 40 | QR-04 |
| Dibenzo [a,h] anthracene | 0.043 | 0.02 | ug/g dry | 0.082 | | | 61.5 | 40 | QR-04 |
| Fluoranthene | 0.595 | 0.02 | ug/g dry | 1.56 | | | 89.7 | 40 | QR-04 |
| Fluorene | 0.042 | 0.02 | ug/g dry | 0.038 | | | 10.2 | 40 | |
| Indeno [1,2,3-cd] pyrene | 0.159 | 0.02 | ug/g dry | 0.307 | | | 63.4 | 40 | QR-04 |
| 1-Methylnaphthalene | 0.061 | 0.02 | ug/g dry | 0.058 | | | 5.1 | 40 | |
| 2-Methylnaphthalene | 0.079 | 0.02 | ug/g dry | 0.073 | | | 7.7 | 40 | |
| Naphthalene | 0.088 | 0.01 | ug/g dry | 0.081 | | | 8.1 | 40 | |
| Phenanthrene | 0.440 | 0.02 | ug/g dry | 0.389 | | | 12.2 | 40 | |
| Pyrene | 0.537 | 0.02 | ug/g dry | 1.50 | | | 94.3 | 40 | QR-04 |
| Surrogate: 2-Fluorobiphenyl | 1.02 | | ug/g dry | | 70.9 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.31 | | ug/g dry | | 91.4 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Benzene | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| Ethylbenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| m,p-Xylenes | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| o-Xylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Surrogate: Toluene-d8 | 6.38 | | ug/g dry | | 104 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | 188 | 7 | ug/g | | 94.2 | 80-120 | | | |
| F2 PHCs (C10-C16) | 97 | 4 | ug/g | ND | 89.9 | 60-140 | | | |
| F3 PHCs (C16-C34) | 228 | 8 | ug/g | ND | 102 | 60-140 | | | |
| F4 PHCs (C34-C50) | 165 | 6 | ug/g | ND | 110 | 60-140 | | | |
| F4G PHCs (gravimetric) | 820 | 50 | ug/g | | 82.0 | 80-120 | | | |
| Metals | | | | | | | | | |
| Antimony | 310 | | ug/L | ND | 124 | 70-130 | | | |
| Arsenic | 322 | | ug/L | ND | 129 | 70-130 | | | |
| Barium | 2580 | | ug/L | 2390 | 75.9 | 70-130 | | | |
| Beryllium | 289 | | ug/L | 2.23 | 115 | 70-130 | | | |
| Boron | 459 | | ug/L | 191 | 107 | 70-130 | | | |
| Cadmium | 272 | | ug/L | 0.85 | 108 | 70-130 | | | |
| Chromium | 605 | | ug/L | 371 | 93.7 | 70-130 | | | |
| Cobalt | 367 | | ug/L | 131 | 94.5 | 70-130 | | | |
| Copper | 550 | | ug/L | 284 | 107 | 70-130 | | | |
| Lead | 399 | | ug/L | 152 | 99.1 | 70-130 | | | |
| Molybdenum | 250 | | ug/L | 2.83 | 98.9 | 70-130 | | | |
| Nickel | 486 | | ug/L | 260 | 90.2 | 70-130 | | | |
| Selenium | 249 | | ug/L | 4.81 | 97.7 | 70-130 | | | |
| Silver | 266 | | ug/L | ND | 106 | 70-130 | | | |
| Thallium | 223 | | ug/L | 13.9 | 83.8 | 70-130 | | | |
| Uranium | 317 | | ug/L | ND | 127 | 70-130 | | | |
| Vanadium | 788 | | ug/L | 542 | 98.2 | 70-130 | | | |
| Zinc | 1030 | | ug/L | 836 | 79.4 | 70-130 | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | 0.147 | 0.02 | ug/g | | 88.4 | 50-140 | | | |
| Acenaphthylene | 0.132 | 0.02 | ug/g | | 78.9 | 50-140 | | | |
| Anthracene | 0.119 | 0.02 | ug/g | | 71.7 | 50-140 | | | |
| Benzo [a] anthracene | 0.102 | 0.02 | ug/g | | 60.9 | 50-140 | | | |
| Benzo [a] pyrene | 0.108 | 0.02 | ug/g | | 65.0 | 50-140 | | | |
| Benzo [b] fluoranthene | 0.139 | 0.02 | ug/g | | 83.5 | 50-140 | | | |
| Benzo [g,h,i] perylene | 0.116 | 0.02 | ug/g | | 69.9 | 50-140 | | | |
| Benzo [k] fluoranthene | 0.128 | 0.02 | ug/g | | 76.5 | 50-140 | | | |
| Chrysene | 0.125 | 0.02 | ug/g | | 75.0 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 0.120 | 0.02 | ug/g | | 72.2 | 50-140 | | | |
| Fluoranthene | 0.122 | 0.02 | ug/g | | 73.3 | 50-140 | | | |
| Fluorene | 0.137 | 0.02 | ug/g | | 82.2 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 0.123 | 0.02 | ug/g | | 73.7 | 50-140 | | | |
| 1-Methylnaphthalene | 0.137 | 0.02 | ug/g | | 82.0 | 50-140 | | | |
| 2-Methylnaphthalene | 0.145 | 0.02 | ug/g | | 86.7 | 50-140 | | | |
| Naphthalene | 0.136 | 0.01 | ug/g | | 81.6 | 50-140 | | | |
| Phenanthrene | 0.131 | 0.02 | ug/g | | 78.6 | 50-140 | | | |
| Pyrene | 0.124 | 0.02 | ug/g | | 74.3 | 50-140 | | | |
| Surrogate: 2-Fluorobiphenyl | 1.14 | | ug/g | | 85.3 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Benzene | 4.73 | 0.02 | ug/g | | 118 | 60-130 | | | |
| Ethylbenzene | 4.34 | 0.05 | ug/g | | 109 | 60-130 | | | |
| Toluene | 4.06 | 0.05 | ug/g | | 102 | 60-130 | | | |
| m,p-Xylenes | 8.79 | 0.05 | ug/g | | 110 | 60-130 | | | |
| o-Xylene | 4.74 | 0.05 | ug/g | | 119 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Aug-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Qualifier Notes:

Sample Qualifiers :

1 : GC-FID signal did not return to baseline by C50

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Paracel ID: 1735030



LABORATORIES LTD.

 TRUS
RESF
RELIABLE

 ice
3 St. Laurent Blvd.
Ontario K1G 4J8
749-1947
e: paracel@paracellabs.com

Chain of Custody

(Lab Use Only)

No 113609

Page ___ of ___

| | | |
|------------------------------|-----------------------------------|--|
| Client Name: GHD Limited | Project Reference: 11146575-E2 | Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____ |
| Contact Name: Luke Lopez | Quote # | |
| Address: 179 Leominster Road | PO # 73508783 | |
| Telephone: 613-288-1723 | Email Address: Luke.Lopez@ghd.com | |

 Criteria: ☒ O. Reg. 153/04 (As Amended) Table ___ ☐ RSC Filing ☒ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

| Parcel Order Number: | | | | | | | | | | | | | | | | |
|---|---------|---|--|---|--------|------|---|---|---|---|--|--|--|---|--|-----------------|
| 1735029 - TC TC P TC P | | | | | | | | | | | | | | | | |
| 1735030 - Reg 153 | | | | | | | | | | | | | | | | |
| Sample ID/Location Name | | | | | | | | | | | | | | | | |
| Matrix | | | | | | | | | | | | | | | | |
| Air Volume | | | | | | | | | | | | | | | | |
| # of Containers | | | | | | | | | | | | | | | | |
| Sample Taken | | | | | | | | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | |
| Time | | | | | | | | | | | | | | | | |
| PHCs F1-F4 + BTEX | | | | | | | | | | | | | | | | |
| VOCs | | | | | | | | | | | | | | | | |
| PAHs | | | | | | | | | | | | | | | | |
| Metals by ICP | | | | | | | | | | | | | | | | |
| Hg | | | | | | | | | | | | | | | | |
| CrVI | | | | | | | | | | | | | | | | |
| B (HWS) | | | | | | | | | | | | | | | | |
| TCLP | | | | | | | | | | | | | | | | |
| (Lab take volume per package) | | | | | | | | | | | | | | | | |
| 1 | BH2/MW2 | S | | 4 | Aug 25 | 9:00 | X | X | X | X | | | | X | | 3x350ml + 1 lid |
| 2 | DUP | S | | 2 | Aug 25 | | X | X | X | | | | | | | 2x350ml + 1 lid |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery:

Walker

| | | | |
|---------------------------------------|---------------------------|------------------------------|----------------------------|
| Relinquished By (Sign): [Signature] | Received by Driver/Depot: | Received at Lab: [Signature] | Verified By: Rachel Simant |
| Relinquished By (Print): Ryan K... .. | Date/Time: | Date/Time: 08/28/17 4:59pm | Date/Time: Aug 28/17 |
| Date/Time: Aug 25, 2017 | Temperature: °C | Temperature: 19.5 °C | pH Verified by: N/A 10:45 |

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400
Ottawa, ON K2E7S4
Attn: Luke Lopers

Client PO: 73508783
Project: 11140575-E2
Custody: 113609

Report Date: 1-Sep-2017
Order Date: 25-Aug-2017

Order #: 1735029

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID
1735029-01

Client ID
BH2/MW2

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------------------------------|--------------------------------------|-----------------|---------------|
| Flashpoint | ASTM D93 - Pensky-Martens Closed Cup | 29-Aug-17 | 29-Aug-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 30-Aug-17 | 31-Aug-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 26-Aug-17 | 29-Aug-17 |
| REG 153: Metals by ICP/OES, soil | based on MOE E3470, ICP-OES | 30-Aug-17 | 30-Aug-17 |
| REG 153: PAHs by GC-MS | EPA 8270 - GC-MS, extraction | 25-Aug-17 | 30-Aug-17 |
| REG 153: VOCs by P&T GC/MS | EPA 8260 - P&T GC-MS | 30-Aug-17 | 31-Aug-17 |
| REG 558 - Cyanide | MOE E3015- Auto Colour | 30-Aug-17 | 30-Aug-17 |
| REG 558 - Fluoride | EPA 340.2 - ISE | 30-Aug-17 | 30-Aug-17 |
| REG 558 - Mercury by CVAA | EPA 7470A - Cold Vapour AA | 31-Aug-17 | 31-Aug-17 |
| REG 558 - Metals, ICP-MS | EPA 6020 - Digestion - ICP-MS | 30-Aug-17 | 30-Aug-17 |
| REG 558 - NO3/NO2 | EPA 300.1 - IC | 30-Aug-17 | 30-Aug-17 |
| REG 558 - PAHs | EPA 625 - GC-MS | 31-Aug-17 | 31-Aug-17 |
| REG 558 - PCBs | EPA 608 - GC-ECD | 31-Aug-17 | 31-Aug-17 |
| REG 558 - VOCs | EPA 624 - P&T GC-MS | 31-Aug-17 | 1-Sep-17 |
| Solids, % | Gravimetric, calculation | 29-Aug-17 | 29-Aug-17 |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: **11140575-E2**

| | | | | |
|--------------|------------|---|---|---|
| Client ID: | BH2/MW2 | - | - | - |
| Sample Date: | 25-Aug-17 | - | - | - |
| Sample ID: | 1735029-01 | - | - | - |
| MDL/Units | Soil | - | - | - |

Physical Characteristics

| | | | | | |
|------------|--------------|------|---|---|---|
| % Solids | 0.1 % by Wt. | 83.9 | - | - | - |
| Flashpoint | °C | >70 | - | - | - |

EPA 1311 - TCLP Leachate Inorganics

| | | | | | |
|---------------|------------|--------|---|---|---|
| Arsenic | 0.05 mg/L | <0.05 | - | - | - |
| Barium | 0.05 mg/L | 0.87 | - | - | - |
| Boron | 0.05 mg/L | <0.05 | - | - | - |
| Cadmium | 0.01 mg/L | <0.01 | - | - | - |
| Chromium | 0.05 mg/L | <0.05 | - | - | - |
| Lead | 0.05 mg/L | <0.05 | - | - | - |
| Mercury | 0.005 mg/L | <0.005 | - | - | - |
| Selenium | 0.05 mg/L | <0.05 | - | - | - |
| Silver | 0.05 mg/L | <0.05 | - | - | - |
| Uranium | 0.05 mg/L | <0.05 | - | - | - |
| Fluoride | 0.05 mg/L | 0.09 | - | - | - |
| Nitrate as N | 1 mg/L | <1 | - | - | - |
| Nitrite as N | 1 mg/L | <1 | - | - | - |
| Cyanide, free | 0.02 mg/L | <0.02 | - | - | - |

EPA 1311 - TCLP Leachate Organics

| | | | | | |
|----------------------------------|-------------|---------|---|---|---|
| Benzene | 0.005 mg/L | <0.005 | - | - | - |
| Carbon Tetrachloride | 0.005 mg/L | <0.005 | - | - | - |
| Chlorobenzene | 0.004 mg/L | <0.004 | - | - | - |
| Chloroform | 0.006 mg/L | <0.006 | - | - | - |
| 1,2-Dichlorobenzene | 0.004 mg/L | <0.004 | - | - | - |
| 1,4-Dichlorobenzene | 0.004 mg/L | <0.004 | - | - | - |
| 1,2-Dichloroethane | 0.005 mg/L | <0.005 | - | - | - |
| 1,1-Dichloroethylene | 0.006 mg/L | <0.006 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 0.30 mg/L | <0.30 | - | - | - |
| Methylene Chloride | 0.04 mg/L | <0.04 | - | - | - |
| Tetrachloroethylene | 0.005 mg/L | <0.005 | - | - | - |
| Trichloroethylene | 0.004 mg/L | <0.004 | - | - | - |
| Vinyl chloride | 0.005 mg/L | <0.005 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 97.7% | - | - | - |
| Dibromofluoromethane | Surrogate | 116% | - | - | - |
| Toluene-d8 | Surrogate | 83.5% | - | - | - |
| Benzo [a] pyrene | 0.0001 mg/L | <0.0001 | - | - | - |
| Terphenyl-d14 | Surrogate | 112% | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

| | Client ID: | BH2/MW2 | - | - | - |
|--------------------|--------------|------------|---|---|---|
| | Sample Date: | 25-Aug-17 | - | - | - |
| | Sample ID: | 1735029-01 | - | - | - |
| | MDL/Units | Soil | - | - | - |
| PCBs, total | 0.003 mg/L | <0.003 | - | - | - |
| Decachlorobiphenyl | Surrogate | 79.6% | - | - | - |

Metals

| | | | | | |
|------------|--------------|------|---|---|---|
| Antimony | 1.0 ug/g dry | <1.0 | - | - | - |
| Arsenic | 1.0 ug/g dry | 8.0 | - | - | - |
| Barium | 1.0 ug/g dry | 296 | - | - | - |
| Beryllium | 1.0 ug/g dry | <1.0 | - | - | - |
| Boron | 1.0 ug/g dry | 8.3 | - | - | - |
| Cadmium | 0.5 ug/g dry | <0.5 | - | - | - |
| Chromium | 1.0 ug/g dry | 32.7 | - | - | - |
| Cobalt | 1.0 ug/g dry | 8.5 | - | - | - |
| Copper | 1.0 ug/g dry | 54.1 | - | - | - |
| Lead | 1.0 ug/g dry | 486 | - | - | - |
| Molybdenum | 1.0 ug/g dry | 1.2 | - | - | - |
| Nickel | 1.0 ug/g dry | 17.5 | - | - | - |
| Selenium | 1.0 ug/g dry | <1.0 | - | - | - |
| Silver | 0.5 ug/g dry | <0.5 | - | - | - |
| Thallium | 1.0 ug/g dry | <1.0 | - | - | - |
| Uranium | 1.0 ug/g dry | <1.0 | - | - | - |
| Vanadium | 1.0 ug/g dry | 32.3 | - | - | - |
| Zinc | 1.0 ug/g dry | 216 | - | - | - |

Volatiles

| | | | | | |
|-------------------------|---------------|-------|---|---|---|
| Acetone | 0.50 ug/g dry | <0.50 | - | - | - |
| Benzene | 0.02 ug/g dry | <0.02 | - | - | - |
| Bromodichloromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Bromoform | 0.05 ug/g dry | <0.05 | - | - | - |
| Bromomethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Carbon Tetrachloride | 0.05 ug/g dry | <0.05 | - | - | - |
| Chlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Chloroform | 0.05 ug/g dry | <0.05 | - | - | - |
| Dibromochloromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Dichlorodifluoromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

| | Client ID: Sample Date: Sample ID: | BH2/MW2 25-Aug-17 1735029-01 Soil | - | - | - |
|------------------------------------|--|--|---|---|---|
| | MDL/Units | | - | - | - |
| 1,2-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichloropropane | 0.05 ug/g dry | <0.05 | - | - | - |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | - |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | <0.05 | - | - | - |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Ethylene dibromide (dibromoethane) | 0.05 ug/g dry | <0.05 | - | - | - |
| Hexane | 0.05 ug/g dry | <0.05 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | <0.50 | - | - | - |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | <0.50 | - | - | - |
| Methyl tert-butyl ether | 0.05 ug/g dry | <0.05 | - | - | - |
| Methylene Chloride | 0.05 ug/g dry | <0.05 | - | - | - |
| Styrene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Tetrachloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Trichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Trichlorofluoromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Vinyl chloride | 0.02 ug/g dry | <0.02 | - | - | - |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | - | - |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 109% | - | - | - |
| Dibromofluoromethane | Surrogate | 103% | - | - | - |
| Toluene-d8 | Surrogate | 108% | - | - | - |

Hydrocarbons

| | | | | | |
|-------------------|------------|-----|---|---|---|
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | - | - | - |
| F2 PHCs (C10-C16) | 4 ug/g dry | <4 | - | - | - |
| F3 PHCs (C16-C34) | 8 ug/g dry | 109 | - | - | - |
| F4 PHCs (C34-C50) | 6 ug/g dry | 148 | - | - | - |

Semi-Volatiles

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

| | MDL/Units | Client ID: | BH2/MW2 25-Aug-17 1735029-01 Soil | - | - | - |
|--------------------------|---------------|--------------|--|---|---|---|
| | | Sample Date: | | | | |
| | | Sample ID: | | - | - | - |
| Acenaphthene | 0.02 ug/g dry | | 0.17 | - | - | - |
| Acenaphthylene | 0.02 ug/g dry | | 0.24 | - | - | - |
| Anthracene | 0.02 ug/g dry | | 0.55 | - | - | - |
| Benzo [a] anthracene | 0.02 ug/g dry | | 1.12 | - | - | - |
| Benzo [a] pyrene | 0.02 ug/g dry | | 1.19 | - | - | - |
| Benzo [b] fluoranthene | 0.02 ug/g dry | | 1.28 | - | - | - |
| Benzo [g,h,i] perylene | 0.02 ug/g dry | | 0.68 | - | - | - |
| Benzo [k] fluoranthene | 0.02 ug/g dry | | 0.74 | - | - | - |
| Chrysene | 0.02 ug/g dry | | 1.13 | - | - | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g dry | | 0.20 | - | - | - |
| Fluoranthene | 0.02 ug/g dry | | 2.72 | - | - | - |
| Fluorene | 0.02 ug/g dry | | 0.20 | - | - | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g dry | | 0.67 | - | - | - |
| 1-Methylnaphthalene | 0.02 ug/g dry | | 0.06 | - | - | - |
| 2-Methylnaphthalene | 0.02 ug/g dry | | 0.07 | - | - | - |
| Methylnaphthalene (1&2) | 0.04 ug/g dry | | 0.13 | - | - | - |
| Naphthalene | 0.01 ug/g dry | | 0.17 | - | - | - |
| Phenanthrene | 0.02 ug/g dry | | 2.02 | - | - | - |
| Pyrene | 0.02 ug/g dry | | 2.30 | - | - | - |
| 2-Fluorobiphenyl | Surrogate | | 98.8% | - | - | - |
| Terphenyl-d14 | Surrogate | | 97.5% | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
|---------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|

EPA 1311 - TCLP Leachate Inorganics

| | | | |
|---------------|----|-------|------|
| Arsenic | ND | 0.05 | mg/L |
| Barium | ND | 0.05 | mg/L |
| Boron | ND | 0.05 | mg/L |
| Cadmium | ND | 0.01 | mg/L |
| Chromium | ND | 0.05 | mg/L |
| Lead | ND | 0.05 | mg/L |
| Mercury | ND | 0.005 | mg/L |
| Selenium | ND | 0.05 | mg/L |
| Silver | ND | 0.05 | mg/L |
| Uranium | ND | 0.05 | mg/L |
| Fluoride | ND | 0.05 | mg/L |
| Nitrate as N | ND | 1 | mg/L |
| Nitrite as N | ND | 1 | mg/L |
| Cyanide, free | ND | 0.02 | mg/L |

EPA 1311 - TCLP Leachate Organics

| | | | | | |
|----------------------------------|--------|--------|------|------|------------|
| Benzene | ND | 0.005 | mg/L | | |
| Carbon Tetrachloride | ND | 0.005 | mg/L | | |
| Chlorobenzene | ND | 0.004 | mg/L | | |
| Chloroform | ND | 0.006 | mg/L | | |
| 1,2-Dichlorobenzene | ND | 0.004 | mg/L | | |
| 1,4-Dichlorobenzene | ND | 0.004 | mg/L | | |
| 1,2-Dichloroethane | ND | 0.005 | mg/L | | |
| 1,1-Dichloroethylene | ND | 0.006 | mg/L | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.30 | mg/L | | |
| Methylene Chloride | ND | 0.04 | mg/L | | |
| Tetrachloroethylene | ND | 0.005 | mg/L | | |
| Trichloroethylene | ND | 0.004 | mg/L | | |
| Vinyl chloride | ND | 0.005 | mg/L | | |
| Surrogate: 4-Bromofluorobenzene | 0.657 | | mg/L | 95.4 | 83-134 |
| Surrogate: Dibromofluoromethane | 0.686 | | mg/L | 99.6 | 78-124 |
| Surrogate: Toluene-d8 | 0.662 | | mg/L | 96.2 | 76-118 |
| Benzo [a] pyrene | ND | 0.0001 | mg/L | | |
| Surrogate: Terphenyl-d14 | 0.227 | | mg/L | 113 | 37.1-155.6 |
| PCBs, total | ND | 0.003 | mg/L | | |
| Surrogate: Decachlorobiphenyl | 0.0152 | | mg/L | 75.9 | 62-138 |

Hydrocarbons

| | | | |
|-------------------|----|---|------|
| F1 PHCs (C6-C10) | ND | 7 | ug/g |
| F2 PHCs (C10-C16) | ND | 4 | ug/g |
| F3 PHCs (C16-C34) | ND | 8 | ug/g |
| F4 PHCs (C34-C50) | ND | 6 | ug/g |

Metals

| | | | |
|------------|----|-----|------|
| Antimony | ND | 1.0 | ug/g |
| Arsenic | ND | 1.0 | ug/g |
| Barium | ND | 1.0 | ug/g |
| Beryllium | ND | 1.0 | ug/g |
| Boron | ND | 1.0 | ug/g |
| Cadmium | ND | 0.5 | ug/g |
| Chromium | ND | 1.0 | ug/g |
| Cobalt | ND | 1.0 | ug/g |
| Copper | ND | 1.0 | ug/g |
| Lead | ND | 1.0 | ug/g |
| Molybdenum | ND | 1.0 | ug/g |
| Nickel | ND | 1.0 | ug/g |
| Selenium | ND | 1.0 | ug/g |
| Silver | ND | 0.5 | ug/g |
| Thallium | ND | 1.0 | ug/g |
| Uranium | ND | 1.0 | ug/g |
| Vanadium | ND | 1.0 | ug/g |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Zinc | ND | 1.0 | ug/g | | | | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g | | | | | | |
| Acenaphthylene | ND | 0.02 | ug/g | | | | | | |
| Anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] pyrene | ND | 0.02 | ug/g | | | | | | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g | | | | | | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Chrysene | ND | 0.02 | ug/g | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g | | | | | | |
| Fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Fluorene | ND | 0.02 | ug/g | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g | | | | | | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.04 | ug/g | | | | | | |
| Naphthalene | ND | 0.01 | ug/g | | | | | | |
| Phenanthrene | ND | 0.02 | ug/g | | | | | | |
| Pyrene | ND | 0.02 | ug/g | | | | | | |
| Surrogate: 2-Fluorobiphenyl | 1.15 | | ug/g | | 86.3 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.50 | | ug/g | | 113 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g | | | | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Bromodichloromethane | ND | 0.05 | ug/g | | | | | | |
| Bromoform | ND | 0.05 | ug/g | | | | | | |
| Bromomethane | ND | 0.05 | ug/g | | | | | | |
| Carbon Tetrachloride | ND | 0.05 | ug/g | | | | | | |
| Chlorobenzene | ND | 0.05 | ug/g | | | | | | |
| Chloroform | ND | 0.05 | ug/g | | | | | | |
| Dibromochloromethane | ND | 0.05 | ug/g | | | | | | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.05 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Ethylene dibromide (dibromoethane) | ND | 0.05 | ug/g | | | | | | |
| Hexane | ND | 0.05 | ug/g | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g | | | | | | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g | | | | | | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g | | | | | | |
| Methylene Chloride | ND | 0.05 | ug/g | | | | | | |
| Styrene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| Tetrachloroethylene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| Trichloroethylene | ND | 0.05 | ug/g | | | | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Trichlorofluoromethane | ND | 0.05 | ug/g | | | | | | |
| Vinyl chloride | ND | 0.02 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| Surrogate: 4-Bromofluorobenzene | 8.21 | | ug/g | | 51.3 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 8.41 | | ug/g | | 52.6 | 50-140 | | | |
| Surrogate: Toluene-d8 | 8.75 | | ug/g | | 54.7 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|--|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| EPA 1311 - TCLP Leachate Inorganics | | | | | | | | | |
| Arsenic | ND | 0.05 | mg/L | ND | | | 0.0 | 29 | |
| Barium | 0.174 | 0.05 | mg/L | 0.154 | | | 12.1 | 34 | |
| Boron | ND | 0.05 | mg/L | ND | | | 0.0 | 33 | |
| Cadmium | ND | 0.01 | mg/L | ND | | | 0.0 | 33 | |
| Chromium | ND | 0.05 | mg/L | ND | | | 0.0 | 32 | |
| Lead | ND | 0.05 | mg/L | ND | | | 0.0 | 32 | |
| Mercury | ND | 0.005 | mg/L | ND | | | 0.0 | 30 | |
| Selenium | ND | 0.05 | mg/L | ND | | | 0.0 | 28 | |
| Silver | ND | 0.05 | mg/L | ND | | | 0.0 | 28 | |
| Uranium | ND | 0.05 | mg/L | ND | | | 0.0 | 27 | |
| Fluoride | 0.11 | 0.05 | mg/L | 0.11 | | | 1.7 | 20 | |
| Nitrate as N | ND | 1 | mg/L | ND | | | | 20 | |
| Nitrite as N | ND | 1 | mg/L | ND | | | | 20 | |
| Cyanide, free | ND | 0.02 | mg/L | ND | | | | 20 | |
| EPA 1311 - TCLP Leachate Organics | | | | | | | | | |
| Benzene | ND | 0.005 | mg/L | ND | | | | 25 | |
| Carbon Tetrachloride | ND | 0.005 | mg/L | ND | | | | 25 | |
| Chlorobenzene | ND | 0.004 | mg/L | ND | | | | 25 | |
| Chloroform | ND | 0.006 | mg/L | ND | | | | 25 | |
| 1,2-Dichlorobenzene | ND | 0.004 | mg/L | ND | | | | 25 | |
| 1,4-Dichlorobenzene | ND | 0.004 | mg/L | ND | | | | 25 | |
| 1,2-Dichloroethane | ND | 0.005 | mg/L | ND | | | | 25 | |
| 1,1-Dichloroethylene | ND | 0.006 | mg/L | ND | | | | 25 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.30 | mg/L | ND | | | | 25 | |
| Methylene Chloride | ND | 0.04 | mg/L | ND | | | | 25 | |
| Tetrachloroethylene | ND | 0.005 | mg/L | ND | | | | 25 | |
| Trichloroethylene | ND | 0.004 | mg/L | ND | | | | 25 | |
| Vinyl chloride | ND | 0.005 | mg/L | ND | | | | 25 | |
| Surrogate: 4-Bromofluorobenzene | 0.649 | | mg/L | | 94.3 | 83-134 | | | |
| Surrogate: Dibromofluoromethane | 0.834 | | mg/L | | 121 | 78-124 | | | |
| Surrogate: Toluene-d8 | 0.572 | | mg/L | | 83.1 | 76-118 | | | |
| Benzo [a] pyrene | ND | 0.0001 | mg/L | ND | | | | 50 | |
| Surrogate: Terphenyl-d14 | 0.216 | | mg/L | | 108 | 37.1-155.6 | | | |
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g dry | ND | | | | 40 | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g dry | ND | | | | 30 | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g dry | ND | | | | 30 | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g dry | ND | | | | 30 | |
| Metals | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Arsenic | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Barium | 120 | 1.0 | ug/g dry | 120 | | | 0.1 | 30 | |
| Beryllium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Boron | 8.90 | 1.0 | ug/g dry | 9.56 | | | 7.2 | 30 | |
| Cadmium | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Chromium | 18.1 | 1.0 | ug/g dry | 18.5 | | | 2.4 | 30 | |
| Cobalt | 6.38 | 1.0 | ug/g dry | 6.53 | | | 2.4 | 30 | |
| Copper | 14.2 | 1.0 | ug/g dry | 14.2 | | | 0.2 | 30 | |
| Lead | 7.52 | 1.0 | ug/g dry | 7.58 | | | 0.9 | 30 | |
| Molybdenum | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Nickel | 13.6 | 1.0 | ug/g dry | 13.0 | | | 4.3 | 30 | |
| Selenium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Silver | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Thallium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Uranium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Vanadium | 27.2 | 1.0 | ug/g dry | 27.1 | | | 0.2 | 30 | |
| Zinc | 42.6 | 1.0 | ug/g dry | 41.8 | | | 1.9 | 30 | |

Certificate of Analysis
 Client: GHD Limited (Ottawa)
 Client PO: 73508783

Report Date: 01-Sep-2017
 Order Date: 25-Aug-2017
 Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| Physical Characteristics | | | | | | | | | |
| % Solids | 82.9 | 0.1 | % by Wt. | 83.1 | | | 0.3 | 25 | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | 0.034 | 0.02 | ug/g dry | 0.036 | | | 6.3 | 40 | |
| Acenaphthylene | 0.051 | 0.02 | ug/g dry | 0.082 | | | 45.8 | 40 | QR-04 |
| Anthracene | 0.121 | 0.02 | ug/g dry | 0.162 | | | 28.9 | 40 | |
| Benzo [a] anthracene | 0.231 | 0.02 | ug/g dry | 0.500 | | | 73.4 | 40 | QR-04 |
| Benzo [a] pyrene | 0.253 | 0.02 | ug/g dry | 0.502 | | | 66.0 | 40 | QR-04 |
| Benzo [b] fluoranthene | 0.294 | 0.02 | ug/g dry | 0.634 | | | 73.3 | 40 | QR-04 |
| Benzo [g,h,i] perylene | 0.194 | 0.02 | ug/g dry | 0.350 | | | 57.6 | 40 | QR-04 |
| Benzo [k] fluoranthene | 0.151 | 0.02 | ug/g dry | 0.332 | | | 75.1 | 40 | QR-04 |
| Chrysene | 0.266 | 0.02 | ug/g dry | 0.481 | | | 57.4 | 40 | QR-04 |
| Dibenzo [a,h] anthracene | 0.043 | 0.02 | ug/g dry | 0.082 | | | 61.5 | 40 | QR-04 |
| Fluoranthene | 0.595 | 0.02 | ug/g dry | 1.56 | | | 89.7 | 40 | QR-04 |
| Fluorene | 0.042 | 0.02 | ug/g dry | 0.038 | | | 10.2 | 40 | |
| Indeno [1,2,3-cd] pyrene | 0.159 | 0.02 | ug/g dry | 0.307 | | | 63.4 | 40 | QR-04 |
| 1-Methylnaphthalene | 0.061 | 0.02 | ug/g dry | 0.058 | | | 5.1 | 40 | |
| 2-Methylnaphthalene | 0.079 | 0.02 | ug/g dry | 0.073 | | | 7.7 | 40 | |
| Naphthalene | 0.088 | 0.01 | ug/g dry | 0.081 | | | 8.1 | 40 | |
| Phenanthrene | 0.440 | 0.02 | ug/g dry | 0.389 | | | 12.2 | 40 | |
| Pyrene | 0.537 | 0.02 | ug/g dry | 1.50 | | | 94.3 | 40 | QR-04 |
| Surrogate: 2-Fluorobiphenyl | 1.02 | | ug/g dry | | 70.9 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.31 | | ug/g dry | | 91.4 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Benzene | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| Bromodichloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromoform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromomethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Carbon Tetrachloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloroform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dibromochloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylbenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylene dibromide (dibromoethane) | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Hexane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methylene Chloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Styrene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Tetrachloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|---------------|------|------------|-----|-----------|-------|
| Trichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichlorofluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Vinyl chloride | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| m,p-Xylenes | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| o-Xylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Surrogate: 4-Bromofluorobenzene | 5.86 | | ug/g dry | | 95.0 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 5.47 | | ug/g dry | | 88.8 | 50-140 | | | |
| Surrogate: Toluene-d8 | 6.38 | | ug/g dry | | 104 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
|---------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|

EPA 1311 - TCLP Leachate Inorganics

| | | | | | | | | | |
|---------------|--------|-------|------|------|------|--------|--|--|--|
| Arsenic | 43.7 | | ug/L | ND | 87.3 | 83-119 | | | |
| Barium | 58.2 | | ug/L | 15.4 | 85.6 | 83-116 | | | |
| Boron | 49.1 | | ug/L | 2.78 | 92.6 | 71-128 | | | |
| Cadmium | 41.9 | | ug/L | ND | 83.8 | 78-119 | | | |
| Chromium | 45.5 | | ug/L | 1.07 | 89.0 | 80-124 | | | |
| Lead | 48.6 | | ug/L | 3.32 | 90.7 | 77-126 | | | |
| Mercury | 0.0282 | 0.005 | mg/L | ND | 94.0 | 70-130 | | | |
| Selenium | 42.3 | | ug/L | ND | 84.6 | 81-125 | | | |
| Silver | 40.8 | | ug/L | ND | 81.5 | 70-128 | | | |
| Uranium | 48.8 | | ug/L | ND | 97.7 | 70-131 | | | |
| Fluoride | 0.60 | 0.05 | mg/L | 0.11 | 97.4 | 70-130 | | | |
| Nitrate as N | 9 | 1 | mg/L | ND | 89.9 | 81-112 | | | |
| Nitrite as N | 10 | 1 | mg/L | ND | 100 | 76-107 | | | |
| Cyanide, free | 0.031 | 0.02 | mg/L | ND | 62.5 | 60-136 | | | |

EPA 1311 - TCLP Leachate Organics

| | | | | | | | | | |
|----------------------------------|--------|--------|------|--|------|--------|--|--|--|
| Benzene | 0.033 | 0.005 | mg/L | | 83.6 | 55-141 | | | |
| Carbon Tetrachloride | 0.046 | 0.005 | mg/L | | 114 | 49-149 | | | |
| Chlorobenzene | 0.035 | 0.004 | mg/L | | 87.0 | 64-137 | | | |
| Chloroform | 0.036 | 0.006 | mg/L | | 90.7 | 58-138 | | | |
| 1,2-Dichlorobenzene | 0.031 | 0.004 | mg/L | | 78.3 | 60-150 | | | |
| 1,4-Dichlorobenzene | 0.031 | 0.004 | mg/L | | 77.9 | 63-132 | | | |
| 1,2-Dichloroethane | 0.037 | 0.005 | mg/L | | 93.4 | 50-140 | | | |
| 1,1-Dichloroethylene | 0.032 | 0.006 | mg/L | | 80.4 | 43-153 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 0.072 | 0.30 | mg/L | | 71.8 | 26-153 | | | |
| Methylene Chloride | 0.025 | 0.04 | mg/L | | 62.8 | 58-149 | | | |
| Tetrachloroethylene | 0.037 | 0.005 | mg/L | | 92.8 | 51-145 | | | |
| Trichloroethylene | 0.044 | 0.004 | mg/L | | 109 | 52-135 | | | |
| Vinyl chloride | 0.045 | 0.005 | mg/L | | 114 | 31-159 | | | |
| Surrogate: 4-Bromofluorobenzene | 0.0742 | | mg/L | | 92.7 | 83-134 | | | |
| Benzo [a] pyrene | 0.0558 | 0.0001 | mg/L | | 112 | 39-123 | | | |
| PCBs, total | 0.025 | 0.003 | mg/L | | 62.6 | 86-145 | | | |

Hydrocarbons

| | | | | | | | | | |
|-------------------|-----|---|------|----|------|--------|--|--|--|
| F1 PHCs (C6-C10) | 188 | 7 | ug/g | | 94.2 | 80-120 | | | |
| F2 PHCs (C10-C16) | 97 | 4 | ug/g | ND | 89.9 | 60-140 | | | |
| F3 PHCs (C16-C34) | 228 | 8 | ug/g | ND | 102 | 60-140 | | | |
| F4 PHCs (C34-C50) | 165 | 6 | ug/g | ND | 110 | 60-140 | | | |

Metals

| | | | | | | | | | |
|------------|------|--|------|------|------|--------|--|--|--|
| Antimony | 310 | | ug/L | ND | 124 | 70-130 | | | |
| Arsenic | 322 | | ug/L | ND | 129 | 70-130 | | | |
| Barium | 2580 | | ug/L | 2390 | 75.9 | 70-130 | | | |
| Beryllium | 289 | | ug/L | 2.23 | 115 | 70-130 | | | |
| Boron | 459 | | ug/L | 191 | 107 | 70-130 | | | |
| Cadmium | 272 | | ug/L | 0.85 | 108 | 70-130 | | | |
| Chromium | 605 | | ug/L | 371 | 93.7 | 70-130 | | | |
| Cobalt | 367 | | ug/L | 131 | 94.5 | 70-130 | | | |
| Copper | 550 | | ug/L | 284 | 107 | 70-130 | | | |
| Lead | 399 | | ug/L | 152 | 99.1 | 70-130 | | | |
| Molybdenum | 250 | | ug/L | 2.83 | 98.9 | 70-130 | | | |
| Nickel | 486 | | ug/L | 260 | 90.2 | 70-130 | | | |
| Selenium | 249 | | ug/L | 4.81 | 97.7 | 70-130 | | | |
| Silver | 266 | | ug/L | ND | 106 | 70-130 | | | |

Certificate of Analysis
 Client: **GHD Limited (Ottawa)**
 Client PO: **73508783**

Report Date: 01-Sep-2017
 Order Date: 25-Aug-2017
 Project Description: **11140575-E2**

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|----------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Thallium | 223 | | ug/L | 13.9 | 83.8 | 70-130 | | | |
| Uranium | 317 | | ug/L | ND | 127 | 70-130 | | | |
| Vanadium | 788 | | ug/L | 542 | 98.2 | 70-130 | | | |
| Zinc | 1030 | | ug/L | 836 | 79.4 | 70-130 | | | |

Semi-Volatiles

| | | | | | | | | | |
|--------------------------|-------|------|------|--|------|--------|--|--|--|
| Acenaphthene | 0.147 | 0.02 | ug/g | | 88.4 | 50-140 | | | |
| Acenaphthylene | 0.132 | 0.02 | ug/g | | 78.9 | 50-140 | | | |
| Anthracene | 0.119 | 0.02 | ug/g | | 71.7 | 50-140 | | | |
| Benzo [a] anthracene | 0.102 | 0.02 | ug/g | | 60.9 | 50-140 | | | |
| Benzo [a] pyrene | 0.108 | 0.02 | ug/g | | 65.0 | 50-140 | | | |
| Benzo [b] fluoranthene | 0.139 | 0.02 | ug/g | | 83.5 | 50-140 | | | |
| Benzo [g,h,i] perylene | 0.116 | 0.02 | ug/g | | 69.9 | 50-140 | | | |
| Benzo [k] fluoranthene | 0.128 | 0.02 | ug/g | | 76.5 | 50-140 | | | |
| Chrysene | 0.125 | 0.02 | ug/g | | 75.0 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 0.120 | 0.02 | ug/g | | 72.2 | 50-140 | | | |
| Fluoranthene | 0.122 | 0.02 | ug/g | | 73.3 | 50-140 | | | |
| Fluorene | 0.137 | 0.02 | ug/g | | 82.2 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 0.123 | 0.02 | ug/g | | 73.7 | 50-140 | | | |
| 1-Methylnaphthalene | 0.137 | 0.02 | ug/g | | 82.0 | 50-140 | | | |
| 2-Methylnaphthalene | 0.145 | 0.02 | ug/g | | 86.7 | 50-140 | | | |
| Naphthalene | 0.136 | 0.01 | ug/g | | 81.6 | 50-140 | | | |
| Phenanthrene | 0.131 | 0.02 | ug/g | | 78.6 | 50-140 | | | |
| Pyrene | 0.124 | 0.02 | ug/g | | 74.3 | 50-140 | | | |

Volatiles

| | | | | | | | | | |
|------------------------------------|------|------|------|--|------|--------|--|--|--|
| Acetone | 6.13 | 0.50 | ug/g | | 61.3 | 50-140 | | | |
| Benzene | 4.73 | 0.02 | ug/g | | 118 | 60-130 | | | |
| Bromodichloromethane | 4.56 | 0.05 | ug/g | | 114 | 60-130 | | | |
| Bromoform | 4.27 | 0.05 | ug/g | | 107 | 60-130 | | | |
| Bromomethane | 3.40 | 0.05 | ug/g | | 84.9 | 50-140 | | | |
| Carbon Tetrachloride | 3.91 | 0.05 | ug/g | | 97.8 | 60-130 | | | |
| Chlorobenzene | 4.19 | 0.05 | ug/g | | 105 | 60-130 | | | |
| Chloroform | 4.33 | 0.05 | ug/g | | 108 | 60-130 | | | |
| Dibromochloromethane | 3.93 | 0.05 | ug/g | | 98.3 | 60-130 | | | |
| Dichlorodifluoromethane | 4.09 | 0.05 | ug/g | | 102 | 50-140 | | | |
| 1,2-Dichlorobenzene | 3.91 | 0.05 | ug/g | | 97.7 | 60-130 | | | |
| 1,3-Dichlorobenzene | 4.05 | 0.05 | ug/g | | 101 | 60-130 | | | |
| 1,4-Dichlorobenzene | 4.11 | 0.05 | ug/g | | 103 | 60-130 | | | |
| 1,1-Dichloroethane | 4.52 | 0.05 | ug/g | | 113 | 60-130 | | | |
| 1,2-Dichloroethane | 4.24 | 0.05 | ug/g | | 106 | 60-130 | | | |
| 1,1-Dichloroethylene | 4.33 | 0.05 | ug/g | | 108 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 4.13 | 0.05 | ug/g | | 103 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 4.46 | 0.05 | ug/g | | 112 | 60-130 | | | |
| 1,2-Dichloropropane | 5.15 | 0.05 | ug/g | | 129 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 4.62 | 0.05 | ug/g | | 115 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 4.86 | 0.05 | ug/g | | 122 | 60-130 | | | |
| Ethylbenzene | 4.34 | 0.05 | ug/g | | 109 | 60-130 | | | |
| Ethylene dibromide (dibromoethane) | 4.32 | 0.05 | ug/g | | 108 | 60-130 | | | |
| Hexane | 4.44 | 0.05 | ug/g | | 111 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 10.2 | 0.50 | ug/g | | 102 | 50-140 | | | |
| Methyl Isobutyl Ketone | 12.4 | 0.50 | ug/g | | 124 | 50-140 | | | |
| Methyl tert-butyl ether | 10.8 | 0.05 | ug/g | | 108 | 50-140 | | | |
| Methylene Chloride | 4.79 | 0.05 | ug/g | | 120 | 60-130 | | | |
| Styrene | 4.31 | 0.05 | ug/g | | 108 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| 1,1,1,2-Tetrachloroethane | 3.97 | 0.05 | ug/g | | 99.2 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 4.86 | 0.05 | ug/g | | 122 | 60-130 | | | |
| Tetrachloroethylene | 3.72 | 0.05 | ug/g | | 92.9 | 60-130 | | | |
| Toluene | 4.06 | 0.05 | ug/g | | 102 | 60-130 | | | |
| 1,1,1-Trichloroethane | 3.97 | 0.05 | ug/g | | 99.3 | 60-130 | | | |
| 1,1,2-Trichloroethane | 5.10 | 0.05 | ug/g | | 127 | 60-130 | | | |
| Trichloroethylene | 4.76 | 0.05 | ug/g | | 119 | 60-130 | | | |
| Trichlorofluoromethane | 3.66 | 0.05 | ug/g | | 91.4 | 50-140 | | | |
| Vinyl chloride | 4.08 | 0.02 | ug/g | | 102 | 50-140 | | | |
| m,p-Xylenes | 8.79 | 0.05 | ug/g | | 110 | 60-130 | | | |
| o-Xylene | 4.74 | 0.05 | ug/g | | 119 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 01-Sep-2017
Order Date: 25-Aug-2017
Project Description: 11140575-E2

Qualifier Notes:

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Paracel ID: 1735029



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No 113609

Page ___ of ___

| | | |
|-----------------------------------|---|--|
| Client Name: <u>GHD Limited</u> | Project Reference: <u>11140575-E2</u> | Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____ |
| Contact Name: <u>Luke Lopers</u> | Quote # | |
| Address: <u>179 Gekowade Road</u> | PO # <u>73508783</u> | |
| Telephone: <u>613-288-1723</u> | Email Address: <u>Luke.Lopers@ghd.com</u> | |

 Criteria: ☒ O. Reg. 153/04 (As Amended) Table ___ ☐ RSC Filing ☒ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

| Parcel Order Number: | | | | | | | | | | | | | | | | |
|-------------------------|---------|--------|------------|-----------------|--------------|------|----------------|------|------|---------------|----|------|---------|------|--------------------------------------|------------------|
| Sample ID/Location Name | | Matrix | Air Volume | # of Containers | Sample Taken | | PTCs F1-F4+BTX | VOCs | PAHs | Metals by ICP | Hg | CrVI | B (HWS) | TCLP | (Leachate unknown potential package) | |
| | | | | | Date | Time | | | | | | | | | | |
| 1 | BH2/MW2 | S | | 24 | Aug 25 | 9:00 | X | X | X | X | | | | X | | 3x350ml (+1 bid) |
| 2 | DUP | S | | 2 | Aug 25 | | X | | X | X | | | | | | 250ml (+1 bid) |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery:

Walk-in

| | | | |
|---|---------------------------|-------------------------------------|---|
| Relinquished By (Sign): <u>[Signature]</u> | Received by Driver/Depot: | Received at Lab: <u>[Signature]</u> | Verified By: <u>Rachel Subject</u> |
| Relinquished By (Print): <u>Ryan VandenBerg</u> | Date/Time: | Date/Time: <u>08/25/17 4:59pm</u> | Date/Time: <u>Aug 28/17</u> |
| Date/Time: <u>Aug 25, 2017</u> | Temperature: _____ °C | Temperature: <u>19.5</u> °C | pH Verified <input checked="" type="checkbox"/> By: <u>N/A</u> <u>10:45</u> |

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400
Ottawa, ON K2E7S4
Attn: Luke Lopers

Client PO: 73508783
Project: 11140575-E2
Custody: 38489

Report Date: 5-Sep-2017
Order Date: 29-Aug-2017

Order #: 1735234

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|------------|-----------|
| 1735234-01 | BH5/MW3 |
| 1735234-02 | BH6 |
| 1735234-03 | BH7 |

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------------------------------|---------------------------------|-----------------|---------------|
| PHC F1 | CWS Tier 1 - P&T GC-FID | 1-Sep-17 | 4-Sep-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 29-Aug-17 | 31-Aug-17 |
| REG 153: Metals by ICP/OES, soil | based on MOE E3470, ICP-OES | 1-Sep-17 | 1-Sep-17 |
| REG 153: PAHs by GC-MS | EPA 8270 - GC-MS, extraction | 29-Aug-17 | 31-Aug-17 |
| REG 153: VOCs by P&T GC/MS | EPA 8260 - P&T GC-MS | 1-Sep-17 | 4-Sep-17 |
| Solids, % | Gravimetric, calculation | 31-Aug-17 | 31-Aug-17 |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 05-Sep-2017

Order Date: 29-Aug-2017

Project Description: **11140575-E2**

| | | | | |
|---------------------|------------|------------|------------|---|
| Client ID: | BH5/MW3 | BH6 | BH7 | - |
| Sample Date: | 29-Aug-17 | 29-Aug-17 | 29-Aug-17 | - |
| Sample ID: | 1735234-01 | 1735234-02 | 1735234-03 | - |
| MDL/Units | Soil | Soil | Soil | - |

Physical Characteristics

| | | | | | |
|----------|--------------|------|------|------|---|
| % Solids | 0.1 % by Wt. | 82.7 | 70.7 | 81.5 | - |
|----------|--------------|------|------|------|---|

Metals

| | | | | | |
|------------|--------------|------|------|------|---|
| Antimony | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Arsenic | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Barium | 1.0 ug/g dry | 94.9 | 85.2 | 31.9 | - |
| Beryllium | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Boron | 1.0 ug/g dry | 6.3 | 6.0 | 2.8 | - |
| Cadmium | 0.5 ug/g dry | <0.5 | <0.5 | <0.5 | - |
| Chromium | 1.0 ug/g dry | 21.1 | 14.4 | 13.1 | - |
| Cobalt | 1.0 ug/g dry | 6.0 | 3.4 | 2.4 | - |
| Copper | 1.0 ug/g dry | 15.4 | 25.4 | 6.5 | - |
| Lead | 1.0 ug/g dry | 42.9 | 58.2 | 42.4 | - |
| Molybdenum | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Nickel | 1.0 ug/g dry | 13.4 | 9.0 | 6.0 | - |
| Selenium | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Silver | 0.5 ug/g dry | <0.5 | <0.5 | <0.5 | - |
| Thallium | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Uranium | 1.0 ug/g dry | <1.0 | <1.0 | <1.0 | - |
| Vanadium | 1.0 ug/g dry | 28.0 | 20.0 | 18.4 | - |
| Zinc | 1.0 ug/g dry | 59.0 | 265 | 32.3 | - |

Volatiles

| | | | | | |
|-------------------------|---------------|-------|-------|-------|---|
| Acetone | 0.50 ug/g dry | <0.50 | <0.50 | <0.50 | - |
| Benzene | 0.02 ug/g dry | <0.02 | <0.02 | <0.02 | - |
| Bromodichloromethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Bromoform | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Bromomethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Carbon Tetrachloride | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Chlorobenzene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Chloroform | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Dibromochloromethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Dichlorodifluoromethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1-Dichloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

| | Client ID: Sample Date: Sample ID: | BH5/MW3 29-Aug-17 1735234-01 Soil | BH6 29-Aug-17 1735234-02 Soil | BH7 29-Aug-17 1735234-03 Soil | - - - - |
|------------------------------------|--|--|--|--|------------------|
| | MDL/Units | | | | |
| 1,2-Dichloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1-Dichloroethylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,2-Dichloropropane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Ethylene dibromide (dibromoethane) | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Hexane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | <0.50 | <0.50 | <0.50 | - |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | <0.50 | <0.50 | <0.50 | - |
| Methyl tert-butyl ether | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Methylene Chloride | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Styrene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Tetrachloroethylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Toluene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Trichloroethylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Trichlorofluoromethane | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Vinyl chloride | 0.02 ug/g dry | <0.02 | <0.02 | <0.02 | - |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| o-Xylene | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| Xylenes, total | 0.05 ug/g dry | <0.05 | <0.05 | <0.05 | - |
| 4-Bromofluorobenzene | Surrogate | 109% | 105% | 107% | - |
| Dibromofluoromethane | Surrogate | 99.8% | 110% | 112% | - |
| Toluene-d8 | Surrogate | 107% | 101% | 104% | - |

Hydrocarbons

| | | | | | |
|-------------------|------------|----|----|----|---|
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | <7 | <7 | - |
| F2 PHCs (C10-C16) | 4 ug/g dry | <4 | <4 | <4 | - |
| F3 PHCs (C16-C34) | 8 ug/g dry | <8 | <8 | <8 | - |
| F4 PHCs (C34-C50) | 6 ug/g dry | <6 | <6 | <6 | - |

Semi-Volatiles

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017

Order Date: 29-Aug-2017

Project Description: 11140575-E2

| | Client ID: Sample Date: Sample ID: | BH5/MW3 29-Aug-17 1735234-01 Soil | BH6 29-Aug-17 1735234-02 Soil | BH7 29-Aug-17 1735234-03 Soil | - - - - |
|--------------------------|--|--|--|--|------------------|
| | MDL/Units | | | | |
| Acenaphthene | 0.02 ug/g dry | 0.03 | 2.83 | <0.02 | - |
| Acenaphthylene | 0.02 ug/g dry | <0.02 | <0.40 [1] | <0.02 | - |
| Anthracene | 0.02 ug/g dry | 0.06 | 5.61 | 0.04 | - |
| Benzo [a] anthracene | 0.02 ug/g dry | 0.18 | 6.34 | 0.11 | - |
| Benzo [a] pyrene | 0.02 ug/g dry | 0.22 | 4.91 | 0.15 | - |
| Benzo [b] fluoranthene | 0.02 ug/g dry | 0.25 | 5.30 | 0.16 | - |
| Benzo [g,h,i] perylene | 0.02 ug/g dry | 0.17 | 2.85 | 0.12 | - |
| Benzo [k] fluoranthene | 0.02 ug/g dry | 0.14 | 3.06 | 0.09 | - |
| Chrysene | 0.02 ug/g dry | 0.23 | 7.03 | 0.13 | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g dry | 0.04 | 0.93 | 0.03 | - |
| Fluoranthene | 0.02 ug/g dry | 0.50 | 17.4 | 0.28 | - |
| Fluorene | 0.02 ug/g dry | 0.02 | 3.04 | <0.02 | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g dry | 0.15 | 2.92 | 0.10 | - |
| 1-Methylnaphthalene | 0.02 ug/g dry | <0.02 | <0.40 [1] | <0.02 | - |
| 2-Methylnaphthalene | 0.02 ug/g dry | <0.02 | <0.40 [1] | <0.02 | - |
| Methylnaphthalene (1&2) | 0.04 ug/g dry | <0.04 | <0.80 [1] | <0.04 | - |
| Naphthalene | 0.01 ug/g dry | <0.01 | 0.57 | <0.01 | - |
| Phenanthrene | 0.02 ug/g dry | 0.28 | 23.2 | 0.16 | - |
| Pyrene | 0.02 ug/g dry | 0.41 | 13.7 | 0.24 | - |
| 2-Fluorobiphenyl | Surrogate | 104% | 83.9% | 92.6% | - |
| Terphenyl-d14 | Surrogate | 104% | 89.2% | 99.4% | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g | | | | | | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g | | | | | | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g | | | | | | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g | | | | | | |
| Metals | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g | | | | | | |
| Arsenic | ND | 1.0 | ug/g | | | | | | |
| Barium | ND | 1.0 | ug/g | | | | | | |
| Beryllium | ND | 1.0 | ug/g | | | | | | |
| Boron | ND | 1.0 | ug/g | | | | | | |
| Cadmium | ND | 0.5 | ug/g | | | | | | |
| Chromium | ND | 1.0 | ug/g | | | | | | |
| Cobalt | ND | 1.0 | ug/g | | | | | | |
| Copper | ND | 1.0 | ug/g | | | | | | |
| Lead | ND | 1.0 | ug/g | | | | | | |
| Molybdenum | ND | 1.0 | ug/g | | | | | | |
| Nickel | ND | 1.0 | ug/g | | | | | | |
| Selenium | ND | 1.0 | ug/g | | | | | | |
| Silver | ND | 0.5 | ug/g | | | | | | |
| Thallium | ND | 1.0 | ug/g | | | | | | |
| Uranium | ND | 1.0 | ug/g | | | | | | |
| Vanadium | ND | 1.0 | ug/g | | | | | | |
| Zinc | ND | 1.0 | ug/g | | | | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g | | | | | | |
| Acenaphthylene | ND | 0.02 | ug/g | | | | | | |
| Anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] pyrene | ND | 0.02 | ug/g | | | | | | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g | | | | | | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Chrysene | ND | 0.02 | ug/g | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g | | | | | | |
| Fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Fluorene | ND | 0.02 | ug/g | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g | | | | | | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.04 | ug/g | | | | | | |
| Naphthalene | ND | 0.01 | ug/g | | | | | | |
| Phenanthrene | ND | 0.02 | ug/g | | | | | | |
| Pyrene | ND | 0.02 | ug/g | | | | | | |
| Surrogate: 2-Fluorobiphenyl | 1.05 | | ug/g | | 79.0 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.12 | | ug/g | | 83.8 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g | | | | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Bromodichloromethane | ND | 0.05 | ug/g | | | | | | |
| Bromoform | ND | 0.05 | ug/g | | | | | | |
| Bromomethane | ND | 0.05 | ug/g | | | | | | |
| Carbon Tetrachloride | ND | 0.05 | ug/g | | | | | | |
| Chlorobenzene | ND | 0.05 | ug/g | | | | | | |
| Chloroform | ND | 0.05 | ug/g | | | | | | |
| Dibromochloromethane | ND | 0.05 | ug/g | | | | | | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| 1,1-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.05 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Ethylene dibromide (dibromoethane) | ND | 0.05 | ug/g | | | | | | |
| Hexane | ND | 0.05 | ug/g | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g | | | | | | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g | | | | | | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g | | | | | | |
| Methylene Chloride | ND | 0.05 | ug/g | | | | | | |
| Styrene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| Tetrachloroethylene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| Trichloroethylene | ND | 0.05 | ug/g | | | | | | |
| Trichlorofluoromethane | ND | 0.05 | ug/g | | | | | | |
| Vinyl chloride | ND | 0.02 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| Surrogate: 4-Bromofluorobenzene | 3.50 | | ug/g | | 110 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 2.76 | | ug/g | | 86.3 | 50-140 | | | |
| Surrogate: Toluene-d8 | 3.23 | | ug/g | | 101 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g dry | ND | | | | 40 | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g dry | ND | | | | 30 | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g dry | ND | | | | 30 | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g dry | ND | | | | 30 | |
| Metals | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Arsenic | 4.17 | 1.0 | ug/g dry | 4.13 | | | 1.1 | 30 | |
| Barium | 45.7 | 1.0 | ug/g dry | 51.5 | | | 12.0 | 30 | |
| Beryllium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Boron | 10.6 | 1.0 | ug/g dry | 10.7 | | | 0.9 | 30 | |
| Cadmium | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Chromium | 12.4 | 1.0 | ug/g dry | 14.3 | | | 14.1 | 30 | |
| Cobalt | 6.79 | 1.0 | ug/g dry | 7.61 | | | 11.4 | 30 | |
| Copper | 23.4 | 1.0 | ug/g dry | 26.0 | | | 10.7 | 30 | |
| Lead | 7.33 | 1.0 | ug/g dry | 7.14 | | | 2.7 | 30 | |
| Molybdenum | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Nickel | 13.9 | 1.0 | ug/g dry | 14.7 | | | 5.5 | 30 | |
| Selenium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Silver | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Thallium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Uranium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Vanadium | 20.6 | 1.0 | ug/g dry | 24.1 | | | 15.5 | 30 | |
| Zinc | 35.3 | 1.0 | ug/g dry | 39.0 | | | 9.8 | 30 | |
| Physical Characteristics | | | | | | | | | |
| % Solids | 86.4 | 0.1 | % by Wt. | 86.4 | | | 0.1 | 25 | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Acenaphthylene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Anthracene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Benzo [a] anthracene | 0.049 | 0.02 | ug/g dry | 0.045 | | | 9.2 | 40 | |
| Benzo [a] pyrene | 0.071 | 0.02 | ug/g dry | 0.060 | | | 16.5 | 40 | |
| Benzo [b] fluoranthene | 0.092 | 0.02 | ug/g dry | 0.077 | | | 18.4 | 40 | |
| Benzo [g,h,i] perylene | 0.070 | 0.02 | ug/g dry | 0.058 | | | 18.2 | 40 | |
| Benzo [k] fluoranthene | 0.036 | 0.02 | ug/g dry | 0.032 | | | 11.2 | 40 | |
| Chrysene | 0.075 | 0.02 | ug/g dry | 0.062 | | | 19.1 | 40 | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Fluoranthene | 0.193 | 0.02 | ug/g dry | 0.161 | | | 17.9 | 40 | |
| Fluorene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Indeno [1,2,3-cd] pyrene | 0.053 | 0.02 | ug/g dry | 0.042 | | | 21.6 | 40 | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Naphthalene | ND | 0.01 | ug/g dry | 0.011 | | | 0.0 | 40 | |
| Phenanthrene | 0.109 | 0.02 | ug/g dry | 0.102 | | | 6.8 | 40 | |
| Pyrene | 0.156 | 0.02 | ug/g dry | 0.135 | | | 15.0 | 40 | |
| Surrogate: 2-Fluorobiphenyl | 1.36 | | ug/g dry | | 87.4 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 1.50 | | ug/g dry | | 96.3 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Benzene | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| Bromodichloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromoform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromomethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Carbon Tetrachloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloroform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dibromochloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|----------|---------------|------|------------|-----|-----------|-------|
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylbenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylene dibromide (dibromoethane) | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Hexane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methylene Chloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Styrene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Tetrachloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichlorofluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Vinyl chloride | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| m,p-Xylenes | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| o-Xylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Surrogate: 4-Bromofluorobenzene | 2.06 | | ug/g dry | | 102 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 2.27 | | ug/g dry | | 112 | 50-140 | | | |
| Surrogate: Toluene-d8 | 2.17 | | ug/g dry | | 107 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | 197 | 7 | ug/g | | 98.5 | 80-120 | | | |
| F2 PHCs (C10-C16) | 95 | 4 | ug/g | ND | 87.2 | 60-140 | | | |
| F3 PHCs (C16-C34) | 232 | 8 | ug/g | ND | 103 | 60-140 | | | |
| F4 PHCs (C34-C50) | 168 | 6 | ug/g | ND | 112 | 60-140 | | | |
| Metals | | | | | | | | | |
| Antimony | 250 | | ug/L | ND | 100 | 70-130 | | | |
| Arsenic | 309 | | ug/L | 82.5 | 90.6 | 70-130 | | | |
| Barium | 1260 | | ug/L | 1030 | 91.8 | 70-130 | | | |
| Beryllium | 223 | | ug/L | 1.48 | 88.7 | 70-130 | | | |
| Boron | 356 | | ug/L | 128 | 91.3 | 70-130 | | | |
| Cadmium | 219 | | ug/L | 1.13 | 87.2 | 70-130 | | | |
| Chromium | 501 | | ug/L | 286 | 85.9 | 70-130 | | | |
| Cobalt | 363 | | ug/L | 152 | 84.4 | 70-130 | | | |
| Copper | 745 | | ug/L | 520 | 90.0 | 70-130 | | | |
| Lead | 356 | | ug/L | 143 | 85.3 | 70-130 | | | |
| Molybdenum | 218 | | ug/L | 6.30 | 84.5 | 70-130 | | | |
| Nickel | 516 | | ug/L | 293 | 88.9 | 70-130 | | | |
| Selenium | 228 | | ug/L | ND | 91.3 | 70-130 | | | |
| Silver | 234 | | ug/L | ND | 93.3 | 70-130 | | | |
| Thallium | 205 | | ug/L | 13.6 | 76.6 | 70-130 | | | |
| Uranium | 258 | | ug/L | ND | 103 | 70-130 | | | |
| Vanadium | 710 | | ug/L | 482 | 91.5 | 70-130 | | | |
| Zinc | 977 | | ug/L | 779 | 79.2 | 70-130 | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | 0.195 | 0.02 | ug/g | ND | 99.8 | 50-140 | | | |
| Acenaphthylene | 0.166 | 0.02 | ug/g | ND | 85.1 | 50-140 | | | |
| Anthracene | 0.179 | 0.02 | ug/g | ND | 91.6 | 50-140 | | | |
| Benzo [a] anthracene | 0.183 | 0.02 | ug/g | 0.045 | 71.0 | 50-140 | | | |
| Benzo [a] pyrene | 0.220 | 0.02 | ug/g | 0.060 | 81.8 | 50-140 | | | |
| Benzo [b] fluoranthene | 0.261 | 0.02 | ug/g | 0.077 | 94.6 | 50-140 | | | |
| Benzo [g,h,i] perylene | 0.226 | 0.02 | ug/g | 0.058 | 86.2 | 50-140 | | | |
| Benzo [k] fluoranthene | 0.226 | 0.02 | ug/g | 0.032 | 99.5 | 50-140 | | | |
| Chrysene | 0.232 | 0.02 | ug/g | 0.062 | 87.4 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 0.196 | 0.02 | ug/g | ND | 101 | 50-140 | | | |
| Fluoranthene | 0.286 | 0.02 | ug/g | 0.161 | 64.4 | 50-140 | | | |
| Fluorene | 0.185 | 0.02 | ug/g | ND | 94.8 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 0.222 | 0.02 | ug/g | 0.042 | 92.4 | 50-140 | | | |
| 1-Methylnaphthalene | 0.193 | 0.02 | ug/g | ND | 99.1 | 50-140 | | | |
| 2-Methylnaphthalene | 0.210 | 0.02 | ug/g | ND | 108 | 50-140 | | | |
| Naphthalene | 0.191 | 0.01 | ug/g | 0.011 | 92.4 | 50-140 | | | |
| Phenanthrene | 0.271 | 0.02 | ug/g | 0.102 | 86.8 | 50-140 | | | |
| Pyrene | 0.292 | 0.02 | ug/g | 0.135 | 80.7 | 50-140 | | | |
| Surrogate: 2-Fluorobiphenyl | 1.41 | | ug/g | | 90.3 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | 9.16 | 0.50 | ug/g | | 91.6 | 50-140 | | | |
| Benzene | 2.95 | 0.02 | ug/g | | 73.7 | 60-130 | | | |
| Bromodichloromethane | 3.41 | 0.05 | ug/g | | 85.3 | 60-130 | | | |
| Bromoform | 5.16 | 0.05 | ug/g | | 129 | 60-130 | | | |
| Bromomethane | 3.43 | 0.05 | ug/g | | 85.7 | 50-140 | | | |
| Carbon Tetrachloride | 3.22 | 0.05 | ug/g | | 80.4 | 60-130 | | | |
| Chlorobenzene | 3.70 | 0.05 | ug/g | | 92.6 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Chloroform | 2.80 | 0.05 | ug/g | | 69.9 | 60-130 | | | |
| Dibromochloromethane | 5.05 | 0.05 | ug/g | | 126 | 60-130 | | | |
| Dichlorodifluoromethane | 2.64 | 0.05 | ug/g | | 66.1 | 50-140 | | | |
| 1,2-Dichlorobenzene | 3.91 | 0.05 | ug/g | | 97.7 | 60-130 | | | |
| 1,3-Dichlorobenzene | 3.93 | 0.05 | ug/g | | 98.3 | 60-130 | | | |
| 1,4-Dichlorobenzene | 3.81 | 0.05 | ug/g | | 95.4 | 60-130 | | | |
| 1,1-Dichloroethane | 2.64 | 0.05 | ug/g | | 66.1 | 60-130 | | | |
| 1,2-Dichloroethane | 2.75 | 0.05 | ug/g | | 68.7 | 60-130 | | | |
| 1,1-Dichloroethylene | 2.91 | 0.05 | ug/g | | 72.8 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 2.62 | 0.05 | ug/g | | 65.5 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 2.62 | 0.05 | ug/g | | 65.5 | 60-130 | | | |
| 1,2-Dichloropropane | 2.87 | 0.05 | ug/g | | 71.6 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 4.31 | 0.05 | ug/g | | 108 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 4.97 | 0.05 | ug/g | | 124 | 60-130 | | | |
| Ethylbenzene | 4.11 | 0.05 | ug/g | | 103 | 60-130 | | | |
| Ethylene dibromide (dibromoethane) | 3.80 | 0.05 | ug/g | | 94.9 | 60-130 | | | |
| Hexane | 3.20 | 0.05 | ug/g | | 80.0 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 6.50 | 0.50 | ug/g | | 65.0 | 50-140 | | | |
| Methyl Isobutyl Ketone | 7.65 | 0.50 | ug/g | | 76.5 | 50-140 | | | |
| Methyl tert-butyl ether | 7.22 | 0.05 | ug/g | | 72.2 | 50-140 | | | |
| Methylene Chloride | 2.70 | 0.05 | ug/g | | 67.6 | 60-130 | | | |
| Styrene | 4.17 | 0.05 | ug/g | | 104 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 4.62 | 0.05 | ug/g | | 116 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 4.67 | 0.05 | ug/g | | 117 | 60-130 | | | |
| Tetrachloroethylene | 3.59 | 0.05 | ug/g | | 89.9 | 60-130 | | | |
| Toluene | 3.66 | 0.05 | ug/g | | 91.4 | 60-130 | | | |
| 1,1,1-Trichloroethane | 3.08 | 0.05 | ug/g | | 77.1 | 60-130 | | | |
| 1,1,2-Trichloroethane | 2.93 | 0.05 | ug/g | | 73.3 | 60-130 | | | |
| Trichloroethylene | 2.76 | 0.05 | ug/g | | 69.0 | 60-130 | | | |
| Trichlorofluoromethane | 3.41 | 0.05 | ug/g | | 85.2 | 50-140 | | | |
| Vinyl chloride | 2.56 | 0.02 | ug/g | | 64.0 | 50-140 | | | |
| m,p-Xylenes | 8.14 | 0.05 | ug/g | | 102 | 60-130 | | | |
| o-Xylene | 4.15 | 0.05 | ug/g | | 104 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 05-Sep-2017
Order Date: 29-Aug-2017
Project Description: 11140575-E2

Qualifier Notes:

Sample Qualifiers :

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Parcel ID: 1735234



20
St. Laurent Blvd.
ntario K1G 4J8
49-1947
e: paracel@paracellabs.com

RELIABLE.

Chain of Custody
(Lab Use Only)

Nº 38489

Page 1 of 1

Turnaround Time:

☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
Date Required: _____

| | |
|----------------------------------|---|
| Client Name: <u>GHD Limited</u> | Project Reference: <u>1146575-E2</u> |
| Contact Name: <u>Luke Lopers</u> | Quote # _____ |
| Address: <u>179 Glenade Road</u> | PO # <u>73508783</u> |
| Telephone: <u>613-258-1723</u> | Email Address: <u>Luke.Lopers@ghd.com</u> |

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number: 1735234
1735234

| Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken | | PHCs, A-H + BTEX | VOCs | PAHs | Metals by DEP | | | | | | | | |
|-------------------------|--------|------------|-----------------|--------------|-------|------------------|------|------|---------------|--|--|--|--|--|--|--|---------------|
| | | | | Date | Time | | | | | | | | | | | | |
| 1 BH5/MW3 | S | | 2 | Aug 29 | 9:00 | X | X | X | X | | | | | | | | 250ml + 1vial |
| 2 BH6 | S | | 2 | Aug 29 | 9:30 | X | X | X | X | | | | | | | | ↓ |
| 3 BH7 | S | | 2 | Aug 29 | 10:00 | X | X | X | X | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery:

Walk-in

| | | | |
|--|---------------------------|--|--|
| Relinquished By (Sign): <u>[Signature]</u> | Received by Driver/Depot: | Received at Lab: <u>[Signature]</u> | Verified By: <u>Rachel Subject</u> |
| Relinquished By (Print): <u>Ryan Kaden Hillert</u> | Date/Time: | Date/Time: <u>Aug 29/17</u> | Date/Time: <u>Aug 29/17</u> |
| Date/Time: <u>August 29, 2017</u> | Temperature: _____ °C | Temperature: <u>31.5°C</u> <u>34.6°C</u> | pH Verified: <u>X</u> By: <u>N/A</u> <u>5:21</u> |

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400
Ottawa, ON K2E7S4
Attn: Luke Lopers

Client PO: 73508783
Project: 11140575-E2
Custody: 112293

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017

Order #: 1737017

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|------------|------------|
| 1737017-01 | BH1/MW1 |
| 1737017-02 | BH2/MW2 |
| 1737017-03 | BH5/MW3 |
| 1737017-04 | Dup |
| 1737017-05 | Trip Blank |

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------------------------|---------------------------------|-----------------|---------------|
| Metals, ICP-MS | EPA 200.8 - ICP-MS | 12-Sep-17 | 12-Sep-17 |
| pH | EPA 150.1 - pH probe @25 °C | 12-Sep-17 | 12-Sep-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 12-Sep-17 | 13-Sep-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 12-Sep-17 | 12-Sep-17 |
| REG 153: PAHs by GC-MS | EPA 625 - GC-MS, extraction | 12-Sep-17 | 12-Sep-17 |
| REG 153: VOCs by P&T GC/MS | EPA 624 - P&T GC-MS | 12-Sep-17 | 13-Sep-17 |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 14-Sep-2017

Order Date: 8-Sep-2017

Project Description: **11140575-E2**

| | | | | | |
|--|---------------------|------------|------------|------------|------------|
| | Client ID: | BH1/MW1 | BH2/MW2 | BH5/MW3 | Dup |
| | Sample Date: | 08-Sep-17 | 08-Sep-17 | 08-Sep-17 | 08-Sep-17 |
| | Sample ID: | 1737017-01 | 1737017-02 | 1737017-03 | 1737017-04 |
| | MDL/Units | Water | Water | Water | Water |

General Inorganics

| | | | | | |
|----|--------------|-----|-----|-----|-----|
| pH | 0.1 pH Units | 8.0 | 8.3 | 7.3 | 7.3 |
|----|--------------|-----|-----|-----|-----|

Metals

| | | | | | |
|------------|----------|--------|--------|-------|-------|
| Antimony | 0.5 ug/L | <0.5 | <0.5 | 0.7 | 0.7 |
| Arsenic | 1 ug/L | <1 | 2 | <1 | <1 |
| Barium | 1 ug/L | 65 | 43 | 75 | 71 |
| Beryllium | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Boron | 10 ug/L | 394 | 454 | 117 | 97 |
| Cadmium | 0.1 ug/L | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | 1 ug/L | <1 | <1 | <1 | <1 |
| Cobalt | 0.5 ug/L | <0.5 | <0.5 | 0.6 | <0.5 |
| Copper | 0.5 ug/L | 1.5 | 2.7 | 2.3 | 5.8 |
| Lead | 0.1 ug/L | 0.3 | 0.1 | <0.1 | <0.1 |
| Molybdenum | 0.5 ug/L | 4.9 | 39.9 | 3.9 | 1.5 |
| Nickel | 1 ug/L | <1 | 2 | 2 | 2 |
| Selenium | 1 ug/L | <1 | <1 | <1 | <1 |
| Silver | 0.1 ug/L | <0.1 | <0.1 | <0.1 | <0.1 |
| Sodium | 200 ug/L | 329000 | 257000 | 87200 | 50000 |
| Thallium | 0.1 ug/L | <0.1 | <0.1 | <0.1 | <0.1 |
| Uranium | 0.1 ug/L | 1.8 | 1.9 | 1.0 | 0.7 |
| Vanadium | 0.5 ug/L | <0.5 | 0.6 | <0.5 | <0.5 |
| Zinc | 5 ug/L | <5 | <5 | 16 | 6 |

Volatiles

| | | | | | |
|-------------------------|----------|------|------|------|------|
| Acetone | 5.0 ug/L | <5.0 | <5.0 | <5.0 | <5.0 |
| Benzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Bromodichloromethane | 0.5 ug/L | <0.5 | <0.5 | 2.9 | <0.5 |
| Bromoform | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Bromomethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | <0.2 | <0.2 | <0.2 |
| Chlorobenzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Chloroform | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibromochloromethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | <1.0 | <1.0 | <1.0 |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |

Certificate of Analysis
 Client: **GHD Limited (Ottawa)**
 Client PO: **73508783**

Report Date: 14-Sep-2017

Order Date: 8-Sep-2017

Project Description: **11140575-E2**

| | Client ID: Sample Date: Sample ID: | BH1/MW1 08-Sep-17 1737017-01 Water | BH2/MW2 08-Sep-17 1737017-02 Water | BH5/MW3 08-Sep-17 1737017-03 Water | Dup 08-Sep-17 1737017-04 Water |
|------------------------------------|--|---|---|---|---|
| | MDL/Units | | | | |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethylbenzene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | 3.5 |
| Ethylene dibromide (dibromoethane) | 0.2 ug/L | <0.2 | <0.2 | <0.2 | <0.2 |
| Hexane | 1.0 ug/L | <1.0 | <1.0 | <1.0 | <1.0 |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | <5.0 | <5.0 | <5.0 |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | <5.0 | <5.0 | <5.0 |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | <2.0 | <2.0 | <2.0 |
| Methylene Chloride | 5.0 ug/L | <5.0 | <5.0 | <5.0 | <5.0 |
| Styrene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Toluene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,2-Trichloroethane | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Trichloroethylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Trichlorofluoromethane | 1.0 ug/L | <1.0 | <1.0 | <1.0 | <1.0 |
| Vinyl chloride | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 |
| m,p-Xylenes | 0.5 ug/L | <0.5 | <0.5 | <0.5 | 13.6 |
| o-Xylene | 0.5 ug/L | <0.5 | <0.5 | <0.5 | 3.5 |
| Xylenes, total | 0.5 ug/L | <0.5 | <0.5 | <0.5 | 17.1 |
| 4-Bromofluorobenzene | Surrogate | 102% | 103% | 104% | 103% |
| Dibromofluoromethane | Surrogate | 79.3% | 93.6% | 119% | 96.2% |
| Toluene-d8 | Surrogate | 85.2% | 85.4% | 85.7% | 83.8% |

Hydrocarbons

| | | | | | |
|-------------------|----------|------|------|------|------|
| F1 PHCs (C6-C10) | 25 ug/L | <25 | <25 | <25 | <25 |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | <100 | <100 | <100 |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | <100 | 203 | <100 |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | <100 | <100 | <100 |

Certificate of Analysis
 Client: GHD Limited (Ottawa)
 Client PO: 73508783

Report Date: 14-Sep-2017

Order Date: 8-Sep-2017

Project Description: 11140575-E2

| | | | | | |
|--|--------------|------------|------------|------------|------------|
| | Client ID: | BH1/MW1 | BH2/MW2 | BH5/MW3 | Dup |
| | Sample Date: | 08-Sep-17 | 08-Sep-17 | 08-Sep-17 | 08-Sep-17 |
| | Sample ID: | 1737017-01 | 1737017-02 | 1737017-03 | 1737017-04 |
| | MDL/Units | Water | Water | Water | Water |

Semi-Volatiles

| | | | | | |
|--------------------------|-----------|-------|-----------|-------|-------|
| Acenaphthene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Acenaphthylene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Anthracene | 0.01 ug/L | <0.01 | <0.02 [2] | <0.01 | <0.01 |
| Benzo [a] anthracene | 0.01 ug/L | <0.01 | <0.02 [2] | <0.01 | <0.01 |
| Benzo [a] pyrene | 0.01 ug/L | <0.01 | <0.02 [2] | <0.01 | <0.01 |
| Benzo [b] fluoranthene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Benzo [g,h,i] perylene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Benzo [k] fluoranthene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Chrysene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Dibenzo [a,h] anthracene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Fluoranthene | 0.01 ug/L | <0.01 | 0.12 [2] | <0.01 | <0.01 |
| Fluorene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Indeno [1,2,3-cd] pyrene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| 1-Methylnaphthalene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| 2-Methylnaphthalene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Methylnaphthalene (1&2) | 0.10 ug/L | <0.10 | <0.20 [2] | <0.10 | <0.10 |
| Naphthalene | 0.05 ug/L | <0.05 | 0.16 [2] | <0.05 | <0.05 |
| Phenanthrene | 0.05 ug/L | <0.05 | <0.10 [2] | <0.05 | <0.05 |
| Pyrene | 0.01 ug/L | <0.01 | 0.10 [2] | <0.01 | <0.01 |
| 2-Fluorobiphenyl | Surrogate | 94.4% | 82.3% [2] | 106% | 99.2% |
| Terphenyl-d14 | Surrogate | 111% | 112% [2] | 107% | 119% |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: **11140575-E2**

| | | | | | |
|----------------------------------|---------------------|------------|---|---|---|
| | Client ID: | Trip Blank | - | - | - |
| | Sample Date: | 07-Sep-17 | - | - | - |
| | Sample ID: | 1737017-05 | - | - | - |
| | MDL/Units | Water | - | - | - |
| Volatiles | | | | | |
| Acetone | 5.0 ug/L | <5.0 | - | - | - |
| Benzene | 0.5 ug/L | <0.5 | - | - | - |
| Bromodichloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Bromoform | 0.5 ug/L | <0.5 | - | - | - |
| Bromomethane | 0.5 ug/L | <0.5 | - | - | - |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | - | - | - |
| Chlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| Chloroform | 0.5 ug/L | <0.5 | - | - | - |
| Dibromochloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | - | - | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | - | - | - |
| Ethylene dibromide (dibromoethar | 0.2 ug/L | <0.2 | - | - | - |
| Hexane | 1.0 ug/L | <1.0 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | - | - | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | - | - | - |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | - | - | - |
| Methylene Chloride | 5.0 ug/L | <5.0 | - | - | - |
| Styrene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Toluene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
 Order Date: 8-Sep-2017
Project Description: 11140575-E2

| | Client ID: | Trip Blank 07-Sep-17 1737017-05 Water | - | - | - |
|------------------------|--------------|--|---|---|---|
| | Sample Date: | | - | - | - |
| | Sample ID: | | - | - | - |
| | MDL/Units | | - | - | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Trichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Trichlorofluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| Vinyl chloride | 0.5 ug/L | <0.5 | - | - | - |
| m,p-Xylenes | 0.5 ug/L | <0.5 | - | - | - |
| o-Xylene | 0.5 ug/L | <0.5 | - | - | - |
| Xylenes, total | 0.5 ug/L | <0.5 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 104% | - | - | - |
| Dibromofluoromethane | Surrogate | 114% | - | - | - |
| Toluene-d8 | Surrogate | 84.7% | - | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | | | | | | |
| F2 PHCs (C10-C16) | ND | 100 | ug/L | | | | | | |
| F3 PHCs (C16-C34) | ND | 100 | ug/L | | | | | | |
| F4 PHCs (C34-C50) | ND | 100 | ug/L | | | | | | |
| Metals | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | | | | | | |
| Arsenic | ND | 1 | ug/L | | | | | | |
| Barium | ND | 1 | ug/L | | | | | | |
| Beryllium | ND | 0.5 | ug/L | | | | | | |
| Boron | ND | 10 | ug/L | | | | | | |
| Cadmium | ND | 0.1 | ug/L | | | | | | |
| Chromium | ND | 1 | ug/L | | | | | | |
| Cobalt | ND | 0.5 | ug/L | | | | | | |
| Copper | ND | 0.5 | ug/L | | | | | | |
| Lead | ND | 0.1 | ug/L | | | | | | |
| Molybdenum | ND | 0.5 | ug/L | | | | | | |
| Nickel | ND | 1 | ug/L | | | | | | |
| Selenium | ND | 1 | ug/L | | | | | | |
| Silver | ND | 0.1 | ug/L | | | | | | |
| Sodium | ND | 200 | ug/L | | | | | | |
| Thallium | ND | 0.1 | ug/L | | | | | | |
| Uranium | ND | 0.1 | ug/L | | | | | | |
| Vanadium | ND | 0.5 | ug/L | | | | | | |
| Zinc | ND | 5 | ug/L | | | | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | ND | 0.05 | ug/L | | | | | | |
| Acenaphthylene | ND | 0.05 | ug/L | | | | | | |
| Anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] pyrene | ND | 0.01 | ug/L | | | | | | |
| Benzo [b] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.05 | ug/L | | | | | | |
| Benzo [k] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Chrysene | ND | 0.05 | ug/L | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.05 | ug/L | | | | | | |
| Fluoranthene | ND | 0.01 | ug/L | | | | | | |
| Fluorene | ND | 0.05 | ug/L | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.05 | ug/L | | | | | | |
| 1-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| 2-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.10 | ug/L | | | | | | |
| Naphthalene | ND | 0.05 | ug/L | | | | | | |
| Phenanthrene | ND | 0.05 | ug/L | | | | | | |
| Pyrene | ND | 0.01 | ug/L | | | | | | |
| Surrogate: 2-Fluorobiphenyl | 17.3 | | ug/L | | 86.4 | 50-140 | | | |
| Surrogate: Terphenyl-d14 | 19.6 | | ug/L | | 97.8 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | | | | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Bromodichloromethane | ND | 0.5 | ug/L | | | | | | |
| Bromoform | ND | 0.5 | ug/L | | | | | | |
| Bromomethane | ND | 0.5 | ug/L | | | | | | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | | | | | | |
| Chlorobenzene | ND | 0.5 | ug/L | | | | | | |
| Chloroform | ND | 0.5 | ug/L | | | | | | |
| Dibromochloromethane | ND | 0.5 | ug/L | | | | | | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Ethylene dibromide (dibromoethane) | ND | 0.2 | ug/L | | | | | | |
| Hexane | ND | 1.0 | ug/L | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | | | | | | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | | | | | | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | | | | | | |
| Methylene Chloride | ND | 5.0 | ug/L | | | | | | |
| Styrene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| Tetrachloroethylene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| Trichloroethylene | ND | 0.5 | ug/L | | | | | | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | | | | | | |
| Vinyl chloride | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| Surrogate: 4-Bromofluorobenzene | 85.6 | | ug/L | | 107 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 80.7 | | ug/L | | 101 | 50-140 | | | |
| Surrogate: Toluene-d8 | 72.9 | | ug/L | | 91.2 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|----------|---------------|------|------------|-----|-----------|-------|
| General Inorganics | | | | | | | | | |
| pH | 7.4 | 0.1 | pH Units | 7.3 | | | 2.5 | 10 | |
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | ND | | | | 30 | |
| Metals | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Arsenic | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Barium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Beryllium | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Boron | ND | 10 | ug/L | ND | | | 0.0 | 20 | |
| Cadmium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Chromium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Cobalt | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Copper | ND | 0.5 | ug/L | ND | | | | 20 | |
| Lead | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Molybdenum | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Nickel | ND | 1 | ug/L | ND | | | | 20 | |
| Selenium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Silver | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Sodium | ND | 200 | ug/L | ND | | | 0.0 | 20 | |
| Thallium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Uranium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Vanadium | ND | 0.5 | ug/L | ND | | | | 20 | |
| Zinc | ND | 5 | ug/L | ND | | | 0.0 | 20 | |
| Volatiles | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromodichloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromoform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromomethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | ND | | | | 30 | |
| Chlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloroform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dibromochloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylene dibromide (dibromoethane) | ND | 0.2 | ug/L | ND | | | | 30 | |
| Hexane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | ND | | | | 30 | |
| Methylene Chloride | ND | 5.0 | ug/L | ND | | | | 30 | |
| Styrene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Tetrachloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Toluene | ND | 0.5 | ug/L | ND | | | | 30 | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Vinyl chloride | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Surrogate: 4-Bromofluorobenzene | 81.3 | | ug/L | | 102 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 87.4 | | ug/L | | 109 | 50-140 | | | |
| Surrogate: Toluene-d8 | 68.3 | | ug/L | | 85.4 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Hydrocarbons | | | | | | | | | |
| F1 PHCs (C6-C10) | 2010 | 25 | ug/L | | 100 | 68-117 | | | |
| F2 PHCs (C10-C16) | 1950 | 100 | ug/L | | 108 | 60-140 | | | |
| F3 PHCs (C16-C34) | 3880 | 100 | ug/L | | 104 | 60-140 | | | |
| F4 PHCs (C34-C50) | 2400 | 100 | ug/L | | 96.8 | 60-140 | | | |
| Metals | | | | | | | | | |
| Antimony | 43.3 | | ug/L | ND | 86.6 | 80-120 | | | |
| Arsenic | 49.3 | | ug/L | ND | 98.7 | 80-120 | | | |
| Barium | 47.6 | | ug/L | ND | 95.2 | 80-120 | | | |
| Beryllium | 48.5 | | ug/L | ND | 96.9 | 80-120 | | | |
| Boron | 46 | | ug/L | ND | 88.8 | 80-120 | | | |
| Cadmium | 47.0 | | ug/L | ND | 93.9 | 80-120 | | | |
| Chromium | 50.4 | | ug/L | ND | 100 | 80-120 | | | |
| Cobalt | 49.0 | | ug/L | ND | 97.9 | 80-120 | | | |
| Copper | 45.6 | | ug/L | ND | 91.2 | 80-120 | | | |
| Lead | 46.0 | | ug/L | ND | 92.0 | 80-120 | | | |
| Molybdenum | 44.6 | | ug/L | ND | 89.1 | 80-120 | | | |
| Nickel | 46.6 | | ug/L | ND | 93.1 | 80-120 | | | |
| Selenium | 49.9 | | ug/L | ND | 99.7 | 80-120 | | | |
| Silver | 44.8 | | ug/L | ND | 89.5 | 80-120 | | | |
| Sodium | 1040 | | ug/L | ND | 103 | 80-120 | | | |
| Thallium | 45.6 | | ug/L | ND | 91.2 | 80-120 | | | |
| Uranium | 46.6 | | ug/L | ND | 93.2 | 80-120 | | | |
| Vanadium | 50.6 | | ug/L | ND | 101 | 80-120 | | | |
| Zinc | 49 | | ug/L | ND | 97.3 | 80-120 | | | |
| Semi-Volatiles | | | | | | | | | |
| Acenaphthene | 4.30 | 0.05 | ug/L | | 85.9 | 50-140 | | | |
| Acenaphthylene | 3.93 | 0.05 | ug/L | | 78.5 | 50-140 | | | |
| Anthracene | 4.13 | 0.01 | ug/L | | 82.6 | 50-140 | | | |
| Benzo [a] anthracene | 3.73 | 0.01 | ug/L | | 74.6 | 50-140 | | | |
| Benzo [a] pyrene | 4.21 | 0.01 | ug/L | | 84.2 | 50-140 | | | |
| Benzo [b] fluoranthene | 6.27 | 0.05 | ug/L | | 125 | 50-140 | | | |
| Benzo [g,h,i] perylene | 4.32 | 0.05 | ug/L | | 86.5 | 50-140 | | | |
| Benzo [k] fluoranthene | 6.06 | 0.05 | ug/L | | 121 | 50-140 | | | |
| Chrysene | 4.33 | 0.05 | ug/L | | 86.6 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 4.52 | 0.05 | ug/L | | 90.4 | 50-140 | | | |
| Fluoranthene | 4.18 | 0.01 | ug/L | | 83.5 | 50-140 | | | |
| Fluorene | 4.05 | 0.05 | ug/L | | 80.9 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 4.62 | 0.05 | ug/L | | 92.4 | 50-140 | | | |
| 1-Methylnaphthalene | 3.77 | 0.05 | ug/L | | 75.5 | 50-140 | | | |
| 2-Methylnaphthalene | 4.09 | 0.05 | ug/L | | 81.9 | 50-140 | | | |
| Naphthalene | 3.84 | 0.05 | ug/L | | 76.7 | 50-140 | | | |
| Phenanthrene | 3.82 | 0.05 | ug/L | | 76.4 | 50-140 | | | |
| Pyrene | 4.30 | 0.01 | ug/L | | 85.9 | 50-140 | | | |
| Surrogate: 2-Fluorobiphenyl | 16.0 | | ug/L | | 79.9 | 50-140 | | | |
| Volatiles | | | | | | | | | |
| Acetone | 62.0 | 5.0 | ug/L | | 62.0 | 50-140 | | | |
| Benzene | 36.7 | 0.5 | ug/L | | 91.6 | 60-130 | | | |
| Bromodichloromethane | 49.0 | 0.5 | ug/L | | 122 | 60-130 | | | |
| Bromoform | 47.4 | 0.5 | ug/L | | 119 | 60-130 | | | |
| Bromomethane | 49.1 | 0.5 | ug/L | | 123 | 50-140 | | | |
| Carbon Tetrachloride | 51.3 | 0.2 | ug/L | | 128 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Chlorobenzene | 34.4 | 0.5 | ug/L | | 86.0 | 60-130 | | | |
| Chloroform | 40.1 | 0.5 | ug/L | | 100 | 60-130 | | | |
| Dibromochloromethane | 48.9 | 0.5 | ug/L | | 122 | 60-130 | | | |
| Dichlorodifluoromethane | 35.8 | 1.0 | ug/L | | 89.6 | 50-140 | | | |
| 1,2-Dichlorobenzene | 34.8 | 0.5 | ug/L | | 87.0 | 60-130 | | | |
| 1,3-Dichlorobenzene | 36.0 | 0.5 | ug/L | | 90.0 | 60-130 | | | |
| 1,4-Dichlorobenzene | 34.6 | 0.5 | ug/L | | 86.6 | 60-130 | | | |
| 1,1-Dichloroethane | 38.5 | 0.5 | ug/L | | 96.2 | 60-130 | | | |
| 1,2-Dichloroethane | 37.9 | 0.5 | ug/L | | 94.7 | 60-130 | | | |
| 1,1-Dichloroethylene | 38.5 | 0.5 | ug/L | | 96.2 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 41.5 | 0.5 | ug/L | | 104 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 37.3 | 0.5 | ug/L | | 93.3 | 60-130 | | | |
| 1,2-Dichloropropane | 42.2 | 0.5 | ug/L | | 106 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 51.0 | 0.5 | ug/L | | 128 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 50.2 | 0.5 | ug/L | | 126 | 60-130 | | | |
| Ethylbenzene | 41.4 | 0.5 | ug/L | | 104 | 60-130 | | | |
| Ethylene dibromide (dibromoethane) | 35.4 | 0.2 | ug/L | | 88.4 | 60-130 | | | |
| Hexane | 31.7 | 1.0 | ug/L | | 79.2 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 93.5 | 5.0 | ug/L | | 93.5 | 50-140 | | | |
| Methyl Isobutyl Ketone | 116 | 5.0 | ug/L | | 116 | 50-140 | | | |
| Methyl tert-butyl ether | 100 | 2.0 | ug/L | | 100 | 50-140 | | | |
| Methylene Chloride | 28.6 | 5.0 | ug/L | | 71.5 | 60-130 | | | |
| Styrene | 47.6 | 0.5 | ug/L | | 119 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 48.5 | 0.5 | ug/L | | 121 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 32.5 | 0.5 | ug/L | | 81.2 | 60-130 | | | |
| Tetrachloroethylene | 33.4 | 0.5 | ug/L | | 83.6 | 60-130 | | | |
| Toluene | 35.3 | 0.5 | ug/L | | 88.2 | 60-130 | | | |
| 1,1,1-Trichloroethane | 42.6 | 0.5 | ug/L | | 106 | 60-130 | | | |
| 1,1,2-Trichloroethane | 42.5 | 0.5 | ug/L | | 106 | 60-130 | | | |
| Trichloroethylene | 45.5 | 0.5 | ug/L | | 114 | 60-130 | | | |
| Trichlorofluoromethane | 37.0 | 1.0 | ug/L | | 92.5 | 60-130 | | | |
| Vinyl chloride | 48.6 | 0.5 | ug/L | | 122 | 50-140 | | | |
| m,p-Xylenes | 80.2 | 0.5 | ug/L | | 100 | 60-130 | | | |
| o-Xylene | 39.5 | 0.5 | ug/L | | 98.8 | 60-130 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 14-Sep-2017
Order Date: 8-Sep-2017
Project Description: 11140575-E2

Qualifier Notes:

Sample Qualifiers :

2 : Elevated Reporting Limits due to limited sample volume.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Parcel ID: 1737017



LABORATORIES LTD.

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RELIABLE .

e: parcel@paracellabs.com

Chain of Custody
(Lab Use Only)

No 112293

Page ___ of ___

Turnaround Time:

☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular

Date Required: _____

| | |
|----------------------------------|--|
| Client Name: <u>640 Limited</u> | Project Reference: <u>811 Gladstone 1140575-62</u> |
| Contact Name: <u>Luke Lopers</u> | Quote # |
| Address: <u>179 Glenade Road</u> | PO # <u>73508783</u> |
| Telephone: <u>615-325-2044</u> | Email Address: <u>Luke.Lopers@640.com</u> |

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ___ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

| Parcel Order Number: | | | Sample Taken | | Required Analyses | | | | | | | | | |
|-------------------------|--|----|--------------|------------|-------------------|------------------|------|----------------|------|------|---------------|----|------|---------|
| Sample ID/Location Name | | | Matrix | Air Volume | # of Containers | Date | Time | PHCs F1-F4+BTX | VOCs | PAHs | Metals by ICP | Hg | CrVI | B (HWS) |
| 1 | BH1/MW1 | GW | | 6 | Sept 8 | 13:30 | | X | X | X | | | | X |
| 2 | BH2/MW2 | GW | | 6 | Sept 8 | 14:00 | | X | X | X | | | | X |
| 3 | BH5/MW3 | GW | | 6 | Sept 8 | 15:00 | | X | X | X | | | | X |
| 4 | DUP | GW | | 6 | Sept 8 | 15:00 | | X | X | X | | | | X |
| 5 | Trip Blank | GW | | ① | Sept 8 | 7 | | X | X | X | | | | X |
| 6 | | | | | | | | | | | | | | |
| 7 | Low volume received in PAH bottle. KW - proceed regardless per Luke. | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |

Comments: All metal samples filtered on site - Extra bottle received - Gen Chem in each set.
Only 1 Trip Blank vial received. KW
Method of Delivery: Walk-in

| | | | |
|--|---------------------------|-------------------------------------|-----------------------------------|
| Relinquished By (Sign): <u>[Signature]</u> | Received by Driver/Depot: | Received at Lab: <u>[Signature]</u> | Verified By: <u>[Signature]</u> |
| Relinquished By (Print): <u>Ryan VanderMolen</u> | Date/Time: | Date/Time: <u>09/08/17 5:54pm</u> | Date/Time: <u>09/12/17 9:55am</u> |
| Date/Time: <u>Sept 8, 2017</u> | Temperature: °C | Temperature: <u>16.9</u> °C | pH Verified By: |

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400
Ottawa, ON K2E7S4
Attn: Luke Lopers

Client PO: 73508783
Project: 11140575-G2
Custody: 38677

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017

Order #: 1737231

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|------------|------------|
| 1737231-01 | MW4 |
| 1737231-02 | Trip Blank |

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: 11140575-G2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------------------------|------------------------------|-----------------|---------------|
| REG 153: VOCs by P&T GC/MS | EPA 624 - P&T GC-MS | 15-Sep-17 | 16-Sep-17 |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: **11140575-G2**

| | | | | |
|--------------|------------|------------|---|---|
| Client ID: | MW4 | Trip Blank | - | - |
| Sample Date: | 12-Sep-17 | 11-Sep-17 | - | - |
| Sample ID: | 1737231-01 | 1737231-02 | - | - |
| MDL/Units | Water | Water | - | - |

Volatiles

| | | | | | |
|------------------------------------|----------|------|------|---|---|
| Acetone | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Benzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromodichloromethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromoform | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromomethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | <0.2 | - | - |
| Chlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Chloroform | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Dibromochloromethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Ethylene dibromide (dibromoethane) | 0.2 ug/L | <0.2 | <0.2 | - | - |
| Hexane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | <2.0 | - | - |
| Methylene Chloride | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Styrene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Toluene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 18-Sep-2017
 Order Date: 12-Sep-2017
Project Description: 11140575-G2

| | MDL/Units | Client ID: | MW4 | Trip Blank | | |
|------------------------|-----------|--------------|------------|------------|---|---|
| | | Sample Date: | 12-Sep-17 | 11-Sep-17 | - | - |
| | | Sample ID: | 1737231-01 | 1737231-02 | - | - |
| | | | Water | Water | - | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| Trichloroethylene | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| Trichlorofluoromethane | 1.0 ug/L | | <1.0 | <1.0 | - | - |
| Vinyl chloride | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| m,p-Xylenes | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| o-Xylene | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| Xylenes, total | 0.5 ug/L | | <0.5 | <0.5 | - | - |
| 4-Bromofluorobenzene | Surrogate | | 102% | 104% | - | - |
| Dibromofluoromethane | Surrogate | | 78.7% | 98.0% | - | - |
| Toluene-d8 | Surrogate | | 99.9% | 98.7% | - | - |

Certificate of Analysis
Client: **GHD Limited (Ottawa)**
Client PO: **73508783**

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: **11140575-G2**

Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Volatiles | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | | | | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Bromodichloromethane | ND | 0.5 | ug/L | | | | | | |
| Bromoform | ND | 0.5 | ug/L | | | | | | |
| Bromomethane | ND | 0.5 | ug/L | | | | | | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | | | | | | |
| Chlorobenzene | ND | 0.5 | ug/L | | | | | | |
| Chloroform | ND | 0.5 | ug/L | | | | | | |
| Dibromochloromethane | ND | 0.5 | ug/L | | | | | | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Ethylene dibromide (dibromoethane) | ND | 0.2 | ug/L | | | | | | |
| Hexane | ND | 1.0 | ug/L | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | | | | | | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | | | | | | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | | | | | | |
| Methylene Chloride | ND | 5.0 | ug/L | | | | | | |
| Styrene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| Tetrachloroethylene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| Trichloroethylene | ND | 0.5 | ug/L | | | | | | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | | | | | | |
| Vinyl chloride | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| Surrogate: 4-Bromofluorobenzene | 82.2 | | ug/L | | 103 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 72.3 | | ug/L | | 90.3 | 50-140 | | | |
| Surrogate: Toluene-d8 | 81.2 | | ug/L | | 102 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: 11140575-G2

Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Volatiles | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromodichloromethane | 1.35 | 0.5 | ug/L | 1.26 | | | 6.9 | 30 | |
| Bromoform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromomethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | ND | | | | 30 | |
| Chlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloroform | 11.3 | 0.5 | ug/L | 10.8 | | | 4.0 | 30 | |
| Dibromochloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | 0.0 | 30 | |
| Ethylene dibromide (dibromoethane) | ND | 0.2 | ug/L | ND | | | | 30 | |
| Hexane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | ND | | | | 30 | |
| Methylene Chloride | ND | 5.0 | ug/L | ND | | | | 30 | |
| Styrene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Tetrachloroethylene | 4.37 | 0.5 | ug/L | 4.79 | | | 9.2 | 30 | |
| Toluene | 5.51 | 0.5 | ug/L | 5.73 | | | 3.9 | 30 | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Vinyl chloride | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Surrogate: 4-Bromofluorobenzene | 71.5 | | ug/L | | 89.3 | 50-140 | | | |
| Surrogate: Dibromofluoromethane | 72.6 | | ug/L | | 90.7 | 50-140 | | | |
| Surrogate: Toluene-d8 | 80.4 | | ug/L | | 101 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: 11140575-G2

Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Volatiles | | | | | | | | | |
| Acetone | 80.9 | 5.0 | ug/L | ND | 80.9 | 50-140 | | | |
| Benzene | 37.1 | 0.5 | ug/L | ND | 92.8 | 50-140 | | | |
| Bromodichloromethane | 41.9 | 0.5 | ug/L | 3.60 | 95.7 | 50-140 | | | |
| Bromoform | 33.0 | 0.5 | ug/L | ND | 82.5 | 50-140 | | | |
| Bromomethane | 33.9 | 0.5 | ug/L | ND | 84.8 | 50-140 | | | |
| Carbon Tetrachloride | 34.9 | 0.2 | ug/L | ND | 87.3 | 50-140 | | | |
| Chlorobenzene | 35.5 | 0.5 | ug/L | ND | 88.7 | 50-140 | | | |
| Chloroform | 40.4 | 0.5 | ug/L | 7.57 | 82.1 | 50-140 | | | |
| Dibromochloromethane | 34.6 | 0.5 | ug/L | 2.30 | 80.7 | 50-140 | | | |
| Dichlorodifluoromethane | 30.8 | 1.0 | ug/L | ND | 76.9 | 50-140 | | | |
| 1,2-Dichlorobenzene | 28.2 | 0.5 | ug/L | ND | 70.4 | 50-140 | | | |
| 1,3-Dichlorobenzene | 26.4 | 0.5 | ug/L | ND | 66.0 | 50-140 | | | |
| 1,4-Dichlorobenzene | 27.8 | 0.5 | ug/L | ND | 69.6 | 50-140 | | | |
| 1,1-Dichloroethane | 38.6 | 0.5 | ug/L | ND | 96.5 | 50-140 | | | |
| 1,2-Dichloroethane | 35.7 | 0.5 | ug/L | ND | 89.2 | 50-140 | | | |
| 1,1-Dichloroethylene | 34.6 | 0.5 | ug/L | ND | 86.4 | 50-140 | | | |
| cis-1,2-Dichloroethylene | 42.6 | 0.5 | ug/L | ND | 106 | 50-140 | | | |
| trans-1,2-Dichloroethylene | 36.1 | 0.5 | ug/L | ND | 90.3 | 50-140 | | | |
| 1,2-Dichloropropane | 41.7 | 0.5 | ug/L | ND | 104 | 50-140 | | | |
| cis-1,3-Dichloropropylene | 38.7 | 0.5 | ug/L | ND | 96.8 | 50-140 | | | |
| trans-1,3-Dichloropropylene | 36.6 | 0.5 | ug/L | ND | 91.5 | 50-140 | | | |
| Ethylbenzene | 36.3 | 0.5 | ug/L | ND | 90.8 | 50-140 | | | |
| Ethylene dibromide (dibromoethane) | 35.3 | 0.2 | ug/L | ND | 88.2 | 50-140 | | | |
| Hexane | 39.6 | 1.0 | ug/L | ND | 99.0 | 50-140 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 97.1 | 5.0 | ug/L | ND | 97.1 | 50-140 | | | |
| Methyl Isobutyl Ketone | 89.4 | 5.0 | ug/L | ND | 89.4 | 50-140 | | | |
| Methyl tert-butyl ether | 103 | 2.0 | ug/L | ND | 103 | 50-140 | | | |
| Methylene Chloride | 33.5 | 5.0 | ug/L | ND | 83.8 | 50-140 | | | |
| Styrene | 31.0 | 0.5 | ug/L | ND | 77.6 | 50-140 | | | |
| 1,1,1,2-Tetrachloroethane | 32.2 | 0.5 | ug/L | ND | 80.6 | 50-140 | | | |
| 1,1,1,2,2-Tetrachloroethane | 32.5 | 0.5 | ug/L | ND | 81.3 | 50-140 | | | |
| Tetrachloroethylene | 34.4 | 0.5 | ug/L | ND | 85.9 | 50-140 | | | |
| Toluene | 34.0 | 0.5 | ug/L | ND | 85.1 | 50-140 | | | |
| 1,1,1-Trichloroethane | 32.6 | 0.5 | ug/L | ND | 81.6 | 50-140 | | | |
| 1,1,2-Trichloroethane | 38.2 | 0.5 | ug/L | ND | 95.6 | 50-140 | | | |
| Trichloroethylene | 40.6 | 0.5 | ug/L | ND | 102 | 50-140 | | | |
| Trichlorofluoromethane | 30.8 | 1.0 | ug/L | ND | 77.0 | 50-140 | | | |
| Vinyl chloride | 33.5 | 0.5 | ug/L | ND | 83.7 | 50-140 | | | |
| m,p-Xylenes | 69.2 | 0.5 | ug/L | ND | 86.5 | 50-140 | | | |
| o-Xylene | 33.7 | 0.5 | ug/L | ND | 84.2 | 50-140 | | | |
| Surrogate: 4-Bromofluorobenzene | 85.0 | | ug/L | | 106 | 50-140 | | | |

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 18-Sep-2017
Order Date: 12-Sep-2017
Project Description: 11140575-G2

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Parcel ID: 1737231



TRUSTED .
RESPONSIVE
RELIABLE .



Chain of Custody
(Lab Use Only)

Nº 38677

Page 1 of 1

Turnaround Time:

☐ 1 Day

☐ 3 Day

☐ 2 Day

☒ Regular

Date Required: _____

| | |
|-----------------------------------|--|
| Client Name: <u>GHD Limited</u> | Project Reference: <u>11140575-62</u> |
| Contact Name: <u>Luke Lopez</u> | Quote # _____ |
| Address: <u>179 Colorado Road</u> | PO # <u>73508783</u> |
| Telephone: <u>613-325-2094</u> | Email Address: <u>Luke.Lopez@ghd.com</u> |

Criteria: ☒ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:

1737231

| Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken | | VOCs | | | | | | | | | | | | | |
|-------------------------|--------|------------|-----------------|--------------|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | Date | Time | | | | | | | | | | | | | | |
| 1 MW4 | GW | | 2 | Sept 12 | 13:30 | X | | | | | | | | | | | | | |
| 2 Trip Blank | GW | | 2 | Sept 12 | | X | | | | | | | | | | | | | |
| 3 | | | | Sept 11 | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery

Walk in

| | | | |
|--|---------------------------|-------------------------------------|----------------------------------|
| Relinquished By (Sign): <u>[Signature]</u> | Received by Driver/Depot: | Received at Lab: <u>[Signature]</u> | Verified By: <u>[Signature]</u> |
| Relinquished By (Print): <u>Ryan Vanden Pillemer</u> | Date/Time: _____ | Date/Time: <u>Sept 12/17</u> | Date/Time: <u>09/20/17 4:09p</u> |
| Date/Time: <u>Sept 12, 2017</u> | Temperature: _____ °C | Temperature: <u>25.4 °C</u> | pH Verified By: _____ |

Certificate of Analysis

GHD Limited (Ottawa)

179 Colonnade Road Suite 400

Ottawa, ON K2E7S4

Attn: Luke Lopers

Client PO: 73508783

Project: 11140575-E2

Custody: 37955

Report Date: 31-Oct-2017

Order Date: 30-Oct-2017

Order #: 1744078

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|------------|-----------|
|------------|-----------|

| | |
|------------|-----|
| 1744078-01 | BH5 |
|------------|-----|

| | |
|------------|-----|
| 1744078-02 | BH6 |
|------------|-----|

Approved By:



Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liability in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Oct-2017
Order Date: 30-Oct-2017
Project Description: 11140575-E2

Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|----------|--|-----------------|---------------|
| pH, soil | EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext. | 31-Oct-17 | 31-Oct-17 |

Sample and QC Qualifiers Notes

1- LG-SMP Sample - One or more parameter received past hold time - pH

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Certificate of Analysis
Client: GHD Limited (Ottawa)
Client PO: 73508783

Report Date: 31-Oct-2017
Order Date: 30-Oct-2017
Project Description: 11140575-E2

Sample Results

| pH | | | | Matrix: Soil |
|------------|-----------|----------|------|------------------------|
| | | | | Sample Date: 29-Aug-17 |
| Paracel ID | Client ID | Units | MDL | Result |
| 1744078-01 | BH5 | pH Units | 0.05 | 7.36 |
| 1744078-02 | BH6 | pH Units | 0.05 | 7.38 |

Laboratory Internal QA/QC

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------|--------|-----------------|----------|---------------|------|------------|-----|-----------|-------|
| Matrix Duplicate | | | | | | | | | |
| pH | 7.92 | 0.05 | pH Units | 7.94 | | | 0.3 | 10 | |



| | | |
|--|--|--|
| Client Name: <u>GHD</u> | Project Reference: <u>11140575-E2</u> | Turnaround Time: <input checked="" type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Regular Date Required: _____ |
| Contact Name: <u>Luke Lopez</u> | Quote # _____ | |
| Address: <u>179 Colonnade Road, Ottawa, ON</u> | PO # <u>73508783</u> | |
| Telephone: <u>613-288-1723</u> | Email Address: <u>luke.lopez@GHD.com</u> | |

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ___ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

| Parcel Order Number: | | Matrix | Air Volume | # of Containers | Sample Taken | | PH | | | | | | | | | | | |
|-------------------------|-----|--------|------------|-----------------|--------------|------|----|--|--|--|--|--|--|--|--|--|--|--|
| Sample ID/Location Name | | | | | Date | Time | | | | | | | | | | | | |
| 1 | BH5 | S | | 1 | Aug 29/17 | | X | | | | | | | | | | | |
| 2 | BH6 | S | | 1 | Aug 29/17 | | X | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |

Comments: Samples received past hold time for pH. KW
Proceed as per Luke. DRUM
 Method of Delivery: Paracel

| | | | |
|--|--|--|--------------------------------------|
| Relinquished By (Sign): <u>[Signature]</u> | Received by Driver/Depot: <u>[Signature]</u> | Received at Lab: <u>SINCEPORN DEKMAI</u> | Verified By: <u>[Signature]</u> |
| Relinquished By (Print): <u>Luke Lopez</u> | Date/Time: <u>30/10/17 3:16</u> | Date/Time: <u>Oct 30, 2017 04:05</u> | Date/Time: <u>Oct 30, 2017 04:05</u> |
| Date/Time: <u>October 30, 2017 / 2:00 PM</u> | Temperature: _____ °C | Temperature: <u>8.4</u> °C | pH Verified By: _____ |

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