

Phase Two Environmental Site Assessment

36 Robinson Avenue Ottawa, Ontario

Robinson Village LPIV Limited Partnership C/o TC United Development







Executive Summary

GHD (Consultant) was retained by Robinson Village LPIV Limited Partnership (Client) represented by Mr. Daniel Boulanger of TC United Development Corporation, 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 current commercial/residential property located at 36 Robinson in Ottawa, Ontario (Site or Phase Two Property). GHD has previously prepared a Phase One Environmental Site Assessment (Phase One ESA) (Ref No: 11186719-E1-RPT-1, dated January 29, 2019) for Robinson Village LPIV Limited Partnership. 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 three on Site potentially contaminating activities (PCA). There was historical and current fuel storage in fixed tanks observed at the Site, specifically, the heating oil UST and AST formerly located adjacent to 44 Robinson Avenue), the heating oil AST currently present on the interior of 44 Robinson Avenue and the former heating oil ASTs formerly located adjacent to each of 36, 38 and 40 Robinson Avenue. Additionally, automotive (motorcycle) repair garages were present at 36 Robinson Avenue (historically) and at 40 Robinson Avenue (presently). These PCAs are considered to have contributed to areas of potential environmental concern (APEC) at the Site.

In addition, 12 PCAs were identified at surrounding properties during the Phase One ESA. One of the off-Site PCAs identified on neighbouring properties in the Phase One Study area is considered to represent an APEC for the Site. The adjacent property to the east of the Site, presently addressed as 85 Robinson Avenue, was identified as a probable source of on-Site petroleum hydrocarbon contamination. It is suspected that the source of contamination at the 85 Robinson Avenue property was the historic use and/or storage of fuels and/or chemicals; this adjacent property is considered to represent an APEC for east portion of the Site.

The Phase Two Environmental Site Assessment (Phase Two ESA) was recommended based on the APECs identified in the Phase One ESA. The purpose of the Phase Two ESA is to assess the soil and groundwater quality at the Site. The investigation involved the advancement of four boreholes which were sampled for environmental purposes. Two boreholes were previous advanced at the site for a preliminary geotechnical investigation, however these two boreholes were not sampled for environmental testing. All of the boreholes except for one were completed with groundwater monitoring well screened in the overburden or upper bedrock.

Five soil samples were submitted for laboratory analysis of Metals and inorganics, Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs), Volatile Organic compounds (VOCs), and pH. One duplicate soil samples was submitted for analysis of metals and inorganics, PAH, PHC and VOC 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, VOCs, PHCs, and PAHs. One of these samples was also submitted for PCBs, Oil and Grease, and General Inorganics. One 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 Full depth Generic Criteria provided in O. Reg. 153/04 Table 3 (non-potable, residential/institutional, course texture) is to be considered to be the applicable comparison. The Site is not: a sensitive Site, a Surface Water Site, or a potable groundwater use Site.

Site Compliance

There were O. Reg. 153/04 Table 3 (residential land use, coarse grained soil texture) criteria exceedances in two of the eight submitted soil samples, including the duplicate QA/QC soil samples.

There were no O. Reg. 153/04 Table 3 (residential land use, coarse grained soil texture) criteria exceedances any of the five submitted groundwater samples, including the duplicate QA/QC groundwater sample.

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

Note that a remedial action plan that includes a soil and groundwater management program may be developed as part of the Site preparation prior to the construction phase of the Site redevelopment in order to manage and dispose of the contaminated soil and groundwater at the time of redevelopment.



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1. Introduction

1.1 Site Description

Location and Identifier

The Site is located at 36 Robinson Avenue within the Sandy Hill neighbourhood of the City of Ottawa, Ontario. The Property is located on the south side of Robinson Avenue, within the neighbourhood that is bordered by Robinson Avenue to the north and east, Lees Avenue to the south, and Hurdman Road to the west. The Site is located within an urban area, which is predominantly for residential use with some parkland, commercial, institutional and industrial uses also observed. The Site consists of a parcel of land with four buildings, with Civic Nos. 36, 38, 40 and 44 Robinson Avenue, however, the entire Site is depicted as 36 Robinson Avenue on the City of Ottawa mapping and is referenced as such in this report (Site or Property). The Site has a municipal zoning designation of R5K [2219] H (27)-h "Residential Fifth Density Zone". The Site is legally described as Lots 7, 10, 13, 16, and 19, Plan 190, in the City of Ottawa in the Province of Ontario. The property identification number associated with the Site is 042070369.

The Site has Latitude and Longitude coordinates of 45° 25' 6" N, 75° 39' 58" W and UTM coordinates of zone 18T, 447875 m E, 5029640 m N. A Site Location Map (Figure 1) and a Borehole Location Plan (Figure 2) are provided following the body of this report. The Site is immediately surrounded by residential properties to the north, south, east and west.

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 approximately rectangular in shape, covers an area of approximately 0.18 hectares (1840 m²), and is located in an area that is developed for mixed use (residential and commercial). The Site is currently occupied by three single storey slab-on-grade buildings, two used as motorcycle service and one residential dwelling, and one two storey residential dwelling. The Site buildings currently covers approximately 30 percent of the Site. The remainder of the Site consists of a gravel cover access laneways, one asphalt laneway and landscaped sections along the perimeter. Vehicular access to the Site is from Robinson Avenue to the north. The topography in the Phase One Study Area has a general slope towards the northeast, east and south. The properties to the north of the Site are elevated approximately 0.6 metres (m) with respect to the Site, while the remaining surrounding properties are relatively the same elevation as the Site.

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 Mr. Gary Courville.

1.3 Current and Proposed Future Uses

The current property use has been mixed commercial and residential since the 1980s until present.



The Site and surrounding properties are located in a predominantly residential and commercial sector of the City of Ottawa. The properties surrounding the Site consist of the following facilities and features:

- North | Robinson Avenue followed by residential dwellings at Civic No. 35 Robinson Avenue, followed by parkland, followed by residential apartments at Civic Nos. 310 and 320 Wiggins Private.
- East | Residential dwellings located at Civic Nos. 59, 60, 61, 62, 63, 64, 65, 67, and 69 Robinson Avenue followed by the Rideau River.
- South | Residential dwellings at Civic Nos. 124, 118, 116, and 110 Robinson Avenue, followed by a municipal works yard at Civic No. 29 Hurdman Road.
- West | Residential dwellings at Civic Nos. 32, 30, 28, 26, 24, 20, 16, 14, 12, 10, and 8 Robinson Avenue, followed by residential dwellings at Civic Nos. 15, 17, and 19 Hurdman Road, followed by Hurdman Road, followed by the Highway 417 right-of-way and adjacent land.

The Site consists of the two existing commercial buildings and two residential dwellings. Under Ottawa Bylaw 2008-250, the Site has a municipal zoning designation of GM "Residential Fifth Density Zone".

GHD understands that the Client will be redeveloping the Site for residential use. The Site is currently used for mixed residential and commercial purposes and therefore requires the filing of a Record of Site Condition (RSC), for a change in land use to a more sensitive land use. This report will also be used to support a submission to the City of Ottawa redevelopment 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 of the Site. There are no areas designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) identified within 250 m of the Site. As the Site does not contain an area of natural significance, and properties within 30 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

Drilling conducted as part of this investigation revealed that there is more than 2 m of soil in all boreholes locations advanced on the Site. The native soils encountered show a single native soil deposit consisting of a mixture of silt, sand, clay, and gravel.

No natural surface water bodies were identified on the Site. The nearest natural surface body is the Rideau River, which is located approximately 110 m to the Northeast of the Site, within the Phase One study area. There is no open surface water bodies within 30 m of the Site limits. As the property does not include all or part of a water body, and the property is not adjacent to a water body, and does not include land that is within 30 m of a water body, the Property is not considered a Surface Water site (O. Reg. 153/04, s43.1[1]).



The existing property use is mixed commercial and residential. The proposed property use is residential. The Site is considered as being residential/parkland/institutional land use as per Section 3 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s1[3]).

The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone. The Site is not in an area designated on the City of Ottawa official plan as a well-head protection area (WHPA). The Site is not an agricultural property. The Site is considered as being non-potable water use as per Section 35 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s35).

Grain Size analysis of the recovered soil samples was conducted as part of this investigation. Based on the analysis, at least 1/3 of the soil at the property is expected to consist of coarse textured soil. The Site is therefore considered as 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 full depth generic O. Reg. 153/04 Table 3 (full depth, residential/institutional land use, non-potable groundwater use, coarse grained soil texture) criteria is considered the applicable Site comparison.

2. Background Information

2.1 Physical Setting

Surface Water

No natural surface water bodies were identified on the Site. The nearest surface water body indicated on the mapping is the Rideau River which flows north and is located approximately 110 m to the northeast, 150 m to the east, and 375 m to the south of the Site.

Topography and Drainage

The Site is on relatively flat terrain, with general topography sloping towards the northeast, east, and south. The Site has surface cover of landscape/grass vegetation and gravel or asphalt driveways. The Site is slightly higher than Robinson Avenue to the north and is approximately level with the surrounding neighbouring properties.

No evidence of fill material at the Site was identified during the environmental records review. 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 clay type soils.

The Site is generally elevated approximately 0.3 to 1 m with respect to the neighbouring street to the north, with the highest elevation recorded at the southeast corner of the Site.

The regional topography in the general area of the Site slopes towards the northeast, east and south.



The Phase Two ESA drilling program identified shale bedrock between 5.3 and 7.1 meters below grade (mbg), with an upper surface described as highly weathered and fractured becoming good to excellent quality with depth. The bedrock was overlain with a native soil deposit consisting of a mixture of silt, sand, clay, and gravel covered with a fill material to provide engineered grading.

Hard surfaces at the Site includes a driveway adjoining the existing building located at 38 Robinson Avenue on Site. Precipitation falling on improved paved surfaces will travel by sheet flow to the storm drains located on the adjacent municipal right-of-ways. 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, 36 Robinson Avenue, Ottawa, Ontario" Reference No. 11186719-E1-RPT-1, prepared by GHD, dated January 29, 2019

The Phase One ESA was completed for the entire Site which contained four buildings identified as 36, 38, 40, and 44 Robinson Avenue. Two of the buildings (36 and 40 Robinson) were occupied by commercial businesses, including a motorcycle parts retailer and a motorcycle repair shop. The building addressed as 38 Robinson Avenue was used for residential purposes, while the building addressed as 44 Robinson Avenue was vacant and had most recently been used for residential purposes.

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. Aerial photographs indicate the Site was occupied by one building in 1928. Fire Insurance plans depict the Site occupied by two residential dwellings in 1902. Portions of the Phase One Property changed ownership between individuals from at least 1889 to between 1957 and 1969. Vorcan Tool Company Limited consolidated the property in 1969. The property was owned by corporations between 1969 and 1981, before returning to ownership by individuals.

Based on the historical research, the Site has been used for residential and commercial purposes since the 1980s to the time of report preparation. Based on aerial photographs, the Site was redeveloped with the present day building between 1928 and 1958.

At the time of the Phase One ESA, the Site was occupied by two single storey slab-on-grade commercial buildings, one slab-on-grade residential building, and one two storey residential dwelling.

Based on the historical research and known information of the general area of the Site, there were three suspected on-Site potentially contaminating activities (PCA); the historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue (PCA/APEC#1), a former automotive (motorcycle) service garage located at 36 Robinson Ave (PCA/APEC#2), and an automotive (motorcycle) service garage located at 40 Robinson Avenue (PCA/APEC#3).

There were 13 off-Site PCAs that are summarized in Section 3.3 of this report. The historic fuel and chemical storage and use located at 85 Robinson Avenue is considered to represent an APEC for the Site (identified as APEC#4).



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.

Advancement of BH5 and BH6 was conducted on December 17, 2018 by means of a track mounted CME 55 power drill rig, as part of a preliminary geotechnical investigation. Additional drilling of BH1 to BH4 was conducted on January 21 and 22, 2019 using a truck mounted CME 55 power drill rig.

Samples were recovered using 50 mm diameter split spoon samplers advanced to the sampling depth with a hydraulic hammer. Recovered soil samples were screened in the field for evidence of visual and olfactory evidence of contamination. All boreholes except BH6 were outfitted with groundwater monitoring wells to measure the groundwater levels and collect representative groundwater samples. The monitoring wells were then developed, with GHD purging the wells dry at least twice, except for the well installed at the BH5 location that was installed as part of the preliminary geotechnical investigation. Environmental sampling was not conducted at this monitoring well location.

- Borehole BH1 was advanced to a depth of approximately 4.6 metres below grade (mbg), located directly east of 44 Robinson Avenue. The borehole was equipped with a groundwater monitoring well screened in the overburden to intercept the shallow groundwater table. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with former heating oil UST and AST located at 44 Robinson Avenue (APEC# 1)
- Borehole BH2 was advanced to a depth of approximately 4.6 mbg, near the southeast corner of the Site boundary. The borehole was equipped with a groundwater monitoring well screened in the overburden to intercept the shallow groundwater table. This borehole/monitoring well was located to assess the environmental soil and groundwater quality associated with the off-Site historic fuel and chemical storage and use located at 85 Robinson Avenue (APEC#4).
- Borehole BH3 was advanced to a depth of approximately 4.6 mbg, near the southwest corner of the Site boundary. The borehole was equipped with a groundwater monitoring well screened in the overburden. This borehole/monitoring well was located to assess the environmental groundwater quality associated with the historic storage of fuel in fixed tanks (APEC# 1) and the existing automotive (motorcycle) service garage (APEC# 2) located at 36 Robinson Avenue.
- Borehole BH4 was advanced to a depth of approximately 4.6 mbg, located near the approximate centre of the Site property. The borehole was equipped with a groundwater monitoring well screened in the overburden. This borehole/monitoring well was located to assess the environmental groundwater quality associated with the historic storage of fuel in fixed tanks (APEC# 1) and the former automotive (motorcycle) service garage (APEC# 3) located at 40 Robinson Avenue.



- Borehole BH5 was advanced to a depth of approximately 7.3 metres below ground surface (mbgs), located near the northeast corner of the Site property boundary. The borehole was equipped with a groundwater monitoring well screened and sealed within the upper bedrock. This borehole was advanced as part of a previous preliminary geotechnical investigation and was used to assess soil stratigraphy across the Site. This borehole was qualitatively screened for environmental purposes using visual and olfactory observations during the drilling fieldwork, however no environmental sampling was completed as part of this assessment.
- Borehole BH6 was advanced to a depth of approximately 8.9 mbgs, located near the southwest corner of the Site property boundary. This borehole was advanced as part of a previous preliminary geotechnical investigation and was used to assess soil stratigraphy across the Site. This borehole was qualitatively screened for environmental purposes using visual and olfactory observations during the drilling fieldwork, however no environmental sampling was completed as part of this assessment.

The following soil samples were collected on January 21, 2019: BH1-SS2, BH2-SS2, BH2-SS3, DUP (a blind duplicate sample of BH2-SS3). The soil samples collected on January 22, 2019 were; BH3-SS1, BH3-SS3, BH4-SS2, DUP (a blind duplicate sample of BH4-SS2), and auger cuttings collected from BH3 (BH3-GS1). These samples were submitted on the same day they were collected to AGAT Laboratories (AGAT) in Ottawa, Ontario under Chain of Custody (CoC) T078093 on January 21, 2019 and T078094, on January 22, 2019. All soil samples were analysed according to O. Reg. 153/04 requirements.

- Soil samples BH1-SS2 and BH4-SS2 were analysed for a combination of metals and inorganics, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs), and pH.
- Soil samples BH2-SS2 and BH3-SS1 were analysed for a combination of metals and inorganics, and PAHs.
- Soil samples BH2-SS3 and BH3-SS3 were analysed for a combination of VOCs, PHCs, and pH.
- Soil sample BH3-GS1 collected from the BH3 auger cuttings was analysed for flashpoint and Toxicity Characteristic Leaching Procedure (TCLP) analysis for metals and inorganics on leachate, VOCs on leachate, PAHs on leachate, and polychlorinated biphenyls (PCBs) on leachate, for comparison to Ontario Regulation 558/00 to provide a waste classification of the soil.

On January 22, 2019, GHD surveyed the relative elevations of the advanced boreholes and monitoring wells, relative to an assigned elevation of 100.00 m of the top of slab of the hydro box (T192) located across the street from 36 Robinson Avenue. The location of this benchmark is provided on Figure 2.

On January 25, 2019, GHD returned to the Site to measure the static groundwater levels in all monitoring wells and to collect groundwater samples. A duplicate groundwater sample was collected from BH2 (BH8-GW1). The groundwater samples to be analysed for metals were filtered using dedicated 45 μ m filters, the remainder of the samples were unfiltered. The collected groundwater samples, along with a trip blank, were submitted to the laboratory on the evening of January 25, 2019.



The groundwater samples were submitted to AGAT in Ottawa, Ontario under Chain of Custody (CoC) T083248. The samples were analysed according to O. Reg. 153/04 requirements.

- Five groundwater samples, labelled as BH1-GW1 to BH4-GW1 including one duplicate sample (BH8-GW1), were submitted for laboratory analysis of a combination of Metals, VOCs, PHCs, and PAHs. BH4-GW1 was also submitted for PCBs, Oil and Grease, and General Inorganics. One trip blank water sample was submitted for analysis of VOCs.
- Trip Blank (prepared by the laboratory on January 25, 2019) was analysed for VOCs.

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 historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue (PCA/APEC#1); on-site former automotive (motorcycle) service garage located at 36 Robinson Ave (PCA/APEC#2); on-site automotive (motorcycle) service garage located at 40 Robinson Avenue (PCA/APEC#3); and off-site historic fuel and chemical storage and use located at 85 Robinson Ave (PCA/APEC#4). Accordingly, boreholes were placed across the Site to allow for collection of soil samples from the Site for an assessment of their environmental quality.

To assess the environmental quality of the groundwater, all of the borehole locations at the Site were outfitted with groundwater monitoring wells, which were screened in the overburden or the bedrock to intercept the groundwater table and possible aquifers in the bedrock. A seal was installed above the sand pack to the ground surface. The groundwater was sampled from the aforementioned monitoring wells using a peristaltic pump or Waterra tubing dedicated to each well, following a period of stabilization, well development, and purging performed prior to the day of sampling using Waterra tubing dedicated to each well. There were no natural surface water bodies observed at the Site during the Phase Two ESA, and therefore no sampling of surface water or sediment was conducted at the time of this investigation.

3.3 Phase One Conceptual Site Model

The Site is located in an area that is developed for mixed use (residential, commercial, and/or institutional).

The Civic Nos. associated with the Property are 36, 38, 40 and 44 Robinson Avenue in Ottawa, Ontario (Site or Property) and is approximately 0.18 hectares (0.4 acres) in area. The Site buildings consisted of three single storey slab-on-grade commercial buildings and one two storey residential dwelling, at the time of the Site visit. Based on the historical research, the Site has been used for commercial and residential purposes since the 1980s to the time of report preparation.



No natural surface water bodies were identified on the Site. The nearest natural surface body is the Rideau River, which is located approximately 110 m to the northeast of the Site, within the Phase One study area. There are no open surface water bodies within 30 m of the Site limits. The Site is generally elevated between approximately 0.3 and 1 m with respect to the neighbouring municipal right-of-way to the north. The soil conditions in the vicinity of the Site are expected to consist of silt, sand, clay, and gravel type soils over shale bedrock at approximately 5 to 7 mbg and a water table to be near 1.7 to 3.0 mbg.

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 were three suspected on Site potentially contaminating activity (PCAs); the historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue; a former automotive (motorcycle) service garage located at 36 Robinson Ave; an automotive (motorcycle) service garage located at 40 Robinson Avenue. These PCAs are considered to represent areas of potential environmental concern (APECs) for the Site.

There were thirteen PCAs identified for the surrounding properties in the Phase One Study Area as part of this assessment. The off-site PCAs are summarized in Section 3.3 of this report. The historic fuel and chemical storage and use located at 85 Robinson Avenue is considered to represent an APEC 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 phone/cable 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 northwest portion of the Site leading to Robinson Avenue. These service trenches are considered to have the potential to act as conduits for contaminant migration. Electricity and phone lines are supplied to the Site buildings from overhead lines from the northwest portion of the site.

According to the 1987 Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No.: 1506A), the natural soil consists of "Till, plain; local relief <5 m (<15 feet [ft.]) ". The thickness of overburden is expected to be approximately 5 to 6 m thick and the bedrock in the general area of the Site is expected to be shale. According to records from the water well information system and borehole databases, as presented in the results of the subcontracted Ecolog Environmental ERIS search, the overburden soil in the vicinity of the Site consist of a mixture of silt, clay, and sand type soils. The overburden soil was reportedly underlain by shale bedrock at an approximate depth ranging from 5.5 to 7.0 m below ground surface.

Regional groundwater flow direction in the overburden within the Study Area was expected to be towards the northeast, following regional topography.



Potentially Contaminating Activities (PCAs)

Based on the known information of the general area of the Site, there were three on-Site PCAs, and thirteen off-Site PCAs identified in the Study Area.

- PCA#1 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | On-Site historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue.
- PCA#2 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site former automotive (motorcycle) service garage located at 36 Robinson Avenue.
- PCA#3 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site automotive (motorcycle) service garage located at 40 Robinson Avenue.
- PCA#4 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site historic fuel and chemical storage and use located at 85 Robinson Avenue.
- PCA#5 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles; Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, former automotive service garage with associated UST located at 37-39 Robinson Avenue.
- PCA#6 (Item 46: Rail Yards, Tracks, and Spurs; Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-site, former railway lines and engine house located at 3 Hurdman Road.
- PCA#7 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks; Item 48: Salt Manufacturing, Processing and Bulk Storage; Item 52: Storage, maintenance, fueling and repair of equipment, vehicles and material used to maintain transportation systems) | Off-site, former lumber yard, former industrial facility, and current municipal works yard located at 29 Hurdman Road.
- PCA#8 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, former gasoline service station located at 33 Hurdman Road.
- PCA#9 (Item 10: Commercial Autobody Shops; Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-site, former automotive service garage and former Autobody shop located at 23 Hurdman road (formerly 25 Hurdman Road and 181 Lees Avenue)
- PCA#10 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, heating oil spill and fuel storage in fixed tanks located at 28 Robinson Avenue.
- PCA#11 (Item 34: Metal Fabrication) | Off-site, former machine shop located at 18 Robinson Avenue.
- PCA#12 (Item 46: Rail Yards, Tracks, and Spurs) | Off-site, former Canadian Pacific Railway, located approximately 140 m southwest of the site with an engine house approximately 175 m south of the site.
- PCA#13 (Item 46: Rail Yards, Tracks, and Spurs) | Off-site, former Grand Trunk Railway located approximately 160 m southwest of the site.



- PCA#14 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste) | Off-site, former landfill located at 200 Lees Avenue.
- PCA#15 (Item 9: Coal Gasification; Item 30: Importation of Fill Material of Unknown Quantity; Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste) | Off-site, former coal gasification plant located at 175 Lees Avenue.
- PCA#16 (Item 8: Chemical Manufacturing, Processing and Bulk Storage; Item 30: Importation of Fill Material of Unknown Quantity) | Off-site, former coal tar distillation plant located at 170 Lees Avenue.

Areas of Potential Environmental Concern (APECs)

The following potentially contaminating activities (PCAs) from the list above are considered to represent areas of potential environmental concern (APECs) for the Site.

- PCA#1 / APEC#1 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | On-Site historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue.
- PCA#2 / APEC#2 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site former automotive (motorcycle) service garage located at 36 Robinson Avenue.
- PCA#3 / APEC#3 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site automotive (motorcycle) service garage located at 40 Robinson Avenue.
- PCA#4 / APEC#4 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site historic fuel and chemical storage and use located at 85 Robinson Avenue.

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 the APECs for the Site:

- 1. Metals and Inorganics
- 2. Polycyclic Aromatic Hydrocarbons (PAHs)
- 3. Petroleum Hydrocarbons (PHCs)
- 4. Volatile Organic Compounds (VOCs)

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan (SAP) proposed sampling using a peristaltic pump. During sampling the battery for the peristaltic pump was fully discharged and sampling was completed using Waterra tubing and a foot valve in monitoring wells BH1 and BH2. The deviation of the aforementioned groundwater sampling methodology is not expected to have significantly influenced the data or conclusions of this assessment.



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

The presence of tree growth limited the placement of BH1 to outside of the footprint of the suspected former underground storage tank location. Instead, this BH was drilled as close as practical to the desired location.

There were no other 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 four new groundwater monitoring wells were considered adequate to assess if contaminants of potential concern (CPCs) would be detected within the soil and groundwater.

The fieldwork as part of the Phase Two ESA included advancement of boreholes, and selection of soil samples for testing based upon visual and olfactory observations and combustible vapour screening. All of the boreholes were then equipped with groundwater monitoring wells to allow collection of water level data, and sample collection for testing of CPC in the groundwater. The boreholes were surveyed relative to a readily identified benchmark (top of slab of a hydro box [T192] located across the street from 36 Robinson Avenue).

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 BH5 and BH6 was conducted on December 17, 2018 by OGS Inc. of Almonte, Ontario, using a track mounted CME 55 power drill rig, as part of a preliminary geotechnical investigation. Additional drilling of BH1 to BH4 was conducted on January 21 and 22, 2019 by George Downing Estate drilling of Grenville-sur-la-Rouge, Quebec, using a truck mounted CME 55 power drill rig. Drilling was performed 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 a pre-defined intervals to the maximum proposed depth of drilling.



4.3 Soil Sampling

Equipment

Split spoon soil samples were recovered from all boreholes 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 four main materials above the shale bedrock:

- Grass vegetation and Topsoil
- Fill (Silty Sand, some clay, trace to some gravel)
- Silty Sand
- Sandy Silt

The subsurface soil encountered in the six borehole locations is described in the following sections, and is presented graphically on the borehole logs, in Appendix C.

Surface Covers

Borehole BH4 was located in a gravel area, while all other boreholes were located in a grass covered landscaped area of the Site. No petroleum odours or visible evidence of staining were noted within the surface material.

Fill

Underlying the surface covers was a layer of fill that was observed to have a thickness ranging from approximately 1.7 m (BH1) to 3.6 m (BH2). The fill material was found to consist of silty sand with some clay and gravel, with possible cobbles. The presence of organics was noted at the borehole BH2 and BH5 locations. The fill material was very loose to very dense and was recovered in a frozen to moist condition.

Black staining and petroleum odours were noted in the fill material at boreholes BH2 and BH4 locations.

Silty Sand to Sandy Silt

A native deposit of silt and sand underlays the fill material at all borehole locations with a thickness ranging from approximately 2.7 m (BH5) to 4.8 m (BH6). The upper portion of the deposit consists of a silty sand with some clay and trace to some gravel. The deposit transitions to becoming a sandy silt with depth. The layer was found to be very loose to dense and was recovered in a moist to saturated condition.

No petroleum odours or visible evidence of staining were noted within the native material.



4.4 Field Screening Measurements

The soil samples were field screened using visual and olfactory observations as well as combustible vapour screening using a Photoionization Detector (PID) for the CPCs. Field observations and PID readings are provided in the borehole logs provided in Appendix C.

4.5 Ground Water: Monitoring Well Installation

All of the boreholes, with the exception BH6, were equipped with 51 mm diameter temporary groundwater monitoring wells, identified as BH1, BH2, BH3, BH4, and BH5, respectively. The well screens consisted of slotted No. 10, 51 millimetre (mm) diameter PVC. The 51 mm PVC risers extended from the top of the screen to finish height, approximately 0.05 mbg. The risers were encased in flush mount well protectors. A PVC slip cap was installed at the base of the screen to prevent sediment infiltration. A J-plug was used in the installations at the top of the riser to prevent surface water or precipitation influence.

Each well was backfilled with clean sand to 0.3 m above the top of the screen. The remaining annular space (directly above the sand pack) was backfilled with bentonite hole plug to within approximately 0.5 m of the ground surface, then backfilled with sand and equipped with a well protector.

Each well was equipped with dedicated 12 mm LDPE Waterra[™] tubing and a dedicated Waterra[™] foot valve. The Waterra[™] tubing/foot valve was then used to develop the well. Wells were purged dry or up to three additional well volumes were removed prior to sampling to allow the collection of fresh groundwater and stabilization of field parameters.

4.6 Ground Water: Field Measurement of Water Quality Parameters

Field measurements of groundwater quality were measured in the field using a Horiba Water Quality Meter prior to sampling. Measurements of temperature, electrical conductivity (EC), turbidity, dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP) were collected during purging prior to sampling. Measurements were collected every 5 minutes, until the water quality parameters stabilized (subsequent readings within 10 percent difference).

4.7 Ground Water: Sampling

Stabilized groundwater levels were recorded in each monitoring well prior to disturbance of the water column.

All wells were developed then purged dry or up to three additional well volumes prior to sampling using a peristaltic pump or Waterra dedicated tubing in each monitoring well. Field measurements of water quality parameters were collected, as described above, to ensure stabilization of these parameters.

Following the repeated purging of the well, a groundwater sample was collected from all monitoring wells using a peristaltic pump or dedicated Waterra tubing in each monitoring well.



All groundwater samples were collected in dedicated amber glass bottles and vials prepared by the laboratory. The groundwater samples for metal analysis were field filtered; the samples for PHC, VOC, PCBs, and PAH, analysis were not field filtered.

Following sampling, the groundwater samples were stored in an ice pack chilled cooler and were taken directly to the laboratory following the sampling event.

4.8 Sediment Sampling

Sediment was not sampled as part of this assessment, as no natural surface water bodies were present at the Site.

4.9 Analytical Testing

All soil and groundwater analytical testing as part of this assessment was conducted by AGAT Laboratories (AGAT). AGAT is a member of the Standards Council of Canada (SCC) and Canadian Association for Laboratory Accreditation (CALA).

4.10 Residue Management Procedures

Soil cuttings from drilling activities were containerized in metal drums and placed in designated areas of the Site. The analytical results indicated there are exceedances of the O. Reg. 153/04 Table 3 criteria, which was determined to be applicable for the Site. The cuttings should be disposed of off-Site at a facility licenced to accept contaminated, non-hazardous waste soil.

Purge water was containerized in the field and was retained on-Site in one metal drum. The purge water can be disposed of on-Site as laboratory analysis showed it is in compliance with the Site criteria.

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 100.00 m for the top of slab of a hydro box (T192) located across the street from 36 Robinson Avenue. The assigned elevations were as follows:

Location	Relative Grade Elevation (m)	Relative Top Of Piezometer (TOP) Elevation (m)	Remarks
ТВМ	100.00	-	Assigned elevation 100 m
BH1	99.31	99.17	
BH2	99.64	99.51	
BH3	100.35	100.24	
BH4	99.59	99.45	

Table 4.1 Elevations



Location	Relative Grade Elevation (m)	Relative Top Of Piezometer (TOP) Elevation (m)	Remarks
BH5	99.20	99.14	
BH6	100.47	-	No well installed

Table 4.1 Elevations

4.12 Quality Assurance and Quality Control Measures

All soil sample jars were provided by AGAT. 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 for each parameter analyzed. Duplicate sample (DUP) was submitted for laboratory analysis of metals and inorganics, PAHs, PHCs, and VOCs. This duplicate sample provides quality assurance and quality control of all parameter sets analysed for soil samples submitted as part of this assessment.

All groundwater sample jars were provided by AGAT. Each sample was given a unique identification. All groundwater samples were transferred directly from the dedicated LDPE tubing directly to the sampling containers. The bottles and vials for PHCs, BTEXs, VOCs, and general chemistry (pH) were not field filtered.

To ensure laboratory quality control, a field duplicate was submitted for laboratory analysis of one of the four collected groundwater samples. One field duplicate (BH8-GW1) was submitted for laboratory analysis of metals and inorganics, VOCs, PHCs, and PAHs. A trip blank groundwater sample was submitted for laboratory analysis of VOCs for each day that sampling was completed. These duplicate and blank samples provide quality assurance and quality control of all parameter sets analysed for groundwater samples submitted as part of this assessment.

5. **Review and Evaluation**

5.1 Geology

Surface Covers

Borehole BH4 was located in a gravel area, while all other boreholes were located in a grass covered landscaped area of the Site. No petroleum odours or visible evidence of staining were noted within the surface material.



Fill

Underlying the surface covers was a layer of fill that was observed to have a thickness ranging from approximately 1.7 m (BH1) to 3.6 m (BH2). The fill material was found to consist of silty sand with some clay and gravel, with possible cobbles. The presence of organics was noted in boreholes BH2 and BH5. The fill material was very loose to very dense and was recovered in a frozen to moist condition.

Black staining and petroleum odor were observed in the fill material in boreholes BH2 and BH4.

Silty Sand to Sandy Silt

A native deposit of silt and sand was found to underlay the fill material at all borehole locations, and had a thickness ranging from approximately 2.7 m (BH5) to 4.8 m (BH6). The upper portion of the deposit consists of a silty sand with some clay and trace to some gravel. The deposit transitions to becoming a sandy silt with depth. The layer was found to be very loose to dense and was recovered in a moist to saturated condition.

No petroleum odours or visible evidence of staining were noted within the native material.

No evidence of staining was noted in the native material.

5.2 Ground Water - Elevations and Flow Direction

In order to assess the environmental quality of the groundwater at the Site, four groundwater monitoring wells (BH1, BH2, BH3, and BH4) were installed on the subject Property as part of the Phase Two ESA. All the wells were screened in the overburden. A bentonite seal above the monitoring well screen/sand pack was formed during all monitoring well installations. Monitoring well construction details are presented in Table 5.1.

Well ID	Grade Elevati on (m)	TOP Elevation (m)	Borehole Bottom Elevation (m)	Screen Elevation (m)	Sand Pack Elevation (m)	Bentonite Seal Elevation (m)	Well Bottom Depth (mbg)
BH1	99.31	99.17	94.7	97.8 to 94.7	98.1 to 94.7	99.0 to 98.1	4.57
BH2	99.64	99.51	95.0	98.1 to 95.0	98.4 to 95.0	99.3 to 98.4	4.50
BH3	100.35	100.24	95.8	98.9 to 95.8	99.2 to 95.8	100.1 to 99.2	4.56
BH4	99.59	99.45	95.0	98.1 to 95.0	98.4 to 95.0	99.3 to 98.4	4.54
Notes:							
*Elevations are not geodetic. Polative to essigned TPM as discussed in Section 4.11							

Table 5.1 Monitoring Well Installation

*Elevations are not geodetic. Relative to assigned TBM as discussed in Section 4.11

Following a period of stabilization of the groundwater in the overburden wells, water levels were collected on January 25, 2019. Groundwater elevations were determined based on the assigned elevation of 100.00 m for the surveyed benchmark (slab of a hydro box [T192] located across the



street from 36 Robinson Avenue, and the monitoring well survey and the measured groundwater level within each monitoring well. Water table elevation details are presented in Table 5.2.

Well ID	Grade Elevation (m)	TOP Elevation (m)	Depth to groundwater (m below grade)	Depth to Groundwater (m below TOP)	Water Table Elevation (m)
BH1	99.31	99.17	2.92	2.78	96.39
BH2	99.64	99.51	1.91	1.77	97.73
BH3	100.35	100.24	2.97	2.86	97.38
BH4	99.59	99.45	1.69	1.64	97.90

Table 5.2 Water Table Details

Free product was not identified during any monitoring.

Three groundwater monitoring wells are required to triangulate groundwater elevations and provide a direction of groundwater flow. Four wells were installed in the overburden as part of the Phase Two ESA. The well installed as part of the preliminary geotechnical investigation was installed and sealed in the upper bedrock. The overburden wells were used to determine a direction of groundwater flow and hydraulic gradient. Based on the water table elevations recorded in the monitoring wells installed as part of this investigation on the Site, the direction of groundwater flow in the vicinity of the boreholes was determined to be towards the north. This direction of groundwater flow is logical based on the surficial topography observed at the Site, the neighbouring properties, and flow direction of the nearby Rideau River.

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 0.07 m/m.

5.4 Fine-Medium or Coarse Soil Texture

Borehole advancement has identified a native deposit consisting of a mixture or silt, sand, clay, and gravel. Based on gradations performed as part of the geotechnical investigation, at least 1/3 of the soil at the property is expected to consist of coarse textured soil. The Site is therefore considered as coarse grained soil texture as per Section 42 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s42). The results of the gradations are provided in Appendix E at the end of this report.

5.5 Soil Field Screening

The soil samples were field screened for the olfactory and visible presence of CPCs and for combustible vapour. The combustible vapour readings for the soil samples collected as part of this assessment were negligible.



5.6 Soil Quality

Location and Depth of Sampling

The locations of the boreholes and sampling locations are indicated on Figure 2: Borehole Location Plan, in the Figures section of this report. During the investigation, soil layers were sampled for metals, PAHs, PHCs, VOCs, pH, and TCLP for metals and inorganics, flashpoint, PAHs, VOCs, and PCBs, as follows:

Sample ID	Submitted Sample	Sample depth (m)	Parameters
BH1-SS2	BH1-SS2	1.5-2.1	metals, PAHs, PHCs, VOCs, pH
BH2-SS2	BH2-SS2	1.2-1.8	metals, PAHs
BH2-SS3	BH2-SS3	1.8-2.4	PHCs, VOCs, pH
BH3-SS1	BH3-SS1	0.8-1.4	Metals, PAHs
BH3-SS3	BH3-SS3	2.3-2.9	PHCs, VOCs, pH
BH4-SS2	BH4-SS2	1.5-2.1	Metals, PAHs, PHCs, VOCs, pH
BH3-GS1	BH3 (Auger Cuttings)	1.5-2.1	TCLP metals, TCLP VOCs, TCLP PAHs, TCLP PCBs, Flashpoint
DUP (Jan 21)	Duplicate of BH2-SS3	1.8-2.4	PHCs, VOCs
DUP (Jan 22)	Duplicate of BH4-SS2	1.5-2.1	Metals, PAHs

Table 5.3 Soil Sample Details

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

As determined in Section 1.4 (Applicable Site Class), full depth generic O. Reg. 153/04 Table 3 (residential/parkland land use, non-potable groundwater use, coarse grain soil texture) criteria is considered the applicable Site comparison.

Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 3 criteria (residential/parkland, coarse grained texture):

- BH1-SS2
 - Benzo(a) Pyrene, Fluoranthene, and Electrical Conductivity
- BH2-SS2
 - Mercury, Electrical Conductivity, and Sodium Adsorption Ratio

A complete summary of the analytical soil testing conducted as part of this Phase Two ESA and comparison to O. Reg. 153/04 criteria are present in Table 1, 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/APEC#1 (On-Site historic storage of fuel in fixed tanks [ASTs and USTs]) | Metals, PAHs, PHCs, VOCs
- PCA#2/APEC#2 (On-Site former automotive [motorcycle] service garage) | Metals, PAHs, PHCs, VOCs
- PCA#3/APEC#3 (On-Site automotive [motorcycle] service garage) | Metals, PAHs, PHCs, VOCs
- PCA#4/APEC#4 (Off-Site historic fuel and chemical storage and use) | Metals, PAHs, PHCs, VOCs

Comparison of TCLP Analytical Results to O. Reg. 558/00 Schedule IV Criteria

A soil sample was collected for leachate testing and was analyzed using the toxicity characteristic leaching procedure (TCLP). The results of the submitted TCLP sample are shown on the laboratory Certificate of Analysis – AGAT #19Z430722 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 PCAs/APECs # 1 to 4. Concentrations of PHCs were detected in the samples from BH2, however, these low level PHC concentrations were not expected to be associated with LNAPL.

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 overburden, straddling the shallow static groundwater table.

Field Filtering

Field filtering is not conducted under standard field protocols for groundwater sampling of PHCs, VOCs, BTEXs, PAHs, or pH.

Samples intended for metal analysis were field filtered using a 45 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/APEC#1 (On-Site historic storage of fuel in fixed tanks (ASTs and USTs)) | Metals, PAHs, PHCs, VOCs
- PCA#2/APEC#2 (On-Site former automotive (motorcycle) service garage) | Metals, PAHs, PHCs, VOCs
- PCA#3/APEC#3 (On-Site automotive (motorcycle) service garage) | Metals, PAHs, PHCs, VOCs
- PCA#4/APEC#4 (Off-Site historic fuel and chemical storage and use) | Metals, PAHs, PHCs, VOCs

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

As determined in Section 1.4 (Applicable Site Class), full depth generic O. Reg. 153/04 Table 3 (residential/parkland land use, non-potable groundwater use, coarse texture) criteria is considered the applicable Site comparison.

Analytical testing of the aforementioned groundwater samples indicated results in compliance with O. Reg. 153/04 Table 3 criteria (residential/parkland, coarse grained 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 2, following the text of this report. A copy of the laboratory certificates of analysis for the groundwater samples are presented in Appendix D.

Chemical or Biological Transformations

Parameters related to chemical or biological transformations of the CPCs were not suspected to be present and were not detected in the analytical results as part of this investigation.

LNAPL/DNAPL

Light Non Aqueous Phase Liquids (LNAPL) were considered to have the potential to be present in the groundwater at the Site as a result of PCAs/APECs # 1 to 4.

There were low level detections of PHCs (F1 range), ethylbenzene and toluene in the analyzed groundwater sample collected from BH2 and BH8 (a duplicate sample of BH2), which were reported at concentrations in compliance of O. Reg. 153/04 Table 3 Site criteria.

Free product was not detected in the groundwater recovered from the monitoring wells.

5.8 Sediment Quality

Natural Surface Water Bodies were not present on the Site; as such sediment sampling was not conducted at the Site as part of the Phase Two ESA.



5.9 Quality Assurance and Quality Control Results

Quality Control

One field duplicate soil sample (DUP [Jan 21], a duplicate of sample BH2-SS3) was submitted for laboratory analysis of VOCs and PHCs. A second duplicate soil sample (DUP [Jan 22], a duplicate of sample BH4-SS2) was submitted for laboratory analysis of Metals and PAHs. These duplicate analysis provides quality assurance and quality control of parameter sets analysed in the six soil samples submitted as part of this assessment. In general the relative percent differences (RPDs) were less than 50 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 (BH8-GW1, a duplicate of BH2-GW1) was submitted for laboratory analysis of metals, VOCs, PHCs, and PAHs. This duplicate provides quality assurance and quality control of parameter sets analysed in the five groundwater samples submitted as part of this assessment. The relative percent differences (RPDs) were less than 50 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 groundwater sample duplicates, the level of variability among results is considered acceptable to indicate that the duplicate groundwater results do indicate general consistency in the laboratory data.

One trip blank samples (one for each day of groundwater sampling) was submitted for laboratory analysis of VOCs in groundwater. This trip blanks provides quality assurance and quality control of volatile parameter sets analysed for groundwater samples submitted as part of this assessment. No contaminants concentrations were detected in the analyzed trip blank sample.

Handling and Transport

All samples were delivered to the laboratory in laboratory supplied containers. Samples were hand delivered to the laboratory in coolers, equipped with ice packs and trip blanks. All samples were delivered to the Laboratory within the mandated holding time and temperature requirements.

Analytical Documentation

The documentation provided from the laboratory meets the requirements of O. Reg. 153/04 Section 47(3). Documentation for each laboratory submitted sample has been included as an appendix to this report. Full documentation, including the laboratory certificates of analysis, is provided in Appendix D.

Analytical Qualifiers

No analytical qualifiers were reported on laboratory reports 19Z430141 or 19Z430722 (soil samples) or report 19Z431882 (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 three on-Site PCAs, and thirteen off-Site PCAs identified in the Study Area.

- PCA#1 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | On-Site historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue.
- PCA#2 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site former automotive (motorcycle) service garage located at 36 Robinson Avenue.
- PCA#3 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site automotive (motorcycle) service garage located at 40 Robinson Avenue.
- PCA#4 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site historic fuel and chemical storage and use located at 85 Robinson Avenue.
- PCA#5 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles; Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, former automotive service garage with associated UST located at 37-39 Robinson Avenue.
- PCA#6 (Item 46: Rail Yards, Tracks, and Spurs; Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-site, former railway lines and engine house located at 3 Hurdman Road.
- PCA#7 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks; Item 48: Salt Manufacturing, Processing and Bulk Storage; Item 52: Storage, maintenance, fueling and repair of equipment, vehicles and material used to maintain transportation systems) | Off-site, former lumber yard, former industrial facility, and current municipal works yard located at 29 Hurdman Road
- PCA#8 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, former gasoline service station located at 33 Hurdman Road.
- PCA#9 (Item 10: Commercial Autobody Shops; Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | Off-site, former automotive service garage and former Autobody shop located at 23 Hurdman road (formerly 25 Hurdman Road and 181 Lees Avenue)
- PCA#10 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-site, heating oil spill and fuel storage in fixed tanks located at 28 Robinson Avenue.
- PCA#11 (Item 34: Metal Fabrication) | Off-site, former machine shop located at 18 Robinson Avenue.



- PCA#12 (Item 46: Rail Yards, Tracks, and Spurs) | Off-site, former Canadian Pacific Railway, located approximately 140 m southwest of the site with an engine house approximately 175 m south of the site.
- PCA#13 (Item 46: Rail Yards, Tracks, and Spurs) | Off-site, former Grand Trunk Railway located approximately 160 m southwest of the site.
- PCA#14 (Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste) | Off-site, former landfill located at 200 Lees Avenue.
- PCA#15 (Item 9: Coal Gasification; Item 30: Importation of Fill Material of Unknown Quantity; Item 58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste) | Off-site, former coal gasification plant located at 175 Lees Avenue.
- PCA#16 (Item 8: Chemical Manufacturing, Processing and Bulk Storage; Item 30: Importation of Fill Material of Unknown Quantity) | Off-site, former coal tar distillation plant located at 170 Lees Avenue.

Areas of Potential Environmental Concern (APECs)

The following potentially contaminating activities from the list above are considered to represent areas of potential environmental concern for the Site.

- PCA#1/APEC#1 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | On-Site historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue.
- PCA#2/APEC#2 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site former automotive (motorcycle) service garage located at 36 Robinson Avenue.
- PCA#3/APEC#3 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site automotive (motorcycle) service garage located at 40 Robinson Avenue.
- PCA#4/APEC#4 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site historic fuel and chemical storage and use located at 85Robinson Avenue.

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 the APECs for the Site:

- 1. Metals and Inorganics
- 2. Polycyclic Aromatic Hydrocarbons (PAHs)
- 3. Petroleum Hydrocarbons (PHCs)
- 4. Volatile Organic Compounds (VOCs)



An assessment of the CPCs for the Site was completed as part of the Phase Two ESA analytical submission program. Soil and groundwater samples were submitted for a combination of the CPCs dependent on borehole/monitoring well locations with respect to the APECs.

Subsurface Conditions

Municipal water and sewer services are supplied by underground service trenches on the northwest portion of the Site leading to Robinson Avenue. These service trenches are considered to have the potential to act as conduits for contaminant migration. Electricity and phone lines are supplied to the Site buildings from overhead lines from the northwest portion of the site.

According to the 1987 Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No.: 1506A), the natural soil consists of "Till, plain; local relief <5 m (<15 ft.)". The thickness of overburden is expected to be approximately 5 to 6 m thick and the bedrock in the general area of the Site is expected to be shale. According to records from the water well information system and borehole databases, as presented in the results of the subcontracted Ecolog Environmental ERIS search, the overburden soil in the vicinity of the Site consist of a mixture of silt, clay, and sand type soils. The overburden soil was reportedly underlain by shale bedrock at an approximate depth ranging from 5.5 to 7.0 m below ground surface.

Physical Setting - Stratigraphy

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

- Grass vegetation and Topsoil
- Fill (Silty Sand, some clay, trace to some gravel)
- Silty Sand
- Sandy Silt

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 north. 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 0.07 m/m. The hydraulic gradient is expected to vary with seasonal and weather conditions.

Physical Setting – Bedrock

Shale bedrock was encountered in boreholes BH5 and BH6 at the Site, generally at depths of 5.3 mbg (BH5) and 7.2 mbg (BH6). In general, the upper surface (top 0.5-1.5 m) of the bedrock was revealed to be highly weathered and fractured. The bedrock becomes good to excellent rock quality with increasing depth.



Physical Setting – Groundwater Table

The static groundwater table in the overburden wells installed by GHD, were measured at depths ranging from approximately 1.7 to 3.0 mbg on January 25, 2019.

The groundwater table in the well installed in the upper bedrock as part of the preliminary geotechnical investigation for the Site, was measured at a depth of 2.6 mbg.

The water table details are summarized in Table 5.2. It should be noted that the water table elevation is expected to vary with seasonal and weather conditions.

Physical Setting – Sensitive or Shallow or Surface Water

The pH of the soil was tested and observed to be within the range of 5-9. There are no Areas of Natural Scientific Interest (ANSI) identified by the Ministry of Natural Resources (MNR) within 250 m of the Site. There are no areas designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) identified within 250 m of the Site. As the Site does not contain an area of natural significance, and properties within 30 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

Drilling conducted as part of this investigation revealed that there is more than 2 m of soil in all boreholes locations advanced on the Site. The native soils encountered show a single native soil deposit consisting of a mixture of silt, sand, clay, and gravel.

No natural surface water bodies were identified on the Site. The nearest natural surface body is the Rideau River, which is located approximately 110 m to the Northeast of the Site, within the Phase One study area. 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 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).

The existing property use is mixed commercial and residential. The proposed property use will be residential. The Site is considered as being residential/parkland/institutional land use as per Section 3 of the Ontario Regulation 153/04 as amended 2011 (O. Reg. 153/04, s1[3]).

Accordingly, the appropriate Site classification under O. Reg. 153/04 will be full depth generic non-potable residential land use (O. Reg. 153/04, Table 3).

Physical Setting – Fill

Underlying the surface covers was a layer of fill that was observed to have a thickness ranging from approximately 1.7 m (BH1) to 3.6 m (BH2). The fill material was found to consist of silty sand with some clay and gravel, with possible cobbles. The presence of organics was noted at the borehole



BH2 and BH5 locations. The fill material was very loose to very dense and was recovered in a frozen to moist condition.

Black staining and petroleum odor noted in the fill material at the borehole BH2 and BH4 locations.

It is suspected that the encountered fill material was used to backfill the foundation of the existing buildings and provide the granular structure for the existing pavement on the Site.

In addition to the fill material identified in the Phase Two ESA drilling program, it is expected that underground services on the property are bedded in imported granular material. It is expected that the construction of the foundations of the existing on-Site building included backfill, and material from off-Site. Backfill around the existing structures and services was not investigated as part of the Phase Two ESA.

Physical Setting – Existing and Proposed Structures

At the time of report preparation:

- The current property use is mixed commercial and residential
- The Site consists of the three existing commercial buildings and one residential dwelling with associated gravel and asphalt driveways, with a landscaped area surrounding the site.

GHD understands that the Client intends to demolish the existing structures and construct a new residential condominium building with two underground levels. The Property is currently used for mixed commercial and residential purposes and therefore requires a Record of Site Condition (RSC), required for a change in land use to more sensitive land uses. This report will also be used to support a submission to the local municipal planning department.

Contamination

Soil samples were collected from the boreholes advanced on January 21 and 22, 2019 and were analysed for a combination of Metals and inorganics, PAHs, PHCs, VOCs and pH.

Two soil samples, BH1-SS2 (1.5-2.1 mbg), and BH2-SS2 (1.2-1.8 mbg) presented O. Reg. 153/04 Table 3 exceedances of electrical conductivity. The soil sample BH1-SS2 also presented exceedances of Benzo(a) Pyrene and Fluoranthene. The soil sample BH2-SS2 also presented exceedances of Mercury and sodium adsorption ratio.

The sample BH1-SS2 was collected from the native silty sand deposit. The sample BH2-SS2 was collected from the fill material. It is suspected that areas of contaminated soil are in localized areas on the Site. The borehole BH1 was located adjacent to the historical heating oil UST location beside 44 Robinson Avenue. It is suspected that poor fill material was used to backfill the area following the tank removal. The borehole BH2 was located in the southeast corner of the site where contamination was historically found in the fill material as discussed in the Limited Environmental Site Characterization for 42 and 44 Robinson Avenue performed by John D. Paterson and Associates Limited in May of 1997. It is suspected that there may be additional contaminated soil present in other localised areas of the Site where this fill material may also be encountered.



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 on January 25, 2019, and analysed for Metals, VOCs, PHCs and PAHs. One groundwater sample was also analysed for Oil and Grease (mineral and non-mineral) and general inorganics. All groundwater samples analysed were in compliance with O. Reg. 153/04 Table 3.

6. Conclusions

Soil samples were collected from the boreholes advanced on January 21 and 22, 2019 and were analysed for a combination of Metals and inorganics, PAHs, PHCs, VOCs and pH.

Two soil samples, BH1-SS2 (1.5-2.1 mbg), and BH2-SS2 (1.2-1.8 mbg) presented O. Reg. 153/04 Table 3 exceedances of electrical conductivity. The soil sample BH1-SS2 also presented exceedances of Benzo(a) Pyrene and Fluoranthene. The soil sample BH2-SS2 also presented exceedances of Mercury and sodium adsorption ratio.

The sample BH1-SS2 was collected from the native silty sand deposit. The sample BH2-SS2 was collected from the fill material. It is suspected that areas of contaminated soil are in localized areas on the Site. The borehole BH1 was located adjacent to the historical heating oil UST location beside 44 Robinson Avenue. It is suspected that poor fill material was used to backfill the area following the tank removal. The borehole BH2 was located in the southeast corner of the site where contamination was historically found in the fill material as discussed in the Limited Environmental Site Characterization for 42 and 44 Robinson Avenue performed by John D. Paterson and Associates Limited in May of 1997. It is suspected that there may be additional contaminated soil present in other localised areas of the Site where this fill material may also be encountered.

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 on January 25, 2019, and analysed for Metals, VOCs, PHCs and PAHs. One groundwater sample was also analysed for Oil and Grease (mineral and non-mineral) and general inorganics. All groundwater samples analysed were in compliance with O. Reg. 153/04 Table 3.

Site Compliance

There were O. Reg. 153/04 Table 3 (residential land use, coarse grained soil texture) criteria exceedances in two of the eight submitted soil samples, including the duplicate QA/QC soil samples.

There were no O. Reg. 153/04 Table 3 (residential land use, coarse grained soil texture) criteria exceedances any of the five submitted groundwater samples, including the duplicate QA/QC groundwater sample.

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



7. References

Ontario Regulation 153/04

Phase One Environmental Site Assessment, 36 Robinson Avenue, Ottawa, Ontario, Reference No. 11186719-RPT-1, prepared by GHD, dated January 29, 2019

Certificate of Analysis - AGAT #19Z430141 - Soil - January 28, 2019

Certificate of Analysis - AGAT #19Z430722 - Soil and TCLP - January 30, 2019

Certificate of Analysis - AGAT #19Z431882 - Groundwater - February 1, 2019



All of Which is Respectfully Submitted,

GHD

Ryan Vanden Tillaart, EIT

ED PROFESSION she Luke Lopers, P. Eng.

Luke Lopers, P. Eng., Qualified Person for Environmental Site Assessment under O. Reg. 153/04, confirms the carrying out of the Phase Two Environmental Site Assessment and the findings and conclusions of this report.



Source: MNRF NRVIS, 2018. Produced by GHD under lice Coordinate System: NAD 1983 UTM Zone 18N



ROBINSON VILLAGE LPIV LIMITED PARTNERSHIP 36 ROBINSON AVENUE, OTTAWA, ONTARIO PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

11186719-E2 Jan 29, 2019

SITE LOCATION MAP

FIGURE 1







ROBINSON VILLAGE LPIV LIMITED PARTNERSHIP 36 ROBINSON AVENUE, OTTAWA, ONTARIO PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

BOREHOLE LOCATION PLAN

FIGURE 2

11186719-E2 Mar 6, 2019
Summary of Soil Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date: Sample Depth (mBG) AGAT report number:					BH1 BH1-SS2 21/01/2019 1.5 - 2.1 197430141	BH2 BH2-SS2 01/21/2019 1.2 - 1.8 197430141	BH2 BH2-SS3 01/21/2019 1.8 - 2.4 197430141	BH2 DUP (BH2-SS3) 01/21/2019 1.8 - 2.4 197430141	BH3 BH3-SS1 22/01/2019 0.8 - 1.4 197430722	BH3 BH3-SS3 22/01/2019 2.3 - 2.9 197430722
Parameters	Units	O.Reg Table 1 ^(a)	. 153/04 Table 3 ^(b)	O.Reg 558/00 Schedule 4	102100111	102100111	102100111	102.00111	102100122	102 1007 22
Inorganics							-			
Electrical Conductivity	mS/cm	0.57	0.7		0.889 ^{ab}	7.4 ^{ab}			0.233	
Sodium Adsorption Ratio	NA	2.4	5		0.601	7.42 ^{ab}			0.449	
pH, 2:1 CaCl ₂ Extraction	pH Units	-	-		7.25	7.42			8.15	
Metals										
Antimony	µg/g	1.3	7.5		<0.8	<0.8			<0.8	
Arsenic	µg/g	18	18		3	4			4	
Barium	µg/g	220	390		88	122			67	
Beryllium	µg/g	2.5	(5) 4		<0.5	<0.5			<0.5	
Boron	hð\ð	36	120		8	8			8	
Boron (Hot Water Soluble)	hð/ð	-	1.5		0.20	0.30			0.12	
Cadmium	µg/g	1.2	1.2		<0.5	<0.5			<0.5	
Chromium	hð\ð	70	160		15	22			11	
Cobalt	hð\d	21	22		6.7	6.6			7.3	
Copper	hð\ð	92	(180) 140		16	28			15	
Lead	hð\à	120	120		36	106			9	
Molybdenum	hð\ð	2	6.9		1.0	1.2			2.0	
Nickel	hð\ð	82	(130) 100		14	25			15	
Selenium	hð\à	1.5	2.4		0.7	0.9			<0.4	
Silver	hð\ð	0.5	(25) 20		<0.2	<0.2			<0.2	
Thallium	hð\ð	1	1		<0.4	<0.4			<0.4	
Uranium	hð\ð	2.5	23		0.6	0.7			0.7	
	hð\ð	86	86		23	28			18	
	hð\ð	290	340		55	131			22	
	hð\ð	0.66	(10) 8		<0.2	<0.2			<0.2	
Cyanide	hð\ð	0.051	0.051		<0.040	<0.040	1		<0.040	
Mercury	hð\ð	0.27	(1.8) 0.27		0.14	0.57	J		0.14	
ORPs pH, 2:1 CaCl2 Extraction	pH Units	-	-				6.81			7.99
PAHs										
Naphthalene	ua/a	0.09	(0.75) 0.6		< 0.05	< 0.05			< 0.05	
Acenaphthylene	ua/a	0.093	(0.17) 0.15		< 0.05	< 0.05			< 0.05	
Acenaphthene	ua/a	0.072	(58) 7.9		0.1 ^a	< 0.05			< 0.05	
Fluorene	na/a	0.12	(69) 62		0.11	< 0.05			<0.05	
Phenanthrene	µg/g	0.69	(78)62		0.85ª	0.26			0.06	
Anthracene	₽9/9 ug/g	0.00	(0.74) 0.67		0.00	0.09			<0.05	
Flueranthana	μg/g	0.10	(0.74) 0.07		0.20	0.00			<0.05	
Durana	µg/g	0.56	0.09		0.94	0.32			0.06	
Pyrene Bonz(a)onthrocono	µg/g	0.00	/0 00) 0 5		0.74	0.43			0.00	
Ohmanna C	µg/g	0.36	(0.63) 0.5		0.38	0.25			<0.05	
	µg/g	2.8	(7.8) 7		0.35	0.26			<0.05	
	µg/g	0.47	0.78		0.40	0.30			<0.05	
	µg/g	0.48	0.78		U.Z I	0.14			<0.05	
	µg/g	0.3	0.3		0.32	0.22			<0.05	
Diserverse blandbar	hð\ð	0.23	(0.48) 0.38		0.14	0.10			<0.05	
Dipenz(a,n)anthracene	µg/g	0.1	U.1		<0.05	<0.05			<0.05	
Denzo(g,n,i)perylene	µg/g	0.68			0.15	0.11			<0.05	
∠-and 1-metnyi Naphthalene	µg/g	0.59	(3.4) 0.99		0.05	<0.05			<0.05	

BH4 BH4-SS2 22/01/2019 1.5 - 2.1	BH4 DUP (BH4-SS2) 22/01/2019 1.5 - 2.1 197420722	BH3 BH3-GS1 22/01/2019 1.5 - 2.1 107/20722
192430722	132430722	152450122
0.185 0.383	0.311 0.695	
7.69	8.21	
<0.8 2	<0.8 3	
62	66	
<0.5 <5	<0.5 7	
0.23	0.14	
<0.5 15	<0.5 14	
4.6	6.1	
18	16	
20	10	
10	14	
<0.4	<0.4	
<0.2	<0.2	
0.7	0.6	
26 44	20 26	
<0.2	<0.2	
<0.040	<0.040	
0.23	<0.10	
<0.05	<0.05	
<0.05	<0.05	
<0.05	<0.05	
0.12	0.05	
< 0.05	< 0.05	
0.19	0.07	
0.09	<0.05	
0.09	< 0.05	
0.08	< 0.05	
0.06	<0.05	
< 0.05	< 0.05	
<0.05 <0.05	<0.05 <0.05	
<0.05	<0.05	

Summary of Soil Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date: Sample Depth (mBG) AGAT report number:					BH1 BH1-SS2 21/01/2019 1.5 - 2.1 19Z430141	BH2 BH2-SS2 01/21/2019 1.2 - 1.8 19Z430141	BH2 BH2-SS3 01/21/2019 1.8 - 2.4 19Z430141	BH2 DUP (BH2-SS3) 01/21/2019 1.8 - 2.4 19Z430141	BH3 BH3-SS1 22/01/2019 0.8 - 1.4 19Z430722	BH3 BH3-SS3 22/01/2019 2.3 - 2.9 19Z430722
		O.Reg	. 153/04	O.Reg 558/00						
Parameters	Units	Table 1 ^(a)	Table 3 ^(b)	Schedule 4						
PHCs F1-F4										
F1 (C6 to C10)	µg/g	25	(65) 55		<5		<5	<5		<5
F1 (C6 to C10) minus BTEX	hð\ð	25	(65) 55		<10		<5	<5		<5
F2 (C10 to C16)	µg/g	10	(150) 98		<50		<10	<10		<10
$F_3 (C16 t0 C34)$	µg/g	240	(1300) 300		<50		130	100		<50
F4 (C34 10 C50) Crovimatria Haavy Hydrogarhana	µg/g	120	(5600) 2800				12	6Z		<00 NA
Gravinetiic neavy hydrocarbons	µg/g	120	(3000) 2000		NA		NA	INA		NA
VOCs										
Dichlorodifluoromethane	µg/g	0.05	(25) 16		<0.05		<0.05	<0.05		< 0.05
Vinyl Chloride	µg/g	0.02	(0.022) 0.02		<0.02		<0.02	<0.02		<0.02
Bromomethane	µg/g	0.05	0.05		<0.05		< 0.05	< 0.05		< 0.05
Trichlorofluoromethane	µg/g	0.25	(5.8) 4		<0.05		< 0.05	< 0.05		< 0.05
Acetone	µg/g	0.5	(28) 16		<0.50		<0.50	<0.50		<0.50
1,1-Dichloroethylene	µg/g	0.05	0.05		<0.05		<0.05	<0.05		<0.05
Trans 1.2 Disblarasthylana	µg/g	0.05	(0.96) 0.1		<0.05		<0.05	<0.05		<0.05
Methyl tert-butyl Ether	µg/g	0.05	(0.75) 0.064 (1.4) 0.75		<0.05		<0.05	<0.05		<0.05
1 1-Dichloroethane	µg/g	0.05	(11) 3 5		<0.03		<0.03	<0.03		<0.03
Methyl Ethyl Ketone	µ9/9	0.5	(44) 16		<0.50		<0.50	<0.50		<0.50
Cis- 1.2-Dichloroethylene	ua/a	0.05	(30) 3.4		<0.02		< 0.02	< 0.02		< 0.02
Chloroform	µg/g	0.05	(0.18) 0.05		< 0.04		< 0.04	< 0.04		< 0.04
1,2-Dichloroethane	µg/g	0.05	0.05		< 0.03		< 0.03	< 0.03		< 0.03
1,1,1-Trichloroethane	µg/g	0.05	(3.4) 0.38		<0.05		< 0.05	< 0.05		< 0.05
Carbon Tetrachloride	µg/g	0.05	(0.12) 0.05		<0.05		<0.05	<0.05		< 0.05
Benzene	µg/g	0.02	(0.17) 0.21		<0.02		<0.02	<0.02		<0.02
1,2-Dichloropropane	hð\ð	0.05	(0.085) 0.05		<0.03		< 0.03	< 0.03		< 0.03
I richloroethylene	µg/g	0.05	(0.52) 0.061		<0.03		< 0.03	<0.03		<0.03
Bromodichioromethane	µg/g	0.05	13		<0.05		<0.05	<0.05		<0.05
1 1 2-Trichloroothane	µg/g	0.5	(4.3) 1.7		<0.50		<0.50	<0.50		<0.50
Toluene	µg/g	0.05	(6) 2 3		<0.04		<0.04	<0.04		<0.04
Dibromochloromethane	µg/g ua/a	0.05	9.4		<0.05		<0.05	<0.05		<0.05
Ethylene Dibromide	ua/a	0.05	0.05		<0.04		< 0.04	< 0.04		< 0.04
Tetrachloroethylene	µg/g	0.05	(2.3) 0.28		<0.05		< 0.05	< 0.05		< 0.05
1,1,1,2-Tetrachloroethane	µg/g	0.05	(0.05) 0.058		<0.04		< 0.04	<0.04		< 0.04
Chlorobenzene	µg/g	0.05	(2.7) 2.4		<0.05		< 0.05	< 0.05		< 0.05
Ethylbenzene	µg/g	0.05	(15) 2		<0.05		<0.05	<0.05		< 0.05
m & p-Xylene	µg/g	-	-		<0.05		<0.05	<0.05		< 0.05
Bromoform	µg/g	0.05	(0.26) 0.27		<0.05		<0.05	< 0.05		< 0.05
Styrene	µg/g	0.05	(2.2) 0.7		<0.05		< 0.05	< 0.05		< 0.05
1,1,2,2- I etrachloroethane	µg/g	0.05	0.05		<0.05		<0.05	<0.05		<0.05
U-AVIENE	µg/g	-	-		<0.05		<0.05	<0.05		<0.05
	μg/g	0.05	(0) 4.0		<0.05		<0.05	<0.05		<0.05
	HA/A	0.05	(<u></u>		<0.05		<0.05	<0.05		~0.05
Xvlene Mixture	H0/0	0.05	(25) 3.1		<0.05		<0.05	<0.05		<0.05
1.3-Dichloropropene	na/a	0.05	(0.083) 0.05		<0.04		<0.04	<0.04		< 0.04
n-Hexane	µg/g	0.05	(34) 2.8		<0.05		< 0.05	<0.05		<0.05

BH4 BH4-SS2 22/01/2019 1.5 - 2.1 19Z430722	BH4 DUP (BH4-SS2) 22/01/2019 1.5 - 2.1 19Z430722	BH3 BH3-GS1 22/01/2019 1.5 - 2.1 19Z430722	
<5			
<10			
<50			
<50			
<50			
NA			
<0.05			
<0.02			
<0.05			
<0.05			
<0.50			
<0.05			
<0.05			
< 0.05			
<0.02			
<0.50			
<0.02			
<0.04			
<0.03			
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<0.05			
<0.05			
< 0.04			
<0.05			

Summary of Soil Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date: Sample Depth (mBG) AGAT report number:				
·		O.Reg.	153/04	O.Reg 558/00
Parameters	Units	Table 1 ^(a)	Table 3 ^(b)	Schedule 4
O.Reg 588- Metals & inorganics				
Arsenic Leachate	mg/L			2.5
Barium Leachate	mg/L			100
Boron Leachate	mg/L			500
Cadmium Leachate	mg/L			0.5
Chromium Leachate	mg/L			5
Lead Leachate	mg/L			5
Mercury Leachate	mg/L			0.1
Selenium Leachate	mg/L			1
Silver Leachate	mg/L			5
Uranium Leachate	mg/L			10
Fluoride Leachate	mg/L			150
Cyanide Leachate	mg/L			20
(Nitrate + Nitrite) as N Leachate	mg/L			1000
Flash Point				
Flash point (Pensky Martin Closed Cuj	Deg C			
O. Reg. 558 - Benzo(a) pyrene				
Benzo(a)pyrene	ma/L			0.001
	5			
O. Reg. 558 - PCBs				
Polychlorinated Biphenyls	ma/L			0.3
Decachlorobiphenyl	%			
. ,				
O. Reg. 558 - VOCs	_			
Vinyl Chloride	mg/L			0.2
1,1 Dichloroethene	mg/L			1.4
Dichloromethane	mg/L			5.0
Methyl Ethyl Ketone	mg/L			200
Chloroform	mg/L			10.0
1,2-Dichloroethane	mg/L			0.5
Carbon Tetrachloride	mg/L			0.5
Benzene	mg/L			0.5
Trichloroethene	mg/L			5.0
Tetrachloroethene	mg/L			3.0
Chlorobenzene	mg/L			8.0
1,2-Dichlorobenzene	mg/L			20.0
1,4-Dichlorobenzene	mg/L			0.5

N	ntae.	
	olea.	

^a 2011 MECP Table 1 Criteria - Full Depth Background Site Condition Standards

^b Value exceeds MECP Table 1 and/or Table 3 Standard

BH1	BH2	BH2	BH2	BH3	BH3
BH1-SS2	BH2-SS2	BH2-SS3	DUP (BH2-SS3)	BH3-SS1	BH3-SS3
21/01/2019	01/21/2019	01/21/2019	01/21/2019	22/01/2019	22/01/2019
1.5 - 2.1	1.2 - 1.8	1.8 - 2.4	1.8 - 2.4	0.8 - 1.4	2.3 - 2.9
19Z430141	19Z430141	19Z430141	19Z430141	19Z430722	19Z430722

BH4	BH4	BH3
BH4-SS2	DUP (BH4-SS2)	BH3-GS1
22/01/2019	22/01/2019	22/01/2019
1.5 - 2.1	1.5 - 2.1	1.5 - 2.1
19Z430722	19Z430722	19Z430722

<0.010 0.612 0.056 <0.010 0.012 <0.010 <0.010 <0.010 <0.050 0.18 <0.05 <0.70
>100
<0.001
<0.005 65
<0.030 <0.020 <0.030 <0.090 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.010 <0.010 <0.010

Summary of Groundwater Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location:				BH1	BH2	BH2	BH3	BH4	
Sample ID:				BH1-GW1	BH2-GW1	BH8-GW1	BH3-GW1	BH4-GW1	Trip Blank
Sample Date:				25/01/2019	25/01/2019	25/01/2019	25/01/2019	25/01/2019	25/01/2019
AGAT report number:				19Z431882	19Z431882	19Z431882	19Z431882	19Z431882	19Z431882
		O.Reg	153/04						
Parameters	Units	Table 1 ^(a)	Table 3 ^(b)						
PAHs									
Naphthalene	µg/L	7	(6400) 1400	<0.20	0.78	0.77	<0.20	<0.20	
Acenaphthylene	µg/L	1	1.8	<0.20	<0.20	<0.20	<0.20	<0.20	
Acenaphthene	µg/L	4.1	(1700) 600	<0.20	<0.20	<0.20	<0.20	<0.20	
Fluorene	µg/L	120	400	<0.20	<0.20	<0.20	<0.20	<0.20	
Phenanthrene	µg/L	0.1	580	<0.10	<0.10	<0.10	<0.10	<0.10	
Anthracene	µg/L	0.1	2.4	<0.10	<0.10	<0.10	<0.10	<0.10	
Fluoranthene	µg/L	0.4	130	<0.20	<0.20	<0.20	<0.20	<0.20	
Pyrene	µg/L	0.2	68	<0.20	<0.20	<0.20	<0.20	<0.20	
Benz(a)anthracene	µg/L	0.2	4.7	<0.20	<0.20	<0.20	<0.20	<0.20	
Chrysene	µg/L	0.1	1	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(b)fluoranthene	µg/L	0.1	0.75	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(k)fluoranthene	µg/L	0.1	0.4	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(a)pyrene	µg/L	0.01	0.81	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	
Dibenz(a,h)anthracene	µg/L	0.2	0.52	<0.20	<0.20	<0.20	<0.20	<0.20	
Benzo(g,h,i)perylene	µg/L	0.2	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	
2-and 1-methyl Naphthalene	µg/L	2	1800	<0.20	0.97	0.99	<0.20	<0.20	
Chrysene-d12	µg/L	-	-	79	115	109	113	63	
PHCs F1 - F4 (with PAHs)									
F1 (C6-C10)	µg/L	-	-	<25	96	110	<25	<25	
F1 (C6 to C10) minus BTEX	µg/L	420	750	<25	55	69	<25	<25	
F2 (C10 to C16)	µg/L	150	150	<100	<100	<100	<100	<100	
F2 (C10 to C16) minus Naphthalene	µg/L	150	150	<100	<100	<100	<100	<100	
F3 (C16 to C34)	µg/L	500	500	<100	<100	<100	<100	<100	
F3 (C16 to C34) minus PAHs	µg/L	500	500	<100	<100	<100	<100	<100	
F4 (C34 to C50)	µg/L	500	500	<100	<100	<100	<100	<100	
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA	NA	NA	
VOCs									
Dichlorodifluoromethane	µg/L	590	4400	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	(1.7) 0.5	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	μg/L	0.89	(56) 5.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	150	2500	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	2700	130000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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Summary of Groundwater Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date: AGAT report number:				BH1 BH1-GW1 25/01/2019 197431882	BH2 BH2-GW1 25/01/2019 197431882	BH2 BH8-GW1 25/01/2019 197431882	BH3 BH3-GW1 25/01/2019 197431882	BH4 BH4-GW1 25/01/2019 197431882	Trip Blank 25/01/2019 197431882
		O.Re	a 153/04	102101002	102-101002		102-101002	102101002	102-101002
Parameters	Units	Table 1 ^(a)	⁾ Table 3 ^(b)						
1,1-Dichloroethylene	µg/L	0.5	(17) 1.6	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	5	(5500) 610	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	(17) 1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	15	(1400) 190	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	μg/L	0.5	(3100) 320	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	μg/L	400	60000) 470000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	(17) 1.6	<0.20	<0.20	<0.20	<0.20	0.20	<0.20
Chloroform	µg/L	2	(22) 2.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.5	(12) 1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	μg/L	0.5	(6700) 640	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.2	(8.4) 0.79	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	0.5	(430) 44	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	0.5	(140) 16	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	0.5	(17) 1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	2	85000	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	640	80000) 140000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	0.5	(30) 4.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.8	18000	0.31	6.7 ^a	6.6 ^a	<0.20	1.9 ^a	<0.20
Dibromochloromethane	µg/L	2	82000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.2	(0.83) 0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	0.5	(17) 1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	1.1	(28) 3.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	0.5	630	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	ua/L	0.5	2300	<0.10	5.4 ^a	5.2 ^a	<0.10	0.28	<0.10
m & p-Xvlene	ua/L	-	-	<0.20	19	19	<0.20	0.82	<0.20
Bromoform	ua/L	5	(770) 380	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10
Stvrene	ua/L	0.5	(9100) 1300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1.1.2.2-Tetrachloroethane	ua/L	0.5	(15) 3.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xvlene	ua/L	-	-	<0.10	10	10	<0.10	0.30	<0.10
1.3-Dichlorobenzene	ua/L	0.5	9600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1.4-Dichlorobenzene	ua/L	0.5	(67) 8	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1.2-Dichlorobenzene	ua/L	0.5	(9600) 4600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1.3-Dichloropropene	ua/L	0.5	(45) 5.2	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Xvlene Mixture	ug/L	72	4200	<0.20	29	19	<0.20	1.1	<0.20
n-Hexane	µg/L	5	(520) 51	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Oil and Grease (+Total)									
Oil and Grease (animal/vegetable)	mg/L	-	-					<0.5	
Oil and Grease (mineral) in water	mg/L	-	-					<0.5	
Oil and Grease (Total) in water	mg/L	-	-					<0.5	

Summary of Groundwater Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date:				BH1 BH1-GW1 25/01/2019	BH2 BH2-GW1 25/01/2019	BH2 BH8-GW1 25/01/2019	BH3 BH3-GW1 25/01/2019	BH4 BH4-GW 25/01/20
AGAT report number:				19Z431882	19Z431882	19Z431882	19Z431882	19Z4318
Parameters	Units	O.Reg Table 1 ^(a)	153/04 Table 3 ^(b)					
Total PCBs								
PCBs	µg/L	-	-					<0.1
Metals & Inorganics								
Antimony	µg/L	1.5	20000					<1.0
Arsenic	µg/L	13	1900					<1.0
Barium	µg/L	610	29000					45.7
Beryllium	µg/L	0.5	67					<0.5
Boron	µg/L	1700	45000					14.3
Cadmium	µg/L	0.5	2.7					<0.2
Chromium	µg/L	11	810					<2.0
Cobalt	µg/L	3.8	66					0.8
Copper	µg/L	5	87					<1.0
Lead	µg/L	1.9	25					<0.5
Molvbdenum	ua/L	23	9200					3.7
Nickel	ua/L	14	490					1.7
Selenium	ua/L	5	63					<1.0
Silver	ua/L	0.3	1.5					< 0.2
Thallium	ua/L	0.5	510					< 0.3
Uranium	ua/L	8.9	420					< 0.5
Vanadium	ua/L	3.9	250					<0.4
Zinc	µg/l	160	1100					<5.0
Mercury	µg/=	0.1	(2 8) 0 29					<0.02
Chromium VI	µ9/=	25	140					<5
Sodium	µg/L	490000	2300000					19900
Chloride	µg/∟ ug/l	790000	2300000					28400
Electrical Conductivity	µg/⊏ uS/cm	750000	2000000					131
pH	pH Units	-	-					7.98
Metals (Including Hydrides)								
Antimony	ua/l	15	20000	~1.0	~1.0	~10	~10	
Arsenic	µg/L	13	1000	<1.0	1.0	17	<1.0	
Barium	µg/∟ ug/l	610	20000	226	158	163	72 /	
Bondlium	µg/∟	010	23000	<0.5	-0.5	-0.5	/ 2.4 <0.5	
Boron	µg/∟	1700	45000	<0.5	<0.5	<0.0 115	<0.5 75 7	
Codmium	µy/∟	0.5	40000	-0.0			10.1	
Chromium	µg/∟	C.U	2.1	<0.2	<0.2	<0.2	<0.2	
Cabalt	µg/∟	11	010	2.3	0.0	4.ŏ	4.2	
Copper	µg/L	3.8 -	00	1.0	1.2	1.2	0.0	
Copper	µg/∟	5	٥ <i>٢</i>	1.4	<1.0	<1.0	1.8	
Lead	µg/∟	1.9	25	<0.5	<0.5	<0.5	<0.5	

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H4	
-GW1	Trip Blank
/2019	25/01/2019
31882	19Z431882

- <0.1
- <1.0
- 45.7
- <0.5
- 14.3
- <0.2
- <2.0
- 0.8
- <1.0 <0.5
- 3.7
- 1.7
- <1.0
- <0.2
- <0.3 <0.5
- <0.4
- <5.0
- <0.02
- <5
- 19900
- 28400 434
- 7.98

Summary of Groundwater Analysis 36 Robinson Avenue Ottawa, Ontario

Sample Location: Sample ID: Sample Date: AGAT report number:		0.Reg	153/04	BH1 BH1-GW1 25/01/2019 19Z431882	BH2 BH2-GW1 25/01/2019 19Z431882	BH2 BH8-GW1 25/01/2019 19Z431882	BH3 BH3-GW1 25/01/2019 19Z431882	BH4 BH4-GW1 25/01/2019 19Z431882	Trip Blank 25/01/2019 19Z431882
Parameters	Units	Table 1 ^(a)	Table 3 ^(b)						
Molybdenum	µg/L	23	9200	2.6	1.6	1.7	1.2		
Nickel	µg/L	14	490	6.3	1.6	1.4	2.6		
Selenium	µg/L	5	63	<1.0	<1.0	<1.0	<1.0		
Silver	µg/L	0.3	1.5	<0.2	<0.2	<0.2	<0.2		
Thallium	µg/L	0.5	510	<0.3	<0.3	<0.3	<0.3		
Uranium	µg/L	8.9	420	6.1	0.7	0.7	3.0		
Vanadium	µg/L	3.9	250	0.5	0.5	0.5	0.6		
Zinc	µg/L	160	1100	<5.0	5.1	<5.0	<5.0		

Notes:

^a 2011 MECP Table 1 Criteria - Full Depth Background Site Condition Standards

^b 2011 MECP Table 3 Criteria - Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
 Value exceeds MECP Table 1 and/or Table 3 Standard

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Appendices

Appendix A Utility Clearances



PUBLIC LOCATE	REPORT Date: 0/-1/-2019				
Client Name : Job Location: Nature of Work : _	GHD 36 KOBINSON ANE BOREHALE				
	Description of Public Locates				
Bell/Communication:	Utility in work area: Yes No No Located Marked See attached sketch M Notes: <u>SEE BELL CLEARAWCE</u>				
Gas:	Utility in work area: Yes I No - Located I Marked I See attached sketch Notes: <u>SEE ENBRIDGE LOCATE</u>				
Hydro:	Utility in work area: Yes I NoX - Located I Marked I See attached sketch X Notes: <u>SEE PLOMALK LOCATE</u>				
Water/Sewer:	Utility in work area: Yes 🗌 No 🗌 - Located 🗌 Marked 🗍 See attached sketch 🗌 Notes:				
Cable:	Utility in work area: Yes I No - Located I Marked I See attached sketch I Notes:				
Traffic:	Utility in work area: Yes 🗌 No 🗌 - Located 🗋 Marked 🗍 See attached sketch 🗌 Notes:				
Street Lights:	Utility in work area: Yes 🗌 No 🗌 - Located 🗋 Marked 🗍 See attached sketch 🗍 Notes:				
Zayo:	Utility in work area: Yes 🗌 No 🗌 - Located 🗌 Marked 🛄 See attached sketch 🗌 Notes:				
Telus:	Utility in work area: Yes 🗌 No 🗍 - Located 🗍 Marked 🗍 See attached sketch 🗍 Notes:				
	Utility in work area: Yes 🗌 No 🗌 - Located 🗌 Marked 🗍 See attached sketch 🗌 Notes:				
NOTE: If there are any questions with regards to this summary report and any other public locate clearance sheet, please contact USL-1 at your convenience for clarification					
Locators Nam	e CHRIS WHARTON Signature				

Monique Larocque

From: Sent: To: Subject: Attachments: Solutions@on1call.com Tuesday, January 08, 2019 10:48 AM moniquel@usl-1.com Request 2019023685 MapSelection_19112018_10272024.png; GHD.36_Robinson.png

<https://www.on1call.com/wp-content/themes/ooc/images/ooc-logo-2.png> LOCATE REQUEST CONFIRMATION

TICKET #: 2019023685REQUEST PRIORITY: STANDARDREQUEST TYPE: RELOCATEWORK TO BEGIN DATE:01/15/201901/15/2019Update of Ticket #2018471204Project #Transmit date: 01/08/2019 10:48:06 AM

REQUESTOR'S CONTACT INFORMATION Contractor ID#: 202 Company Phone #: (613) 226-8750 Contact Name: JACQUES DESJARDINS Cell #: Alternate Contact Name: JEFF FORRESTER Fax #: (613) 226-8677 Company name: U S L Email: moniquel@usl-1.com Address: 775 TAYLOR CREEK DR Alternate Contact #:

DIG INFORMATION Region/County: OTTAWA Type of work: BORE HOLES Mark & Fax: NO Community: Max Depth: 32.81 FT Area is not marked: NO City: OTTAWA Machine Dig: YES Area is marked: YES Address: 36, ROBINSON AVE Hand Dig: NO Site Meet Req.: NO Directional Drilling: NO Work being done for: GHD Intersecting Street 1: HURDMAN RD Public Property: YES Intersecting Street 2: LEES AVE Private Property: YES

DETAILED DESCRIPTION OF WORK REMARKS CORLOT=U Drilling throughout property. Clear entir e property and to sidewalk on Robinson Ave.

MEMBERS NOTIFIED: The following owners of underground infrastructure in the area of your excavation site have been notified.

Member name Station CodeInitial StatusHYDRO OTTAWA (HOT1)HOT1Notification sentPROMARK FOR ENBRIDGE GAS (ENOE01)ENOE01Notification sentCLI FOR ROGERS (ROGOTT01)ROGOTT01Notification sentCITY OF OTTAWA WATER/SEWER (OTWAWS01)OTWAWS01Existing locate still validBLACK AND MC DONALD FOR CITY OF OTTAWA STREET LIGHTS (OTWASL01)OTWASL01Existing locate still validPROMARK FOR BELL CANADA (BCOE01)BCOE01Notification sentExisting locate still valid

MAP SELECTION: Map Selection provided by the excavator through Ontario One Call's map tool or through agent interpretation by phone

1

CONTRACTOR'S SKETCH: A file provided directly by the excavator, not generated by Ontario One Call:

IMPORTANT INFORMATION: Please read.

Defining "NC" - Non-Compliant

- Non-compliant members have not met their obligations under section 5 of the Ontario Underground Infrastructure Notification Act.ON1Call has notified these members to ensure they are aware of your excavation. In this circumstance, should the member not respond, the excavator should contact the member directly to obtain their locates or request a status. ON1Call will not be provided with a locate status from the member regarding this ticket and therefore, cannot provide further information at this time.For locate status contact information please refer to our website.

You have a valid locate when ...

- You have reviewed your locate request information for accuracy. CONTACT Ontario One Call (ON1Call) IMMEDIATELY if changes are needed and obtain a corrected locate request confirmation.

- You have obtained locates or clearances from all ON1Call members listed in this ticket before beginning your dig.

You've met your obligations when ...

- In addition to this locate request, you have DIRECTLY contacted all owners of infrastructure who ARE NOT current members of ON1Call (such as owned buried infrastructure on private property), as well as arranged for contract locates for your private lines on your private property - where applicable. For a list of locate status contacts visit www.on1call.com.

- You respect the marks and instructions provided by the locators and dig with care; the marks and locator instructions MUST MATCH.

- You have obtained any necessary permits from the municipality in whichyou are excavating.

What does "Cleared" mean in the "Initial Status" section?

1. The information that you have provided about your dig will not affect that member's underground infrastructure and they have provided you with a

clearance, if anything about your excavation changes, please ensure that you update your ticket immediately.

What are the images under "Map Selection":

1. A drawing created by an excavator directly within Ontario One Call's web ticket tool, this is expected to be an accurate rendition of the dig site, and it is the excavator's responsibility to ensure the location matches the information they provide under the 'Dig Location' section OR;

2. A drawing created by an Ontario One Call agent, this drawing is based on a verbal description by phone of the area by the excavator. Agents may create drawings that are larger than the proposed dig to minimize risk of interpretation. It is the excavator's responsibility to review these map selections for accuracy. Changes can be made by the excavator through the web ticket tool, to learn how visit www.on1call.com/contractors.

3. All drawings dictate which members are notified.

Page 1 of

Promark	1	Prim	ary Locate SI	neet	mail	Request	#201902368	5
telecon Location of underground infrae	Fax 613: structures	723-9277	1-800-371-88	66	mail.	RELOCAT	E	
Jtilities: □Bell □Gas _ocated: □Blink □Pee	■ HydroOttawa I Fibre □	□ Street Lighting	Revised Exca	vation Date	Excavation Date 1/15/2019 8:00:00 AM	и .	Status <u>STANDARD</u> Homeowner	
Requested by: JACQUES DESJARDINS	Company USL	<i>(</i> .	Phone: (613)-226-8750) ext.	Fax/email: (613)-226-8677 ext		Contractor Project	
Appt Date:	Received Date: 1/8/2019 10:50:03	AM 1st Int	ate Address: 36 ers.: HURDMA	, ROBINSO N RD	2nd Inters ::	LEES AVE		
Type of work: BORE HOLES	11111333333			-	City: OTT	wwa		
			Paol Fibro	Dlink			1	
Mark Clear Mark Cle	ar Mark Clear	Mark Clear	Mark Clear	Mark Cle	ar Mark Clear	Mark Clear	Mark Cle	ar
OCATED AREA: EXCA	VATOR SHALL	NOT WORK OU	ITSIDE THE LO	CATED AF	REA WITHOUT O	BTAINING AN	NOTHER LOCA	ATE.
Records Reference:		_ 1	Third Party Not	fication				
Map Network X #	E							
_ Byers _ Datapak: Field Notes:			CLEAR F	FOR HY	DRO OTTA	WA		
Otner: DPT Remarks:								
				Apply Sti	cker Here if Requ	ired		
Excavator shall notify &	receive a clea	rance from Util	ity prior to ex	cavation fo	or the following:			
Telecon 🗆	High Priority Ca				ala com-Orana	Gae-Vallow	Hudro Ott -	Red
Method of Field Marking	g: ∐ Paint∐St ID offer 20 douis	See Dicclaimer	Unset Flags	e for the en	ecific Eacility Own	ner's Guideline	s injuito otta -	Red
Caution: Locates are vo Caution: Any changes to Located Area without a ne service/property owner. F Ontario One Call at 1-800-	location or natur aw locate. Private or all Locate req 400-2255 or w	e of work require ly owned service Jests including r ww.on1call.com	e new locate. 1 es within the lo remarks contac 1.	he Excavat cated area h t:	or must not work have not been ma	outside the rked - check v	vith	
Locator Name:_BELAIR DA	ANICK	Start Time:		Mark	& Fax _ Let	ft on Site	_ Emailed	
ID # : <u>1591</u>		End Time :	12:59:16	Print		- <u> </u>		
Date 01/09/20)19			Signatur	re:			
A copy of this Primary	/ Locate Sheet	t and Auxiliary f sketch and r	/ Locate She narkings do	et(s) must not coinc	t be on site an ide, the Excav	d in the han ator must ol	ids of the ma btain a new	achi locz

temp20190109121827280.txt BELL CANADA 360 NETWORKS/GROUP TELECOM GHD

Station Code:	BCOE01	Start Date:	1/8/2019 10:47:00 AM
Ticket Type: Request No: Excav. Name: Phone: Caller:	RELOCATE 2019023685 U S L (613)-226-8750 JACQUES DESJARD	Priority: Prev. Request: ext. INS	STANDARD 2018471204 Fax: (613)-226-8677 ext.
Cell: Alernate Contact: Alt. Phone: Callback: Excav. Address:	JEFF FORRESTER ANYTIME 775		Pager:
Excav. Street: Excav. City: Excav. Zip/Postal Code: Excav. State:	TAYLOR CREEK DR OTTAWA K1C 1T1 ON		
Civic No. From: Civic No. To: Street:	36 ROBINSON AVE		
<pre>Intersect. 1: Intersect. 2: City: County/Neighb./Quarter: State:</pre>	HURDMAN RD LEES AVE OTTAWA		
Excav. Email: Excav. Doing Work: Type of Work:	moniquel@usl-1. GHD BORE HOLES	com	
Work Date:	1/15/2019 8:00:	00 AM	
Area Marked: Depth: 32.81 Orientation: Remarks: UPDATE OF 2018471204-75 S01 - R ROGOTT01 ENOF01	Length: Width: .665984 45.41836 HOT1	0 0 4 NB_SEGMENTS::	1 BCOE01 OTWASL01 -R OTWAW

Add Loc Info:

temp20190109121827280.txt

OTTAWA DPRA:3 CORLOT=U DRILLING THROUGHOUT PROPERTY. CLEAR ENTIRE PROPERTY AND T O SIDEWALK ON ROBINSON AVE. NO_PLAN::613 241-K1N Utility Remarks:

Add Dig Info:

PUBL. PROP.

PRIV. PROP

PREMARKED

MACH. DIG

2019023685



Dear Excavator:

We are in receipt of your recent request for a Bell relocate.

Please be advised that the original locate(s) issued for the request in question will remain valid for the duration of your project. If any of the exceptions below apply and you would like the site remarked for Bell or you would like to discuss your relocate request, please contact us during business hours at **1-844-225-5550**, Option # 8:

- The excavator did not start their work within 60 days of the original locate completion date
- Tie in's/offsets used as measurements on the original Bell locate are no longer there
- The excavator suspects new Bell plant has been added in the locate area since the original locate
- The excavator has lost control of the site for an extended period of time (i.e. the excavation begins however the excavator has left site and did not return for 60 days or more)
- There is a sticker on your locate indicating there is a Bell Hydro line in the locate area and you're
 entitled to a Relocate of that area.

Bell expects excavators will protect and preserve the paint marks placed at the time of their original locate. If markings are removed due to weather or ongoing excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate sheet.

If an excavator would like their markings refreshed they can contact the Bell LSP (Locate Service Provider) directly and arrange for this at the excavator's expense. The LSP contact information is available on the original locate sheet.

Sincerely,

Bell Screening Centre

					GUI-1つ Page 1 of 2
0		Pri	imary Locate Sheet	Ś	STANDARD
EENBR	IDGE	Toll free: 1-866-922-362	Email: 2 DamagePrevention@enb	ridge.com 201	Request # 19023685
Utilities: 🗱 Gas			Revised Excavation Date 1/15/2019 8:00:00 AM	Excavation Date 1/15/2019 8:00:00 AM	Status ofFICE CLEARED Homeowner
Requested by	Company		Phone (613)-226-8750 ext.	Fax/email moniquel@usl-1.com	Contractor 🖄 Project 🗆
Received Date	City	Locat	e Address 36, ROBINSON AVE		
1/8/2019 10:49:00 AM	OTTAWA, OTTAWA	1 st inte	ers HURDMAN RD 2n	nd inters. LEES AVE	
Type of work BORE HOLES					
Caller's Remarks: UPDATE OF 2018471204	PUBL. PROP., PRI	V. PROP, PREM	IARKED, MACH. DIG, NB_SEC	GMENTS::1, NO_PLAN::6	13 241-K1N
CORLOT=U DRILLING TH	IROUGHOUT PROF	PERTY. CLEAR	ENTIRE PROPERTY AND TO S	SIDEWALK ON ROBINSC	ON AVE.
Located Area: Exc	avator shall no	t work outsid	de the limits of the Dig A	rea without obtainir	ng another locate.
The located area id If you plan on exc area identified.	dentified is clea avating outside	r of Enbridg of the ident	e Gas Distribution asset ified located area please	ts. e request a new loca	ate with the new
				** ₁	
Caution: This locate is v	alid for 30 days from	the date of comp	letion. Excavation after this time w	vill require a new locate	
Caution: Any changes to Privately owned services or remarks contact: Ontario	location or nature of within the located are One Call at 1-800-40	work require nev a have not been 10-2255 or www.	v locate. The Excavator must not v marked - check with service/prop .on1call.com.	work outside the Located A erty owner. For all Locate re	rea without a new locate. quests including
Clerk Name: 1017					
Date:01/08/20	19				

	Page	2	of	2
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ONE-CALL SYSTEMS INC. 775 TAYLOR CREEK DRIVE	PHONE (613) 226-87
OTTAWA, ON, K4A 0Z9	FAX (613) 226-86
CUSTOMER: GHD	REQUESTED BY: RYAN VANDEN TILLAA
LOCATION OF WORK: 36 ROBINSON	AVE LIMITS OF WORK: AS PER MAP
HYDRO H CABLE T. GAS G SANITAR BELL B STORM UNIDENTIFIED CABLE UC FIBER OF WATER	.V. T.V STEAM STEAM .Y SAN ELECTRICAL E ST COMMUNICATIONS COM PTIC FOC OTHER:
LOCATES UNLY APPLICABLE TO	SKETCH NOT TO SCA
	REFERENCE NORTH
44 40 3	38 36 3Z
WS WS	ws ws
L	+
 USL-1 as a Private utility locator, is not permitted to locate 1 FOR REFERENCE ONLY, and under no circumstances sha Public utilities noted on the USL-1 sketch by referring to the ASSUME LIABILITY FOR PUBLIC LOCATE INNACCURAC If the proposed work area is on Private property, it does NC the proposed depth of excavation is, it is the law to notify O COMMENTS: NO OTHER PRIVATE THIS SKETCH IS NOT A PUBLIC UTILITY LOCATE/DOC USL-1 DISCLAIMER - FORM 101, CONTRACTOR IS RE COMMENCING WORK. 	Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are all be used for excavation purposes. It is the contractor's responsibility to verify any a Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NC CIES. The mean that all buried utilities are Private. Regardless of when you are digging, and whi intario One Call (or Info-Excavation in Quebec) to obtain Public utility locates. UTILITY DETECTED, SANI NOT LOCATED CUMENT. PUBLIC UTILITIES SHOWN ARE FOR REFERENCE ONLY. REFER SPONSIBLE TO ENSURE THEY HAVE PUBLIC UTILITY LOCATES BEFOR
LOCATORS NAME: CHRIS WHARTO	SIGNATURE: ··· (/ .
	Print Name Signature

USL-1 DISCLAIMER - FORM 101

-

- It is our Glients responsibility to fully read and understand this document, prior to any ground disturbance taking place.
- Should any quastions or clarifications be required, contact USL-1 before commoncing work Locate is VOID after 30 days from the date the locate was completed. Contact USL-1 for remarks and/or new ticket
- if the scope of work, locale area, or alle information changes, contact USL-1 before continuing work. In certain instances,
- a new users requires may an requires Any work within 1.5 metres laterally of a mericad utility, must be hand dug or daylighted. Utility depthe very, as does the
- any work matter to the locate equipment, and therefore depits are typically not provided and should not be used for excertation purposes. Depth of utilities should also be vertiled by hand digging or daylighting. The best information is provided at the . time of the locate, however the accuracy of field markings can very with regard to equipment accuracy and external
- If the paint markings or fings on also differ from that of the exetch provided, please contact USL-1 before commonoing work. If possible, the issue will be clarified by USL-1 and/or a site meet may be requested with the appropriate parties
- The "Excervator" is responsible for isseping a current copy of the locates on site, with the operators and infon the
- excernation squipment AT ALL TIMES It is the "Encounter/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 sive Special purpose isonies such as enver sondeling, locate surveys, tunnel kientification, conduit identification, ground fault detections, ground penetrating rader, well cap location, concrete scanning, or anything else that requires use of more than detections, ground penetrating rader, 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 identity any special needs services during a normal Private utility locate, the client will be notified for the appropriate course of
- Not all buried utilities can be traced. In many instances, water and sewar 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 menholes. 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 unbraceable 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 ending 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 elie 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
- USL- 1 cannot be held liable for damage to Private water and/or server interale unless building access is granted, and the
- Thick snow and ice, frozen manhole lide, live traffic, parked care, construction debrie 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 identes, prior to USL-1's arrival to elle
- LIGL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a skeloh, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excervation purposes. . it is the contractor's responsibility to verify any Public utilities noted on the USL-1 statch by referring to the Public utility loosis 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 excevation is, it is the law to notify Onisito One Call (or info-Exception 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

72

USL-1 - Jenuary 2018

1.

Appendix B Sampling Analysis Plan



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Figure Index

Figure 1 Proposed Borehole/Monitoring Well Locations

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1. Background

A Phase Two Environmental Site Assessment is to be completed for the residential and commercial properties identified as 36, 38, 40, and 44 Robinson Avenue in Ottawa, Ontario ("Site") to investigate the areas of potential environmental concern (APECs) identified by the Phase One ESA.

The Phase One ESA identified:

- PCA#1/APEC#1 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | On-Site historic storage of fuel in fixed tanks (ASTs and USTs) located at 36, 38, 40, and 44 Robinson Avenue.
- PCA#2/APEC#2 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site former automotive (motorcycle) service garage located at 36 Robinson Avenue.
- PCA#3/APEC#3 (Item 27: Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles) | On-Site automotive (motorcycle) service garage located at 40 Robinson Avenue.
- PCA#4/APEC#4 (Item 28: Gasoline and Associated Products Storage in Fixed Tanks) | Off-Site historic fuel and chemical storage and use located at 85 Robinson Avenue.

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, PAHs, PHCs, VOCs
- APEC#2 | Metals, PAHs, PHCs, VOCs,
- APEC#3 | Metals, PAHs, PHCs, VOCs,
- APEC#4 | Metals, PAHs, PHCs, 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 four borehole locations are illustrated on the Proposed Borehole Location Plan attached as Figure 1.

- Four boreholes advanced to approximately 4.6 metres (m).
- Install groundwater monitoring wells in all borehole locations

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



Depths

Continuous soil samples will be collected from the boreholes in 0.6 m intervals using stainless steel split spoons. Soil sampling will be conducted from ground surface down to proposed drilling depth (4.6 m). If the ground surface is frozen, the upper layers will be augered down to non-frozen material.

All of the groundwater monitoring wells will be screened within the overburden. 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 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:

Location	Analytical Parameter	Approximate Depth/Stratigraphy
All Boreholes	Metals, PAHs, PHCs, VOCs, pH	 Sample near water table interface, or just above low permeable soil layer or fill layer, or area of obvious contamination
Duplicate Sample	DUP-1	Any material sampled for Metals, PAHs, PHCs, VOCs, and pH
Worst Case	Reg. 558 – laflesche unknown petroleum package	Select 1 sample for leachate (TCLP) Metal & Inorganics, Flashpoint, PAH, VOC, and PCB testing from borehole with most evident contamination. Bulk sample from the same borehole should be worst case soil followed by TCLP sample.

Table 4.1 Soil Sampling

Should contamination be detected in other locations or evident contamination requiring vertical delineation is suspected in any borehole, this should be discussed with the project manager immediately.



Soil Jarring requirements:

- Metals, PAHs one large and one medium soil jar
- PHCs, VOCs one medium soil jar and one vial
- pH one small soil jar
- Reg. 558 TCLP five large soil jars

Should any visually or olfactory observations be made with respect to the potential presence of contaminants in the soil at a specific depth in a particular borehole location, the soil sample with the suspected contaminants will be submitted for laboratory analysis in lieu of the sample depth referenced in the table above.

Groundwater

The following groundwater samples from the screened intervals will be submitted for laboratory analysis of the specified analytical parameters:

Table 4.2	Groundwater Sampling	
Location	Analytical Parameters	Approximate Depth of Sample
All wells	Metals, PAHs, VOCs, BTEX/PHCs, pH	Screened Interval
Duplicate	Duplicate of Metals, PAHs, VOCs, BTEX/PHCs, pH	1/10 samples
Trip Blank	VOC	1/cooler/sampling event

Should contamination be detected in other locations or evident contamination, this should be discussed with the project manager immediately.

5. Quality Assurance/Quality Control

5.1 Decontamination of Sampling Equipment

All non-dedicated sampling equipment such as stainless steel split spoons will be washed between uses.

Water level monitoring equipment, including water level meters and interface probes will be decontaminated with Alconox and rinsed with deionized water between water level readings to prevent cross contamination.

5.2 Field Duplicates

Field duplicate samples shall be collected in each medium (soil and groundwater) being sampled. At least one field duplicate sample will be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.

Field duplicates will be selected from samples which have the greatest probability of environmental contamination (i.e., where field observations indicate potential contamination is present). A



duplicate sample will be selected should the presence of contamination be suspected in any of the soil or groundwater samples.

5.3 Trip Blanks

One laboratory prepared trip blank shall be analyzed for VOC when submitting groundwater samples for analysis.

5.4 Soil Vapour Screening

All soil samples will be screened for organic vapours in the field using a Photoionization detector (PID) in the field. Soil samples with notably elevated combustible gas concentrations should be discussed with the Project Manager and may be selected for laboratory analysis.

6. Standard Operating Procedures

GHD standard operating procedures (SOP) shall be used during borehole drilling and soil sampling. Deviations to the SOP shall be discussed with the project manager.

6.1 Well Development

Groundwater monitoring wells will be developed on the day of drilling. At least three and up to ten well volumes will be removed from the monitoring wells in order to remove all sediment from the wells. In cases where the monitoring well goes dry prior to purging three well volumes, the well should be purged dry a minimum of three times, waiting approximately 30 minutes between purging events. Waterra tubing should be removed from the monitoring wells following well development.

6.2 Borehole Locating

The locations of all boreholes and monitoring wells must be measured in the field on the day of drilling. Borehole locations should be measured with respect to building corners or known property boundaries and shown on a plan.

6.3 Elevation Survey

An elevation survey of all boreholes and monitoring wells will be conducted following the completion of the drilling program. A fixed temporary benchmark should be used as a reference elevation; the top of the spindle of a fire hydrant is preferred for this purpose as geodetic elevations can be obtained for these points. The ground surface elevation of all boreholes should be surveyed. The top of riser of each monitoring well should also be surveyed; this will ensure maximum accuracy in the interpretation of groundwater elevations.



6.4 Groundwater Elevation Survey

Following a period of stabilization (one week is recommended) a groundwater elevation survey will be completed for all monitoring wells. The depth to groundwater is recorded prior to disturbance of the water column and is recorded with respect to the top of riser of the monitoring well.

6.5 Groundwater Sampling

Groundwater sampling is conducted following the collection of groundwater elevations. A peristaltic pump or Waterra tubing and foot valve are used for groundwater sampling. The wells are purged of standing water by removing at least one well volume. Samples are collected in dedicated bottles prepared by the laboratory. Samples are field filtered in the case of metals sampling.



on from Microsoft Corporation, Date Unknown





ROBINSON VILLAGE LPIV LIMITED PARTNERSHIP 36 ROBINSON AVENUE, OTTAWA, ONTARIO PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

PROPOSED BOREHOLE LOCATION PLAN

FIGURE 1

11186719-Jan 28, 2019

Appendix C Borehole Logs

REFERENCE No.: 11186719 ENCLOSURE No.: 1																							
		C	5)	BOR	BOREHOLE LOG																		
		<u> </u>		ELE\	ATION:	99.3	31	m				Page: <u>1</u> of <u>1</u>											
CLIE	ENT: TO	C Unite	ed Group									LEGEND											
PRC	JECT:	Geote	chnical Investigation										SS GS	Split S Auge	Spoo r Sar	n mple							
LOC	ATION:	36 R	obinson Avenue										ST	Shelb	oy Tu	ıbe							
DES	CRIBED	BY:	R. Vanden Tillaa	art	CHECKED BY	(:		B. Vazh	nbakh	t		Ţ		Wate	r Lev	/el	6)						
DAT	E (STAR	RT):	21 January 2019	9	DATE (FINISH	H):	2	21 Janua	ary 20	19		-	i Ni	Attert	berg	limits /	;%)						
SC	ALE		STRATIGRAPHY		MONITO	PR		SAM	NPLE	DATA		Penetration Index based on Split Spoon sample N Penetration Index based on Dynamic Cone sample											
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION SOIL AND BEDRO	OF DCK			State	Type and Number	Recovery	OVC	Penetration Index / RQD	△ □ S	Cu Cu	Shea Shea Sensi Shea Pocke	r Stre r Stre itivity r Stre et Pe	ength l ength l v Value ength ength	ample based based based neter	on Fie on La vil on	eld V lb Va	ane ne			
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2.5							$\left \right $	SS3	100	11	41				•	,							
3.0	96.3		SANDY SILT- some cla	ay,	WL 2.92 — 01/25/2019												_						
3.5			trace gravel, grey, satu compact	rated,			Å	SS4	100	12	17		•					+					
4.0							$\left \right $	SS5	71	9	13		•										
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mbgs:	, meters b	elow g	round surface																				
DOVEL																							

REFERENCE No.: 11186719 ENCLOSURE No.: 2																			
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		G	Ð	ELEV	ATION:	99.	64	m					Pag	le:	1	of	1		
0.15														L	EGE	ND			
	ENI: <u>IC</u>	Cooto	d Group									🖂 ss	Spli	t Spoo	on				
		36 R										GS Construction	6 Aug	er Sa	mple				
DES		BY.	R Vanden Tilla:	art	CHECKED P	şγ·		B Vazh	hakh	t		<u>₹</u>	Wat	er Lev	vel				
DAT	E (STAR	T):	21 January 2019	9	DATE (FINIS	SH):	:	21 Janua	arv 20	19		°	Wat Atte	er con	tent (9	%) (%)			
	SCALE STRATIGRAPHY MONITOR SAMPLE DATA												Pen Spli	etration t	on Ind	ex base	ed on		
30		>	STRATIGRAFHT		WELI	<u> </u>		SAN		DATA	-	• N	Pen Dyn	etratic amic (on Inde Cone s	, x base sample	d on		
Depth BGS	Elevation (m)	Stratigraph	DESCRIPTION SOIL AND BEDR	OF DCK			State	Type and Number	Recovery	OVC	Penetration Index / RQD	A Cu □ Cu S	She She Sen She Poc	ar Str ar Str sitivity ar Str ket Pe	ength ength / Valu ength enetro	based based e of Soi based meter	on Fie on Lal I on	ld Va b Var	ine 1e
meters	99.64		GROUND SURF	ACE					%	ppm	Ν	5 10	SCAL	LE FO 100k	R TE:	ST RES	ULTS 200 70 8	; kPa 10 91	0
_			FILL - Silty sand, some	clay,	99.51 -	NΠ													-
0.5			construction debris, bro damp to moist, very loc compact Upper 0.6 m frozen	own, ose to	0.30 — Riser — Bentonite —			SS1	83	7	19		•						
			Black staining and PH	odour	1.22-		Ĥ												
- 1.5			from 1.2 to 2.4 mbgs		5and — 1.52 —		X	SS2	33	17	13	•					$\left \right $		
2.0					WL 1.91 — 01/25/2019	X	$\left[\right]$	SS3	29	13	2	•							
2.5							\mathbb{H}										$\left \right $		
3.0					Screen-		\mathbb{N}	SS4	4		2	•							
- 25					ocreen		M	SS5	25	8	1								
	96.0	ĨĨ	SANDY SILT- some cla	ay,	-		\square												
- 4.0			very loose	raleu,			Å	SS6	33	6	1	•							
4.5	95.1		Borehole terminated at	4.6	4.57 —												$\left \right $		
5.0			mbgs																
5.5																	$\left \right $		
6.0																			
																	$\left \right $		
7.5																_	$\left \right $		
8.0																			
8.5															_	_	$\left \right $		
9.0																	$\left \right $		
NOTES	: motoro bi		round surface										-	· 1	I		1	I	
	meters De	SIOW G	iounu sunace																

REFERENCE No.: 11186719 ENCLOSURE No.: 3																					
				BOR	EHOLE No	.:	BH3	3					BO	RF	но	IE		G			
		C	Ð	ELE\	ATION:	10	0.35	5 m				Page: <u>1</u> of <u>1</u>									
														L	EGE	ND					
	ENT: <u>IC</u>	Conte	ed Group									⊠ s	S Spli	t Spo	on						
	CATION:	36 R	obinson Avenue									G 🖉 G	S Aug T She	jer Sa elbv Ti	mple ube						
DES	SCRIBED	BY:	R. Vanden Tillaa	art	CHECKED I	BY:		B. Vazł	nbakh	t		Ţ	Wat	ter Le	vel						
DAT	DATE (START): 22 January 2019 DATE (FINISH): 22 January 2019											°I	Wat Atte	ter cor erberg	ntent (' limits	%) (%)					
SC	CALE		STRATIGRAPHY		MONI	TOR _L		SAM	NPLE	DATA	1	• N • N	Per Spli Pen	netration t Spoo netration	on Ind on sar on Inde	ex bas nple ex bas	ed on ed on				
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION SOIL AND BEDRO	OF OCK			State	Type and Number	Recovery	OVC	Penetration Index / RQD	△ C □ C S	Dyn u She u She Ser She Poo	amic ear Str ear Str sitivity ear Str cket Po	Cone : rength rength y Valu rength enetro	sample based based e of So based meter	on Fie on La oil I on	eld Va b Var	ine ie		
meters	100.35		GROUND SURF	ACE					%	ppm	Ν	؛ 10	SCA 50kPa 20 3	LE FC 1004 30 40	PR TE	ST RE 150kPa 60	SULTS 200 70 8	S IkPa 10 91	0		
0.5			FILL - Silty sand, some brown, moist, very loos compact Upper 0.6 m frozen	gravel, e to	100.24 – 0.30 – Riser – Bentonite –																
1.0					1.22 Sand		X	SS1	67	28	13	•					+				
2.0					1.52-			SS2	4		3	•					-				
2.5	98.1		SILTY SAND- some cla some gravel, grey to br	ay, own,	Screen –			SS3	58	42	17		•				-				
3.0			Saturated, 1005e to con	ipaci	WL 2.97 01/25/2019	-											-				
- 3.5								SS4	58	26	8	•					+				
4.0								SS5	71		16	•	•				╞				
- 4.5	95.8	<u>e gedengelen</u>	Borehole terminated at mbgs	4.6	- 4.57 -												+-				
5.5																	+				
																	+				
6.5																	+				
																	+				
																	+				
																	+				
																	+				
MOTES	S: meters b	elow g	round surface													[

REFERENCE No.: 11186719 ENCLOSURE No.: 4																					
				BOR	EHOLE No.:	В	H4						В	OR	FH	OI F	=	00	}		
		G	HD	ELEV		99.	59	m				Page: <u>1</u> of <u>1</u>									
		211-14-	d Crown											-	LEC) SENC)	_			
		Geote	ed Group									\boxtimes	SS S	Split Sp	boon		-				
	ATION:	36 R	obinson Avenue										GS / ST S	Auger : Shelbv	Samp Tube	e					
DES	CRIBED	BY:	R. Vanden Tillaa	art	CHECKED B	Y:		B. Vazh	bakh	t		Ţ	١	Vater I	_evel						
DAT	DATE (START): 22 January 2019 DATE (FINISH): 22 January 2019												\ /	Vater o Atterbe	onten rg lim	t (%) its (%)					
SC	ALE		STRATIGRAPHY		MONITOR WELL SAMPLE DATA							•	N F	Penetra Split Sp Penetra	ation I boon s ation Ii	ndex ba ample ndex ba	ased ased	on on			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION SOIL AND BEDR	OF OCK			State	Type and Number	Recovery	OVC	Penetration Index / RQD	⊲ □ S ▲	Cu S Cu S Cu S	Dynam Shear S Sensitir Shear S Pocket	ic Cor Streng Streng vity Va Streng Pene	e samp th base th base alue of th base trometer	ole ed or ed or Soil ed or er	า Fiel า Lab า	d Va Van	ine ie	
meters	99.59		GROUND SURF	ACE					%	ppm	Ν	10	50kP	CALE I	FOR 7 00kPa 40	EST R 150k	RESU	ILTS 200k	Pa	0	
0.5			FILL - Silty sand, some brown, moist, very loos loose	gravel, e to	99.45 0.30 Riser Bentonite																
					1.22 — Sand —		Å	SS1	4		5	•					+	_			
	97.6		Black staining, PHC od 1.5 mbgs	our at	1.52 — WL 1.69 — 01/25/2019	Y	$\left \right $	SS2	54	19	3	•					_	_			
2.0	01.0		SILTY SAND- some gr some clay, grey to brow to saturated, compact	avel, vn, moist			\square										\downarrow	\downarrow	_		
- 3.0					Screen		\square	SS3	63	28	22		•				_		_		
3.5							M	SS4	58	17	10	-							_		
4.0							\mathbb{N}	SS5	88	14	16		•				\downarrow	_	_		
4.5	95.0		Borehole terminated at mbas	4.6	4.57 —														_		
5.0			0												-		+	+			
5.5																	_	_			
																\downarrow	+	+	_		
7.0																	+	+	+		
7.5																+	+	+	+		
8.0																\square	\mp	+	\rightarrow		
8.5																	\downarrow	+	\downarrow		
9.0																					
NOTES mbgs:	8: meters b	elow g	round surface																		

REFER	ENCE N	o.:	11186719									ENC	LOS	URE	No.:			5					
BOREHOLE No.: BH5												BOREHOLE LOG											
		G	Ð	ELEV		99.2	20	m					F	Page	: 1	Ŭ _	of	1	-				
															LEC	GEN	D						
CLIE	ENT: <u>T(</u>	Conte	ed Group									\boxtimes	SS S	Split S	Spoon		_						
		Geote	chnical investigation										GS /	Auger	Samp	le							
DES		R Vazh	hakh	t		∠⊿ ▼	51 .	Water	Level														
DAT	DATE (START): 17 December 2018 DATE (FINISH): 17 December 2018												1	Nater Atterb	conter	nt (%) uits (%)						
													 N Penetration Index based on Split Spoon sample 										
SC	ALE		STRATIGRAPHY		WELL	_		SAN		DATA		•	N I	Peneti	ration I	ndex b	ased	on					
Depth BGS	Elevation (m)	Stratigraph	DESCRIPTION SOIL AND BEDR	OF OCK			State	Type and Number	Recovery	OVC	Penetration Index / RQD	□ S	Cu Cu	Shear Shear Sensit Shear Pocke	Streng Streng tivity V Streng t Pene	gth ba gth ba alue o gth ba strome	sed o sed o f Soil sed o ter	n Fiel n Lab n	d Vane Vane				
meters	99.20		GROUND SURF	ACE					%	ppm	Ν	10	50kP	CALE a 30	FOR 100kPa 40	TEST 150 50 6	RESU kPa	JLTS 200k 0 80	.Pa) 90				
_		\bigotimes	FILL - Silty sand, some	clay,	99.14-											1							
0.5			organics, rootlets, brow grey, moist, very loose compact	in and to	0.61 —		Å	SS1	71		26	0		•									
- 1.0							X	SS2	71		17		•					_					
- 1.5					Cuttings —		X	SS3	54		3	•											
2.5	96.6		SILTY SAND- some cli	av	WL 2.59 —		M	SS4	54		20		0										
3.0			some gravel, brown, m loose to compact	oist, very	01/03/2019 Riser—																		
3.5							Å	SS5	71		15		€						_				
4.0							M	SS6	4		5	•	0										
4.5	94.6		SANDY SILT- some cla trace gravel, grey, satu	ay, rated,			M	SS7	92		3	•	-0					_					
	93.9		Coarse sand layer enco	ountered	5.18-		\mathbb{A}	SS8	100		50+		0	_		•			——				
- 5.5	93.6		at 5.2 mbgs	ered at	Bentonite —									_				_					
	90.0		5.3 mbgs SHALE- highly weather	red and	5.79 — Sand —			RC1	100		0							_					
6.0			fractured, black Auger refusal encounte	ered at	6.10-													+					
6.5			5.6 mbgs SHALE- very poor bec	oming	Screen —			PC2	100		<u>8</u> 1												
7.0			good quality, black 0.1 m thick mud seam encountered at 6.1 mb	as	Corcon			1102	100		01							_					
7.5	91.9		Borehole terminated at	7.3	7.32-																		
			mbys															_					
													-+		_			\dashv	——				
8.5													-	_	_			\dashv	——				
																		+					
	:																						
mbgs:	meters b	elow g	round surface																				
- <u>(</u>																							

REFERENCE No.: 11186719														6	
BOREHOLE No.: BH6											BORE	EHO	LEL	.00	}
		G	<u>س</u>	ELEVATION:1	00.47	m				·	Page:	_1_	of _	1	
CLIF	NT· TC	: Unite	d Group								ļ	EGE	ND		
	JECT:	Geote	chnical Investigation							SS I	Split Sp	oon ample			
LOC	ATION:	36 R	obinson Avenue							I∎ 63 Ø ST	Shelby T	Tube			
DES	CRIBED	BY:	S. Wheeler		▼	Water L	evel	.)							
DAT	E (STAR	T):	17 December 201	018		н н	Atterber	g limits (%) %)	4 0 0					
SC	ALE	>	STR	RATIGRAPHY		SAI	MPLE	DATA		• N	Split Spo Penetrat	ion inde oon sam ion Inde : Cone s	ple x based ample	on	
Depth BGS	Elevation (m)	Stratigraph	DES SOIL	SCRIPTION OF AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD	△ Cu □ Cu S ▲	based o based o of Soil based o neter	ad on Field Vane ad on Lab Vane Soil ad on ar			
meters	100.47		GRO	OUND SURFACE			%	ppm	Ν	50 10	SCALE F lkPa 101 20 <u>30</u>	OR TES 0kPa 1 10 50	T RESU 50kPa 60 70	JLTS 200kl 200kl	Pa <u>90</u>
0.5			FILL - Silty sand, some moist, loose to very der	clay, trace gravel, dark brown, nse, possible cobbles		SS1	58		4	• •					
- 1.0 - 1.5															
2.0	98.2				X	SS3	75		21		•				
2.5	00.2		SILTY SAND- some cla some gravel, grey and compact	ay becoming clayey, trace to brown, saturated, loose to	M	SS4	83		11	• (
3.0					X	SS5	88		13	• (
4.0					X	SS6	0		9	•					
- 4.5 					X	SS7	83		10	• •					
5.5					X	SS8	100		9	٠					
6.5					X	SS9	100		22	-0	•				
7.0	02.4		Spoon refusal encounte Auger refusal encounte	erd at 7.1 mbgs red at 7.2 mbgs		SS10	33		50+						
7.5	93.4 93.3		SHALE- black, highly v SHALE- black, excelled	veathered and fractured	-/1	RC1	100		92					-	
8.0						B CO	100		00						
8.5						кυ2			90					_	
9.0	91.6		Borehole terminated at	8.9 mbgs											
NOTES Monito Boreho mbgs:	: ring well (ble backfil meters be	could r led wit elow g	not be installed due to the h sand, bentonite and au round surface	e existence of a saturated sand iger cuttings.	layer.										
Appendix D Laboratory Certificates of Analysis



Page 1 of 15

CLIENT NAME: GHD LIMITED 455 Phillip St WATERLOO, ON N2V1C2 (519) 884-0510

ATTENTION TO: LUKE LOPERS

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z430141

SOIL ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jan 28, 2019

PAGES (INCLUDING COVER): 15

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES	

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories (V1)

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA) Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA)	AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation Masurement Uncertainty is not taken into consideration when stating
	the scope of accreditation. Measurement Uncertainty is not taken into consideration when stati

Results relate only to the items tested. Results apply to samples as received. All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2019-01-22

Inorgan	ics (Soil)	
		DATE REPORTED: 2019-01-28
BH1-SS2	BH2-SS2	

			SAMPI	E DESCRIPTION:	BH1-SS2	BH2-SS2	
				SAMPLE TYPE:	Soil	Soil	
				DATE SAMPLED:	2019-01-21	2019-01-21	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9848727	9848728	
Antimony	µg/g	0.8	2019-01-25	2019-01-25	<0.8	<0.8	
Arsenic	µg/g	1	2019-01-25	2019-01-25	3	4	
Barium	µg/g	2	2019-01-25	2019-01-25	88	122	
Beryllium	µg/g	0.5	2019-01-25	2019-01-25	<0.5	<0.5	
Boron	hð/ð	5	2019-01-25	2019-01-25	8	8	
Boron (Hot Water Soluble)	µg/g	0.10	2019-01-25	2019-01-25	0.20	0.30	
Cadmium	µg/g	0.5	2019-01-25	2019-01-25	<0.5	<0.5	
Chromium	µg/g	2	2019-01-25	2019-01-25	15	22	
Cobalt	µg/g	0.5	2019-01-25	2019-01-25	6.7	6.6	
Copper	µg/g	1	2019-01-25	2019-01-25	16	28	
Lead	µg/g	1	2019-01-25	2019-01-25	36	106	
Molybdenum	µg/g	0.5	2019-01-25	2019-01-25	1.0	1.2	
Nickel	µg/g	1	2019-01-25	2019-01-25	14	25	
Selenium	µg/g	0.4	2019-01-25	2019-01-25	0.7	0.9	
Silver	µg/g	0.2	2019-01-25	2019-01-25	<0.2	<0.2	
Thallium	µg/g	0.4	2019-01-25	2019-01-25	<0.4	<0.4	
Uranium	µg/g	0.5	2019-01-25	2019-01-25	0.6	0.7	
Vanadium	µg/g	1	2019-01-25	2019-01-25	23	28	
Zinc	µg/g	5	2019-01-25	2019-01-25	55	131	
Chromium VI	µg/g	0.2	2019-01-25	2019-01-25	<0.2	<0.2	
Cyanide	µg/g	0.040	2019-01-25	2019-01-25	<0.040	<0.040	
Mercury	µg/g	0.10	2019-01-25	2019-01-25	0.14	0.57	
Electrical Conductivity	mS/cm	0.005	2019-01-25	2019-01-25	0.889	7.40	
Sodium Adsorption Ratio	NA	NA	2019-01-25	2019-01-25	0.601	7.42	
pH, 2:1 CaCl2 Extraction	pH Units	NA	2019-01-25	2019-01-25	7.25	7.42	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848727-9848728 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. Analysis performed at AGAT Toronto (unless marked by *)



Certified By:



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

O. Reg. 153(511) - ORPs (Soil)

			SAMPLE DESCRIPTION:					
	SAMPLE TYPE:						Soil	
	DATE SAMPLED:				2019-01-21			
	Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9848730	
pH, 2:1 Ca0	CI2 Extraction	pH Units		NA	2019-01-25	2019-01-25	6.81	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848730 pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

Analysis performed at AGAT Toronto (unless marked by *)



DATE REPORTED: 2019-01-28

Certified By:



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2019-01-22

				CAMDI		DU4 000	DUO CCO
				SAMPL	E DESCRIPTION:	BH1-552	BH2-552
					SAMPLE IYPE:	Soli	Soli
_					DATE SAMPLED:	2019-01-21	2019-01-21
Paran	neter	Unit	G/S RDL	Date Prepared	Date Analyzed	9848727	9848728
Naphthalene		µg/g	0.05	2019-01-28	2019-01-28	<0.05	<0.05
Acenaphthylene		µg/g	0.05	2019-01-28	2019-01-28	<0.05	<0.05
Acenaphthene		µg/g	0.05	2019-01-28	2019-01-28	0.10	<0.05
Fluorene		µg/g	0.05	2019-01-28	2019-01-28	0.11	<0.05
Phenanthrene		µg/g	0.05	2019-01-28	2019-01-28	0.85	0.26
Anthracene		µg/g	0.05	2019-01-28	2019-01-28	0.28	0.09
Fluoranthene		µg/g	0.05	2019-01-28	2019-01-28	0.94	0.52
Pyrene		µg/g	0.05	2019-01-28	2019-01-28	0.74	0.43
Benz(a)anthracene		µg/g	0.05	2019-01-28	2019-01-28	0.38	0.25
Chrysene		µg/g	0.05	2019-01-28	2019-01-28	0.35	0.26
Benzo(b)fluoranthe	ne	µg/g	0.05	2019-01-28	2019-01-28	0.45	0.30
Benzo(k)fluoranthe	ne	µg/g	0.05	2019-01-28	2019-01-28	0.21	0.14
Benzo(a)pyrene		µg/g	0.05	2019-01-28	2019-01-28	0.32	0.22
Indeno(1,2,3-cd)py	ene	µg/g	0.05	2019-01-28	2019-01-28	0.14	0.10
Dibenz(a,h)anthrac	ene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	<0.05
Benzo(g,h,i)perylen	е	µg/g	0.05	2019-01-28	2019-01-28	0.15	0.11
2-and 1-methyl Nap	hthalene	µg/g	0.05	2019-01-28	2019-01-28	0.05	<0.05
Moisture Content		%	0.1	2019-01-28	2019-01-28	10.7	19.2
Surro	gate	Unit	Acceptable Limits				
Chrysene-d12	-	%	50-140	2019-01-28	2019-01-28	87	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848727-9848728 Results are based on the dry weight of the soil.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column. 2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

NPopukolof



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

ATTENTION TO: LUKE LOPERS

SAMPLED BY:R. Vanden Tillaart

O. Reg. 153(511) - PHCs F1 - F4 (Soil) (for GHD with mp - and o-Xylene)

DATE RECEIVED: 2019-01-22

			SAMPL	SAMPLE DESCRIPTION:		DUP
				SAMPLE TYPE:	Soil	Soil
				DATE SAMPLED:	2019-01-21	2019-01-21
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9848730	9848734
F1 (C6 to C10)	µg/g	5	2019-01-24	2019-01-24	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	2019-01-24	2019-01-24	<5	<5
F2 (C10 to C16)	µg/g	10	2019-01-25	2019-01-25	<10	<10
F3 (C16 to C34)	µg/g	50	2019-01-25	2019-01-25	130	100
F4 (C34 to C50)	µg/g	50	2019-01-25	2019-01-25	72	62
Gravimetric Heavy Hydrocarbons	µg/g	50			NA	NA
Moisture Content	%	0.1	2019-01-25	2019-01-25	21.1	23.6
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140	2019-01-25	2019-01-25	130	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848730-9848734 Results are based on sample dry weight.

The C6-C10 fraction is calculated using Toluene response factor.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons > C50 are present.

The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX contribution.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client. Quality Control Data is available upon request.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

NPopukoloj



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

O. Reg. 153(511) - PHCs F1 - F4 (Soil) (for GHD with mp - and o-Xylene) (with PAH)

DATE RECEIVED: 2019-01-22

			SAMPL	SAMPLE DESCRIPTION:		
				SAMPLE TYPE:	Soil	
				DATE SAMPLED:	2019-01-21	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9848727	
F1 (C6 to C10)	µg/g	5	2019-01-24	2019-01-24	<5	
F1 (C6 to C10) minus BTEX	µg/g	5	2019-01-24	2019-01-24	<5	
F2 (C10 to C16)	µg/g	10	2019-01-25	2019-01-25	<10	
C>10 - C16 (F2 minus Naphthalene)	µg/g	10	2019-01-25	2019-01-25	<10	
F3 (C16 to C34)	µg/g	50	2019-01-25	2019-01-25	<50	
C>16 - C34 (F3 minus PAHs)	µg/g	50	2019-01-25	2019-01-25	<50	
F4 (C34 to C50)	µg/g	50	2019-01-25	2019-01-25	<50	
Gravimetric Heavy Hydrocarbons	µg/g	50			NA	
Moisture Content	%	0.1	2019-01-25	2019-01-25	10.7	
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140	2019-01-25	2019-01-25	69	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848727 Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present. The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX and PAH contributions.

C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.

C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

NPopukoloj



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523)

ATTENTION TO: LUKE LOPERS

SAMPLED BY:R. Vanden Tillaart

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2019-01-22									DATE REPORTED: 2019-01-28
				SAMPL	E DESCRIPTION:	BH1-SS2	BH2-SS3	DUP	
					SAMPLE TYPE:	Soil	Soil	Soil	
					DATE SAMPLED:	2019-01-21	2019-01-21	2019-01-21	
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9848727	9848730	9848734	
Dichlorodifluoromethane	µg/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Vinyl Chloride	ug/g		0.02	2019-01-25	2019-01-25	<0.02	<0.02	<0.02	
Bromomethane	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	< 0.05	
Trichlorofluoromethane	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	< 0.05	
Acetone	ug/g		0.50	2019-01-25	2019-01-25	<0.50	<0.50	<0.50	
1,1-Dichloroethylene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Methylene Chloride	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Trans- 1,2-Dichloroethylene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Methyl tert-butyl Ether	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,1-Dichloroethane	ug/g		0.02	2019-01-25	2019-01-25	<0.02	<0.02	<0.02	
Methyl Ethyl Ketone	ug/g		0.50	2019-01-25	2019-01-25	<0.50	<0.50	<0.50	
Cis- 1,2-Dichloroethylene	ug/g		0.02	2019-01-25	2019-01-25	<0.02	<0.02	<0.02	
Chloroform	ug/g		0.04	2019-01-25	2019-01-25	<0.04	<0.04	< 0.04	
1,2-Dichloroethane	ug/g		0.03	2019-01-25	2019-01-25	<0.03	<0.03	<0.03	
1,1,1-Trichloroethane	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Carbon Tetrachloride	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Benzene	ug/g		0.02	2019-01-25	2019-01-25	<0.02	<0.02	<0.02	
1,2-Dichloropropane	ug/g		0.03	2019-01-25	2019-01-25	<0.03	<0.03	< 0.03	
Trichloroethylene	ug/g		0.03	2019-01-25	2019-01-25	<0.03	<0.03	< 0.03	
Bromodichloromethane	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Methyl Isobutyl Ketone	ug/g		0.50	2019-01-25	2019-01-25	<0.50	<0.50	<0.50	
1,1,2-Trichloroethane	ug/g		0.04	2019-01-25	2019-01-25	<0.04	<0.04	<0.04	
Toluene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Dibromochloromethane	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Ethylene Dibromide	ug/g		0.04	2019-01-25	2019-01-25	<0.04	<0.04	<0.04	
Tetrachloroethylene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,1,1,2-Tetrachloroethane	ug/g		0.04	2019-01-25	2019-01-25	<0.04	<0.04	<0.04	
Chlorobenzene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Ethylbenzene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
m & p-Xylene	ug/g		0.05	2019-01-25	2019-01-25	<0.05	<0.05	< 0.05	

Certified By:

NPopukolof



AGAT WORK ORDER: 19Z430141 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson Ave.

SAMPLED BY:R. Vanden Tillaart O. Reg. 153(511) - VOCs (Soil)

ATTENTION TO: LUKE LOPERS

DATE RECEIVED: 2019-01-22								DATE REPORTED: 2019-01-28
			SAMPL	E DESCRIPTION:	BH1-SS2	BH2-SS3	DUP	
				SAMPLE TYPE:	Soil	Soil	Soil	
				DATE SAMPLED:	2019-01-21	2019-01-21	2019-01-21	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9848727	9848730	9848734	
Bromoform	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Styrene	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	< 0.05	
1,1,2,2-Tetrachloroethane	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	< 0.05	
o-Xylene	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,3-Dichlorobenzene	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,4-Dichlorobenzene	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,2-Dichlorobenzene	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Xylene Mixture	ug/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
1,3-Dichloropropene	µg/g	0.04	2019-01-25	2019-01-25	<0.04	<0.04	< 0.04	
n-Hexane	µg/g	0.05	2019-01-25	2019-01-25	<0.05	<0.05	<0.05	
Surrogate	Unit	Acceptable Limits						
Toluene-d8	% Recovery	50-140	2019-01-25	2019-01-25	97	95	91	
4-Bromofluorobenzene	% Recovery	50-140	2019-01-25	2019-01-25	73	71	74	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9848727-9848734 The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Certified By:

NPopukolof



Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson Ave.

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

Soil Analysis

RPT Date: Jan 28, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
		Id					value	Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & In	organics (Soi	l)													-
Antimony	9848727	9848727	< 0.8	<0.8	NA	< 0.8	99%	70%	130%	90%	80%	120%	102%	70%	130%
Arsenic	9848727	9848727	3	3	NA	< 1	118%	70%	130%	104%	80%	120%	108%	70%	130%
Barium	9848727	9848727	88	89	1.1%	< 2	104%	70%	130%	98%	80%	120%	94%	70%	130%
Beryllium	9848727	9848727	< 0.5	<0.5	NA	< 0.5	125%	70%	130%	102%	80%	120%	105%	70%	130%
Boron	9848727	9848727	8	8	NA	< 5	101%	70%	130%	108%	80%	120%	103%	70%	130%
Boron (Hot Water Soluble)	9848727	9848727	0.20	0.12	NA	< 0.10	112%	60%	140%	95%	70%	130%	92%	60%	140%
Cadmium	9848727	9848727	< 0.5	<0.5	NA	< 0.5	105%	70%	130%	101%	80%	120%	93%	70%	130%
Chromium	9848727	9848727	15	15	0.0%	< 2	103%	70%	130%	100%	80%	120%	99%	70%	130%
Cobalt	9848727	9848727	6.7	6.6	1.5%	< 0.5	110%	70%	130%	101%	80%	120%	101%	70%	130%
Copper	9848727	9848727	16	16	0.0%	< 1	102%	70%	130%	102%	80%	120%	89%	70%	130%
Lead	9848727	9848727	36	35	2.8%	< 1	106%	70%	130%	104%	80%	120%	91%	70%	130%
Molybdenum	9848727	9848727	1.0	1.0	NA	< 0.5	109%	70%	130%	100%	80%	120%	104%	70%	130%
Nickel	9848727	9848727	14	14	0.0%	< 1	108%	70%	130%	100%	80%	120%	94%	70%	130%
Selenium	9848727	9848727	0.7	<0.4	NA	< 0.4	97%	70%	130%	98%	80%	120%	94%	70%	130%
Silver	9848727	9848727	< 0.2	<0.2	NA	< 0.2	105%	70%	130%	98%	80%	120%	90%	70%	130%
Thallium	9848727	9848727	< 0.4	<0.4	NA	< 0.4	101%	70%	130%	99%	80%	120%	93%	70%	130%
Uranium	9848727	9848727	0.6	0.6	NA	< 0.5	114%	70%	130%	104%	80%	120%	106%	70%	130%
Vanadium	9848727	9848727	23	22	4.4%	< 1	112%	70%	130%	100%	80%	120%	102%	70%	130%
Zinc	9848727	9848727	55	55	0.0%	< 5	104%	70%	130%	103%	80%	120%	97%	70%	130%
Chromium VI	9848727	9848727	< 0.2	<0.2	NA	< 0.2	108%	70%	130%	101%	80%	120%	106%	70%	130%
Cyanide	9848727	9848727	< 0.040	<0.040	NA	< 0.040	100%	70%	130%	95%	80%	120%	110%	70%	130%
Mercury	9848727	9848727	0.14	0.15	NA	< 0.10	123%	70%	130%	118%	80%	120%	117%	70%	130%
Electrical Conductivity	9848727	9848727	0.889	0.948	6.4%	< 0.005	101%	90%	110%						
Sodium Adsorption Ratio	9848727	9848727	0.601	0.667	10.4%	NA	NA								
pH, 2:1 CaCl2 Extraction	9848727	9848727	7.25	7.31	0.8%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.

Duplicate Qualifier: For duplicates as the measured result approaches the Reporting Limit (RL), the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.





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AGAT QUALITY ASSURANCE REPORT (V1)



Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson Ave.

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

Trace Organics Analysis

							-								
RPT Date: Jan 28, 2019			C	UPLICAT	E	j	REFERE	NCE MA	TERIAL	METHOD	BLAN	(SPIKE	МАТ		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lii	eptable nits	Recovery	Acce Lii	eptable nits	Recovery	Acce	ptable nits
							Value	Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	9848727	9848728	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	97%	50%	140%	99%	50%	140%
Acenaphthylene	9848727	9848728	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	105%	50%	140%	108%	50%	140%
Acenaphthene	9848727	9848728	0.10	0.10	NA	< 0.05	119%	50%	140%	96%	50%	140%	98%	50%	140%
Fluorene	9848727	9848728	0.11	0.10	NA	< 0.05	110%	50%	140%	94%	50%	140%	99%	50%	140%
Phenanthrene	9848727	9848728	0.85	0.82	3.6%	< 0.05	106%	50%	140%	88%	50%	140%	94%	50%	140%
Anthracene	9848727	9848728	0.28	0.26	7.4%	< 0.05	114%	50%	140%	101%	50%	140%	108%	50%	140%
Fluoranthene	9848727	9848728	0.94	0.92	2.2%	< 0.05	117%	50%	140%	99%	50%	140%	105%	50%	140%
Pyrene	9848727	9848728	0.74	0.74	0.0%	< 0.05	111%	50%	140%	104%	50%	140%	102%	50%	140%
Benz(a)anthracene	9848727	9848728	0.38	0.40	5.1%	< 0.05	93%	50%	140%	95%	50%	140%	113%	50%	140%
Chrysene	9848727	9848728	0.35	0.37	5.6%	< 0.05	115%	50%	140%	90%	50%	140%	101%	50%	140%
Benzo(b)fluoranthene	9848727	9848728	0.45	0.43	4.5%	< 0.05	101%	50%	140%	90%	50%	140%	82%	50%	140%
Benzo(k)fluoranthene	9848727	9848728	0.21	0.21	NA	< 0.05	110%	50%	140%	94%	50%	140%	82%	50%	140%
Benzo(a)pyrene	9848727	9848728	0.32	0.31	3.2%	< 0.05	98%	50%	140%	98%	50%	140%	91%	50%	140%
Indeno(1,2,3-cd)pyrene	9848727	9848728	0.14	0.12	NA	< 0.05	109%	50%	140%	86%	50%	140%	81%	50%	140%
Dibenz(a,h)anthracene	9848727	9848728	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	82%	50%	140%	81%	50%	140%
Benzo(g,h,i)perylene	9848727	9848728	0.15	0.14	NA	< 0.05	114%	50%	140%	93%	50%	140%	91%	50%	140%
2-and 1-methyl Naphthalene	9848727	9848728	0.05	0.05	NA	< 0.05	106%	50%	140%	97%	50%	140%	96%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (Soil) (for G	HD with m	חם - and o	-Xvlene) (with PAH	4)									
F1 (C6 to C10)	9848734	9848734	< 5	< 5	NA	, <5	89%	60%	130%	89%	85%	115%	80%	70%	130%
F2 (C10 to C16)	9848734	9848734	< 10	< 10	NA	< 10	90%	60%	130%	82%	80%	120%	82%	70%	130%
F3 (C16 to C34)	9848734	9848734	100	120	NA	< 50	94%	60%	130%	101%	80%	120%	82%	70%	130%
F4 (C34 to C50)	9848734	9848734	62	67	NA	< 50	93%	60%	130%	90%	80%	120%	94%	70%	130%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	109%	50%	140%	116%	50%	140%
Vinvl Chloride	9848734	9848734	< 0.02	< 0.02	NA	< 0.02	87%	50%	140%	94%	50%	140%	99%	50%	140%
Bromomethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	110%	50%	140%	90%	50%	140%
Trichlorofluoromethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	97%	50%	140%	98%	50%	140%
Acetone	9848734	9848734	< 0.50	< 0.50	NA	< 0.50	98%	50%	140%	82%	50%	140%	78%	50%	140%
1,1-Dichloroethylene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	97%	60%	130%	77%	50%	140%
Methylene Chloride	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	91%	60%	130%	99%	50%	140%
Trans- 1,2-Dichloroethylene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	78%	50%	140%	77%	60%	130%	83%	50%	140%
Methyl tert-butyl Ether	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	90%	60%	130%	88%	50%	140%
1,1-Dichloroethane	9848734	9848734	< 0.02	< 0.02	NA	< 0.02	95%	50%	140%	82%	60%	130%	93%	50%	140%
Methyl Ethyl Ketone	9848734	9848734	< 0.50	< 0.50	NA	< 0.50	95%	50%	140%	83%	50%	140%	99%	50%	140%
Cis- 1,2-Dichloroethylene	9848734	9848734	< 0.02	< 0.02	NA	< 0.02	78%	50%	140%	95%	60%	130%	81%	50%	140%
Chloroform	9848734	9848734	< 0.04	< 0.04	NA	< 0.04	85%	50%	140%	80%	60%	130%	75%	50%	140%
1,2-Dichloroethane	9848734	9848734	< 0.03	< 0.03	NA	< 0.03	75%	50%	140%	90%	60%	130%	88%	50%	140%
1,1,1-Trichloroethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	77%	50%	140%	114%	60%	130%	80%	50%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson Ave.

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

Trace Organics Analysis (Continued)

RPT Date: Jan 28, 2019				DUPLICATE			REFERE	NCE MA	TERIAL	METHOD	BLANK		MATRIX SPIKE		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lir	ptable nits	Recovery	Acceptal Limits		Recovery	Acce Lin	ptable nits
		Ia					value	Lower	Upper		Lower	Upper		Lower	Upper
Carbon Tetrachloride	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	78%	60%	130%	80%	50%	140%
Benzene	9848734	9848734	< 0.02	< 0.02	NA	< 0.02	87%	50%	140%	89%	60%	130%	89%	50%	140%
1,2-Dichloropropane	9848734	9848734	< 0.03	< 0.03	NA	< 0.03	82%	50%	140%	95%	60%	130%	89%	50%	140%
Trichloroethylene	9848734	9848734	< 0.03	< 0.03	NA	< 0.03	91%	50%	140%	91%	60%	130%	94%	50%	140%
Bromodichloromethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	78%	60%	130%	78%	50%	140%
Methyl Isobutyl Ketone	9848734	9848734	< 0.50	< 0.50	NA	< 0.50	94%	50%	140%	82%	50%	140%	93%	50%	140%
1,1,2-Trichloroethane	9848734	9848734	< 0.04	< 0.04	NA	< 0.04	98%	50%	140%	95%	60%	130%	103%	50%	140%
Toluene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	96%	60%	130%	102%	50%	140%
Dibromochloromethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	74%	60%	130%	79%	50%	140%
Ethylene Dibromide	9848734	9848734	< 0.04	< 0.04	NA	< 0.04	80%	50%	140%	87%	60%	130%	89%	50%	140%
Tetrachloroethylene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	94%	60%	130%	93%	50%	140%
1,1,1,2-Tetrachloroethane	9848734	9848734	< 0.04	< 0.04	NA	< 0.04	83%	50%	140%	72%	60%	130%	80%	50%	140%
Chlorobenzene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	95%	60%	130%	98%	50%	140%
Ethylbenzene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	90%	60%	130%	89%	50%	140%
m & p-Xylene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	86%	60%	130%	84%	50%	140%
Bromoform	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	79%	60%	130%	86%	50%	140%
Styrene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	96%	60%	130%	101%	50%	140%
1,1,2,2-Tetrachloroethane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	93%	60%	130%	102%	50%	140%
o-Xylene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	92%	60%	130%	92%	50%	140%
1,3-Dichlorobenzene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	86%	60%	130%	88%	50%	140%
1,4-Dichlorobenzene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	88%	60%	130%	92%	50%	140%
1,2-Dichlorobenzene	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	88%	60%	130%	94%	50%	140%
1,3-Dichloropropene	9848734	9848734	< 0.04	< 0.04	NA	< 0.04	76%	50%	140%	77%	60%	130%	77%	50%	140%
n-Hexane	9848734	9848734	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	108%	60%	130%	106%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

NPopukoli

AGAT QUALITY ASSURANCE REPORT (V1)

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Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPI ED BY:R Vanden Tillaart

SAMPLING SITE:36 Robinson Ave.		SAMPLED BY:R. Vanden Tillaart									
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE								
Soil Analysis		•									
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES								
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER								
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER								
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS								
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER								
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	CP/OES								
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER								
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	pH METER								



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson Ave.

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID
C>10 - C16 (F2 minus Naphthalene)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3 minus PAHs)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson Ave.

AGAT WORK ORDER: 19Z430141 ATTENTION TO: LUKE LOPERS SAMPLED BY:R. Vanden Tillaart

SAMIFLING SITE.30 RODITSON AVE.		SAWFLED BT.R.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

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Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	e Comments/ Special Instructions	Y/N	details	TAN MAY	RPs: 1	UT NHC	begulat	I NO.	olatiles	HOs FI	eNs	SHR	CBax		01-10			
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CLIENT NAME: GHD LIMITED 455 Phillip St WATERLOO, ON N2V1C2 (519) 884-0510

ATTENTION TO: LUKE LOPERS

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z430722

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Jan 30, 2019

PAGES (INCLUDING COVER): 22

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES	

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

 AGAT Laboratories (V1)
 Page 1 of 22

 Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
 AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory

 Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation Inc. (CALA) and/or specific drives (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) or specific drives (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) or specific drives (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) or specific drives (Mississauga) is also accredited by the Canadian Association and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received. All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

SAMPLED BY:Ryan Vanden Tillaart O. Reg. 153(511) - Metals & Inorganics (Soil)

ATTENTION TO: LUKE LOPERS

DATE RECEIVED: 2019-01-23	3							DATE REPORTED: 2019-01-30
			SAMPL	E DESCRIPTION:	BH3-SS1	BH4 SS2	DUP	
				SAMPLE TYPE:	Soil	Soil	Soil	
			I	DATE SAMPLED:	2019-01-22	2019-01-22	2019-01-22	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9851877	9851880	9851883	
Antimony	µg/g	0.8	2019-01-25	2019-01-25	<0.8	<0.8	<0.8	
Arsenic	µg/g	1	2019-01-25	2019-01-25	4	2	3	
Barium	µg/g	2	2019-01-25	2019-01-25	67	62	66	
Beryllium	µg/g	0.5	2019-01-25	2019-01-25	<0.5	<0.5	<0.5	
Boron	µg/g	5	2019-01-25	2019-01-25	8	<5	7	
Boron (Hot Water Soluble)	µg/g	0.10	2019-01-25	2019-01-25	0.12	0.23	0.14	
Cadmium	µg/g	0.5	2019-01-25	2019-01-25	<0.5	<0.5	<0.5	
Chromium	µg/g	2	2019-01-25	2019-01-25	11	15	14	
Cobalt	µg/g	0.5	2019-01-25	2019-01-25	7.3	4.6	6.1	
Copper	µg/g	1	2019-01-25	2019-01-25	15	18	16	
Lead	µg/g	1	2019-01-25	2019-01-25	9	20	10	
Molybdenum	µg/g	0.5	2019-01-25	2019-01-25	2.0	0.8	1.5	
Nickel	µg/g	1	2019-01-25	2019-01-25	15	10	14	
Selenium	µg/g	0.4	2019-01-25	2019-01-25	<0.4	<0.4	<0.4	
Silver	µg/g	0.2	2019-01-25	2019-01-25	<0.2	<0.2	<0.2	
Thallium	µg/g	0.4	2019-01-25	2019-01-25	<0.4	<0.4	<0.4	
Uranium	µg/g	0.5	2019-01-25	2019-01-25	0.7	0.7	0.6	
Vanadium	µg/g	1	2019-01-25	2019-01-25	18	26	20	
Zinc	µg/g	5	2019-01-25	2019-01-25	22	44	26	
Chromium VI	µg/g	0.2	2019-01-28	2019-01-28	<0.2	<0.2	<0.2	
Cyanide	µg/g	0.040	2019-01-28	2019-01-28	<0.040	<0.040	<0.040	
Mercury	µg/g	0.10	2019-01-25	2019-01-25	0.14	0.23	<0.10	
Electrical Conductivity	mS/cm	0.005	2019-01-30	2019-01-30	0.233	0.185	0.311	
Sodium Adsorption Ratio	NA	NA	2019-01-30	2019-01-30	0.449	0.383	0.695	
pH, 2:1 CaCl2 Extraction	pH Units	NA	2019-01-28	2019-01-28	8.15	7.69	8.21	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851877-9851883 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. Analysis performed at AGAT Toronto (unless marked by *)







AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 153(511) - ORPs (Soil)

					SAMPL	E DESCRIPTION:	BH3-SS3
						SAMPLE TYPE:	Soil
						DATE SAMPLED:	2019-01-22
	Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9851879
рŀ	H, 2:1 CaCl2 Extraction	pH Units		NA	2019-01-28	2019-01-28	7.99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851879 pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

Analysis performed at AGAT Toronto (unless marked by *)



DATE REPORTED: 2019-01-28

Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Ryan Vanden Tillaart

DATE RECEIVED: 2019-01-23							DATE REPORTED: 2019-01-29
				SAMPL	E DESCRIPTION:	BH3-GS1	
					SAMPLE TYPE:	Soil	
				I	DATE SAMPLED:	2019-01-22	
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9851884	
Arsenic Leachate	mg/L	2.5	0.010	2019-01-29	2019-01-29	<0.010	
Barium Leachate	mg/L	100	0.100	2019-01-29	2019-01-29	0.612	
Boron Leachate	mg/L	500	0.050	2019-01-29	2019-01-29	0.056	
Cadmium Leachate	mg/L	0.5	0.010	2019-01-29	2019-01-29	<0.010	
Chromium Leachate	mg/L	5	0.010	2019-01-29	2019-01-29	0.012	
Lead Leachate	mg/L	5	0.010	2019-01-29	2019-01-29	<0.010	
Mercury Leachate	mg/L	0.1	0.01	2019-01-29	2019-01-29	<0.01	
Selenium Leachate	mg/L	1	0.010	2019-01-29	2019-01-29	<0.010	
Silver Leachate	mg/L	5	0.010	2019-01-29	2019-01-29	<0.010	
Uranium Leachate	mg/L	10	0.050	2019-01-29	2019-01-29	<0.050	
Fluoride Leachate	mg/L	150	0.05	2019-01-29	2019-01-29	0.18	
Cyanide Leachate	mg/L	20	0.05	2019-01-29	2019-01-29	<0.05	
(Nitrate + Nitrite) as N Leachate	mg/L	1000	0.70	2019-01-29	2019-01-29	<0.70	

O. Reg. 558 Metals and Inorganics

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation. Analysis performed at AGAT Toronto (unless marked by *)



Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

SAMPLED BY:Ryan Vanden Tillaart

ATTENTION TO: LUKE LOPERS

	Flash Point Analysis											
DATE RECEIVED: 2019-01-23							DATE REPORTED: 2019-01-26					
				SAMPLI	E DESCRIPTION:	BH3-GS1						
					SAMPLE TYPE:	Soil						
				[DATE SAMPLED:	2019-01-22						
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9851884						
Flash point (Pensky Martin Closed Cup)	Deg C		NA	2019-01-26	2019-01-26	>100						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

teus



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

DATE RECEIVED: 2019-01-23

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2019-01-23								DATE REPORTED: 2019-01-28
			SAMPL	E DESCRIPTION:	BH3-SS1	BH4 SS2	DUP	
				SAMPLE TYPE:	Soil	Soil	Soil	
				DATE SAMPLED:	2019-01-22	2019-01-22	2019-01-22	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9851877	9851880	9851883	
Naphthalene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Acenaphthylene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Acenaphthene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	<0.05	
Fluorene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Phenanthrene	µg/g	0.05	2019-01-28	2019-01-28	0.06	0.12	0.05	
Anthracene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Fluoranthene	µg/g	0.05	2019-01-28	2019-01-28	0.08	0.19	0.07	
Pyrene	µg/g	0.05	2019-01-28	2019-01-28	0.06	0.15	0.05	
Benz(a)anthracene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	0.09	<0.05	
Chrysene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	0.09	<0.05	
Benzo(b)fluoranthene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	0.08	<0.05	
Benzo(k)fluoranthene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	0.05	< 0.05	
Benzo(a)pyrene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	0.06	< 0.05	
Indeno(1,2,3-cd)pyrene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Dibenz(a,h)anthracene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	< 0.05	
Benzo(g,h,i)perylene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	< 0.05	<0.05	
2-and 1-methyl Naphthalene	µg/g	0.05	2019-01-28	2019-01-28	<0.05	<0.05	<0.05	
Moisture Content	%	0.1	2019-01-28	2019-01-28	8.8	35.9	10.7	
Surrogate	Unit	Acceptable Limits						
Chrysene-d12	%	50-140	2019-01-28	2019-01-28	82	99	92	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851877-9851883 Results are based on the dry weight of the soil.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column. 2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

ATTENTION TO: LUKE LOPERS

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

SAMPLED BY:Ryan Vanden Tillaart

DATE REPORTED: 2019-01-28

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2019-01-23

			SAMPL	BH3-SS3	
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2019-01-22
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9851879
F1 (C6 to C10)	µg/g	5	2019-01-24	2019-01-24	<5
F1 (C6 to C10) minus BTEX	µg/g	5	2019-01-24	2019-01-24	<5
F2 (C10 to C16)	µg/g	10	2019-01-28	2019-01-28	<10
F3 (C16 to C34)	µg/g	50	2019-01-28	2019-01-28	<50
F4 (C34 to C50)	µg/g	50	2019-01-28	2019-01-28	<50
Gravimetric Heavy Hydrocarbons	µg/g	50	2019-01-28	2019-01-28	NA
Moisture Content	%	0.1	2019-01-25	2019-01-25	14.2
Surrogate	Unit	Acceptable Limits			
Terphenyl	%	60-140	2019-01-28	2019-01-28	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851879 Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons > C50 are present.

The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX contribution.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

ATTENTION TO: LUKE LOPERS

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2019-01-23

			SAMPL	E DESCRIPTION:	BH4 SS2	
				SAMPLE TYPE:	Soil	
				DATE SAMPLED:	2019-01-22	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9851880	
F1 (C6 to C10)	µg/g	5	2019-01-24	2019-01-24	<5	
F1 (C6 to C10) minus BTEX	µg/g	5	2019-01-24	2019-01-24	<5	
F2 (C10 to C16)	µg/g	10	2019-01-28	2019-01-28	<10	
F2 (C10 to C16) minus Naphthalene	µg/g	10	2019-01-28	2019-01-28	<10	
F3 (C16 to C34)	µg/g	50	2019-01-28	2019-01-28	<50	
F3 (C16 to C34) minus PAHs	µg/g	50	2019-01-28	2019-01-28	<50	
F4 (C34 to C50)	µg/g	50	2019-01-28	2019-01-28	<50	
Gravimetric Heavy Hydrocarbons	µg/g	50	2019-01-28	2019-01-28	NA	
Moisture Content	%	0.1	2019-01-25	2019-01-25	35.9	
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140	2019-01-28	2019-01-28	110	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851880 Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present. The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX and PAH contributions.

C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.

C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%. Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2019-01-23								DATE REPORTED: 2019-01-28
				SAMPL	E DESCRIPTION:	BH3-SS3	BH4 SS2	
					SAMPLE TYPE:	Soil	Soil	
					DATE SAMPLED:	2019-01-22	2019-01-22	
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9851879	9851880	
Dichlorodifluoromethane	hð\ð		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Vinyl Chloride	ug/g		0.02	2019-01-25	2019-01-28	<0.02	<0.02	
Bromomethane	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Trichlorofluoromethane	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Acetone	ug/g		0.50	2019-01-25	2019-01-28	<0.50	<0.50	
1,1-Dichloroethylene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Methylene Chloride	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Trans- 1,2-Dichloroethylene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Methyl tert-butyl Ether	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
1,1-Dichloroethane	ug/g		0.02	2019-01-25	2019-01-28	<0.02	<0.02	
Methyl Ethyl Ketone	ug/g		0.50	2019-01-25	2019-01-28	<0.50	<0.50	
Cis- 1,2-Dichloroethylene	ug/g		0.02	2019-01-25	2019-01-28	<0.02	<0.02	
Chloroform	ug/g		0.04	2019-01-25	2019-01-28	<0.04	<0.04	
1,2-Dichloroethane	ug/g		0.03	2019-01-25	2019-01-28	<0.03	<0.03	
1,1,1-Trichloroethane	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Carbon Tetrachloride	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Benzene	ug/g		0.02	2019-01-25	2019-01-28	<0.02	<0.02	
1,2-Dichloropropane	ug/g		0.03	2019-01-25	2019-01-28	<0.03	<0.03	
Trichloroethylene	ug/g		0.03	2019-01-25	2019-01-28	<0.03	<0.03	
Bromodichloromethane	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Methyl Isobutyl Ketone	ug/g		0.50	2019-01-25	2019-01-28	<0.50	<0.50	
1,1,2-Trichloroethane	ug/g		0.04	2019-01-25	2019-01-28	<0.04	< 0.04	
Toluene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Dibromochloromethane	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Ethylene Dibromide	ug/g		0.04	2019-01-25	2019-01-28	<0.04	<0.04	
Tetrachloroethylene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
1,1,1,2-Tetrachloroethane	ug/g		0.04	2019-01-25	2019-01-28	<0.04	<0.04	
Chlorobenzene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
Ethylbenzene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	
m & p-Xylene	ug/g		0.05	2019-01-25	2019-01-28	<0.05	<0.05	

Certified By:

teus



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

DATE RECEIVED: 2019-01-23

SAMPLE DESCRIPTION: BH3-SS3 BH4 SS2 SAMPLE TYPE: Soil Soil DATE SAMPLED: 2019-01-22 2019-01-22 G/S 9851879 9851880 Parameter Unit RDL Date Prepared Date Analyzed Bromoform 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 ug/g Styrene 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 ug/g < 0.05 1,1,2,2-Tetrachloroethane ug/g 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 < 0.05 o-Xylene 0.05 2019-01-25 2019-01-28 ug/g 1,3-Dichlorobenzene 0.05 2019-01-25 2019-01-28 <0.05 < 0.05 ug/g 1.4-Dichlorobenzene 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 ug/g 1,2-Dichlorobenzene 0.05 2019-01-25 2019-01-28 <0.05 < 0.05 ug/g Xylene Mixture ug/g 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 0.04 2019-01-25 2019-01-28 < 0.04 < 0.04 1,3-Dichloropropene µg/g n-Hexane 0.05 2019-01-25 2019-01-28 < 0.05 < 0.05 µg/g Surrogate Unit Acceptable Limits Toluene-d8 50-140 2019-01-25 2019-01-28 108 108 % Recovery 4-Bromofluorobenzene 50-140 2019-01-25 97 91 % Recovery 2019-01-28

O. Reg. 153(511) - VOCs (Soil)

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9851879-9851880 The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

teur



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 330 - Denzo(a) pyrene														
DATE RECEIVED: 2019-01-23							DATE REPORTED: 2019-01-30							
				SAMPL	E DESCRIPTION:	BH3-GS1								
					SAMPLE TYPE:	Soil								
					DATE SAMPLED:	2019-01-22								
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9851884								
Benzo(a)pyrene	mg/L	0.001	0.001	2019-01-30	2019-01-30	<0.001								

O Pog 558 - Bonzo(a) nyrono

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9851884 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.

Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 558 - PCBs DATE RECEIVED: 2019-01-23 **DATE REPORTED: 2019-01-30** SAMPLE DESCRIPTION: BH3-GS1 SAMPLE TYPE: Soil DATE SAMPLED: 2019-01-22 G/S 9851884 Parameter Unit RDL Date Prepared Date Analyzed Polychlorinated Biphenyls mg/L 0.3 0.005 2019-01-29 2019-01-30 < 0.005 Surrogate Unit Acceptable Limits % 65 Decachlorobiphenyl 60-130 2019-01-29 2019-01-30

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9851884 The soil sample was leached using the Regulation 558 procedure. Analysis was performed on the leachate.

PCB total is a calculated parameter. The calculated value is the sum of Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260.

Certified By:



AGAT WORK ORDER: 19Z430722 PROJECT: 11186719-E2 (PO#73514523)

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:36 Robinson

Parameter

Vinyl Chloride

1,1 Dichloroethene

Dichloromethane

ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

O. Reg. 558 - VOCs DATE RECEIVED: 2019-01-23 **DATE REPORTED: 2019-01-29** SAMPLE DESCRIPTION: BH3-GS1 SAMPLE TYPE: Soil DATE SAMPLED: 2019-01-22 G/S 9851884 Unit RDL Date Prepared Date Analyzed mg/L 0.2 0.030 2019-01-29 2019-01-29 < 0.030 mg/L 1.4 0.020 2019-01-29 2019-01-29 < 0.020 mg/L 5.0 2019-01-29 < 0.030 0.030 2019-01-29

Methyl Ethyl Ketone	mg/L	200	0.090	2019-01-29	2019-01-29	<0.090	
Chloroform	mg/L	10.0	0.020	2019-01-29	2019-01-29	<0.020	
1,2-Dichloroethane	mg/L	0.5	0.020	2019-01-29	2019-01-29	<0.020	
Carbon Tetrachloride	mg/L	0.5	0.020	2019-01-29	2019-01-29	<0.020	
Benzene	mg/L	0.5	0.020	2019-01-29	2019-01-29	<0.020	
Trichloroethene	mg/L	5.0	0.020	2019-01-29	2019-01-29	<0.020	
Tetrachloroethene	mg/L	3.0	0.050	2019-01-29	2019-01-29	<0.050	
Chlorobenzene	mg/L	8.0	0.010	2019-01-29	2019-01-29	<0.010	
1,2-Dichlorobenzene	mg/L	20.0	0.010	2019-01-29	2019-01-29	<0.010	
1,4-Dichlorobenzene	mg/L	0.5	0.010	2019-01-29	2019-01-29	<0.010	
Surrogate	Unit	Acceptable	Limits				
Toluene-d8	% Recovery	60-130)	2019-01-29	2019-01-29	109	

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria Comments:

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Sample was prepared using Regulation 558 protocol and a zero headspace extractor. 9851884

Certified By:



Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS

SAMPLED BY:Ryan Vanden Tillaart

			Soi	l Ana	alysis	6								
RPT Date:		[DUPLICATI	E		REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
DADAMETED	Botob Sample	Dup #1	Dup #2		Method Blank	Measured	Acce	ptable nits	Boooverv	Acce Lir	ptable nits	Boooverv	Acce Lir	ptable nits
FANAMETEN	Id Id	Dup #1	Dup #2	RF D		Value	Lower	Upper	Recovery	Lower	Upper	Recovery	Lower	Upper
O. Reg. 153(511) - Metals & Inorg	anics (Soil)													
Antimony	9857648	<0.8	<0.8	NA	< 0.8	101%	70%	130%	93%	80%	120%	107%	70%	130%
Arsenic	9857648	6	6	0.0%	< 1	115%	70%	130%	107%	80%	120%	104%	70%	130%
Barium	9857648	41	42	2.4%	< 2	109%	70%	130%	102%	80%	120%	102%	70%	130%
Beryllium	9857648	1.0	0.8	NA	< 0.5	108%	70%	130%	99%	80%	120%	103%	70%	130%
Boron	9857648	16	16	NA	< 5	88%	70%	130%	107%	80%	120%	97%	70%	130%
Boron (Hot Water Soluble)	9851877 9851877	0.12	0.19	NA	< 0.10	112%	60%	140%	95%	70%	130%	95%	60%	140%
Cadmium	9857648	<0.5	<0.5	NA	< 0.5	106%	70%	130%	102%	80%	120%	98%	70%	130%
Chromium	9857648	25	26	3.9%	< 2	99%	70%	130%	103%	80%	120%	101%	70%	130%
Cobalt	9857648	16.3	16.4	0.6%	< 0.5	105%	70%	130%	102%	80%	120%	98%	70%	130%
Copper	9857648	26	26	0.0%	< 1	101%	70%	130%	106%	80%	120%	96%	70%	130%
Lead	9857648	4	4	NA	< 1	107%	70%	130%	105%	80%	120%	101%	70%	130%
Molybdenum	9857648	<0.5	<0.5	NA	< 0.5	108%	70%	130%	105%	80%	120%	102%	70%	130%
Nickel	9857648	31	31	0.0%	< 1	106%	70%	130%	101%	80%	120%	94%	70%	130%
Selenium	9857648	<0.4	0.7	NA	< 0.4	103%	70%	130%	105%	80%	120%	91%	70%	130%
Silver	9857648	<0.2	<0.2	NA	< 0.2	107%	70%	130%	101%	80%	120%	92%	70%	130%
Thallium	9857648	<0.4	<0.4	NA	< 0.4	93%	70%	130%	99%	80%	120%	98%	70%	130%
Uranium	9857648	0.6	0.6	NA	< 0.5	114%	70%	130%	105%	80%	120%	110%	70%	130%
Vanadium	9857648	32	32	0.0%	< 1	105%	70%	130%	101%	80%	120%	100%	70%	130%
Zinc	9857648	68	68	0.0%	< 5	105%	70%	130%	108%	80%	120%	100%	70%	130%
Chromium VI	9851877 9851877	<0.2	<0.2	NA	< 0.2	108%	70%	130%	100%	80%	120%	115%	70%	130%
Cyanide	9851877 9851877	<0.040	<0.040	NA	< 0.040	97%	70%	130%	104%	80%	120%	102%	70%	130%
Mercury	9857648	<0.10	<0.10	NA	< 0.10	87%	70%	130%	108%	80%	120%	114%	70%	130%
Electrical Conductivity	9851877 9851877	0.233	0.225	3.5%	< 0.005	101%	90%	110%	NA			NA		
Sodium Adsorption Ratio	9851877 9851877	0.449	0.406	10.1%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	9851877 9851877	8.15	8.14	0.1%	NA	101%	80%	120%	NA			NA		
O. Reg. 558 Metals and Inorganic	S													
Arsenic Leachate	9851884 9851884	<0.010	<0.010	NA	< 0.010	97%	90%	110%	88%	80%	120%	82%	70%	130%
Barium Leachate	9851884 9851884	0.612	0.626	2.3%	< 0.100	96%	90%	110%	100%	80%	120%	97%	70%	130%
Boron Leachate	9851884 9851884	0.056	0.054	NA	< 0.050	108%	90%	110%	106%	80%	120%	111%	70%	130%
Cadmium Leachate	9851884 9851884	<0.010	<0.010	NA	< 0.010	102%	90%	110%	92%	80%	120%	94%	70%	130%
Chromium Leachate	9851884 9851884	0.012	0.012	NA	< 0.010	101%	90%	110%	100%	80%	120%	95%	70%	130%
Lead Leachate	9851884 9851884	<0.010	<0.010	NA	< 0.010	99%	90%	110%	96%	80%	120%	92%	70%	130%
Mercury Leachate	9851884 9851884	<0.01	<0.01	NA	< 0.01	104%	90%	110%	89%	80%	120%	92%	70%	130%
Selenium Leachate	9851884 9851884	<0.010	<0.010	NA	< 0.010	100%	90%	110%	86%	80%	120%	85%	70%	130%
Silver Leachate	9851884 9851884	<0.010	<0.010	NA	< 0.010	102%	90%	110%	99%	80%	120%	90%	70%	130%
Uranium Leachate	9851884 9851884	<0.050	<0.050	NA	< 0.050	104%	90%	110%	99%	80%	120%	109%	70%	130%
Fluoride Leachate	9851884 9851884	0.18	0.18	NA	< 0.05	101%	90%	110%	103%	90%	110%	95%	70%	130%
Cyanide Leachate	9851884 9851884	<0.05	<0.05	NA	< 0.05	101%	90%	110%	101%	90%	110%	108%	70%	130%
(Nitrate + Nitrite) as N Leachate	9851884 9851884	<0.70	<0.70	NA	< 0.70	99%	80%	120%	100%	80%	120%	101%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Ryan Vanden Tillaart

Soil Analysis (Continued)

RPT Date: DUPL					E		REFERENCE MATERIAL			. METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch Sampl	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lin	ptable nits	Recoverv	Acce Lin	ptable nits	Recoverv	Acce Lir	ptable nits
		Id					value	Lower	Upper		Lower	Upper		Lower	Upper

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL





AGAT QUALITY ASSURANCE REPORT (V1)

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS

SAMPLED BY:Ryan Vanden Tillaart

Trace Organics Analysis

RPT Date:			C	UPLICAT	E		REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MA	RIX SPI	KE	
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lir	ptable nits	Recovery	Acce Lir	ptable nits	Recovery	Acce	ptable nits	
							Value	Lower	Upper		Lower	Upper		Lower	Upper	
O. Reg. 153(511) - PAHs (Soil)																
Naphthalene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	97%	50%	140%	99%	50%	140%	
Acenaphthylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	105%	50%	140%	108%	50%	140%	
Acenaphthene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	96%	50%	140%	98%	50%	140%	
Fluorene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	110%	50%	140%	94%	50%	140%	99%	50%	140%	
Phenanthrene	9851880	9851880	0.12	0.10	NA	< 0.05	106%	50%	140%	88%	50%	140%	94%	50%	140%	
Anthracene	9851880	9851880	<0.05	< 0.05	NA	< 0.05	114%	50%	140%	101%	50%	140%	108%	50%	140%	
Fluoranthene	9851880	9851880	0.19	0.17	NA	< 0.05	117%	50%	140%	99%	50%	140%	105%	50%	140%	
Pyrene	9851880	9851880	0.15	0.14	NA	< 0.05	111%	50%	140%	104%	50%	140%	102%	50%	140%	
Benz(a)anthracene	9851880	9851880	0.09	0.08	NA	< 0.05	93%	50%	140%	95%	50%	140%	113%	50%	140%	
Chrysene	9851880	9851880	0.09	0.08	NA	< 0.05	115%	50%	140%	90%	50%	140%	101%	50%	140%	
Benzo(b)fluoranthene	9851880	9851880	0.08	0.07	NA	< 0.05	101%	50%	140%	90%	50%	140%	82%	50%	140%	
Benzo(k)fluoranthene	9851880	9851880	0.05	0.05	NA	< 0.05	110%	50%	140%	94%	50%	140%	82%	50%	140%	
Benzo(a)pyrene	9851880	9851880	0.06	0.06	NA	< 0.05	98%	50%	140%	98%	50%	140%	91%	50%	140%	
Indeno(1,2,3-cd)pyrene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	86%	50%	140%	81%	50%	140%	
Dibenz(a,h)anthracene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	82%	50%	140%	81%	50%	140%	
Benzo(g,h,i)perylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	93%	50%	140%	91%	50%	140%	
2-and 1-methyl Naphthalene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	97%	50%	140%	96%	50%	140%	
O Bog 152(511) DUCo 51 54 (oil)														
0. Reg. 155(511) - FRCS F1 - F4 (-	0051000	0051000	- 5	- 5	NIA	- 5	909/	60%	1200/	000/	050/	1150/	000/	700/	1200/	
F1(C0(0,C10)) F2(C10 to C16)	9001000	9031000	< 10	< 10	NA NA	< 10	09%	60%	130%	0970 82%	80%	120%	82%	70%	130%	
$F_2(C16 to C34)$	0851880	0851880	< 50	< 50		< 50	90 % 0.4%	60%	130%	101%	80%	120%	02 /0 82%	70%	130%	
$F_{4}(C_{34} to C_{50})$	9001000	9031000	< 50	< 50	NA NA	< 50	94%	60%	130%	0.0%	80%	120%	02%	70%	130%	
1 4 (034 10 030)	9031000	9031000	< 50	< 50	11/5	< 50	9378	00 /8	130 /6	9078	00 /6	12070	34 /0	1078	15070	
O. Reg. 153(511) - VOCs (Soil)																
Dichlorodifluoromethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	109%	50%	140%	116%	50%	140%	
Vinyl Chloride	9851880	9851880	< 0.02	< 0.02	NA	< 0.02	87%	50%	140%	94%	50%	140%	99%	50%	140%	
Bromomethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	110%	50%	140%	90%	50%	140%	
Trichlorofluoromethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	97%	50%	140%	98%	50%	140%	
Acetone	9851880	9851880	< 0.50	< 0.50	NA	< 0.50	98%	50%	140%	82%	50%	140%	78%	50%	140%	
1,1-Dichloroethylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	97%	60%	130%	77%	50%	140%	
Methylene Chloride	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	91%	60%	130%	99%	50%	140%	
Trans- 1,2-Dichloroethylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	78%	50%	140%	77%	60%	130%	83%	50%	140%	
Methyl tert-butyl Ether	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	90%	60%	130%	88%	50%	140%	
1,1-Dichloroethane	9851880	9851880	< 0.02	< 0.02	NA	< 0.02	95%	50%	140%	82%	60%	130%	93%	50%	140%	
Methyl Ethyl Ketone	9851880	9851880	< 0.50	< 0.50	NA	< 0.50	95%	50%	140%	83%	50%	140%	99%	50%	140%	
Cis- 1,2-Dichloroethylene	9851880	9851880	< 0.02	< 0.02	NA	< 0.02	78%	50%	140%	95%	60%	130%	81%	50%	140%	
Chloroform	9851880	9851880	< 0.04	< 0.04	NA	< 0.04	85%	50%	140%	80%	60%	130%	75%	50%	140%	
1,2-Dichloroethane	9851880	9851880	< 0.03	< 0.03	NA	< 0.03	75%	50%	140%	90%	60%	130%	88%	50%	140%	
1,1,1-Trichloroethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	77%	50%	140%	114%	60%	130%	80%	50%	140%	

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

Trace Organics Analysis (Continued)

RPT Date:		DUPLICATE			REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lin	ptable nits	Recovery	Acce Lin	ptable nits	Recovery	Acce Lin	ptable nits
		iù		-			value	Lower	Upper		Lower	Upper		Lower	Upper
Carbon Tetrachloride	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	78%	60%	130%	80%	50%	140%
Benzene	9851880	9851880	< 0.02	< 0.02	NA	< 0.02	87%	50%	140%	89%	60%	130%	89%	50%	140%
1,2-Dichloropropane	9851880	9851880	< 0.03	< 0.03	NA	< 0.03	82%	50%	140%	95%	60%	130%	89%	50%	140%
Trichloroethylene	9851880	9851880	< 0.03	< 0.03	NA	< 0.03	91%	50%	140%	91%	60%	130%	94%	50%	140%
Bromodichloromethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	78%	60%	130%	78%	50%	140%
Methyl Isobutyl Ketone	9851880	9851880	< 0.50	< 0.50	NA	< 0.50	94%	50%	140%	82%	50%	140%	93%	50%	140%
1,1,2-Trichloroethane	9851880	9851880	< 0.04	< 0.04	NA	< 0.04	98%	50%	140%	95%	60%	130%	103%	50%	140%
Toluene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	96%	60%	130%	102%	50%	140%
Dibromochloromethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	74%	60%	130%	79%	50%	140%
Ethylene Dibromide	9851880	9851880	< 0.04	< 0.04	NA	< 0.04	80%	50%	140%	87%	60%	130%	89%	50%	140%
Tetrachloroethylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	94%	60%	130%	93%	50%	140%
1,1,1,2-Tetrachloroethane	9851880	9851880	< 0.04	< 0.04	NA	< 0.04	83%	50%	140%	72%	60%	130%	80%	50%	140%
Chlorobenzene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	95%	60%	130%	98%	50%	140%
Ethylbenzene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	90%	60%	130%	89%	50%	140%
m & p-Xylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	86%	60%	130%	84%	50%	140%
Bromoform	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	79%	60%	130%	86%	50%	140%
Styrene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	96%	60%	130%	101%	50%	140%
1,1,2,2-Tetrachloroethane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	93%	60%	130%	102%	50%	140%
o-Xylene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	92%	60%	130%	92%	50%	140%
1,3-Dichlorobenzene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	86%	60%	130%	88%	50%	140%
1,4-Dichlorobenzene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	88%	60%	130%	92%	50%	140%
1,2-Dichlorobenzene	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	88%	60%	130%	94%	50%	140%
1,3-Dichloropropene	9851880	9851880	< 0.04	< 0.04	NA	< 0.04	76%	50%	140%	77%	60%	130%	77%	50%	140%
n-Hexane	9851880	9851880	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	108%	60%	130%	106%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

O. Reg. 558 - PCBs														
Polychlorinated Biphenyls	9851884 9851884	< 0.005	< 0.005	NA	< 0.005	96%	60%	130%	95%	60%	130%	NA	60%	130%
O. Reg. 558 - VOCs														
Vinyl Chloride	9851884 9851884	< 0.030	< 0.030	NA	< 0.030	75%	60%	140%	112%	60%	140%	NA	60%	140%
1,1 Dichloroethene	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	79%	70%	130%	95%	70%	130%	NA	60%	140%
Dichloromethane	9851884 9851884	< 0.030	< 0.030	NA	< 0.030	85%	70%	130%	101%	70%	130%	NA	60%	140%
Methyl Ethyl Ketone	9851884 9851884	< 0.090	< 0.090	NA	< 0.090	116%	70%	130%	97%	70%	130%	NA	60%	140%
Chloroform	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	87%	70%	130%	98%	70%	130%	NA	60%	140%
1,2-Dichloroethane	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	102%	70%	130%	88%	70%	130%	NA	60%	140%
Carbon Tetrachloride	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	94%	70%	130%	87%	70%	130%	NA	60%	140%
Benzene	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	85%	70%	130%	105%	70%	130%	NA	60%	140%
Trichloroethene	9851884 9851884	< 0.020	< 0.020	NA	< 0.020	91%	70%	130%	93%	70%	130%	NA	60%	140%
Tetrachloroethene	9851884 9851884	< 0.050	< 0.050	NA	< 0.050	88%	70%	130%	109%	70%	130%	NA	60%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

Trace Organics Analysis (Continued)

RPT Date:	PT Date:			DUPLICATE			REFERENCE MATERIAL			METHOD	BLANK	SPIKE	MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lin	ptable nits	Recovery	Acce Lin	ptable nits	Recovery	Acce Lir	ptable nits
							value	Lower	Upper		Lower	Upper		Lower	Upper
Chlorobenzene	9851884	9851884	< 0.010	< 0.010	NA	< 0.010	91%	70%	130%	111%	70%	130%	NA	60%	140%
1,2-Dichlorobenzene	9851884	9851884	< 0.010	< 0.010	NA	< 0.010	89%	70%	130%	108%	70%	130%	NA	60%	140%
1,4-Dichlorobenzene	9851884	9851884	< 0.010	< 0.010	NA	< 0.010	86%	70%	130%	106%	70%	130%	NA	60%	140%
O. Reg. 558 - Benzo(a) pyrene															
Benzo(a)pyrene	9851884	9851884	< 0.001	< 0.001	NA	< 0.001	96%	70%	130%	92%	70%	130%	NA	70%	130%
Comments: When the average of the	e sample an	d duplicate	results is	less than 5	ix the RDL	, the Rela	tive Perce	nt Diffei	rence (F	RPD) will b	e indic	ated as	Not Applie	cable (N	\ A).

Flash Point Analysis								
Flash point (Pensky Martin Closed Cup)	2506	Butanol	35	35	0.0%	100%	80%	120%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By:

Page 18 of 22

AGAT QUALITY ASSURANCE REPORT (V1)



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS

SAMPLING SITE:36 Robinson		SAMPLED BY:Ryan Vanden Tillaart			
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE		
Soil Analysis					
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES		
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER		
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER		
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS		
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER		
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	CP/OES		
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER		
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	pH METER		
Arsenic Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Barium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Boron Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Cadmium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Chromium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Lead Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Mercury Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Selenium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Silver Leachate	MET -93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Uranium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS		
Fluoride Leachate	INOR-93-6018	EPA SW-846-1311 & SM4500-F- C	ION SELECTIVE ELECTRODE		
Cyanide Leachate	INOR-93-6052	EPA SW-846-1311 & MOE 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER		
(Nitrate + Nitrite) as N Leachate	INOR-93-6053	EPA SW 846-1311 & SM 4500 - NO3- I	LACHAT FIA		



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS

SAMPLING STIL.30 KUDIIISUII		SAMFLED DT. N	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Flash point (Pensky Martin Closed Cup)	TO 2210	ASTM D93	Pensky Martin Closed Cup
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	CCME Tier 1 Method	GC/FID
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC/FID
Terphenyl	VOL-91-5009		GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS


Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:36 Robinson

AGAT WORK ORDER: 19Z430722 ATTENTION TO: LUKE LOPERS SAMPLED BY:Ryan Vanden Tillaart

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1.2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1.1.1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1.2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzo(a)pyrene	ORG-91-5105	EPA SW846 3540 & 8270	GC/MS
Polychlorinated Biphenyls	ORG-91-5112	Regulation 558, EPA SW846 3510C/8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW846 3510C/8082	GC/ECD
Vinyl Chloride	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,1 Dichloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Dichloromethane	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Trichloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5230B & 8260	(P&T)GC/MS

Chain of Custody Record If this I	Laborat	tories 12 p	5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 h: 905.712.5100 Fax: 905.712.5122 webearth.agatlabs.com able water consumed by humans)	Laboratory Use Work Order #: 9 Cooler Quantity: 6 Arrival Temperatures:	Only 2430722 Me 4.014.514.3
Report Information: GHD Limited		Regulatory Requirements: (Please check all applicable boxes)	No Regulatory Requirement	Custody Seal Intact:	
Contract: Contract: Address: Address: Phone: Reports to be sent to: 1. Email: 2. Email: Project Information: Project: Site Location: Sampled By: AGAT Quote #: Project Information: Project: Site Location: Company: Contact: Company: Contact: Contac	t will be billed full price for analysis. Bill To Same: Yes X No		Jse Indicate One Report Guideline on Certificate of Analysis Yes No O. Reg 153 O. Reg 153 Wetagl	Turnaround Time Regular TAT Rush TAT (Rush surcharger 3 Business Days OR Date Requir Please provid *TAT is exclusive For 'Same Day' analy	(TAT) Required: (Required: (TAT) Required: (TAT) Required: (Required: (TAT) Required: (Required: (Requi
Address: Email: Sample Identification Date	Time # of Sampled Containers N	ample Comments/	Field Filtere fetals and Inorgani Ani Metals 153 Met Il Ani Metals 153 Met Ani Metals 153 Chen 153 Metals Scan ull Metals Scan egulation/Custom fivo, 100, 010	alattles: X voc HCs F1 - F4 BNs AHs CBs: 🗆 Total	rganochlorine Pesi cuP: MM&I MVocs ewer Use
B1+3-551 Jan 22	U 10'30 Z	S Special instructions			
RH3-553 11	1030 3	5	X	××	
BHY SSC "	12.17 5	<u>></u> ち			
BH3-GS1	12.15 5	5 MBT. Flashmint, PAH. Voc. ACB			X
Samples Relinquished By (Print Name and Sign): Samples Relinquished By (Print Name and Sign): Semples Relinquished By (Print Name and Sign): Document ID: DIV-78 1511,015	Date JALZ 19-01-23 Date Date Time	7.00 Samples Received By (Print Name and Sign): NOD Samples Received By (Print Name and Sign): Samples Received By (Print Name and Sign):	Pink Copy - Client Y	1000 Copy - AGAT White	Page of N°: T 0 7 8 0 9 4 Copy- AGAT Page 22 0722



CLIENT NAME: GHD LIMITED 455 Phillip St WATERLOO, ON N2V1C2 (519) 884-0510

ATTENTION TO: LUKE LOPERS

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z431882

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

WATER ANALYSIS REVIEWED BY: Milithza Silva, Analytical Supervisor (M.Sc. in Analytical Chemistry)

DATE REPORTED: Feb 01, 2019

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES	

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

 AGAT Laboratories (V1)
 Page 1 of 16

 Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
 AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory

 Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific citests listed on the scope of accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation Inc. (CALA) and/or specific drivinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received. All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: LUKE LOPERS

SAMPLED BY:Christine Berthiaux

DATE RECEIVED: 2019-01-28 DATE REPORTED: 2019-01-31										
			SAMPL	E DESCRIPTION:	BH4-GW1	BH1-GW1	BH3-GW1	BH2-GW1	BH8-GW1	
				SAMPLE TYPE:	Water	Water	Water	Water	Water	
				DATE SAMPLED:	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9862488	9862489	9862490	9862491	9862492	
Naphthalene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	0.78	0.77	
Acenaphthylene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Acenaphthene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Fluorene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Phenanthrene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	
Anthracene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	
Fluoranthene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Pyrene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Benz(a)anthracene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Chrysene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(b)fluoranthene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(k)fluoranthene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	
Benzo(a)pyrene	µg/L	0.01	2019-01-31	2019-01-31	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Dibenz(a,h)anthracene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
Benzo(g,h,i)perylene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	
2-and 1-methyl Naphthalene	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	0.97	0.99	
Surrogate	Unit	Acceptable Limits								
Chrysene-d12	%	50-140	2019-01-31	2019-01-31	63	79	113	115	109	

O. Reg. 153(511) - PAHs (Water)

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9862488-9862492 Note: The result for Benzo(b)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column. 2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Certified By:



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523)

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

ATTENTION TO: LUKE LOPERS

SAMPLED BY: Christine Berthiaux

DATE REPORTED: 2019-01-31

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Water)

DATE RECEIVED: 2019-01-28

			SAMPL	E DESCRIPTION:	BH4-GW1	BH1-GW1	BH3-GW1	BH2-GW1	BH8-GW1	
				SAMPLE TYPE:	Water	Water	Water	Water	Water	
				DATE SAMPLED:	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9862488	9862489	9862490	9862491	9862492	
F1 (C6-C10)	µg/L	25	2019-01-31	2019-01-31	<25	<25	<25	96	110	
F1 (C6 to C10) minus BTEX	µg/L	25	2019-01-31	2019-01-31	<25	<25	<25	55	69	
F2 (C10 to C16)	µg/L	100	2019-01-30	2019-01-30	<100	<100	<100	<100	<100	
F2 (C10 to C16) minus Naphthalene	µg/L	100	2019-01-30	2019-01-30	<100	<100	<100	<100	<100	
F3 (C16 to C34)	µg/L	100	2019-01-30	2019-01-30	<100	<100	<100	<100	<100	
F3 (C16 to C34) minus PAHs	µg/L	100	2019-01-30	2019-01-30	<100	<100	<100	<100	<100	
F4 (C34 to C50)	µg/L	100	2019-01-30	2019-01-30	<100	<100	<100	<100	<100	
Gravimetric Heavy Hydrocarbons	µg/L	500			NA	NA	NA	NA	NA	
Surrogate	Unit	Acceptable Limits								
Terphenyl	%	60-140	2019-01-30	2019-01-30	93	71	91	95	94	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9862488-9862492 The C6-C10 fraction is calculated using toluene response factor.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present. The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX and PAH contributions.

C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.

C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Certified By:



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

ATTENTION TO: LUKE LOPERS SAMPLED BY:Christine Berthiaux

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

O. Reg. 153(511) - VOCs (Water)

SAMPLE DESCRIPTION BH-6VM BH-6VM BH-6VM BH-6VM BH-6VM BH-6VM Water SAMPLE DESCRIPTION Water	DATE RECEIVED: 2019-01-28					DATE REPORTED: 2019-01-31						
Parameter Unit G/S RD Date Prepared Date Nnalyzed 986248 986249 <th< th=""><th></th><th></th><th></th><th></th><th>SAMPL</th><th>E DESCRIPTION:</th><th>BH4-GW1</th><th>BH1-GW1</th><th>BH3-GW1</th><th>BH2-GW1</th><th>BH8-GW1</th><th>Trip Blank</th></th<>					SAMPL	E DESCRIPTION:	BH4-GW1	BH1-GW1	BH3-GW1	BH2-GW1	BH8-GW1	Trip Blank
Parameter Unit G / S PDL Date Propriand Date Analyzad 9862490 98624490						SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
Parameter Unit G.V. RDL Date Prepared BetZ428 9862480 962437 2019 7 9017 7 9017 9017 9017 9017 9018 9010131 <th></th> <th></th> <th></th> <th></th> <th></th> <th>DATE SAMPLED:</th> <th>2019-01-25</th> <th>2019-01-25</th> <th>2019-01-25</th> <th>2019-01-25</th> <th>2019-01-25</th> <th>2019-01-25</th>						DATE SAMPLED:	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25
Dichlorodihuoromethane ypL 0.20 2019 01-31 2019 01-31 2019 01-31 20.20 -0.20	Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9862488	9862489	9862490	9862491	9862492	9862493
Viny Chindia µg/L 0.17 2019-01-31 2019-01-31 2019-01-31 20.0	Dichlorodifluoromethane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromomethane μg/L 0.20 2019-01-31 2019-01-31 20.20 40.20<	Vinyl Chloride	µg/L		0.17	2019-01-31	2019-01-31	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
TichlorodiuoromethaneμgL0.402019-01-31 <t< td=""><td>Bromomethane</td><td>µg/L</td><td></td><td>0.20</td><td>2019-01-31</td><td>2019-01-31</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td></t<>	Bromomethane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acetoneµg/L1.02019-01-312019-01-31<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<	Trichlorofluoromethane	µg/L		0.40	2019-01-31	2019-01-31	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
11-DichlorecthyleneμpL0.302019-01-312019-01-3120.30-0.30<	Acetone	µg/L		1.0	2019-01-31	2019-01-31	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride µgL 0.30 2019-01-31 2019-01-31 20.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0.30 <0	1,1-Dichloroethylene	µg/L		0.30	2019-01-31	2019-01-31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans 1,2-Dichloroethyleneµg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20 <th< td=""><td>Methylene Chloride</td><td>µg/L</td><td></td><td>0.30</td><td>2019-01-31</td><td>2019-01-31</td><td><0.30</td><td><0.30</td><td><0.30</td><td><0.30</td><td><0.30</td><td><0.30</td></th<>	Methylene Chloride	µg/L		0.30	2019-01-31	2019-01-31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl eth-buyl ether pgL 0.20 2019-01-31 2019-01-31 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <th< td=""><td>trans- 1,2-Dichloroethylene</td><td>µg/L</td><td></td><td>0.20</td><td>2019-01-31</td><td>2019-01-31</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td></th<>	trans- 1,2-Dichloroethylene	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1.1-Dichloroerhane µg/L 0.30 2019-01-31 2019-01-31 20.30 +0.20 +0.20 <td< td=""><td>Methyl tert-butyl ether</td><td>µg/L</td><td></td><td>0.20</td><td>2019-01-31</td><td>2019-01-31</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td></td<>	Methyl tert-butyl ether	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Ethyl Ketone µg/L 1.0 2019-01-31 2019-01-31 0.20 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	1,1-Dichloroethane	µg/L		0.30	2019-01-31	2019-01-31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
cis-1,2-bichloroethylene µg/L 0.20 2019-01-31 2019-01-31 2019-01-31 0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20	Methyl Ethyl Ketone	µg/L		1.0	2019-01-31	2019-01-31	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroformμg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20	cis- 1,2-Dichloroethylene	µg/L		0.20	2019-01-31	2019-01-31	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1.2-Dichloroethaneμg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<	Chloroform	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethaneµg/L0.302019-01-312019-01-31<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.30<0.3	1,2-Dichloroethane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbon Tetrachlorideµg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20	1,1,1-Trichloroethane	µg/L		0.30	2019-01-31	2019-01-31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzene µg/L 0.20 2019-01-31 2019-01-31 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20	Carbon Tetrachloride	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropaneµg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<	Benzene	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethyleneμg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20 </td <td>1,2-Dichloropropane</td> <td>µg/L</td> <td></td> <td>0.20</td> <td>2019-01-31</td> <td>2019-01-31</td> <td><0.20</td> <td><0.20</td> <td><0.20</td> <td><0.20</td> <td><0.20</td> <td><0.20</td>	1,2-Dichloropropane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethaneµg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20	Trichloroethylene	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketoneµg/L1.02019-01-312019-01-31<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0<1.0 <th< td=""><td>Bromodichloromethane</td><td>µg/L</td><td></td><td>0.20</td><td>2019-01-31</td><td>2019-01-31</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td><td><0.20</td></th<>	Bromodichloromethane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethaneµg/L0.202019-01-312019-01-31<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.20<0.2	Methyl Isobutyl Ketone	µg/L		1.0	2019-01-31	2019-01-31	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tolueneµg/L0.202019-01-312019-01-311.90.31<0.206.76.6<0.20Dibromochloromethaneµg/L0.102019-01-312019-01-31<0.10	1,1,2-Trichloroethane	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane µg/L 0.10 2019-01-31 2019-01-31 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <th< td=""><td>Toluene</td><td>µg/L</td><td></td><td>0.20</td><td>2019-01-31</td><td>2019-01-31</td><td>1.9</td><td>0.31</td><td><0.20</td><td>6.7</td><td>6.6</td><td><0.20</td></th<>	Toluene	µg/L		0.20	2019-01-31	2019-01-31	1.9	0.31	<0.20	6.7	6.6	<0.20
Ethylene Dibromideµg/L0.102019-01-312019-01-31<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10<0.10 </td <td>Dibromochloromethane</td> <td>µg/L</td> <td></td> <td>0.10</td> <td>2019-01-31</td> <td>2019-01-31</td> <td><0.10</td> <td><0.10</td> <td><0.10</td> <td><0.10</td> <td><0.10</td> <td><0.10</td>	Dibromochloromethane	µg/L		0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene µg/L 0.20 2019-01-31 2019-01-31 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <0.20 <th<< td=""><td>Ethylene Dibromide</td><td>µg/L</td><td></td><td>0.10</td><td>2019-01-31</td><td>2019-01-31</td><td><0.10</td><td><0.10</td><td><0.10</td><td><0.10</td><td><0.10</td><td><0.10</td></th<<>	Ethylene Dibromide	µg/L		0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2-Tetrachloroethane µg/L 0.10 2019-01-31 2019-01-31 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10	Tetrachloroethylene	µg/L		0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
μg/L 0.10 2019-01-31 2019-01-31 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10	1,1,1,2-Tetrachloroethane	µg/L		0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzeneμg/L0.102019-01-312019-01-310.28<0.10<0.105.45.2<0.10m & p-Xyleneμg/L0.202019-01-312019-01-310.82<0.20	Chlorobenzene	µg/L		0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene μg/L 0.20 2019-01-31 2019-01-31 0.82 <0.20 <0.20 19 19 <0.20	Ethylbenzene	µg/L		0.10	2019-01-31	2019-01-31	0.28	<0.10	<0.10	5.4	5.2	<0.10
	m & p-Xylene	µg/L		0.20	2019-01-31	2019-01-31	0.82	<0.20	<0.20	19	19	<0.20

Certified By:

teus



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

ATTENTION TO: LUKE LOPERS

SAMPLED BY: Christine Berthiaux

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-01-28	3				DATE REPORTED: 2019-01-31					
			SAMPL	E DESCRIPTION:	BH4-GW1	BH1-GW1	BH3-GW1	BH2-GW1	BH8-GW1	Trip Blank
				SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
				DATE SAMPLED:	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25	2019-01-25
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9862488	9862489	9862490	9862491	9862492	9862493
Bromoform	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L	0.10	2019-01-31	2019-01-31	0.30	<0.10	<0.10	10	10	<0.10
1,3-Dichlorobenzene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	0.10	2019-01-31	2019-01-31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	0.30	2019-01-31	2019-01-31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	0.20	2019-01-31	2019-01-31	1.1	<0.20	<0.20	29	19	<0.20
n-Hexane	µg/L	0.20	2019-01-31	2019-01-31	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits								
Toluene-d8	% Recovery	50-140	2019-01-31	2019-01-31	111	114	112	110	112	91
4-Bromofluorobenzene	% Recovery	50-140	2019-01-31	2019-01-31	105	105	97	106	108	103

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9862488-9862493 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

AGAT CERTIFICATE OF ANALYSIS (V1)

teus

Certified By:



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:

CLIENT NAME: GHD LIMITED

SAMPLED BY: Christine Berthiaux

DATE RECEIVED: 2019-01-28							DATE REPORTED: 2019-01-31
				SAMPL	E DESCRIPTION:	BH4-GW1	
					SAMPLE TYPE:	Water	
					DATE SAMPLED:	2019-01-25	
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	9862488	
Oil and Grease (animal/vegetable)	mg/L		0.5	2019-01-31	2019-01-31	<0.5	
Oil and Grease (mineral) in water	mg/L		0.5	2019-01-31	2019-01-31	<0.5	
Oil and Grease (Total) in water	mg/L		0.5	2019-01-31	2019-01-31	<0.5	

Oil and Grease (+Total) - water

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9862488 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.

Certified By:

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AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

ATTENTION TO: LUKE LOPERS

SAMPLING SITE:

CLIENT NAME: GHD LIMITED

SAMPLED BY: Christine Berthiaux

	Total PCBs (water)										
DATE RECEIVED: 2019-01-28						DATE REPORTED: 2019-01-30					
			SAMPL	E DESCRIPTION:	BH4-GW1						
				SAMPLE TYPE:	Water						
			I	DATE SAMPLED:	2019-01-25						
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9862488						
PCBs	µg/L	0.1	2019-01-30	2019-01-30	<0.1						
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	60-130	2019-01-30	2019-01-30	99						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

teus



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

ATTENTION TO: LUKE LOPERS

SAMPLED BY: Christine Berthiaux

DATE REPORTED: 2019-01-30

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2019-01-28

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

				SAMPLI	E DESCRIPTION:	BH4-GW1	
					SAMPLE TYPE:	Water	
				[DATE SAMPLED:	2019-01-25	
Para	neter Uni	t G/S	RDL	Date Prepared	Date Analyzed	9862488	
Antimony	μg/l	-	1.0	2019-01-30	2019-01-30	<1.0	
Arsenic	μg/l	-	1.0	2019-01-30	2019-01-30	<1.0	
Barium	μg/l	-	2.0	2019-01-30	2019-01-30	45.7	
Beryllium	μg/l	-	0.5	2019-01-30	2019-01-30	<0.5	
Boron	μg/l	-	10.0	2019-01-30	2019-01-30	14.3	
Cadmium	μg/l	-	0.2	2019-01-30	2019-01-30	<0.2	
Chromium	μg/l	-	2.0	2019-01-30	2019-01-30	<2.0	
Cobalt	μg/l	-	0.5	2019-01-30	2019-01-30	0.8	
Copper	μg/l	-	1.0	2019-01-30	2019-01-30	<1.0	
Lead	μg/l	_	0.5	2019-01-30	2019-01-30	<0.5	
Molybdenum	μg/l	_	0.5	2019-01-30	2019-01-30	3.7	
Nickel	μg/l	_	1.0	2019-01-30	2019-01-30	1.7	
Selenium	μg/l	_	1.0	2019-01-30	2019-01-30	<1.0	
Silver	μg/l	_	0.2	2019-01-30	2019-01-30	<0.2	
Thallium	μg/l	_	0.3	2019-01-30	2019-01-30	<0.3	
Uranium	μg/l	_	0.5	2019-01-30	2019-01-30	<0.5	
Vanadium	μg/l	_	0.4	2019-01-30	2019-01-30	<0.4	
Zinc	μg/l	_	5.0	2019-01-30	2019-01-30	<5.0	
Mercury	μg/l	_	0.02	2019-01-30	2019-01-30	<0.02	
Chromium VI	μg/l	_	5	2019-01-30	2019-01-30	<5	
Sodium	μg/l	_	500	2019-01-30	2019-01-30	19900	
Chloride	μg/l	_	100	2019-01-30	2019-01-30	28400	
Electrical Conduct	vity uS/c	m	2	2019-01-30	2019-01-30	434	
pН	pH Ur	nits	NA	2019-01-30	2019-01-30	7.98	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Milithya O. Silva



AGAT WORK ORDER: 19Z431882 PROJECT: 11186719-E2 (PO#73514523) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

ATTENTION TO: LUKE LOPERS SAMPLED BY:Christine Berthiaux

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

O. Reg. 153(511) - Metals (Including Hydrides) (Water)

DATE	RECEI	/ED:	2019-0	1-28	

			SAMPL	E DESCRIPTION:	BH1-GW1	BH3-GW1	BH2-GW1	BH8-GW1	
				SAMPLE TYPE:	Water	Water	Water	Water	
				DATE SAMPLED:	2019-01-25	2019-01-25	2019-01-25	2019-01-25	
Parameter	Unit	G/S RDL	Date Prepared	Date Analyzed	9862489	9862490	9862491	9862492	
Antimony	µg/L	1.0	2019-01-30	2019-01-30	<1.0	<1.0	<1.0	<1.0	
Arsenic	μg/L	1.0	2019-01-30	2019-01-30	<1.0	<1.0	1.8	1.7	
Barium	µg/L	2.0	2019-01-30	2019-01-30	226	72.4	158	163	
Beryllium	µg/L	0.5	2019-01-30	2019-01-30	<0.5	<0.5	<0.5	<0.5	
Boron	µg/L	10.0	2019-01-30	2019-01-30	101	75.7	108	115	
Cadmium	μg/L	0.2	2019-01-30	2019-01-30	<0.2	<0.2	<0.2	<0.2	
Chromium	μg/L	2.0	2019-01-30	2019-01-30	2.3	4.2	5.0	4.8	
Cobalt	µg/L	0.5	2019-01-30	2019-01-30	1.6	0.6	1.2	1.2	
Copper	µg/L	1.0	2019-01-30	2019-01-30	1.4	1.8	<1.0	<1.0	
Lead	µg/L	0.5	2019-01-30	2019-01-30	<0.5	<0.5	<0.5	<0.5	
Molybdenum	μg/L	0.5	2019-01-30	2019-01-30	2.6	1.2	1.6	1.7	
Nickel	μg/L	1.0	2019-01-30	2019-01-30	6.3	2.6	1.6	1.4	
Selenium	µg/L	1.0	2019-01-30	2019-01-30	<1.0	<1.0	<1.0	<1.0	
Silver	μg/L	0.2	2019-01-30	2019-01-30	<0.2	<0.2	<0.2	<0.2	
Thallium	µg/L	0.3	2019-01-30	2019-01-30	<0.3	<0.3	<0.3	<0.3	
Uranium	µg/L	0.5	2019-01-30	2019-01-30	6.1	3.0	0.7	0.7	
Vanadium	µg/L	0.4	2019-01-30	2019-01-30	0.5	0.6	0.5	0.5	
Zinc	µg/L	5.0	2019-01-30	2019-01-30	<5.0	<5.0	5.1	<5.0	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Milithya O. Silva

DATE REPORTED: 2019-01-30



Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS

SAMPLED BY: Christine Berthiaux

Trace Organics Analysis

					, oo /											
RPT Date:			C	UPLICAT	E		REFERE	NCE MA	TERIAL	METHOD	BLAN	(SPIKE	MAT	RIX SPI	KE	
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lir	eptable nits	Recovery	Acce Lir	eptable mits	Recovery	Acce Lir	ptable nits	
		Id		5 ap2			Value	Lower	Upper		Lower	Upper		Lower	Upper	
O Reg. 153(511) - PHCs F1 - F4 ()	with PAHs)	(Water)	1			1										
F1 (C6-C10)	9862488 9	9862488	< 25	< 25	NA	< 25	89%	60%	140%	86%	60%	140%	80%	60%	140%	
F2 (C10 to C16)	0002100	TW	< 100	< 100	NA	< 100	104%	60%	140%	74%	60%	140%	76%	60%	140%	
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	103%	60%	140%	93%	60%	140%	109%	60%	140%	
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	86%	60%	140%	92%	60%	140%	100%	60%	140%	
O. Reg. 153(511) - PAHs (Water)																
Naphthalene		TW	< 0.20	< 0.20	NA	< 0.20	91%	50%	140%	80%	50%	140%	80%	50%	140%	
Acenaphthylene		TW	< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	86%	50%	140%	83%	50%	140%	
Acenaphthene		TW	< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	81%	50%	140%	81%	50%	140%	
Fluorene		TW	< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	88%	50%	140%	83%	50%	140%	
Phenanthrene		TW	< 0.10	< 0.10	NA	< 0.10	100%	50%	140%	89%	50%	140%	82%	50%	140%	
Anthracene		TW	< 0.10	< 0.10	NA	< 0.10	108%	50%	140%	90%	50%	140%	89%	50%	140%	
Fluoranthene		TW	< 0.20	< 0.20	NA	< 0.20	113%	50%	140%	98%	50%	140%	100%	50%	140%	
Pyrene		TW	< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	95%	50%	140%	95%	50%	140%	
Benz(a)anthracene		TW	< 0.20	< 0.20	NA	< 0.20	92%	50%	140%	89%	50%	140%	84%	50%	140%	
Chrysene		TW	< 0.10	< 0.10	NA	< 0.10	114%	50%	140%	88%	50%	140%	92%	50%	140%	
Benzo(b)fluoranthene		TW	< 0.10	< 0.10	NA	< 0.10	90%	50%	140%	86%	50%	140%	83%	50%	140%	
Benzo(k)fluoranthene		TW	< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	94%	50%	140%	102%	50%	140%	
Benzo(a)pyrene		TW	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	102%	50%	140%	96%	50%	140%	
Indeno(1,2,3-cd)pyrene		TW	< 0.20	< 0.20	NA	< 0.20	91%	50%	140%	85%	50%	140%	81%	50%	140%	
Dibenz(a,h)anthracene		TW	< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	86%	50%	140%	84%	50%	140%	
Benzo(g,h,i)perylene		TW	< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	85%	50%	140%	87%	50%	140%	
2-and 1-methyl Naphthalene		TW	< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	84%	50%	140%	83%	50%	140%	
O. Reg. 153(511) - VOCs (Water)																
Dichlorodifluoromethane	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	76%	50%	140%	79%	50%	140%	88%	50%	140%	
Vinyl Chloride	9862489 9	9862489	< 0.17	< 0.17	NA	< 0.17	83%	50%	140%	101%	50%	140%	82%	50%	140%	
Bromomethane	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	86%	50%	140%	83%	50%	140%	81%	50%	140%	
Trichlorofluoromethane	9862489 9	9862489	< 0.40	< 0.40	NA	< 0.40	80%	50%	140%	81%	50%	140%	82%	50%	140%	
Acetone	9862489 9	9862489	< 1.0	< 1.0	NA	< 1.0	108%	50%	140%	91%	50%	140%	106%	50%	140%	
1,1-Dichloroethylene	9862489 9	9862489	< 0.30	< 0.30	NA	< 0.30	98%	50%	140%	79%	60%	130%	76%	50%	140%	
Methylene Chloride	9862489 9	9862489	< 0.30	< 0.30	NA	< 0.30	106%	50%	140%	119%	60%	130%	92%	50%	140%	
trans- 1,2-Dichloroethylene	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	96%	60%	130%	87%	50%	140%	
Methyl tert-butyl ether	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	92%	50%	140%	86%	60%	130%	80%	50%	140%	
1,1-Dichloroethane	9862489 9	9862489	< 0.30	< 0.30	NA	< 0.30	99%	50%	140%	98%	60%	130%	79%	50%	140%	
Methyl Ethyl Ketone	9862489 9	9862489	< 1.0	< 1.0	NA	< 1.0	103%	50%	140%	79%	50%	140%	104%	50%	140%	
cis- 1,2-Dichloroethylene	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	84%	60%	130%	103%	50%	140%	
Chloroform	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	95%	50%	140%	95%	60%	130%	93%	50%	140%	
1,2-Dichloroethane	9862489 9	9862489	< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	80%	60%	130%	101%	50%	140%	
1,1,1-Trichloroethane	9862489 9	9862489	< 0.30	< 0.30	NA	< 0.30	77%	50%	140%	88%	60%	130%	78%	50%	140%	

AGAT QUALITY ASSURANCE REPORT (V1)

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Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS SAMPLED BY: Christine Berthiaux

Trace Organics Analysis (Continued)

RPT Date:			DUPLICATE				REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MATRIX SPIKE			
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lir	ptable nits	Recovery	Acce Lir	ptable nits	Recovery	Acce Lin	ptable nits	
							Value	Lower	Upper		Lower	Upper		Lower	Upper	
Carbon Tetrachloride	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	84%	60%	130%	75%	50%	140%	
Benzene	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	78%	60%	130%	99%	50%	140%	
1,2-Dichloropropane	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	105%	60%	130%	97%	50%	140%	
Trichloroethylene	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	80%	60%	130%	103%	50%	140%	
Bromodichloromethane	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	93%	60%	130%	103%	50%	140%	
Methyl Isobutyl Ketone	9862489	9862489	< 1.0	< 1.0	NA	< 1.0	94%	50%	140%	88%	50%	140%	88%	50%	140%	
1,1,2-Trichloroethane	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	85%	60%	130%	101%	50%	140%	
Toluene	9862489	9862489	0.31	0.29	NA	< 0.20	97%	50%	140%	83%	60%	130%	86%	50%	140%	
Dibromochloromethane	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	84%	50%	140%	94%	60%	130%	86%	50%	140%	
Ethylene Dibromide	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	102%	50%	140%	74%	60%	130%	93%	50%	140%	
Tetrachloroethylene	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	76%	60%	130%	76%	50%	140%	
1,1,1,2-Tetrachloroethane	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	82%	60%	130%	76%	50%	140%	
Chlorobenzene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	97%	50%	140%	81%	60%	130%	87%	50%	140%	
Ethylbenzene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	84%	60%	130%	76%	50%	140%	
m & p-Xylene	9862489	9862489	< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	87%	60%	130%	82%	50%	140%	
Bromoform	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	73%	60%	130%	92%	50%	140%	
Styrene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	80%	50%	140%	90%	60%	130%	89%	50%	140%	
1,1,2,2-Tetrachloroethane	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	77%	60%	130%	98%	50%	140%	
o-Xylene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	92%	50%	140%	77%	60%	130%	80%	50%	140%	
1,3-Dichlorobenzene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	82%	60%	130%	81%	50%	140%	
1,4-Dichlorobenzene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	94%	50%	140%	78%	60%	130%	85%	50%	140%	
1,2-Dichlorobenzene	9862489	9862489	< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	78%	60%	130%	88%	50%	140%	
1,3-Dichloropropene	9862489	9862489	< 0.30	< 0.30	NA	< 0.30	85%	50%	140%	88%	60%	130%	93%	50%	140%	
n-Hexane	9862489	9862489	<0.20	<0.20	NA	< 0.20	96%	50%	140%	104%	60%	130%	100%	50%	140%	
Total PCBs (water)																
PCBs		TW	< 0.1	< 0.1	NA	< 0.1	96%	60%	140%	95%	60%	140%	100%	60%	140%	
Oil and Grease (+Total) - water																
Oil and Grease (animal/vegetable)		TW	< 0.5	< 0.5	NA	< 0.5	NA	70%	130%	103%	70%	130%	101%	70%	130%	
Oil and Grease (mineral) in water		TW	< 0.5	< 0.5	NA	< 0.5	NA	70%	130%	83%	70%	130%	81%	70%	130%	
Oil and Grease (Total) in water		TW	< 0.5	< 0.5	NA	< 0.5	NA	70%	130%	93%	70%	130%	91%	70%	130%	

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume. When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

AGAT QUALITY ASSURANCE REPORT (V1)

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> Acceptable Limits Lower Upper

70% 130%

70% 130%

70% 130%

70% 130% 70%

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Quality Assurance

Water Analysis

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:

Thallium

Uranium

Mercury

Sodium

Chloride

pН

Chromium VI

Electrical Conductivity

Zinc

Vanadium

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS

SAMPLED BY: Christine Berthiaux

					• 7 11										
RPT Date:			DUPLICATE				REFEREN	NCE MA	TERIAL	METHOD	BLANK	MAT	RIX SPI	KE	
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acce Lin	ptable nits	Recovery	Acce Lir	ptable nits	Recovery	Acce Lin	pta nits
		Id					value	Lower	Upper		Lower	Upper] [Lower	U
O. Reg. 153(511) - Metals & Inc	organics (Wate	er)													
Antimony	9862488	9862488	< 1.0	<1.0	NA	< 1.0	102%	70%	130%	96%	80%	120%	94%	70%	13
Arsenic	9862488	9862488	< 1.0	<1.0	NA	< 1.0	104%	70%	130%	100%	80%	120%	100%	70%	13
Barium	9862488	9862488	45.7	44.8	2.0%	< 2.0	101%	70%	130%	99%	80%	120%	95%	70%	13
Beryllium	9862488	9862488	< 0.5	<0.5	NA	< 0.5	102%	70%	130%	97%	80%	120%	102%	70%	13
Boron	9862488	9862488	14.3	15.5	NA	< 10.0	103%	70%	130%	100%	80%	120%	104%	70%	13
Cadmium	9862488	9862488	< 0.2	<0.2	NA	< 0.2	101%	70%	130%	101%	80%	120%	101%	70%	1:
Chromium	9862488	9862488	< 2.0	<2.0	NA	< 2.0	106%	70%	130%	107%	80%	120%	100%	70%	13
Cobalt	9862488	9862488	0.8	0.8	NA	< 0.5	103%	70%	130%	100%	80%	120%	95%	70%	13
Copper	9862488	9862488	< 1.0	<1.0	NA	< 1.0	101%	70%	130%	105%	80%	120%	97%	70%	13
Lead	9862488	9862488	< 0.5	<0.5	NA	< 0.5	94%	70%	130%	92%	80%	120%	89%	70%	13
Molybdenum	9862488	9862488	3.7	3.6	2.7%	< 0.5	106%	70%	130%	102%	80%	120%	104%	70%	13
Nickel	9862488	9862488	1.7	1.5	NA	< 1.0	104%	70%	130%	105%	80%	120%	97%	70%	13
Selenium	9862488	9862488	< 1.0	<1.0	NA	< 1.0	95%	70%	130%	95%	80%	120%	98%	70%	13
Silver	9862488	9862488	< 0.2	<0.2	NA	< 0.2	106%	70%	130%	107%	80%	120%	89%	70%	13

Comments: NA signifies Not Applicable.

9862488 9862488

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< 0.3

< 0.5

< 0.4

< 5.0

< 0.02

< 5

19900

28400

434

7.98

<0.3

<0.5

<0.4

<5.0

< 0.02

<5

19600

28500

403

7.94

NA

NA

NA

NA

NA

NA

1.5%

0.4%

7.4%

0.5%

< 0.3

< 0.5

< 0.4

< 5.0

< 0.02

< 5

< 500

< 100

< 2

NA

101%

104%

100%

102%

99%

103%

93%

106%

100%

100%

70%

70%

70%

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70%

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70%

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90%

130%

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130%

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130%

110%

110%

98%

92%

100%

102%

101%

100%

92%

107%

NA

NA

80%

80%

80%

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70%

120%

120%

120%

120%

120%

120%

120%

130%

109%

91%

95%

99%

99%

98%

94%

80%

NA

NA

Duplicate Qualifier: For duplicates as the measured result approaches the Reporting Limit (RL), the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Certified By:

Milithya O. Silva

AGAT QUALITY ASSURANCE REPORT (V1)

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Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS SAMPLED BY:Christine Berthiaux

SAMPLING SITE:	SAMPLED BY: Christine Berthiaux								
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE						
Trace Organics Analysis									
Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Acenaphthylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Acenaphthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Fluorene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Phenanthrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Benz(a)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Chrysene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Benzo(b)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Benzo(k)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Benzo(a)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Indeno(1,2,3-cd)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Dibenz(a,h)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Benzo(g,h,i)perylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
2-and 1-methyl Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
Chrysene-d12	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS						
F1 (C6-C10)	VOL-91- 5010	MOE PHC-E3421	(P&T)GC/FID						
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID						
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC/FID						
F2 (C10 to C16) minus Naphthalene	VOL-91-5010	MOE PHC E3421	GC/FID						
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC/FID						
F3 (C16 to C34) minus PAHs	VOL-91-5010	MOE PHC E3421	GC/FID						
F4 (C34 to C50)	VOL-91-5010	MOE PHC E3421	GC/FID						
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE						
Terphenyl	VOL-91-5010		GC/FID						
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS						



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

SAMPLING SITE:

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS SAMPLED BY:Christine Berthiaux

		0, 220 0						
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE					
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS					
Oil and Grease (animal/vegetable)	VOL-91-5011	SM 5520 & EPA SW846 3510C & EF 1664	PA BALANCE					
Oil and Grease (mineral) in water	VOL-91-5011	SM 5520 & EPA SW846 3510C & EF 1664	PA BALANCE					
Oil and Grease (Total) in water	VOL-91-5011	SM 5520 & EPA SW846 3510C & EF 1664	^{PA} BALANCE					
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD					
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD					



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11186719-E2 (PO#73514523)

AGAT WORK ORDER: 19Z431882 ATTENTION TO: LUKE LOPERS

SAMPLING SITE:		SAMPLED BY: Christine Berthiaux								
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE							
Water Analysis	L									
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS							
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS							
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER							
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES							
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH							
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE							
рН	INOR-93-6000	SM 4500-H+ B	PC TITRATE							

Chain of Custody Record	rd If this is	La s a Drinking Wat	abora er sample, ple	ato:	と	3 (₆ 7 (Custody Form (Ph: 9	M 05.71 water d	5 ississa 2.5100 we	835 Coop Iga, Ontai Fax: 90 bearth.ag	io L4, io L4, 5712. atlabs	enue 2 1Y2 5122 		Lab Work Coole Arriva	Order Order r Quar I Temp	ory (#: ntity: peratu	Use 191 	Only ZY W	318 5 11.9	82	1.0	
Report Information: Company: CHD Limite	à				Regulatory Requi	rements:		No R	egula	tory Re	quire	ment		Custody Seal Intact: Wes No N/A								
Contact: Address: Har Calanade Ra Phone: Reports to be sent to: Like Loop 16 Fax: Reports to be sent to: Like Loop 16 Fax: F					Table - Indicate One Sewer Ind/Com Sanit Res/Park Storn Agriculture Series			Jse Regulation 558 ry CCME Prov. Water Quality Objectives (PWQO)			ity D)	Turnaround Time (TAT) Required: Regular TAT Rush TAT (Rush Surcharges Apply)										
2. Email:	63				Coarse	Indica MISA	ate One),),		Indicate	One			3 Business 2 Business Next Business Days Days Days OR Date Required (Rush Surcharges May Apply):								
Project Information: Project: Site Location:					Is this submission Record of Site Com	n for a dition? No		Re Cer	eport tifica Yes	Guidelin te of Ar	ne or alys No	i Is	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays For 'Same Day' analysis, please contact your AGAT CPM									
AGAT Quote #: Ptease note: If quotation number Invoice Information: Company: Contact: Address: Email:	PO:is not provided, client	Will be billed full price	for analysis. Yes No [Sample Matrix LegaBBiotaGWGround WaterOOilPPaintSSoilSDSedimentSWSurface Water	end	Field Filtered - Metals, Hg, CrVI	and Inorganics	als 153 Metals (exc. Hydrides) O Metals 153 Metals (Incl. Hydrides)	3 123 JB-HWS CICI CICN JEC CIFOC CIHg SAR	als Scan	on/Custom Metals		- F4			Total Decions	A&I CVOCS CABNS CB(a)P CPCBS	se NGrase (rivera) . Ner	al Inorganics	de sodrum, swentitt, pH, CAV	
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	e Comment Special Instru	s/ ctions	Y/N	Metals	All Met		Full Me	Regulat	Unlatile	PHCs F	ABNS	PAHs	PCBS	TCLP:	Sewer L	Cent	55	
BHJ-GWI BHJ-GWI BHJ-GWI BHJ-GWI BHJ-GWI Trip Blank		XOXSON A XOF MARSHO	1) 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	GU				XXXX					>>> >>> >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>			× × × ×	*					
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5100 Neme and Sign:		9-01-Z	8 Time	5h0	Samples Received By (Prin Samples Received By (Prin	t Name and Sign):			10	Pink (2 <i>9</i> Copy -	Date Date Client	Yello	w Copy	Time Time / - AGA	T I V	Vhite (Nº: T Copy- A(Page // 083 GAT Ø	_ of	8 6 76 ^{16, 2018}	

Appendix E Sieve Analysis



SIEVE ANALYSIS





SIEVE ANALYSIS





about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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