

Highway 400 – Highway 404 Link (Bradford Bypass) County Road 4 Early Work (GWP 2008-21-00)

Town of Bradford West Gwillimbury, Ontario

Ministry of Transportation, Central Region

60636190

January 2022

Highway 400 – Highway 404 Link (Bradford Bypass) County Road 4 Early Work (GWP 2008-21-00)

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Ministry of Transportation, Central Region

Waste and Excess Materials Management Plan

Highway 400 - Highway 404 Link (Bradford Bypass) County Road 4 Early Work (GWP 2008-21-00)

Quality Information

Prepared by

Reviewed and Approved by

Kesh Appadurai, P.Eng., QP_{ESA} Environmental Engineer Kesh.Appadurai@aecom.com

Sergiy N. Tchernikov, M.Sc., P.Geo., QP (ESA-O Reg 153-04) Senior Environmental Geoscientist/Hydrogeologist Senior Project Manager

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Prepared for:

Ministry of Transportation, Central Region

Prepared by:

Kesh Appadurai, P.Eng., QP_{ESA}
Environmental Engineer
Kesh.Appadurai@aecom.com
AECOM Canada Ltd.
105 Commerce Valley Drive West, 7th Floor
Markham, ON L3T 7W3
Canada

T: 905.886.7022 F: 905.538.8076 www.aecom.com

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1. Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM Canada Ltd. (AECOM) to undertake the Early Works study for the grade separated bridge crossing at County Road 4 for the future Bradford Bypass (Highway 400 – Highway 404 Link) Project, in accordance with the provisions of the Ontario Regulation (O.Reg.) 697/21. The Project limits of construction work (herein referred to as the "Project Area") is located along County Road 4 from north of 8th Line to north of the intersection with 9th Line within in the Town of Bradford West Gwillimbury and that area is referred to as the Study Area. The Study Area map is presented in key plan below and location is presented in **Appendix A**. This study will advance as an early works project for the Bradford Bypass Project. The new bridge will be designed to include the widening and underpass of County Road 4 approved by Simcoe County. Refer to Section 2 for specific project component details.

This Waste and Excess Materials Management Plan (WEMMP) was prepared for the MTO in support of the County Road 4 (also referred to as Yonge Street) Early Works Project (the Project). This WEMMP has been developed based on current understanding of applicable legislation, existing conditions, current land use, and planned future construction activities for the Project. For construction-based activities to be undertaken responsibly and in a manner that is protective of both human health and the environment, basic foundation principles and industry standard practices for management of contaminated and/or excess material were considered in the development of the WEMMP. Further, it should be noted that the WEMMP itself is a dynamic document that is anticipated to evolve and be updated based on changing legislation and/or specific requirements of the Project.

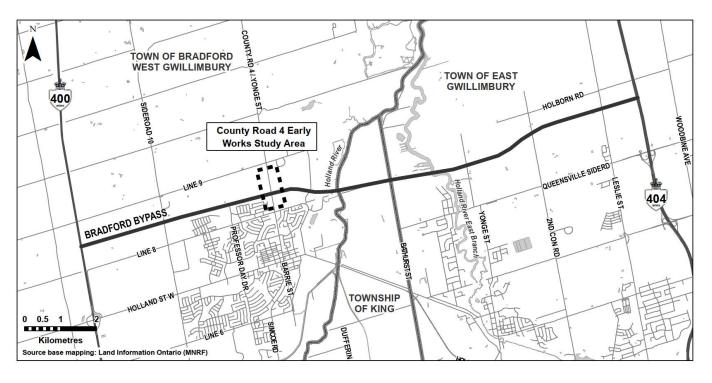


Figure 1: Study Area

2. Project Scope

The scope of work for the County Road 4 Early Works project (GWP 2008-21-00) undertaken in accordance with O. Reg.697/21, generally includes the following roadway and structure works:

Roadway/Grading

- Shoulder strengthening (west side) and temporary roadway widening (east side) for construction staging as required.
- Temporary detour road around the west side of the future bridge structure for construction staging as required.
- Temporary aerial traffic signal spans, traffic island removals, and lane shifts at 8th Line intersection for construction staging as required.
- Reprofiling and realigning County Road 4 to meet MTO's future interchange for the Bradford Bypass and intersection standards within the property constraints.
- Widening County Road 4 from two to four lanes on behalf of the County of Simcoe.
- Temporary road protection system will be used for construction staging to maintain the two existing lanes of traffic as required.
- Pavement markings, signage, traffic safety and control devices, barriers, and attenuators as required.
- Driveway and entrance access modifications, realignment, and reconstruction as required.
- Stormwater management, drainage improvements and culvert works.

Structures

This Project includes a new structure for the grade separated crossing of County Road 4 and the future Bradford Bypass as follows:

Structure Site No.	Structure Site No. Structure Name	
30X-0866/B0	Highway 400 – Highway 401 Link (Bradford Bypass)	New Construction
	County Road 4 Underpass	

Construction Staging

To accommodate traffic safety and efficient construction, construction staging is required to facilitate the proposed works. The following impacts to traffic are anticipated:

- Two lanes north of 8th Line to south of 9th Line are anticipated to be maintained throughout construction.
- At 8th Line intersection, the Southbound through and right-turn lanes are to be combined during construction reducing the total available lanes from 6 to 5 lanes during Stages 4, 5, and 6 to tie-in the works in the south limits.
- At 8th Line intersection during night-time lane closures for construction, a Southbound left-turn lane will be removed reducing the total available lanes from 5 to 4 lanes in Stages 4, 5, and 6 to tie-in the works in the south limits.

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3. Waste and Excess Materials Management Plan Purpose

3.1 Purpose

There are minimum Soil Management Requirements that every Project must adhere to in accordance with O. Reg. 406/19. These requirements are listed in Part I, Section C of The Soil Rules. The purpose of the Soil Management Requirements is to prevent any cross-contamination between soils of different quality and to prevent contaminants from being released into the environment.

In addition, every project that will generate Excess Soil must have an excavation procedure that outlines what is required when observations of contaminated soil are made in the field. The requirements for these procedures are listed in Section 23 of O. Reg 406/19.

The purpose of this WEMMP is to provide guidance for the contractor during the construction of the County Road 4 Early Works. The WEMMP describes appropriate procedures for the management of soil and waste on site including, if necessary, evaluating and managing potentially contaminated and/or excess soils. This WEMMP will serve to support Soil Management Planning (SMP)before initiating any construction or development activities and will support verification that conditions of Project approval documents, applicable relevant environmental legislation, policies, permitting requirements, protocols and procedures are implemented accordingly.

The intent of this WEMMP is to provide relevant and applicable guidance as it pertains to the following key elements:

- Applicable regulatory and permitting requirements;
- Key construction personnel;
- Protocols and procedures to be employed for excavation and management of on-site soils including those that are potentially contaminated or in excess, including:
 - Retention and preservation of suitable soil for on-site use in Project reclamation/rehabilitation; and
 - Identification and management of soil impacted by existing or historical anthropogenic activities that require removal to allow development of the Project;
- Applicable environmental protection measures to be employed;
- Applicable soil transportation and reuse or disposal requirements; and
- Prevention of admixing or comingling, compaction, rutting during hauling and soil loss.

This WEMMP applies to the Project Area that will undergo changes through construction to accommodate the advancement of the Project. AECOM's understanding is that no excess soil will be excavated and transported for off-site disposal unless the excavated soil is geotechnically unsuitable and with approval from the Qualified Professional, Project Leader, and MTO's Environmental Monitor, as defined in Section 4 below. This WEMMP applies to all individuals working for or on behalf of MTO, including employees and contractors, who have a role and/or accountability for the development, implementation, and maintenance of this WEMMP.

However, material identified as contaminated or soil that cannot be reused on site may require off-site reuse or disposal. It is important to note that the regulatory regime for off-site soil transportation and reuse or disposal differs from the regulatory regime applicable to on-site soil management. These important differences are addressed further in **Section 4.2** below. Should the need for off-site reuse or disposal arise in the exceptional case, this WEMMP provides procedures and protocols for the handling and off-site transportation and reuse or disposal of potentially contaminated and excess soil.

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3.2 Performance Objectives

This WEMMP also describes the objectives and targets to be established to drive continuous improvement in environmental performance. Objectives are measurable (where practical), monitored, communicated, and updated as appropriate. MTO will establish the following performance objectives for the WEMMP that considers key Project interactions and compliance obligations:

- to utilize on-site material for the creation of berms or other usages;
- to preserve adequate volumes of topsoil for rehabilitation; and
- meet the applicable regulations and guidelines when handling, managing and disposing of contaminated soil or sediment.

4. Planning

4.1 Organizational Roles, Responsibilities and Authorities

Table 4-1 provides the roles and responsibilities of the key construction personnel with respect to this WEMMP.

Table 4-1: Conceptual Roles and Responsibilities

Role	Definition	Responsibility
Qualified Person (QP)	The person holds a license, limited license or temporary license under the <i>Professional Engineers Act</i> ; or the person holds a certificate of registration under the Professional Geoscientists Act, 2000 and is a practicing member, temporary member or limited member of the Association of Professional Geoscientists of Ontario per Section 5 of O. Reg. 153/04. The QP will be assigned by the Contractor.	 The QP will be assigned by the Contractor and is responsible for: Ensuring this SMP is followed. Assessment of soil and its appropriate use with respect to all Phase 1 activities. Regular communication with MTO on the management and use of soil within Phase 1 Project Area.
MTO Environmental Monitor	The Environmental Monitor has the authority to direct the Construction Manager or Contractor to satisfy or meet the standards outlined in the Environmental Protection Plan ¹ .	Independent of the Contractor and staff structure and is ultimately responsible to MTO.
Contractor	Any person, who is not directly employed by MTO, conducting work or other activities in relation to the Project on behalf of or at the request of MTO.	Is responsible for construction of the Project in accordance with detailed design plans and implementation of associated mitigation measures, as outlined in the Environmental Protection Plan and associated tender packages(s).
Project Leader	The Project Leader of MTO or the duly authorized agents.	Is ultimately responsible for making decisions relating to the planning and implementation of the Project.

4.2 Compliance Obligations

This plan has been developed with the assumption that no soil will be transported off the Project Area. The following applicable regulations, permits, approvals, certifications, and notifications should be examined for relevance. It is the responsibility of the Contractor to understand their obligations and relevant regulations with respect to soils movement within and outside the Project Area. The following is provided for reference purposes.

4.2.1 Regulatory and Permitting Requirements

This plan has been developed with the assumption that no soil will be transported off the Project Area. The following applicable regulations, permits, approvals, certifications, and notifications should be examined for relevance. It is the responsibility of the Contractor to understand their obligations and relevant regulations with respect to soils movement within and outside the Project Area.

4.2.2 Applicable Regulations

The Project Area is located in the Province of Ontario within the Town of Bradford West Gwillimbury and the County of Simcoe. The two tiers of government responsible for these jurisdictions (i.e., the Provincial Government of Ontario, and the Town of Bradford West Gwillimbury and County of Simcoe) develop, implement and enforce laws, ordinances and applicable regulations that govern activities and the standards applied thereto for construction projects in the Town of Bradford West Gwillimbury. Applicable regulations that may be relevant to construction-based activities undertaken as part of the Project are outlined in the following sections.

^{1.} The Environmental Protection Plan is an attachment provided in the overall Tender Package.

4.2.3 Provincial Government of Ontario

Provincial environmental legislature and associated regulations that apply to future site development and construction-based activities include but are not limited to, the following.

Table 4-2: Provincial Legislation Applicable Future Site Development Activities

Media	Regulatory Body	Legislation	Regulations/Standards/Guidelines	
All	MECP	Environmental Protection Act, R.S.O. 1990, c. E.19	 Management of Excess Soil – A Guide for Best Management Practices (January 2014) MECP Management of Excess Materials In Road Construction and Maintenance (1994), Ministry of the Environment and Energy (MOEE) On-Site and Excess Soil Management, R.R.O. 1990, O. Reg. 406/19. Classification and Exemption of Spills and Reporting of Discharges, O. Reg. 675/98 General - Waste Management, R.R.O. 1990, Reg. 347 Records of Site Condition - Part XV.1 of the Act, O. Reg. 153/04 as amended Spill Prevention and Contingency Plans, O. Reg. 224/07 Spills, R.R.O. 1990, Reg. 360 Waste Audits and Waste Reduction Work Plans, O. Reg. 102/94 Ontario Regulation 103/94: Industrial, Commercial and Institutional Source Separation Programs Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, ²011 Ambient Air Quality Criteria (point of impingement, 24-hour AAQC) Ontario Provincial Standard Specification (OPSS) 180: General Specification for the Management of Excess Materials (Nov. 2011) 	
		NA	 Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996 (MOE 1996 Guidance Manual) 	
		NA	Ontario Provincial Standards for Roads and Public Works	
Materials Handling	NA	Technical Standards and Safety Act (TSSA)	 Fuel Oil Regulation, O. Reg. 213/01 Liquid Fuels Regulation, O. Reg. 217/01 Gaseous Fuels Regulation, O. Reg. 212/01 Compressed Gas Regulation, O. Reg. 214/01 Propane Storage and Handling Regulation, O. Reg. 211/01 	
Groundwater and Soil (Specific)	Ontario Ministry of the Environment	Ontario Water Resources Act R.S.O. 1990, c. O.40	■ Wells, R.R.O. 1990, O. Reg. 903	

4.2.4 Regulatory Requirements for Off-Site Soil Management Activities

No off-site soil transportation or reuse or disposal is planned in relation to the Project. The Contractor is expected to make all reasonable efforts to find suitable locations within the Project Area (see **Appendix B**) to reuse or place excess soil. However, in the event that excess soils cannot be re-used or placed on site and/or if contaminated soils are encountered that cannot be re-used or placed on site, off-site transportation and reuse or disposal may be considered. Any off-site transportation and reuse or disposal of soils from within the Construction Limits must be approved by the QP, Project Leader, and MTO's Environmental Monitor prior to commencing any off-site soil management activity.

Soil management activities that may occur outside of the Construction Limits, such as the off-site transportation and reuse or disposal of contaminated or excess soils in the unplanned event such activity is required, would be subject to provincial and local legislation. Compliance with applicable legislation and regulation, including obtaining all

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necessary permits, approvals, certificates, or other authorizations, including payment of any associated fees, will be the responsibility of the Contractor for any and all off-site soil management activity outside the Construction Limits.

Provincial and local legislation that may be applicable to off-site soil management activities are summarized in Table 5-3. Note this is not an exhaustive list. It will be the responsibility of the Contractor to confirm and comply with all applicable legislation and regulation.

Table 4-3: Provincial and Local Legislation Potentially Applicable to Future Off-Site Activities

Media	Regulatory Body	Legislation	Regulations/Standards/Guidelines
For Soils Transported outside Construction Limits ²	Ministry of the Environment, Conservation and Parks	Environmental Protection Act, R.S.O. 1990, c. E.19	 Management of Excess Soil – A Guide for Best Management Practices (January 2014) MECP Management of Excess Materials in Road Construction and Maintenance (1994), Ministry of the Environment and Energy (MOEE). On-Site and Excess Soil Management, R.R.O. 1990, O. Reg. 406/19. Rules for Soil Management and Excess Soil Quality Standards (The Soil Rules). General – Waste Management, R.R.O. 1990, Reg. 347 Valid operating licenses and permits for each proposed disposal/receiving facility prior to commencing transportation of materials from the site. Valid operating licenses, certifications and permits from each carrier for all proposed transport vehicles/containers prior to entry to the site. Supporting information, payment of associated fees, and implementing and managing document control procedures and protocols for the appropriate disposal of waste materials generated as part of construction-based activities.
	Receiving Landfill	Varies	■ Licensed landfill sites can implement their own requirements beyond those outlined in this WEMMP or O. Reg. 406/19 in order to accept Excess Soil that is designated as waste. These requirements are developed on a landfill-by-landfill basis. As such, supplemental sampling beyond what is outlined in the SMP (e.g., additional leachate analysis), may be required to dispose of Excess Soil that is designated as waste.

As of January 2021, certain requirements of O. Reg 406/19 for excess soil management came into force. Excess soil as defined by this regulation means "Soil, crushed rock, or soil mixed with rock or crushed rock, that has been excavated as part of a project and removed from the Project area for the project". Project Area as defined by this regulation means "in respect of a project, a single property or adjoining properties on which the project is carried out". Based on these definitions soil that is excavated within the Project Area and reused in the Project Area is not considered excess soil under this regulation.

In addition to compliance with any provincial or local legislation or regulation that may apply to off-site transportation and reuse or disposal of soils, the Contractor must comply with the practices and procedures outlined in **Section 6.3** regarding beneficial reuse and **Section 6.4** regarding off-site transportation and reuse or disposal.

^{2.} Soil shall not be transported off-site without the approval of the QP. Engineer, and MTO's Environmental Monitor.

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5. Support

5.1 Identification / Inventory of Resources

5.1.1 Historical Soil Quality Data

A Contamination Overview Study (COS) was completed by AECOM in advance of the Preliminary Design study for the Bradford Bypass. The study area consisted of the 16.2 km proposed route for Bradford Bypass (Highway 404 to Highway 400 Link) starting from Highway 400 easterly to Highway 404 and includes the lands within a 500 m buffer on either side of the proposed Bradford Bypass Right-of-Way (ROW). The COS covered the Early Works Study Area. The COS report was completed based on a desktop review of available historical records and documented.

The Ministry of Environment, Conservation and Parks (MECP) has also prepared a list of processes and operations that historically posed a higher risk of environmental impact, referred to as "potentially contaminating activity" (PCAs) as listed in Table 2 of Schedule D of O. Reg. 153/04. These PCAs must be identified and evaluated when preparing Phase I ESAs for filing Record of Site Conditions. In general, these PCAs are considered to represent "high" potential for contamination, unless other information supports assigning a lower risk.

Based on the COS findings, the following two properties were identified with a high potential for contamination based on the past and current "potentially contaminating activity" (PCAs) within the Early Work Study Area. The Early Works Study Area and Contamination Potential Ratings are presented in **Figure A**.

Parcel Identi (PID)	ifier Address	Occupant/Site Description	Risk Rating Rationale	PCA Description
172	3001 Yonge Street	GFL Environmental/ Charter Construction/ Hulst Town Contracting	Waste management services	Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners
1350	305 Barrie Street	Commercial Plaza	Based on 1994 City Directories, Panda Cleaners (possible dry cleaners) was listed as a shop in the commercial plaza.	Operation of Dry Cleaning Equipment (where chemicals are used)

5.1.2 Characterization of Soils in Project Area

The following summarizes the results of a geo-environmental program undertaken by AECOM in June 2021-October 2021, which provides a description of soils quality within the Project Area. The environmental program was undertaken in conjunction with the Foundation Investigation and Design Report investigation undertaken by Golder Associates Ltd. (Golder). A total of twenty two (22) boreholes (CR4-01 to CR4-13, HF-01 to HF-05 and CV1-01 to CV1-04) were advanced, the borehole locations and borehole logs can be found in **Appendix B** and **Appendix C** of this report and also within the separate geotechnical report, on file with the MTO. The soils sampling program was completed to according to O. Reg. 406/19. Locations of the boreholes for soil sampling were chosen where the properties identified high or medium risk of contamination based on the Contaminated Overview Study (conducted by AECOM).

5.1.2.1 Soil Sampling Program and Procedures

The borehole drilling program was supervised by Golder and environmental soil samples were collected by AECOM staff during the drilling program. AECOM collected twenty-nine (29) soil samples from eleven (11) boreholes out of twenty two (22), which were selected due to their proximity to the PCA's. The samples were taken within the depth range 0.7 to 2.0 m bgs and submitted for laboratory analyses as shown below in **Table 5-1**.

Sample ID	Analytical Parameters
HF-04-SS-2, CV1-03-SS-2, CR4-04, HF-02, CR4-11, CR4-02, CR4-09-SS2	Selected Inorganic Parameters and Metals and Inorganic (M&I)
HF-04-SS-2, CR4-04, CR4-07, CV1-04, CR4-06-SS2, CR4-09-SS2	Polycyclic Aromatic Hydrocarbons (PAHs)
HF-04-SS-2, CR4-07, CR4-11	Petroleum Hydrocarbons in Fractions F1 to F4 (PHCs)
HF-04-SS-2, CR4-07	Volatile Organic Compounds (VOCs)
HF-04-SS-2, HF-02, CR4-06-SS2	Polychlorinated Biphenyls (PCBs)
HF-02, CR4-02	Synthetic Precipitate Leaching Procedure (SPLP) Metals
CR4-07	SPLP VOCs
CR4-06-SS2	Organophosphorus Pesticide
CR4-06-SS2	Organochlorine Pesticides
CR4-07	SPLP PAHs

Table 5-1: Analytical Parameters Tested on Samples

Soil samples were screened for combustible organic vapours using a RKI GX-6000 photoionization detector (PID), which was calibrated using isobutylene. Soil vapours readings ranged from 0 to less than 50 ppm in all soil samples across the site. In addition, field staff looked for potential visual indicators of soil contamination including staining or soil odours during the collection of samples; however, none were observed in the samples. Therefore, representative samples were submitted for laboratory analysis for PAHs, PHCs F1-F4, PCBs, VOCs, metals and inorganics, and mandatory testing of SPLP to support the requirements under O. Reg 406/19.

SPLP PCBs

O. Reg. 558 - Benzo(a) pyrene

5.1.2.2 Regulatory Framework for Evaluation of Soil Quality

The soil chemical analysis results were evaluated with respect to the MTO requirements for soil management as follows:

- O.Reg. 406/19, Appendix 1, TABLE 2.1: Full Depth Excess Soil Quality Standards in a Potable Groundwater Condition for Industrial/ Commercial/ Community Property Use uses with coarse type of soil condition (Table 2.1 standards).
- O.Reg. 406/19, Appendix 2, TABLE 2.1: Leachate Screening Levels for Full Depth Excess Soil in a Potable Groundwater Condition for Industrial/ Commercial/ Community Property Use uses with coarse type of soil condition.

5.1.2.3 Soil Analytical Results

HF-02

CR-07-COM

Based on results of analysis, the concentration of several PAHs exceeded the applicable MECP Table 2.1 Standards in shallow soil samples mainly in fill material collected from HF-04-SS-2, CR4-04, and CR4-07 from the depth interval 0.7-2.0 m bgs. In addition, Sodium Adsorption Ratio (SAR) exceeded MECP Table 2.1 Standards in shallow soil samples collected from HF-02 from depth interval 0.7-1.5 m bgs. **Table 5-2** Shows soil samples exceedances in comparison to MECP Table 2.1 Standards.

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Table 5-2:	C	- t C - : I	Camania	Exceedances
I anie 5-7.	Summarv	OT SOII	Samnies	EXCEPHANCES

Borehole	Exceedance	Criteria	Result
HF-04	Anthracene	0.16	0.53
	Benzo(a)pyrene	0.31	0.38
CR4-04	Naphthalene	0.2	0.79
	Acenaphthylene	0.093	0.41
	Anthracene	0.16	3.00
	Fluoranthene	2.8	6.84
	Benz(a)anthracene	0.92	4.62
	Benzo(b)fluoranthene	3.2	5.22
	Benzo(a)pyrene	0.31	4.07
	Indeno(1,2,3-cd)pyrene	0.76	1.42
	Methylnaphthalene 2-(1-)	0.59	1.21
CR4-07	Naphthalene	0.2	0.62
	Acenaphthylene	0.093	0.13
	Anthracene	0.16	1.19
	Benz(a)anthracene	0.92	1.58
	Benzo(a)pyrene	0.31	1.36
	Dibenzo(a,h)anthracene	0.7	0.72
	Methylnaphthalene 2-(1-)	0.59	1.05
HF-02	SAR*	12.0	12.2

Notes: * Results with salt related exceedances Criteria = MECP Table 2.1 standards, referenced in O. Reg. 406/19 All units in micrograms per gram (ug/g), unless otherwise specified.

No other contaminants analyzed exceeded the MECP Table 2.1 standards from the soil samples collected from the eight drilled boreholes at the investigated Site. The concentrations of PHCs, VOCs, PCBs, and M&I (except SAR) were non-detect and/or below applicable criteria in soil samples collected from all boreholes. Also, all SPLP soil sample's analytical results were below the Table 2.1 screening level criteria.

For off-site waste management considerations, one composite soil sample was prepared from CR4-07 and HF-04 and submitted to the laboratory for PAH Toxicity Characteristic Leaching Procedure (TCLP) testing. Based on the results of laboratory analyses, the soil sample is classified as non-hazardous solid waste in accordance with O. Reg. 347, Schedule 4 Leachate Quality Criteria for non-hazardous material.

Appendix B – Borehole Location Plan; **Appendix D** – The Certificate of Analysis on the collected soil samples.

5.1.3 Waste and Excess Materials Identification and Classification

Based on the age and materials used for buildings on properties and two culverts within the Project Area, there is potential for designated substances to be present. Should buildings be identified for demolition by MTO, a Designated Substance Survey (DSS) should be completed to ensure proper handling and disposal of materials.

The asphalt levelling course on County Road 4 may contain asbestos and prior to construction, asphalt core samples should be collected and tested for asbestos. If asbestos containing materials are found, an asbestos abatement plan should be implemented according to MTO standard special provision 101 F21 'Occupational Health and Safety Compliance - List of Designated Substances', that is included in the MTO construction tender documents in accordance with the Occupational Health and Safety Act of the presence of designated substances.

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5.2 Competence, Training and Awareness

Prior to construction, the Contractor and any sub-contractors shall attend an Environmental Orientation, to be developed by the Project Leader and the MTO Environmental Monitor. The Contractor will be responsible for ensuring all personnel on the Site are informed on the contents of the Plans and the Environmental Orientation Program. The Contractor must ensure that all new employees and/ or subcontractors receive the Environmental Orientation training prior to them conducting any activity on site.

Competence of a person means they hold a license, limited license or temporary license under the Professional Engineers Act, 1990 or the QP holds a certificate of registration under the Professional Geoscientists Act, 2000 or is a practicing member, temporary member or limited member of the Association of Professional Geoscientists of Ontario per Section 5 of Ontario Regulation 153/04.

5.3 Internal and External Communication

A communication protocol shall be developed by the Engineer and provided to the Contractor. The Contractor will be required to follow the Communication Protocol, including any notification requirements. The Protocol will include but not be limited to the following:

- Schedule of the construction activities, including construction activities that generate noise, light trespass or dust;
- 2. Process for notification in the event of any accidents and malfunctions;
- 3. Process for notifying the public of any night-time construction activities;
- 4. Details for receiving complaints related to noise, light, dust, fumes or any other complaint; and
- 5. Process for how a member of the public can record a complaint.

6. Implementation of Mitigation Measures

6.1 General Approach

The following provides the relevant protocols and procedures for Project Area soil management. Given the results of the Soils Chemical Analysis as described in **Section 5.1** above, additional soil sampling programs may be required to investigate the extent of the soil impact based on the proposed locations of the excavation. It is anticipated that most of the excavated soils can be re-used on Project. This will need to be confirmed by the Contractor and QP.

If contaminated soils are encountered during construction, the Contractor must notify the MTO Environmental Monitor and the Project Leader. The suitability of re-using that soil must be determined before re-using it in accordance with O. Reg 406/19.

If excavated soil is deemed unsuitable for backfill operations due to environmental conditions, the Contractor shall proceed to stockpile the material in the appropriate location assigned for unsuitable material on site (refer to **Appendix A**). The Project Leader, and MTO's Environmental Monitor can direct the contractor, whether the soil is required to leave the site or can remain on site with the additional approval of the QP. No soil may be transported off-site without authorization from a designated QP, the Project Leader and MTO's Environmental Monitor during construction work. Refer to **7.3** for more detail.

6.2 Soil Excavation and Salvage

6.2.1 Cut/ Fill Locations

The major areas that require cut/fill include the grading for the road winding, as well as the areas designated County Road 4 Underpass. The estimated volume of excess material for the entire Project throughout each stage is estimated to be 21,000 m³. The estimated quantity of material that could be reused or placed within the Project Area is unknown at the time of this report.

6.2.2 Topsoil

For the purposes of this WEMMP, topsoil includes those horizons in a soil profile containing organic material typically comprised of deposits of partially decomposed organic matter. Subsoil consists of the soils which occur below the topsoil.

Topsoil stripping will be based on, but not limited to, the following considerations and constraints.

- Topsoil will be stripped and stockpiled in accordance with the Grading Plan for all permanent and temporary construction areas after areas have been cleared of vegetation.
- Topsoil stripped during the site preparation program is not considered suitable for reuse in any application other than general landscaping on the site. The topsoil can be used for landscaping within diversion channel and swales, and the construction of landscaped berms.
- Any topsoil to be salvaged will be stripped during dry periods to the greatest extent practical. Topsoil will be stored in accordance with the sediment and erosion control measures described in the Environmental Protection Plan (EPP) and contract specifications, until it is required for site reclamation.

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- Topsoil piles shall be marked with appropriate signage to prevent accidental admixing. Topsoil shall not be imported to or exported from the site unless it satisfies the requirements of the Aggregate Resources Act.
- Topsoil from the natural areas will be separated from other topsoil stockpiles so that it may be used for restoration of the areas from which it was removed, to the extent possible.
- Replace topsoil as evenly as possible over areas of the construction area to be reclaimed where topsoil salvage was conducted. Postpone replacing topsoil during wet weather or high winds to prevent damaging soil structure or erosion of topsoil.
- Subsoil will be stored separately from topsoil with a minimum of 1 m separation of the piles
- Blade rutted topsoil flat prior to topsoil replacement.
- To prepare restoration areas for seeding, spread, loosen and fine grade topsoil. Topsoil shall be prepared for planting at a depth of 0.3 m unless otherwise specified.

6.3 Handling and Storage of On-Site Soil

The following outlines the requirements for handling, transporting, and storing on-site soil.

6.3.1 General Handling and Storage of Soil

6.3.1.1 Laydown Areas

It is the responsibility of the Contractor and MTO to determine the best strategy for the movement of soil across the Project Area. Double handling of soil is to be minimized to the extent possible.

Soil shall not be placed in locations where there is direct drainage to that location. The drainage at the laydown located need to be managed appropriately to avoid localized flooding and/ or erosion of these storage areas.

6.3.1.2 Site Access and Movement

Site access and movement will be based on, but not limited to, the following considerations and constraints:

- The Contractor must keep within the designated construction limits and not travel from different areas of the Project Area using the public road network for movement of soil.
- The Contractor should limit the crossing of any watercourse to pre-determined locations to aid movement within the Project Area. Should other temporary crossings be required for any other fish-bearing watercourse, the Contractor shall develop a plan and submit to the MTO Environmental Monitor for approval. Approval must be received before implementation. These temporary crossings of any watercourse will not be accessible once the realignment and restoration of the watercourse is complete. Work shall be undertaken in compliance with the *Fisheries Act* and any permits or approvals. The Contractor shall move the soil within Construction Limits. The off-site soil storage and movement is descripted in the **Section 6.4**.

6.3.1.3 Stockpiles

Stockpiles within the Project Area will either be re-used for engineered or for other purposes (e.g., topsoil/slope flattening). Some stockpiles may be required for a short period of time, but in some instances, it may be necessary to stockpile earth material for an extended period. Stockpile locations are to be limited to the Laydown Areas outlined in **Section 7.3.1.1**.

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Stockpile locations within the Laydown Areas will be based on, but not limited to, the following considerations and constraints.

- Excavated earth that is not to be utilized immediately will be temporarily stockpiled in a manner that does not cause an adverse environmental effect or impair water quality.
- There will be minimal stockpiles of earth and granular material on-site in order to limit/ avoid double handling of material.
- A stockpiling location will generally be in proximity to where the material will be ultimately used.
- Earth will not be placed in locations where there is direct drainage to that location.
- Stockpiled materials near any watercourse will be stored and stabilized at least 30 m away from the watercourse.
- Soil must not be stored within 10 m of the construction limits unless any of the following apply:
 - 500 m³ or less will be stored
 - Soil storage will be less than 1 week
 - There is a physical barrier between the excess soil and the Construction Limits; or
- Stockpile management will be based on, but not limited to, the following considerations and constraints.
- Implement measures, during construction, to avoid the introduction or spread of invasive vegetation with the Project Area, including from equipment brought on-site from other worksites and from imported fill. In doing so, take into account Ontario Invasive Plant Council's Clean Equipment Protocol for Industry.
- Stockpiles with invasive species may be tarped to facilitate the invasive species deterioration.
- Stockpiles shall be temporarily seeded to reduce erosion if left exposed or inactive for more than 30 days.
- Measures to prevent the mobilization of stockpiles will be employed using silt fences and other erosion control methods in accordance with the Erosion and Sediment Control Plans and approved by MTO's Environmental Monitor.
- For stockpiles left on-site long-term (more than one month) and where erosion and sediment control measures are required to manage on-site runoff water, the Contractor shall maintain such measures to ensure their effectiveness. Silt fencing installed around soil stockpiles must maintain a minimum 1 m distance from the toe of the stockpile.
- Additional erosion and sediment control measures will be inspected on a weekly basis and after a major precipitation event. The Contractor is responsible to correct any identified deficiencies in a timely manner.
- The stockpiles should be monitored to ensure that stockpiles remain intact and that there are no environmental adverse effects, erosion issues, or other concerns.
- Soil stockpiles of any type must be stored with slopes 70 degrees or less from April 15 until July 15 (MNRF, 2017) to prevent Bank Swallows (*Riparia riparia*), a bird Species at Risk, from nesting in the stockpiles. If not permittable, the contractor shall implement exclusion techniques such as tarping of slopes.
- Soils shall be handled and stored during construction in a manner that protects soil quality for re-use.

6.3.1.4 On-site Reuse of Soil

Decisions on re-using stockpiled soil to backfill the excavations or for grading within the Project Area will be determined in accordance with the project specifications and will be based strictly on the suitability of soil for use in backfilling construction excavations or as structural fill. The Contractor is responsible for the reuse of soil within the Project Area to the extent possible.

6.3.2 Environmental Protection Measures

The following provides the relevant environmental protection measures with respect to the management of soil within the Project Area. These recommendations should be read in conjunction with other Project reports including the Erosion and Sediment Control Plan, the Final Design-Build Ready Reference Design, Early Works Report and applicable drawings provide additional measures for the management of soil to reduce potential environmental effects during construction.

6.3.2.1 Dust Suppression

During all phases of the Project, the following measures to mitigate fugitive dust emissions must be implemented:

- Use of dust suppressants with the least potential for adverse environmental effects when conducting any project activity that may generate dust.
- Not handling non-enclosed granular materials during sustained high wind conditions.
- Covering or enclosing sources of granular materials stored in open containers within the Project Area.
- Building and managing temporary and permanent roads and parking lots located within the Project Area to reduce fugitive dust emissions from dirt surfaces, including through paving and the removal of loose materials on road surfaces.
- Establishing speed limits of no more than 30 km/hour on temporary and permanent roads located within the Project Area and requiring that all persons abide by these speed limits.

Such activities should be co-ordinated with the Contractor's Air Quality Best Management Practices, including the monitoring of dust during construction through the use of mobile detectors to inform on the location and timing of construction activities that may result in adverse effects and corresponding implementation of targeted dust suppression measures.

6.3.2.2 Erosion and Sediment Control

During all phases of the Project, the following measures to mitigate sedimentation and erosion must be implemented with respect to soil management:

- Follow the Erosion and Sediment Control Plan for Construction and corresponding Erosion and Sediment Control Plan for the stream realignment work.
- No work will be permitted on site until all such erosion and sediment control devices are properly installed.
- Maintain all erosion and sediment control devices to the satisfaction of MTO's Environmental Monitor.
- Trapped sediments and controls are to be removed only after the soils of the construction area have been stabilized and adequately re-vegetated, unless sediments have accumulated to a depth of 1/3 the height of the sediment control device.
- The Contractor shall remove accumulated sediment to the level of existing grade, in a manner that avoids sediment release to the downstream side of the sediment control device. The disposal location

and method of disposal of removed sediment must be approved by MTO's Environmental Monitor. All sediment control devices shall remain in place until after the surrounding ground has been permanently stabilized according to the Contract Drawings.

- Any stockpiled material must be deposited, stored, and contained in a manner to ensure sediment does not enter a water body and will be appropriately stored, as approved by MTO's Environmental Monitor. Areas containing exposed soil or stockpiled material will be isolated using appropriated sediment control devices to prevent the entry of sediment into the watercourse.
- All activities, including maintenance procedures, will be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substance into the water. Vehicular refuelling and maintenance will be conducted a minimum of 30 m away from any aquatic areas to avoid potential impacts, in the event that an accidental spill occurs.
- Periodically inspect all erosion and siltation control devices in accordance with requirements.
- Remove temporary erosion control devices upon completion of work.

6.3.2.3 Restoration

The Project will be restored in phases (i.e., progressive restoration), such that restoration of disturbed areas is completed as soon as possible following the completion of contraction activities in the corresponding areas. To achieve this outcome, the following measures will be taken during restoration activities with respect to soil management:

- Regrade areas with vehicle ruts, erosion gullies or where there has been subsidence. Regrade streambanks, and approaches to a maximum of 1:3 (rise over run), unless otherwise directed by a QP or as specified in Project-specific regulatory authorizations.
- Blade rutted subsoils flat prior to topsoil replacement
- Damaged Soil: Disc, till or cultivate ripped subsoils to break up lumps and to smooth the surface. To reduce further compaction, limit discing to what is necessary to break up clods. Till or cultivate soil and any severely compacted or rutted areas to loosen compacted soil.
- The contractor shall remove any felled trees, debris, or soil inadvertently deposited below the high watermark of a watercourse within one working day.
- In restoration areas, topsoil shall be prepared in accordance with the Natural Channel Design.
- To prepare restoration areas for seeding, spread, loosen and fine grade topsoil. Topsoil shall be prepared for planting at a depth of 0.3 m unless otherwise specified.

6.4 Handling and Storage of Excess Soils (Off-Site)

The Contractor shall reuse excess soil within the Project Area to the extent possible. Remaining excess soil shall be re-used or placed in the creation of berms at locations to be determined by the QP, Project Leader and MTO's Environmental Monitor. In some instances, on-site reuse of soil may not be possible. In these instances, with the consultation and approval of the QP, Project Leader and MTO's Environmental Monitor the soil may be reused offsite or if that is not possible, disposed off-site.

Stockpiles of excess soil deemed unsuitable for use in any application after all construction excavations have been backfilled and grading completed within the Project Area and as approved by the QP, Project Leader and MTO's Environmental Monitor, must be transported to an off-site disposal facility or approved off-site reuse receiver in accordance with the applicable regulations, including O. Reg. 406/19. Transportation and reuse or disposal of excess soil should follow an Excess Soil Management Plan (ESMP) developed by the Contractor and approved by

MTO prior to transport of reuse or disposal of the soil. All documentation (bills of lading, waste manifests, waste characterization, etc.) are to be maintained on-site, and copies shall be provided to MTO and the QP. When required, off-site reuse or disposal details should be included in the ESMP by the contractor outlining specific procedures and protocols for soil sampling. No soil removed from the site may be disposed of off-site or re-used at any location other than the Project Area and/or off-site location permitted to accept the soil. Approval by the QP is required prior to the removal of any soil from the site. Preference will be given to reusing soil instead of disposing of soil at a landfill, if the geotechnical quality of the soil is deemed appropriate for reuse. Large debris and solid waste material such as foundations, concrete, field stones, cobble stones, wood or metal shall be separated from the soil by mechanical means and salvaged for on-site/off-site reuse or disposed off-site separately as solid waste at a facility permitted to receive construction/ demolition debris.

Any excess soil should be sampled according to a Sampling and Analysis Plan that is prepared by the QP based on O.Reg. 406/19 and at a minimum, soil samples must be analyzed for the following parameters: PHCs, and metals (including lead), salinity (if there are any intended agricultural receiving sites), inorganics, pH and grain size. Additional analysis may also be required for leachate if any substances with published Leachate Screening Levels in the Soil Rules are identified as COCs within the Project Area.

Assuming excess soil is stockpiled, appropriate bulk soil sample frequencies should comply with "Records of Site Condition - Part XV.1 of the Act, O. Reg. 153/04 as amended, Table 2 Minimum Stockpile Sampling Frequency". This is a requirement of O. Reg. 406/19.

All sampling and decontamination procedures, laboratory analytical methods, and protocols and procedures will be consistent with those established by the MECP, as documented in "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996" (MOE 1996 Guidance Manual). Representative samples should be collected in containers supplied by a Canadian Association for Laboratory Accreditation (CALA) - accredited laboratory.

Based on the results of the analytical testing of soils within the Project Area, excess materials should not be reused off-site at a residential, commercial, or industrial property without further verification sampling or acceptance of that material according to the ESMP for the receiver site that is completed by the Contractor and approved by MTO. It should be noted that the private receiver site may require additional testing to satisfy the Excess Soil Quality Standards published in the Soil Rules; which may require the collection and analysis of soil for select Synthetic Precipitation Leaching Procedure (SPLP) parameters to meet O.Reg. 406/19 before soil are exported and accepted. The Contractor will follow the proper screening for excess soil if any is deemed to require off-site reuse or disposal. When soil suspected of being potentially contaminated are observed during construction, the contactor should inform the QP. Additional testing should be conducted to further characterize the contamination based on the QP's recommendation to determine suitability for reuse on-site or disposal.

6.4.1 Off-site receiving Sites for Beneficial Reuse

Should on-site reuse not be possible, the Contractor shall make all reasonable attempts to locate a suitable off-site beneficial reuse receiver. Only as a last resort shall disposal of excess soil at landfill will be undertaken. Reuse at off-site beneficial reuse receivers shall be communicated to MTO and the Contractor shall verify and document that the receiver is operating under appropriate by-laws, permits and regulations and that the quality of material being reused is suitable for their operation. Copies of all agreements, hauling record, bills of lading, weigh bills, analytical results shall be forwarded to MTO and/or Contract Administrator. A copy of the hauling record must be retained on behalf of the MTO and confirmation of receipt of the excess soil at the destination site must be obtained by the hauler a copy of the final record must be retained by all parties for two years.

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Receiving sites identified for beneficial reuse of excess material will be screened in advance and will require approval by the QP. As part of the screening process, the QP will ensure that receiving site criteria, and legislative and regulatory requirements are withheld. If excess soil is to be transported off MTO property for beneficial reuse at a receiving site, each load should be accompanied by documentation from the QP that summarized or provides (as a minimum):

- The sampling and segregating work done,
- The excess soil data pertaining to the suitability for the excess soil for reuse,
- The receiving site soil date pertaining to the suitability of the excess soil for reuse at the receiving site,
- A statement from the QP that the soil should be used for beneficial reuse and is not likely to cause a negative effect on human health or the environment; and a statement from the QP confirming the land use of the receiving site matches the intended use/ suitability of the excess soil

Before the soil has been shipped and received at the receiving site, MTO requires written documentation from the owner of the receiving site confirming acceptance of the soil and the owner's understanding of the soil quality and quantity. The following must be kept on file for future reference as out lined in OPSS.MUNI 100:

- A record of the exact location where the soil is deposited on the Receiving site;
- Landowner/ facility names and civic addresses;
- Date of disposition;
- Quantity (bill of lading);
- Soil sampling results; and,
- QPs confirmation of appropriateness of excess soil for Receiving Site.

6.4.2 Handling and Storage of Contaminated Soil

If potentially contaminated soil is encountered based on organic vapour monitor, odours, soil discolouration, buried containers or other materials contributing to a potential release, etc., the Contractor must inform MTO and the QP. The following provides guidance with respect to contaminated soil management within the Project Area.

6.4.2.1 Soil Testing

A thorough understanding of the contaminants that may be encountered and appropriate means and measures for handling and managing excavated materials should be contemplated in advance of undertaking excavation activities of suspected contaminated soils. Contaminated soil is soil that exceeds the applicable MECP Table 2 Site Condition Standard (MECP, 2011).

A procedure for soil testing, if soil that is observed to be potentially contaminated is encountered during excavation shall be developed by the QP, in accordance with the project specification. If potentially contaminated soil is encountered during excavation, the contractor shall notify MTO and the QP and the above noted procedure shall be implemented by the Contractor.

6.4.2.2 Temporary Soil Storage Site

The Contractor shall stockpile all suspected contaminated soil in a designated Temporary Soil Storage Site (TSSS) in such a manner as to protect existing surface, materials and structures from contamination, runoff surface water and, as result, erosion. Intermediate staging of contaminated soils elsewhere within the Project Area is strictly prohibited. If the designated TSSS cannot be used for any reason, the Contractor must consult with the QP to determine an alternative, if possible. The QP should notify MTO of any changes.

The TSSS should be designed by the QP and constructed by the Contractor. Once designated, the surface soils (up to 1.5 m depth) of the TSSS will be sampled to establish a baseline of environmental conditions. Depending on

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the size of the TSSS, between three and eight samples will be collected and submitted for chemical analysis of PHCs in F1-F4, VOCs, PAHs, metals and inorganic parameters, including pH. Samples will be collected using either hand auger or by excavation of shallow test pits.

The design of the TSSS will include: a minimum of 10-mil (10 thousandth of an inch) nylon reinforced polyethylene sheeting serving as an impermeable/low permeable barrier to contain stockpiled potentially contaminated excess soils; a 0.5 to 1 m high berm of baled hay or clean fill with the 10-mil nylon reinforced polyethylene sheeting extended over the berm, reaching the exterior ground surface; and consider how the potentially contaminated soils will be transported and stockpiled without compromising the berms (controlling runoff/run-on) or causing potential cross contamination (e.g., migration of contaminants outside the TSSS). If more than one sheet of polyethylene is needed to line the ground beneath the TSSS, each section of sheeting must overlap by at least 1 m. As necessary, the TSSS will be designed with a sump pump to remove any accumulated water from the TSSS and temporary store it for proper discharge. In addition, should contaminated soil be encountered that the QP or MTO consider a potential source of groundwater contamination, then these soils will either be:

- Placed in a separate cell in the TSSS, or;
- Placed directly into a lined roll-off and properly disposed of at a licensed landfill facility.

Following the use of the TSSS, confirmatory surface soil samples (up to 1.5 m depth) will be collected and submitted for chemical analysis of PHCs, VOCs, PAHs, pH, metals and inorganic parameters to verify the quality of soil in this area. These sample results will be compared to the baseline samples to verify the area was not contaminated through the use of the TSSS. If needed, shallow remedial excavations can be completed to return the TSSS area back to original condition.

6.4.2.3 Excavation and Management

If necessary, the excavation of contaminated soil, segregation and processing will be overseen by the QP or a designate of the QP, and any additional excavations/removal of impacted soil will require approvals from MTO, as well as a management plan and document for the additional work.

When excavation and/or trenching are required at a suspected contaminated location, appropriate management of the contaminated solid or semi-solid material (such as soil or sludge) is required. Concerns for excavation and management of impacted soil relate to the potential for transfer of contaminants during materials handling and transportation activities. Transfer of contaminants may occur due to:

- Excavation, storage, sizing etc. and the potential for dust and volatile emissions from the contaminated media;
- High potential for fugitive dust emissions due to movement of equipment at the site;
- Leaching contaminants from contaminated soil to surface and groundwater water can occur from unlined and uncovered stockpiles and excavated pits;
- Migration of contaminants to uncontaminated areas may occur during transportation;
- Improper handling and reuse or disposal of contaminated soil may allow contaminants to migrate into and pollute uncontaminated areas.

Excavation and trenching primarily involves equipment that is widely used in the construction or non-hazardous solid waste disposal industries, such as excavators, earth movers or backhoes, dump trucks, and containers of various shapes, sizes, and materials.

General guidance and best practice measures to prevent potential transfer of contaminants during excavation, material handling and transport of contaminated material include the following:

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- Entry to the active work area should be limited to avoid unnecessary exposure and related transfer of contaminants.
- Traffic should be minimized on contaminated soil.
- Surface drainage and subsurface utility systems should be identified.
- Any runoff should be prevented from entering and mixing with on-site contaminated media by building earthen berms or adopting similar other measures on the TSSS and on the site, where needed.
- Provisions should generally be made to capture surface water runoff by diverting it to a controlled depression-area or lined pit on the TSSS and on-site, where needed.
- Fugitive dust emissions should be controlled during excavation both on the TSSS and on-site, where needed, by spraying water or other materials to keep the ground moist or covered. During wet weather or rainfall no water spraying would be needed. Materials for dust control must be approved by the QP prior to use on the site.
- Appropriate personnel and equipment and decontamination procedures should be employed as required to keep the site-related contaminants within the TSSS and the Project Area.
- Covers and liners should be used at all times when contaminated materials are being stored at the TSSS. Covers should be used on trucks that are moving materials around and from the site.
- Any equipment that is involved in earthwork activities or that may have come into contact with waste or any potentially contaminated material must be decontaminated prior to being removed from the Site or TSSS.

General guidance and best practice measures for the storage of contaminated soil include the following:

- For contaminated suspected soil, soil must be stored in a manner that prevents potential contaminants from leaching into the groundwater.
- Potentially contaminated soil will be protected to prevent the infiltration of precipitation and/or generation of runoff.
- If determined necessary by a QP, soil from the Project Area that require sampling needs to be kept segregated from soil that has already been sampled.

6.4.2.4 Reuse of Contaminated Soil

In the event that contaminated soil are encountered during construction, the suitability of reusing the soil should be determined before it's re-use. The contractor must consult with the QP and the MTO Environmental Monitor prior to re-using contaminated soil on-site. In general, contaminated soil may be re-used on-site for backfilling construction excavations/or as structural fill, as deemed appropriate by the QP subject to approval from MTO the Project Leader and MTO's Environmental Monitor.

Contaminated soil must be stockpiled as close as possible to the location from where it was excavated or placed in a separate cell in the TSSS to ensure it is isolated from stockpiled clean material and is clearly identifiable. Contaminated soil may only be re-used in areas that will be advised by the QP with approval from the Project Leader and MTO's Environmental Monitor according to the provincial and local authority standards. The contractor shall maintain a log to document the final disposition of contaminated soil re-used on-site, if any.

Contaminated soil will not be replaced beneath the groundwater table under any circumstance. In addition, if contaminated soil is encountered that the QP, notify MTO immediately and then - consider a potential long-term source to groundwater contamination, then these contaminated soils may not be re-used in the Project Area in their

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current state. In the event contaminated soil is found below the water table, the contractor should contact MTO first for potential remedial actions. This soil should be either:

- Placed in a separate cell in the TSSS; and
- Placed directly into a lined roll-off container.

In the event that off-site disposal is required, with prior approval from the QP, Project Leader and MTO, the Contractor shall dispose of soil not suitable for reuse according to proper disposal requirements, taking into account Ontario's *Management of Excess Soil- A Guide for Best Management Practices* (MECP, 2014) and O. Reg. 406/19, including the *Soil Rules*.

6.4.3 Transportation of Soils

It is important that transportation of contaminated soil/excess soil is carefully considered prior to the commencement of the Project. Transportation of Dangerous Goods, General Waste Management, and other environmental regulations apply to the off-site transportation and of materials.

Contaminated soil not suitable for reuse within the Project Area shall be managed and reuse or disposed of in accordance with all applicable laws, industry standards and best management practices, this may include but not limited to:

- The Environmental Protection Act;
- O. Reg. 406/19, as amended;
- OPSS.PROV 180 General Specification for the Management of Excess Materials;
- Management of Excess Soil A Guide for Best Management Practices (Ministry of Environment, Conservation and Parks [MECP], Updated: April 4, 2019, Published: April 5, 2016, as updated).

During all phases of the Project, the following measures must be implemented with respect to transportation and reuse or disposal requirements for soil management:

- The contractor will ensure that all shipments comply with applicable regulatory requirements, including
 O. Reg. 406/19, and all necessary documentation is provided to MTO in a timely manner.
- Only approved disposal facilities for contaminated soil (either non-hazardous or hazardous) will be permitted for use.
- Acceptance criteria must be met, including but not limited to provision of adequate soil quality data for bulk chemical analysis and Schedule 4 leachate criteria. The origin and volume of contaminated material being transferred to a reuse or disposal site and its final destination shall be tracked.
- The Contractor shall arrange for and pay for any additional testing required by the receiver site as a condition of acceptance of the material. The Contractor shall submit to MTO a copy of the forms provided under OPSS.PROV. 180, signed by the receiver site.
- Mitigation measures will be developed in consultation with the QP and MTO Environmental Monitor to mitigate the mobilization and transport of potential residual agricultural contaminants within the Project Area towards waterbodies during all phases of the Project, including measures to allow time for increased die-off of pathogenic organisms and volatilization of agricultural contaminants prior to soil disturbance and removal of nutrient compounds through plant harvesting.
- Prior to disposing of a subject waste (i.e., liquid industrial waste and hazardous waste, including hazardous soil), the contractor shall ensure that the subject waste be properly classified as per O. Reg. 347 and registered in the MECP Hazardous Waste Information Network (HWIN), and a valid waste

Ministry of Transportation, Central Region

Waste and Excess Materials Management Plan

Highway 400 - Highway 404 Link (Bradford Bypass) County Road 4 Early Work (GWP 2008-21-00)

subject waste generator registration number is obtained. The generator shall ensure that waste manifests are completed correctly for each subject waste transferred and all waste transfers are properly identified and tracked through the HWIN system.

- A waste tracking system governing all hazardous waste transfers in accordance with the federal Transportation of Dangerous Goods Regulation and provincial regulations should be implemented by the contractor.
- Soil/fill materials imported to the Project Area, including quantity, quality and the source of the imported materials, should also be tracked and documented during the construction activities in accordance with O. Reg. 406/19.
- For the purpose of any record-keeping mentioned in this document, it is recommended that records be retained for a minimum of 7 years after the completion of all excess soil management activities or the removal of all excess soil from a TSSS, as required by O. Reg. 406/19.

7. Monitoring, Evaluation and Reporting

The following sections describe the protocols and practices to monitor progress, quality and daily activities.

7.1 Monitoring, Measurement, Analysis and Evaluation

Field monitoring for excavated materials is required during and post-construction. Construction monitoring for excavated materials during construction will be focused on the mitigation measures and management strategies described in this SMP. QPs will conduct daily visual inspections of active construction work zones to monitor stockpiles, potential excess soil or work in potentially contaminated areas.

The Contractor will be responsible for tracking and managing the quality and quantity of material excavated from or imported to the site using existing information and new information, as needed. Tracking will include quantifying and documenting locations for the beneficial on-site reuse of excavated materials. Management will include:

- Minimizing adverse effects to workers and sensitive receptors through Best Management Practices (BMPs), worker health and safety provisions and ensuring that remedial/risk management options are considered during the construction planning process and appropriately incorporated into final designs.
- Minimizing soil disturbance and retaining vegetation, including wildlife trees, within and around the Project Area in accordance with the setbacks / buffers identified on applicable design drawings, and in other areas to the extent that it is technically feasible or unless required to meet engineering requirements for safe and facility operation. The construction vehicle traffic will be minimized on contaminated soils.
- Manage soil in such a way as to prevent any adverse effects associated with receiving, processing, storage and movement of soil with respect to noise, dust, mud, tracking, leaching, runoff, erosion, outdoor air quality and odour. Monitoring will be completed in accordance with the Contractor's Air Quality Best Management Practices Plan to reduce the potential generation of dust (specifically PM10) and other fugitive air emissions during construction, including daily visual observations and on-site dust monitoring to inform the implementation of mitigation measures.
- Handle and store soil during construction in a manner that protects soil quality for re-use. In the event that contaminated soil are encountered during construction, the Contractor, QP, with approval from MTO, shall determine the suitability of reusing the soil before reusing it. The Contractor shall (with Project Leader and MTO's Environmental Monitor's permission) dispose of any soil not suitable for reuse according to proper screening and disposal requirements, taking into account *Ontario's Management of Excess Soil- a Guide for Best Management Practices* (MECP, 2014) and O. Reg. 406/19, including the *Soil Rules*.
- Encouraging reuse of soil where appropriate, balancing cut and fill, minimizing grading, and minimizing the need to transport additional soil to the Project Area where possible.

8. References

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Contamination Overview Study – FINAL Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001, Prepared for MTO.

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Management of Excess Soil - A Guide for Best Management Practices (January 2014) MECP

Ministry of the Environment, Conservation and Parks (MECP), 2019:

Ontario Regulation 407/19 - Records of Site Condition – Part XV.1 of the Environmental Protection Act

Ministry of the Environment, Conservation and Parks (MECP), 2020:

Rules for Soil Management and Excess Soil Quality Standards (The Soil Rules)

Kesh Appadurai, P.Eng., QPESA Environmental Engineer Kesh.Appadurai@aecom.com

AECOM Canada Ltd. 105 Commerce Valley Drive West, 7th Floor Markham, ON L3T 7W3 Canada

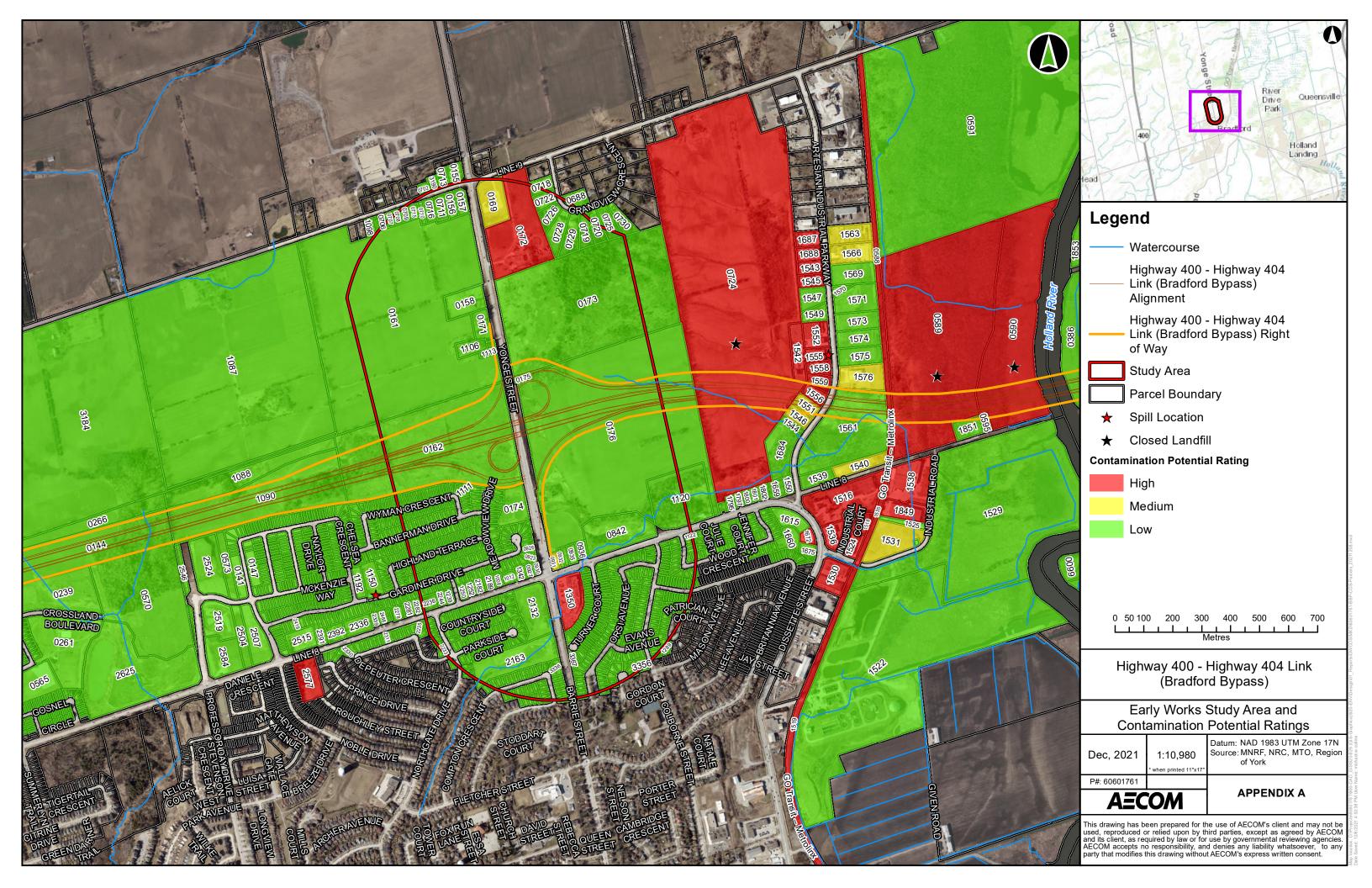
T: 905.886.7022 F: 905.538.8076 www.aecom.com





Appendix A

Early Works Study Area and Contamination Potential Ratings





Appendix B

Borehole Locations and Soil Exceedances





Appendix C

Borehole Logs

CLIENT: AECOM September 30, 2021 ELEVATION: 262.80 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131693° Long: -79.569600°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 1 of 2

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HAMMER TYPE: Automatic



MEMBER OF WSP

LOGGED: Dipendra Paudel

CHECKED: ACK

Pre-draft

DATE: Sep 30, 2021 DATE:

Golder - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

September 30, 2021

ELEVATION: 262.80 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131693° Long: -79.569600°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 2 of 2

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 30, 2021

Golder - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

AECOM DATE: September 21, 2021 ELEVATION:

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131759° Long: -79.569053°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

259.72 m (CGVD28)

Sheet 1 of 1

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:



Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 21, 2021

CLIENT: AECOM DATE: September 23, 2021 ELEVATION: 261.18 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131484° Long: -79.569594°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

DESCRIPTION SILTY SAND (SM), trace gravel, trace rootlets (FILL) Loose Brown Moist SILTY CLAY (CI) Firm to very stiff Brown Moist	SM USCS	STRATA	ELEV. DEPTH (m) 0.00 260.50 0.68	NUMBER 629	Hammer: M D1586, I 3-N hamm	Automatic Blows per ner, 0.76-m	c 0.15 m ordrop	H Pla (% 0 Wa NP		STRENGTI	ADDITIONA LAB TESTIN	ADDITIONAL	GROUNDWATER OBSERVATIONS	CON	ISTRUCTION AND ALLATION DETAILS
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



LOGGED: Dipendra Paudel

CHECKED: ACK DATE

DATE: Sep 23, 2021 DATE:

REV:

Pre-draft

GOLDER MEMBER OF WSP

Golder - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

CLIENT: AECOM DATE: September 23, 2021 ELEVATION: 261.18 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131484° Long: -79.569594°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

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DRILL RIG	MATERIAL PROFILE DESCRIPTION	nscs	STRATA	ELEV.	ASTI 62	Hammer: A M D1586, Blo 3-N hammer,	utomatic ows per 0.1 , 0.76-m dr	IS m	WATER CONTENT H Plastic & Liquid Limits (%) O Water Content (%)	SHEAR STRENGT X Nat Vane Rem Vane Pocket Pen Q U	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
DRII	CLAYEY SILT-SILT (CL-ML) to SILT (ML) of slight plasticity Hard Grey Moist	ח	ST	DEPTH (m)	NUMBER	TYPE REC %	BLOWS	N-VALUE	NP Nonplastic	200 0	AE LAI	OBS	GRG	
1					11	SS	14-15-20-44	35	0		MIS_202 110289			<u> </u>
					12	SS 100	8-16-29-65	45	0		MIS_202 1102810			
ım Auger		CL-ML			13	SS 100	23-17-25-32	42	0		MIS_202 1102811			
D 90 210 mm O.D. Hollow Stem Auger					14	SS 100	15-23-37-47	09	0		MIS_202 1102812			
					15	SS 100	17-18-24-31	42						
	CLAYEY SILT (CL) to SILTY CLAY (CI) Hard Grey Moist to wet			243.35 17.83										
3		ō			16	SS	21-27-55-87	82						
	Continued on Next Page													REV:

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 23, 2021

CLIENT: AECOM DATE: September 23, 2021 ELEVATION: 261.18 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131484° Long: -79.569594°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

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	Z L	DESCRIPTION	nscs	STRATA	DEPTH				S	J.	(%) Wate	er Conte	uid Limits ent (%) tic	×⊕ ■ •○	Poo	cket Pe	n	E	315	ERV.	ERV.		
ء ◘ ق	불		ñ	STI	(m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE					Q U			4	LAE	AD OBSI	GRC OBS		
+		CLAYEY SILT (CL) to SILTY CLAY (CI)			1	z		_	_	z	, 8 ,	9	8 8	<u>a</u> :	9 9	300	400	ğ					
		Hard																					
		Grey Moist to wet																					
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



MEMBER OF WSP

Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 23, 2021

Sheet 4 of 5 RECORD OF BOREHOLE: BH CR4-03 CLIENT: AECOM September 23, 2021 ELEVATION: 261.18 m (CGVD28) **Bradford Bypass** COORDINATES: Lat: 44.131484° Long: -79.569594° PROJECT: PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28 HOLE LOC: Bradford Bypass - County Road 4 SHEAR CONSTRUCTION AND INSTALLATION DETAILS WATER CONTENT MATERIAL PROFILE SAMPLES STRENGTH GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING ADDITIONAL OBSERVATIONS DRILL RIG DEPTH (m) ELEV. astic & Liquid Limits STRATA PLOT Pocket Pen Q U DESCRIPTION BLOWS Water Content (%) REC % DEPTH TYPE (m) CLAYEY SILT (CL) to SILTY CLAY (CI) 21-33-56-100/108mm Hard Grey Moist to wet 109 MIS_202 1102815 20 SS 83 31 32 33 13-17-26-42 100 7 SS 43 34 210 mm O.D. Hollow Stem Auger D 90 35

SS 22 38

Continued on Next Page

6-37-57 00

REV:

Pre-draft

GOLDER MEMBER OF WSP

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 23, 2021 DATE:

er - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

36

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15-17-21-29 100

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RECORD OF BOREHOLE: BH CR4-03 Sheet 5 of 5

CLIENT: AECOM DATE: September 23, 2021 ELEVATION: 261.18 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131484° Long: -79.569594°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

																				LOC:		Bypas	s - County	
	90	MATERIAL PROFILE					SAN				WAT	TER	CONTE	NT	,	S STF	HE/ REN	AR GTH	1	Åδ	ADDITIONAL OBSERVATIONS	똢옷	CONS	STRUCTION AND LLATION DETAILS
DEPTH (m) DRILL RIG	DRILL METHOD			⋖.	ELEV.	AST 62	Hamme M D1586 23-N ham	er: Autom i, Blows p mer, 0.76			H Pla	stic 8	Liquid Li	mits	×	Na Re	at Van em Va	ine		ADDITIONAL LAB TESTING	IONA ATIC	GROUNDWATER OBSERVATIONS		
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- 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48	210 mm O.D. Hollow Stem Auger	End of hole at 49.38 m.	Ō		211.80	25	88		//356mm 20-49-100/133mm 12-17-20-34	37	l-c-									MIS_202 1102817				
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 23, 2021

RECORD OF BOREHOLE: BH CR4-04 Sheet 1 of 2

CLIENT: AECOM July 14, 2021 ELEVATION: 262.75 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131580° Long: -79.569143°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

	۵	MATERIAL PROFILE					SAM	PLES	 S	W	ATER	CONT	ENT		SHE	AR	I	LOC:	Bradford Bypass - County Road 4	T~
RIG	THO				ELEV.	AS	Har STM D1586, 623-N hamm	nmer: Blows per	0.15 m					×	Nat Var	ne	1	ONAL	ONAL	WATER
DRILLRIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	DEPTH (m)			KEC %		NP		ontent (%)		Rem Va Pocket Q U	Pen		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER
		ASPHALT (180mm)			0.00	_				· P	8 4	9	8 3	9 0	500	300	200			
		SAND (SP), some gravel (FILL) Dense Brown Dry	SP		262.57 0.18	-	SS	58	33	3										
1		CLAYEY SAND (SC), trace gravel (FILL) Very stiff Grey Moist	SC		261.96 0.79	2	SS	7 6 10 16	_		4									
		SAND (SP), trace gravel, trace fines, containing silt pockets (FILL) Compact	SP		261.30 1.45		SS	50												
2		Brown Moist CLAYEY SAND (SC) to Sandy CLAYEY SILT (CL), trace gravel (FILL)	0		260.54 2.21		00													
		Very stiff Brown Moist			7	4	SS	10 10 1	19-10-14	2										
3			SC			5	SS	0 12 0 12	21-6-21-6	i										
4					258.48	6A	S	67	11-12-11	2										
		Sandy CLAYEY SILT (CL) to CLAYEY SILT (CL), trace organics Loose Brown Moist			4.27	89														
5			G			7	SS	2212	1.7.7											
6		SILTY SAND (SM), trace gravel Compact			256.96 5.79															
		Grey Wet				8	SS	0												
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						10	SS	100	28 28	3										
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DEPTH SCALE: 1:51 HAMMER TYPE:



MEMBER OF WSP

Pre-draft

LOGGED: DP CHECKED: ACK

RECORD OF BOREHOLE: BH CR4-04 Sheet 2 of 2 ELEVATION: CLIENT: AECOM July 14, 2021 262.75 m (CGVD28) PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131580° Long: -79.569143° PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: VERT DATUM: CGVD28 NAD83 HOLE LOC: Bradford Bypass - County Road 4 SHEAR MATERIAL PROFILE SAMPLES WATER CONTENT STRENGTH GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. Plastic & Liquid Limits nscs Pocket Pen Q U DESCRIPTION REC % BLOWS O Water Content (%) DEPTH (m) SILTY SAND (SM), trace gravel SM CLAYEY SILT (CL), trace sand
Very stiff to hard 252.54 10.21 Grey Wet 8-12-16-16 SS 72 8 12 10-12-14-22 26 13 10-18-21-23 SS 88 39 10-12-18-23 SS 2 8 4

DEPTH SCALE: 1:51 HAMMER TYPE:



MEMBER OF WSP

LOGGED: DP CHECKED: ACK

DATE: Jul 14, 2021 DATE: Jul 27, 2021

REV:

Pre-draft

CLIENT: AECOM DATE: September 15, 2021 ELEVATION: 258.01 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131601° Long: -79.568978°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 1 of 5

DESCRIPTION DESCR			I				1						1			E LOC:	Bradford Bypass - County Road 4	ı
CAMPY SHIT (CL), some sand, toolog graved Compared (FEL) Compared (F	. U	4OD	MATERIAL PROFILE	ı	1	T					WATER CON	ITENT				AL NG	AL	#
CAMPY SHIT (CL), some sand, toolog graved Compared (FEL) Compared (F	ORILL RIG	MET		S	¥μ	ELEV.	AS 6	TM D1586, Blo 323-N hammer		15 m Irop	H Plastic & Liqui	d Limits	$\overset{\times}{\oplus}$	Rem Van	в	TION	TION	4DWA
CAMPY SHIT (CL), some sand, toolog graved Compared (FEL) Compared (F	DRII	3ILL	DESCRIPTION	nsc	STRA	DEPTH (m)	MBER	YPE	SWO	ALUE	 Water Conten 	t (%)	•	Q	en	AB T	ADDI:	ROUN
CLAYEY SILY (CL) Some sand trace gravel CLAYEY SILY (CL) S		ā			0,		Ī	F 2	8	ž	0 6 4 6	08			400	` ' '	066	0
Model Sandy S(ML) of alignin blasticity Looks to compact Grow West Sign to very staff Sign to very staf			gravel, trace organics (FILL)			0.00			7									
Sarry St (ML) or significations Sarry St (ML) or significant			Brown to black	님			_	SS SS	2-5-	3								
			Moist						+									
CLAYEY SILT (CL.), some sand, trace graved Sift to very stiff Grave Signature (SM), trace graved Avg. 25.5.6. Soft to very stiff Compact Wet SLITY SAND (SM), trace graved Compact Wet Avg. 25.5.6. Avg. 25.5.6.			Sandy Silt (ML) of clight placticity				2A		φ				Ш					
CLAYEY SILT (CL.), some sand, trace graved Sift to very stiff Grave Signature (SM), trace graved Avg. 25.5.6. Soft to very stiff Compact Wet SLITY SAND (SM), trace graved Compact Wet Avg. 25.5.6. Avg. 25.5.6.	1		Loose to compact			0.91	2B	SS 8	1-3-5-	8								Z
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CLAYEY SILT (CL), some send, trace gravel Suff to very stiff Grey Moist 65 17 271 271 272 38 47 58 58 58 58 58 58 58 58 58 5				M														
CLAYEY SILT (CL), some send, trace gravel Suff to very stiff Grey Moist 65 17 271 271 272 38 47 58 58 58 58 58 58 58 58 58 5							3	SS 75	9-5-6	4								
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SILTY SAND (SM), trace gravel Compact Brown Wet 253,67 CLAYEY SILT-SILT (CL-ML), trace sand Wey CLAYER SILT-SILT (CL-ML), trace sand CLA	3																	
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CLAYEY SILT-SILT (CL-ML), trace sand Very stiff to hard. Grey Wet Wet		_	Brown						3-13									
CLAYEY SILT-SILT (CL-ML), trace sand Very stiff to hard. Grey Wet Wet	5 6	Rotan		Σ			7	SS	7-12-1	25								
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Grey Wet 1			CLAYEY SILT-SILT (CL-ML), trace sand	-														
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 15, 2021

CLIENT: AECOM DATE: September 15, 2021 ELEVATION: 258.01 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131601° Long: -79.568978°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 2 of 5

							I				-					LOC:	Bradford Bypass - County Road 4	
	9	DRILL METHOD	MATERIAL PROFILE	1	ı		l	SAM				WATER CONTENT		SHEAR FRENGTH		NG AL	ADDITIONAL OBSERVATIONS	JER SNS
DEPTH (m)	DRILL RIG	METI		တ္	₹⊢	ELEV.		Hammer M D1586, 23-N hamn		er 0.15 m m drop	<u></u>	Plastic & Liquid Limits (%)	× • • •	Nat Vane Rem Vane Pocket Pen		ADDITIONAL LAB TESTING	TION (VATI	GROUNDWATER OBSERVATIONS
DEP	DRII	3IL	DESCRIPTION	nscs	STRATA	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-WALUE	H Plastic & Liquid Limits (%)) Water Content (%) NP Nonplastic		Q U		ADDI AB T	ADDI:	ROUN
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-			CLAYEY SILT-SILT (CL-ML), trace sand Very stiff to hard		Y.													
-			Very stiff to hard Grey Wet		Y													
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-		Mud	Grey Moist		KM.													
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

RECORD OF BOREHOLE: BH CR4-05 Sheet 3 of 5

CLIENT: AECOM DATE: September 15, 2021 ELEVATION: 258.01 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131601° Long: -79.568978°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

																				LOC:	Bradford Bypass - County Road 4	
		٥	MATERIAL PROFILE					SAMF	PLES	S	1	WATE	R CO	NTENT		STR	HEA ENC	R STH		LO	ω 	w s
(E)	DRILL RIG	DRILL METHOD				ELEV.	AS	Hammer: A STM D1586, Blo 623-N hammer	utomat ows per	ic r 0.15 m	+						t Vane m Van			ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS
DEPTH (m)	Z	ME	DESCRIPTION	nscs	STRATA		2	623-N hammer		n drop Ш	-[(%) Water	r Conte	uid Limits nt (%) tic	X (1) (1)	Por	cket P	en		TES	IRVA	N A A
DE	ᆸ	J.	BEGGINI HON	SN	STR	DEPTH (m)	NUMBER	TYPE RFC %		N-VALUE	N	P N	lonplast			Q U				ADE LAB	ADI	GROI
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-			CLAYEY SILT (CL) Very stiff to hard Grey Moist																			
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DEP	TH	SC	ALE: 1:51																		REV:	

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 15, 2021 DATE:

Sheet 4 of 5 RECORD OF BOREHOLE: BH CR4-05 CLIENT: AECOM September 15, 2021 ELEVATION: 258.01 m (CGVD28) PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131601° Long: -79.568978° PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates VERT DATUM: CGVD28 LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 HOLE LOC: Bradford Bypass - County Road 4 SHEAR STRENGTH WATER CONTENT MATERIAL PROFILE SAMPLES GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. astic & Liquid Limits STRATA PLOT nscs Pocket Pen Q U DESCRIPTION REC % BLOWS Water Content (%) DEPTH TYPE (m) CLAYEY SILT (CL) Very stiff to hard Grey Moist 18-26-37-75 SS 100 20 31 32 33 15-16-22-25 100 7 SS 89 34 Mud Rotary D 90 35

Continued on Next Page DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

36

38

39



MEMBER OF WSP

7-23-34 SS 100

21-24-35-53 100

29

22 SS

> LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 15, 2021

REV:

Pre-draft

DATE:

er - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

CLIENT: AECOM DATE: September 15, 2021 ELEVATION: 258.01 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131601° Long: -79.568978°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

																		HOL	E LC	C:	Bradford Bypass - County Road 4	
		Ö	MATERIAL PROFILE						MPL			WA	ATER	CONTE	ENT	S	SHE	AR NGTH	Ι.	(D	, <u>o</u>	αω
DEPTH (m)	DRILL RIG	DRILL METHOD				ELEV.	AS	Hamn STM D158 623-N har	mer: Auto	omatic s per 0.1	15 m	н ы	lastic &	Liquid	imite	×	Nat Va	ane	1 🕺	LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 15, 2021

START DATE: October 01, 2021 ELEVATION: 258.20 m (CGVD28)

PROJECT: Bradford Bypass END DATE: October 06, 2021 COORDINATES: Lat: 44.131114° Long: -79.569432°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 1 of 5

DRILL RIG					SAMF	PLES		WATER CONTENT		SHEA	TH		. <u>ග</u>	N (0
DEPTH (m) DRILL RIG	DESCRIPTION	USCS	ELEV.		Hammer: A M D1586, Blo 23-N hammer			H Plastic & Liquid Limits (%) Water Content (%)	× ⊕ ■ • ○	Nat Vane Rem Van Pocket P	e	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS
		STE		NUMBER	TYPE REC%	BLOWS	N-VALUE	NP Nonplastic) (1) (2)	200 U	400	ADI	ADI	GRO
	SILTY SAND (SM), trace sand, trace rootlets, trace gravel Loose to compact Dark brown to brown Moist to wet		0.00	1	SS 88	1-2-3-3	5							
1		MS		2	SS 100	4-7-6-16	13							
2	CLAYEY SILT (CL), trace sand to sandy, trace gravel, (TILL) Stiff to Very Stiff Brownish Grey Moist		256.22	38 3A	SS 100	8-7-5-6	12							
3	Brownish Grey Moist	CI.		4	SS S	5-7-10-14	17							
	SILTY SAND (SM), trace gravel		254.47 3.73	5	SS 62	6-8-16-19	24							
4	Compact Grey Moist to Wet		3./3	9	SS 75	6-9-11-15	20							
D 90 Mud Rotary	0-	WS		7	SS 29	7-9-13-18	22							
6	CLAYEY SILT (CL), trace sand, trace gravel Hard Grey Moist		252.56											
				8	SS 88	9-11-13-19	24							
7														
8		ਰ ///		6	SS 001	23-24-25-27	49							
9					(0)	22-18								
10	Continued on Next Page			10	SS 88	17-20-22-18	42							

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Oct 01, 2021

DATE:

Golder - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

START DATE: October 01, 2021

ELEVATION: CLIENT: AECOM 258.20 m (CGVD28) PROJECT: **Bradford Bypass** END DATE: October 06, 2021 COORDINATES: Lat: 44.131114° Long: -79.569432°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

VERT DATUM: CGVD28 LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83

Bradford Bypass - County Road 4 HOLE LOC:

Sheet 2 of 5

SHEAR STRENGTH MATERIAL PROFILE SAMPLES WATER CONTENT ELEV. DESCRIPTION DEPTH

GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) Pocket Pen Q U REC % BLOWS (m) CLAYEY SILT (CL), trace sand, trace gravel 20-23-30-11 SS 88 20-27-23-29 13-19-32-57 SS Mud Rotary 15 06 17-26-44-59 100 SS 2 4 18-27-31-27 90 15 SS 28 14-17-34-50 100 SS 21 Continued on Next Page

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

DATE: Oct 01, 2021 LOGGED: Dipendra Paudel CHECKED: ACK DATE:

START DATE: October 01, 2021 ELEVATION: 258.20 m (CGVD28)

PROJECT: Bradford Bypass END DATE: October 06, 2021 COORDINATES: Lat: 44.131114° Long: -79.569432°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 3 of 5

Section Sect		۵	MATERIAL PROFILE				SAM	PLES	3	٧	WATER C	CONTEN	т	ST	SHEA REN		LE LOC	
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



LOGGED: Dipendra Paudel

CHECKED: ACK

DATE: Oct 01, 2021

Pre-draft

CLIENT: AECOM START DATE: October 01, 2021 ELEVATION: 258.20 m (CGVD28)

PROJECT: Bradford Bypass END DATE: October 06, 2021 COORDINATES: Lat: 44.131114° Long: -79.569432°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

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HAMMER TYPE: Automatic



LOGGED: Dipendra Paudel

CHECKED: ACK

Pre-draft
DATE: Oct 01, 2021

START DATE: October 01, 2021

ELEVATION: 258.20 m (CGVD28)

PROJECT: **Bradford Bypass** END DATE: October 06, 2021 COORDINATES: Lat: 44.131114° Long: -79.569432° PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 5 of 5

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_	유	MATERIAL PROFILE		1			SAM				WATER CO	NTENT		SHEAR TRENG		AP NG	AL ONS	R ER
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Oct 01, 2021 DATE:

CLIENT: AECOM START DATE: July 13, 2021 ELEVATION: 261.21 m (CGVD28)

PROJECT: **Bradford Bypass** END DATE: July 15, 2021 COORDINATES: Lat: 44.131232° Long: -79.569039°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4 LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd.

Sheet 1 of 2

						,											LOC:	Bradford	l Bypas	s - Co	ounty	Road	4
(1)	QQ	MATERIAL PROFILE				Homes	SAM			atia	WATER CO	NTENT			HEAR ENG		A G	AL ONS	E S				TION AND N DETAILS
DRILL RIG	DRILL METHOD		δί	4ĭ.∀ ĭ	ELEV.		er: Automati STM D1586, 623-N hamn				H Plastic & Liqu	uid Limits	× •	Ren	Vane m Vane cket Per		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS				
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		Stiff Grey Moist	Ľ		259.74 1.47	L		1	4													Ī	
		SILTY SAND (SM) of slight plasticity, trace			3		SS	100	9-11-12-14	23												1	
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Diedrich D-50 Track	/ Stem	sand, trace gravel, trace organics Firm to very stiff			4.50	J.		è	P)													1	
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



MEMBER OF WSP

Pre-draft

LOGGED: Matthew Montesano

DATE:

DATE: Jul 13, 2021

CHECKED: ACK

START DATE: July 13, 2021 ELEVATION: 261.21 m (CGVD28)

PROJECT: END DATE: **Bradford Bypass** July 15, 2021 COORDINATES: Lat: 44.131232° Long: -79.569039°

PROJECT NO: 19136074 90.0° INCLINATION: COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 2 of 2

									_				01.17			LOC:		l Bypas	s - County	
DEPTH (m)	DRILL METHOD	MATERIAL PROFILE	SS ATA DT	ELEV.		er: Automatio TM D1586, 623-N hamm		Automat 0.15 m drop	atic	H Plastic (%)) Water (× + + 0	Nat V Rem	EAR NGT /ane /ane vane et Pen		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	CONS INSTA	STRUCTION AND LLATION DETAILS
DR	DRILL	DESCRIPTION	USCS STRATA PLOT	DEPTH (m)	NUMBER	TYPE	REC %	N-VALUE	N	Water ((%)		Q U		400	ADD LAB	ADD	GROU		
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DEPTH SCALE: 1:51

HAMMER TYPE: Automatic Historic,

Automatic

CLIENT:

AECOM



Pre-draft

REV:

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jul 13, 2021 DATE:

DATE: September 09, 2021

INCLINATION: 90.0°

CONTRACTOR: Walker

ELEVATION: 253.27 m (CGVD28)

COORDINATES: Lat: 44.131227° Long: -79.568623°

COORD SYS: Geographical Coordinates

HORZ DATUM: NAD83 VERT DATUM: CGVD28

Sheet 1 of 5

HOLE LOC: Bradford Bypass - County Road 4 SHEAR MATERIAL PROFILE SAMPLES WATER CONTENT STRENGTH GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. lastic & Liquid Limits STRATA PLOT Pocket Pen Q U DESCRIPTION BLOWS Water Content (%) REC % DEPTH (m) CLAYEY SILT (CL), some sand, trace 0.00 rootlets (FILL) Soft to firm 2-2-3 100 SS Moist 252.58 ∇ CLAYEY SILT (CL), trace sand, trace gravel Soft to stiff Brown 1-1-2-3 SS 75 20 SS 251.06 CLAYEY SILT (CL), trace sand, trace gravel 2.21 (TILL) Stiff to Hard 4-5-9-13 SS 75 Grey Moist 7-8-9-14 9 SS 16-22-24-26 SS 62 14-14-20-27 62 Mud Rotary SS D 90 13-16-17-21 SS 88 33 **8** 10-23-50-75 SS 88 23 8 21-24-27-28 100 9 SS 21 Continued on Next Page REV:

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

PROJECT: PROJECT NO:

LOCATION:

AECOM

19136074

Bradford Bypass

Bradford, Ontario



MEMBER OF WSP

Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 09, 2021 DATE:

CLIENT: AECOM DATE: September 09, 2021 ELEVATION: 253.27 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131227° Long: -79.568623°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 2 of 5

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 09, 2021

CLIENT: AECOM DATE: September 09, 2021 ELEVATION: 253.27 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.131227° Long: -79.568623°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

UCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD2
HOLE LOC: Bradford Bypass - County Road 4

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

Sheet 3 of 5

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 09, 2021

Sheet 4 of 5 RECORD OF BOREHOLE: BH CR4-08 CLIENT: AECOM September 09, 2021 ELEVATION: 253.27 m (CGVD28) PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131227° Long: -79.568623° PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates VERT DATUM: CGVD28 LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 HOLE LOC: Bradford Bypass - County Road 4 SHEAR STRENGTH WATER CONTENT MATERIAL PROFILE SAMPLES GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. STRATA PLOT nscs Pocket Pen Q U DESCRIPTION REC % BLOWS Water Content (%) DEPTH TYPE (m) CLAYEY SILT (CL), trace sand 14-15-25-37 SS 100 20 31 32

33 14-19-30-38 100 7 SS 49 34 Mud Rotary 35 6 36 15-17-21-29 100 22 SS 88 38 39 5-100/83rr 23 SS Continued on Next Page REV:

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 09, 2021 DATE:

Pre-draft

der - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

CLIENT: AECOM September 09, 2021 ELEVATION: 253.27 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.131227° Long: -79.568623°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC:

Bradford Bypass - County Road 4

Sheet 5 of 5

																				LOC:	Bradford Bypass - County Road 4	
		Q	MATERIAL PROFILE						MPL			١	WATER	CONTE	NT	s	SHE	EAR NGTH		_ O	N N	H. Ω
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Sep 09, 2021

START DATE: October 06, 2021 ELEVATION:

PROJECT: **Bradford Bypass** END DATE: COORDINATES: Lat: 44.130758° Long: -79.569369° October 12, 2021

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC:

Bradford Bypass - County Road 4

256.46 m (CGVD28)

Sheet 1 of 5

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Cartificación Next Page	<u>.</u> <u>0</u>	GOH.	MATERIAL PROFILE								WATER CONTEN				TH	ING ING	IONS	YTER
Cartificación Next Page	DRILL RIG	. MET	DESCRIPTION	CS	ATA				- 1	lrop	Plastic & Liquid Limi (%) Water Content (**)	ts	N R	em Vane ocket Pe	n	TEST	RVAT	JNDW/
Cartificación Next Page	R	JRILL	DESCRIPTION	ns	STR	DEPTH (m)	UMBE	TYPE	SLOWS	-VALU	NP Nonplastic					ADD	ADD	GROU
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PTH SCALE: 1:51 REV:	DTI	80															RF	V:

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



MEMBER OF WSP

Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

CLIENT: AECOM START DATE: October 06, 2021 ELEVATION: 256.46 m (CGVD28)

Bradford Bypass END DATE: COORDINATES: Lat: 44.130758° Long: -79.569369° PROJECT: October 12, 2021

19136074 PROJECT NO: INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 2 of 5

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Oct 06, 2021 DATE: Oct 21, 2021

START DATE: October 06, 2021

PROJECT: Bradford Bypass END DATE: October 12, 2021 COORDINATES: Lat: 44.130758° Long: -79.569369°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

256.46 m (CGVD28)

ELEVATION:

Sheet 3 of 5

																					LOC:	Bradford Bypass - County Road 4	
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



LOGGED: Dipendra Paudel

CHECKED: ACK

DATE: Oct 06, 2021 DATE: Oct 21, 2021

Pre-draft

CLIENT: AECOM START DATE: October 06, 2021 ELEVATION: 256.46 m (CGVD28)

PROJECT: Bradford Bypass END DATE: October 12, 2021 COORDINATES: Lat: 44.130758° Long: -79.569369°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



LOGGED: Dipendra Paudel

CHECKED: ACK

DATE: Oct 21

DATE: Oct 06, 2021 DATE: Oct 21, 2021

Pre-draft

START DATE: October 06, 2021 ELEVATION:

256.46 m (CGVD28) END DATE: COORDINATES: Lat: 44.130758° Long: -79.569369° October 12, 2021

Bradford Bypass PROJECT: 19136074 PROJECT NO: INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4 Sheet 5 of 5

		ОО	MATERIAL PROFILE					SAN				WATER CONTENT	S	SHEAR RENGTH	F LOC:	Bradford Bypass - County Road 4	
DEPTH (m)	DRILL RIG	DRILL METHOD		SS	ATA T	ELEV.		Hamme TM D1586 23-N ham		atic er 0.15 r i-m drop	n T	H Plastic & Liquid Limits (%) O Water Content (%) NP Nonplastic	×⊕ ■ •○	Nat Vane Rem Vane Pocket Pen Q U	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS
DEP	DRI	DRILL	DESCRIPTION	nscs	STRATA	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		•	Q U	ADDI LAB T	ADDI	GROUI
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DEP	TH	SC	ALE: 1:51														REV:

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM

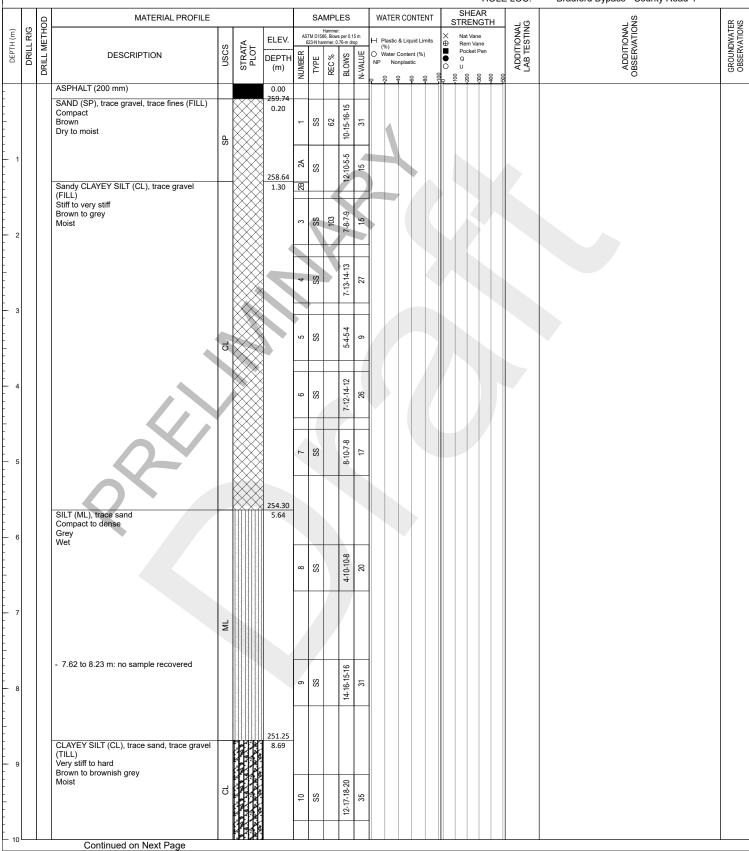


Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Oct 06, 2021 DATE: Oct 21, 2021

RECORD OF BOREHOLE: BH CR4-10 Sheet 1 of 2 CLIENT: AECOM July 13, 2021 **ELEVATION:** 259.94 m (CGVD28) PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.130808° Long: -79.568956° PROJECT NO: 19136074 COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: NAD83 VERT DATUM: CGVD28 HOLE LOC: Bradford Bypass - County Road 4 SHEAR



DEPTH SCALE: 1:51 HAMMER TYPE:



Pre-draft

REV:

LOGGED: DP CHECKED: ACK RECORD OF BOREHOLE: BH CR4-10 Sheet 2 of 2

CLIENT: AECOM DATE: July 13, 2021 ELEVATION: 259.94 m (CGVD28)

COORDINATES: Lat: 44.130808° Long: -79.568956° PROJECT: **Bradford Bypass** Geographical Coordinates 19136074 PROJECT NO: COORD SYS:

LOCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

SHEAR SAMPLES WATER CONTENT MATERIAL PROFILE

		ОC	MATERIAL PROFILE				L	SAMP			WAT	ER CC	NTENT	S	TRE	NGTI	1_	ی بــ	ω 	K S
DEPTH (m)	DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA PLOT	ELEV. DEPTH (m)	ایدا	Hamm TM D1586, Blo 23-N hammer,		N-VALUE	H Plas (%) O Wate NP	stic & Lic er Conte Nonplas	uid Limits ent (%) tic	×	Nat Va Rem V Pocke Q U	ane		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS
-		PO	CLAYEY SILT (CL), trace sand, trace gravel (TILL) Very stiff to hard Brown to brownish grey Moist		s	(m)	NUN	Y 8	BLC	W-N	-20	40	00	000	200	300	2005	, J	4 0 9 0	500
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1	6		SILT (ML), trace sand Dense to very dense Grey			243.63 16.31														∇
- - - 1	7		Wet	ML			15	SS	25-28-42-47	02										
- - - - 1	8			2					56-26											
- 1	9		End of hole at 18.90 m.			241.04	16	SS	12-23-26-26	49										
-			End of Borehole																	

DEPTH SCALE: 1:51 HAMMER TYPE:



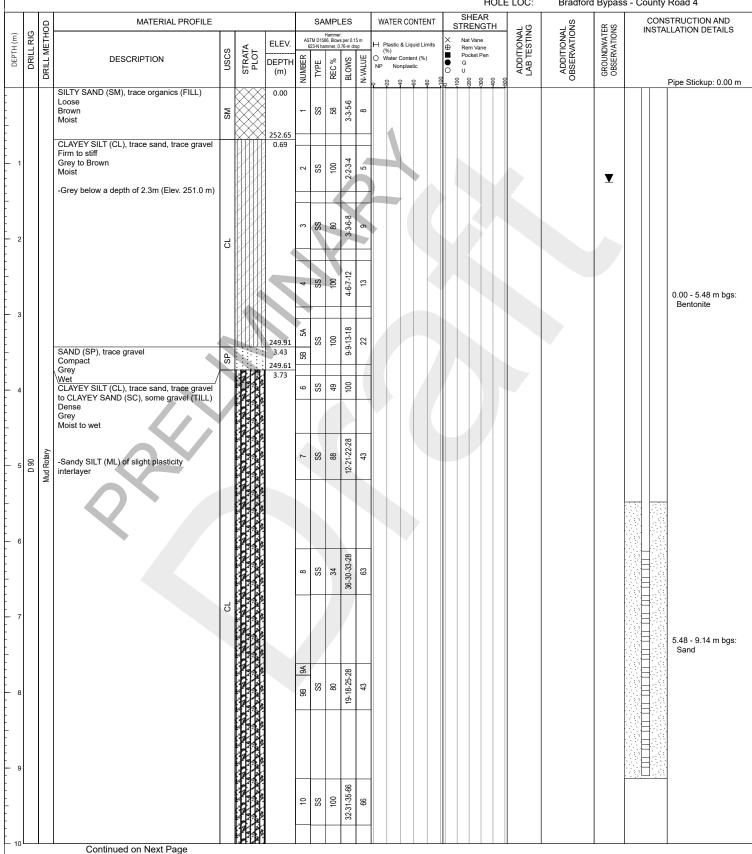
MEMBER OF WSP

Pre-draft

REV:

LOGGED: DP CHECKED: ACK

Sheet 1 of 6 RECORD OF BOREHOLE: BH CR4-11 AECOM August 30, 2021 CLIENT: **ELEVATION:** 253.34 m (CGVD28) COORDINATES: Lat: 44.130896° Long: -79.568730° PROJECT: **Bradford Bypass** PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: CONTRACTOR: Walker Bradford, Ontario HORZ DATUM: NAD83 VERT DATUM: CGVD28 HOLE LOC: Bradford Bypass - County Road 4



DEPTH SCALE: 1:51 HAMMER TYPE:



MEMBER OF WSP

Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

CLIENT: AECOM DATE: August 30, 2021 ELEVATION: 253.34 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.130896° Long: -79.568730°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

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DEPTH SCALE: 1:51 HAMMER TYPE:



MEMBER OF WSP

Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Aug 30, 2021 DATE: RECORD OF BOREHOLE: BH CR4-11 Sheet 3 of 6

CLIENT: AECOM DATE: August 30, 2021 ELEVATION: 253.34 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.130896° Long: -79.568730°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4 LOCATION: Bradford, Ontario CONTRACTOR: Walker

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Continued on Next Page CLAYEY ST. SET. (CC.ME) to CLAYEY CL	DEPTH (m)		Ĭ			×	ELEV.	AS	Ha STM D1586, 623-N hamn	mmer: Blows pener, 0.76	er 0.15 m i-m drop	_ r	⊢ Plastic	& Liquid	Limits		Nat Va	ane Vane	IONA		ATIO	WATE ATION	INSTALL	ATION DETAIL	J
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28 29 20 1.1+1.1 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 20 20 20 20 20 20 20 20 20 20						K/K/																			
28 29 20 1.1+1.1 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 2.1 1.2 1.2 20 20 20 20 20 20 20 20 20 20 20 20 20	07								П																
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29 EDTH COAL F. 4.54						W/		4		4															
29 EDTH COAL F. 4.54											0-26														
29 EDTH COAL F. 4.54								22	SS	9	4-17-2	۵													
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20 Continued on Next Page						KIKI																			
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DEPTH SCALE: 1:51 HAMMER TYPE:



MEMBER OF WSP

Pre-draft

LOGGED: Dipendra Paudel CHECKED: ACK

RECORD OF BOREHOLE: BH CR4-11 Sheet 4 of 6 CLIENT: AECOM August 30, 2021 ELEVATION: 253.34 m (CGVD28) **Bradford Bypass** COORDINATES: Lat: 44.130896° Long: -79.568730° PROJECT: PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28 HOLE LOC: Bradford Bypass - County Road 4 SHEAR CONSTRUCTION AND INSTALLATION DETAILS MATERIAL PROFILE SAMPLES WATER CONTENT ADDITIONAL OBSERVATIONS STRENGTH GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. lastic & Liquid Limits STRATA PLOT Pocket Pen Q U DESCRIPTION REC % BLOWS Water Content (%) DEPTH TYPE (m) Pipe Stickup: 0.00 m CLAYEY SILT-SILT (CL-ML) to CLAYEY SILT (CL) Hard Grey Moist 14-26-34-34 100 SS 24 8 31 32 17-22-29-40 9 SS 33 18-36-50-68 100 SS 98 Mud Rotary D 90 35

15-21-27-48 9 SS 48 27 20-23-25-50 100 SS 28 8

19-23-30-99

0-400/83 n 14 SS

23

23 SS 9

Continued on Next Page DEPTH SCALE: 1:51

36

38

39



LOGGED: Dipendra Paudel

CHECKED: ACK

DATE:

REV:

Pre-draft

DATE: Aug 30, 2021

HAMMER TYPE:

r - 1 Metric Global / MTO Auto (Ministry of Transport Ontario) / 2021-11-19

GOLDER MEMBER OF WSP

RECORD OF BOREHOLE: BH CR4-11 Sheet 5 of 6 CLIENT: AECOM August 30, 2021 **ELEVATION:** 253.34 m (CGVD28) **Bradford Bypass** COORDINATES: Lat: 44.130896° Long: -79.568730° PROJECT: PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28 HOLE LOC: Bradford Bypass - County Road 4 SHEAR CONSTRUCTION AND INSTALLATION DETAILS MATERIAL PROFILE SAMPLES WATER CONTENT STRENGTH GROUNDWATER OBSERVATIONS DRILL METHOD ADDITIONAL LAB TESTING ADDITIONAL OBSERVATIONS DRILL RIG DEPTH (m) ELEV. Plastic & Liquid Limits STRATA PLOT Pocket Pen Q U DESCRIPTION REC % BLOWS Water Content (%) DEPTH TYPE (m) Pipe Stickup: 0.00 m CLAYEY SILT-SILT (CL-ML) to CLAYEY SILT (CL) Hard Grey Moist 41 16-22-28-28 9 SS 42 16-18-25-32 32 90 SS 43 15-24-28-39 SS 100 33 25 Mud Rotar 06 Q 45 207.32 SILTY SAND (SM) 46.02

SILTY SAND (SM)
Very dense
Grey
Moist

88 88 00.78.19.89.1

DEPTH SCALE: 1:51 HAMMER TYPE:

Grey Moist

48



MEMBER OF WSP

204.27

Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Aug 30, 2021 DATE:

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CLAYEY SILT (CL), trace sand, trace gravel (TILL) Hard

Continued on Next Page

RECORD OF BOREHOLE: BH CR4-11 Sheet 6 of 6

CLIENT: AECOM DATE: August 30, 2021 ELEVATION: 253.34 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.130896° Long: -79.568730°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

																E LOC:	Diadioi	и Бураѕ	s - County	Noau 4
	00	MATERI	AL PROFILE			0,	SAMI	PLES		WATE	R CONT	ENT	S ⁻	SHE	AR IGTH	1(5)	ZS.	R	CON	STRUCTION AND LLATION DETAILS
DRILL RIG	DRILL METHOD				ELEV.	ASTM	Ham D1586, B	mer: lows per 0.1 r, 0.76-m dr	15 m	⊢ Plac+i-	. & Liquid	Limite	\ <u></u>	Nat Var	ne	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	INSTA	LLATION DETAILS
	M	DESCRIPTION	nscs	STRATA					тор	(%) Water	c & Liquid Content (%)		Rem Va Pocket	ine Pen		NE SE	JNDV		
, E	8	DEGORII HON	SU	STR	DEPTH (m)	NUMBER	IYPE	BLOWS	N-VALUE	NP N	onplastic	,	o	Q U		API	ADE	3ROI 3BSE		
	"	OLAY57(01) T		rage par		≥ '			ż	8	9 ₽	8	9 9	-300	900	98	0	-		Pipe Stickup: 0.00
D 90	Mud	CLAYEY SILT (CL), trace sand (TILL) Hard Grey Moiet	, trace gravei		•															
	T,	Hard Grev	_ ا		•			84												
		Moist	5		•	35	8 5	32-44-62-84	106											
				ALC:	202.44		`	32-4	,											
51		End of hole at 50.90	m.	r LPT 61	202				4											
		End of Borehole																		
											17									
52																				
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DEPTH SCALE: 1:51 HAMMER TYPE:



LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Aug 30, 2021

REV:

Pre-draft

MEMBER OF WSP

DATE:

CLIENT: AECOM DATE: October 13, 2021 ELEVATION: 255.23 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.130596° Long: -79.569281°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 1 of 2

\top		MATERIAL PROFILE					041	.D. E		14/	/ATED		CENT		SHE			LOC:	Bradford Bypass - County Road 4	
; IG	DRILL METHOD	MATERIAL PROFILE	T		T	Δ9	Hammer TM D1586, 323-N hamn	PLES		+	ATER				SHE TREI		Н	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER
DRILL RIG	L ME	DESCRIPTION	nscs	STRATA	ELEV.		1 1		n drop	1 0 /	Plastic 8 (%) Water C Non	& Liquid Content (Limits %)	×⊕ ■ ●○	Rem \	Vane		OITIOI TEST	OITIO	UNDW
; H	DRIL	BEGOM HOW	Sn	STF	DEPTH (m)	NUMBER	TYPE	REC %	N-VALLIF	NP NP					O D 002	0 (ADI LAB	ADI	GRO
+		SILTY SAND (SM), trace rootlets, trace			0.00	_					50 4	β	8	٩	8	8 9	500			
		gravel, Loose Brown				-	SS	62	3	,										
		Moist	5								1									
			SM						1											
1						2	SS	0 2 5 7	2-2-5											
		CLAVEY SILT (CL) trace to some sand			253.78			1	4			.								
		CLAYEY SILT (CL), trace to some sand, trace gravel, (TILL) Stiff to Hard			1.45			0	6-1			4								
2		Grey Moist				3	SS	100	8						4					
					4															
						4	SS	75	12	2										
							0		† _											- 7
3												1								
						2	SS	100	60,0											
							Ш	_	+	4										
								2	2											
						9	SS	100	30	3										
	ıger						-4	à	6							1	И			
	210 mm O.D. Hollow Stem Auger						M	4F	î						1					
06 Q	ollow S					7	SS	100	6	3										
	O.D. H							7	7	+										
	10 mm																			
	2		占																	
6																				
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								1												
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3						6	SS	100	31	5										
								α	6											
		CLAYEY SILT (CL)	-		246.54 8.69															
9		Hard Grey		V//.	1															
		Moist to Wet		V///	1			2	3											
				V///	1	10	SS	75	89	3										
				Y///	1			+	+	\perp										
1 1		Continued on Next Page		V/L	1															

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



D: Dipendra Paudel DATE: Oct 13, 2021

DATE:

Pre-draft

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LOGGED: Dipendra Paudel CHECKED: ACK

RECORD OF BOREHOLE: BH CR4-12 Sheet 2 of 2

CLIENT: AECOM October 13, 2021 ELEVATION: 255.23 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.130596° Long: -79.569281°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

SHEAR STRENGTH WATER CONTENT MATERIAL PROFILE SAMPLES GROUNDWATER OBSERVATIONS ADDITIONAL LAB TESTING DRILL RIG DEPTH (m) ELEV. lastic & Liquid Limits Pocket Pen Q U DESCRIPTION REC % BLOWS Water Content (%) DEPTH (m) CLAYEY SILT (CL) Hard Grey Moist to Wet 21-27-29-23 SS 100 26 End of hole at 11.28 m. End of Borehole 12 16 18 19

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



Pre-draft

REV:

LOGGED: Dipendra Paudel CHECKED: ACK

DATE: Oct 13, 2021 DATE:

CLIENT: AECOM DATE: August 27, 2021 ELEVATION: 252.46 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.130667° Long: -79.568660°

PROJECT NO: 19136074 COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: NAD83 VERT DATUM: CGVD28

DCATION: Bradford, Ontario CONTRACTOR: HORZ DATUM: NAD83 VERT DATUM: CGVL
HOLE LOC: Bradford Bypass - County Road 4

																HOL	E LO	C:	Bradford Bypass - County Road 4	
	ЭD	MATERIAL PROFILE						IPLES			VATER	CON.	ΓENT	S	SHE/	AR IGTH		G	N S	H 4
DRILL RIG	DRILL METHOD			<	ELEV.	AS 6	Ha TM D1586, 323-N hamn	mmer: Blows per ner, 0.76-n	0.15 m drop	Н	Plastic 8	& Liquid	Limits		Nat Var Rem Va	ne	ADDITIONAL	STIN	ADDITIONAL OBSERVATIONS	GROUNDWATER
SRILL	LLM	DESCRIPTION	nscs	STRATA	DEPTH				2 4) NF	Water C	Content on plastic	%)	•	Pocket Q	Pen	I	B TE	SERV	OUNI
	DRI		٦	l R	(m)	NUMBER	TYPE	REC %	N-VALIE	- N	8 8		08	0 00	200	300	₽	Z	AI O B8	8.8
		SILTY SAND (SM), trace organics, trace			0.00			26.11	-		0 4		1			6 4	9			
		rootlets (FILL) Compact Brown	SM			-	SS	2	4	=										
		Moist			251.77		Ш				4									
		CLAYEY SILT (CL), trace sand, trace gravel Firm		TUTA	0.69															
1		Brown Moist				2	SS	1.2.2.5	44	4										
		ivioist		XX				,												
								4				.		b						
							40	8	2 ~						K					
2						3	SS	2358	2 "						4					
		CLAYEY SILT (CL), trace to some sand,		илы	250.25 2.21			4												
		trace gravel			2.21			5	2											
		Very stiff to hard Brown to grey Moist				4	SS	16.11.13	4	=										
		Moist					\vdash													
3								ă	3											
		-Grey below a depth of 3.8m below ground surface (Elev. 248.7m)				2	SS	11-17-03-08	40	₽ .										
							Ш	-					17							
									,											
4			L			9	SS	12.17.16.18	2 %	3			1							
								10.42	1						Т					
						/	(0)	6.13.11.18	2											
5]	7	SS	13,	27	١										
			占																	
6																				
								100	-											
						80	SS	10-12-18-24	8	3										
							Ш	5	2											
7							Ш		4											
						l,	И													
								+.												J
						6	SS	14-24-26-24	47											
8								14.2												
]															
]															
9]															
								1,04	5											
]	10	SS	14-16-17-24	3 8	3										
		End of hole at 9.75 m.			242.71	<u> </u>		2	-											-
1 1		End of note at 9.75 m.	1			1	1 1	- 1	- 1	Ш							Ш			- 1

DEPTH SCALE: 1:51

HAMMER TYPE:



MEMBER OF WSP

LOGGED: DP CHECKED: ACK Pre-draft

REV:

Sheet 1 of 1

DATE: Aug 27, 2021

DATE:

START DATE: July 19, 2021 ELEVATION: 264.43 m (CGVD28)

PROJECT: END DATE: **Bradford Bypass** July 20, 2021 COORDINATES: Lat: 44.131934° Long: -79.569230°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4 LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd.

Sheet 1 of 2

																	DLE I	LOC:		d Bypas	s - Count	y Roa	d 4
ניז	유	MATERIAL PROFILE		1				MPLE			WAT	TER C	ONTEN	Т		HEAR ENGTH	1	NG NG	AL	TER SNS			CTION AND ION DETAILS
DRILL RIG	DRILL METHOD		SS	ATA T	ELEV.		Hamm STM D158 623-N han				⊢ Pla:	ıstic & Li	iquid Limit	s	⊕ Re	t Vane m Vane cket Pen		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			
DRI	JIIL	DESCRIPTION	nscs	STRATA	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS			iter Cont Nonpla	tent (%)		O U			ADDI LAB 1	ADDI	GROUI			
		ASPHALT (100 mm)		. x x >	0.00	Z			ш :	ż	50	40	Q Q	9	, 0 8	300	200				,a · 8	0.00) - 0.10 m bgs
		SAND (SP) some gravel to gravelly, trace fines (FILL)	SP		264.33 0.10	4	SS	75	9-10-15-9	25								/IS_202					
		Compact Brown Moist	S		263.70	4	S	_	9-10	7								09103					
		SILT (ML) of slight plasticity, some sand to SILTY SAND (ML), of slight plasticity, trace			0.73				φ	1		N											
		gravel (FILL) Loose to compact				2	SS	22	6-17-12-5	න	0							/IS_202 09105					
		Brown to Grey Moist			$\stackrel{\checkmark}{}$				+														
									-15				11										
						က	SS	83	9-9-8-15	17													
			占		× •) - 4.27 m bg ntonite
						4	SS	100	4-2-3-2	2	ОН			1				/IS_202					
							0,	- !	4-7								1	09101					
						Sa																	
						5b	SS	75	2-4-6-16	9	4												
					260.70	Ľ		-	7	4				4									
	ď	SILTY CLAY (CI), trace sand Firm to very stiff			3.73				2														
	Hole Dia	Brown Moist				9	SS	100	2-2-3-5	വ	H	э	Л					/IS_202 09131				_	
	0-mm															47							
Track	ger - 21	4.60 m: Wet sands noted at approximately 4.6 m, difficult advancement with augers. Borehole moved 1.0 m south, obstruction	ᅙ				0)		2-19	_													
Diedrich D-50 Track	em Au	Borehole moved 1.0 m south, obstruction encountered at a depth of 0.3 m. Borehole				7	SS	19	5-9-15-19	54													
Diedric	ollow Si	encountered at a depth of 0.3 m. Borehole moved approximately 2.7 m south of original location, sampling resumed at a depth of 10.7 m.																					
	210 mm O.D. Hollow Stem Auger - 210-mm Hole Dia.	SILTY SAND (SM)			258.79																		
	10 mm	Loose to very dense Brown to Grey			3.04																	4.2	7 - 7.62 m bg
	2	Wet							65,													Sa	
						∞	SS	100	13-18-24-29	42	0						N 1	/IS_202 09104					
								-	33	_													
									4														
									E														
			SM			6	SS	100	1948-52/81mm												9 9		
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						9	SS	100	244-7	∞	0						N 1	/IS_202 09106			9 9 0		
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CLIENT:

AECOM

HAMMER TYPE: Automatic



MEMBER OF WSP

LOGGED: Matthew Montesano

CHECKED: ACK

Pre-draft

DATE: Jul 19, 2021 DATE:

START DATE: July 19, 2021 ELEVATION: 264.43 m (CGVD28)

PROJECT: END DATE: **Bradford Bypass** July 20, 2021 COORDINATES: Lat: 44.131934° Long: -79.569230°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4 LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd.

Sheet 2 of 2

																		LOC:	Bradford	l Bypas	s - County F	toad 4
5	go.	MATERIAL PROFILE						1PLE			WAT	ER CO	ONTEN	Г	SI STR	HEAR ENGTI	Н	- D	NS NS	문 S	CONST	RUCTION AND ATION DETAILS
DRILL RIG	Ĭ			Α.	ELEV.	AS'	Hamme TM D1586 323-N ham	r: Autom , Blows p ner, 0.76	atic er 0.15 r i-m drop	m H	H Plas	stic & Lic	quid Limit			t Vane m Vane		STIN	IONA ATIO	WATE ATION	II TO IT LE	311011 DE 1711E0
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	DEPTH	NUMBER	TYPE	REC %	BLOWS	۳ I	O Wate	er Cont Nonpla	ent (%)	s ×⊕ ■ ○ ○	Po Q	cket Pen		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		
				S -	(m)	MON	Τ	Ä.	BLC	≸ Ż	-50		φ φ			000	200	₹	OBA	P. 9		
		SILTY SAND (SM) Loose to very dense																			9 9	
		Brown to Grey Wet																				
		- 10.21 m: - grey below a depth of 10.2 m								\dashv												
11			SM			1	SS	9	9-18-31-46	6	'											
									9-18													
								4														
		007(40) (1:14 1 1:2			252.70				V													
12 2		SILT (ML) of slight plasticity, trace sand Hard			11.73		7								V							
	Hole	Hard Grey Wet			4				21	\exists												
	10-mm					12	SS	100	17-23-30-62	23	O D							MIS_202				
Track	ger - 2				7				17-2:									109102				
3 P D-50	em Au						•															
Diedrich D-50 Track	low St																					
1 1 5	210 mm O.D. Hollow Stem Auger - 210-mm Hole Dia.		4							- 1	4											
	E E		ML					-	33	4				1								
14	210		_			13	SS	9	26-42-58/133mm				И									
									264	7												
																47						
15																						
								4	8	\dashv												
						14	SS	9	20-23-26-53	49												
Ш					248.58				20-2													
16		End of hole at 15.85 m.																				
		End of Borehole Note: 1. Borehole moved 1 m south due to flowing																				
		sands in hollow stem augers at a depth of 4.6																				
		m.					Ш															
17							И															
8																						
19																						
20																						
						•								111	-							

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jul 19, 2021

DATE:

Sheet 1 of 2

CLIENT: AECOM START DATE: July 06, 2021 ELEVATION: 258.07 m (CGVD28)

PROJECT: Bradford Bypass END DATE: July 09, 2021 COORDINATES: Lat: 44.130378° Long: -79.568995°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

DRILL RIG	MATERIAL PROFILE						IPLES		۷	NATE	ER CO	NTENT		SH	IEAR ENG	t TH		Ø	1
METH		ı F											`) \L	-110	• • •	1 79 1	⇒≍	出:
≓ ≥	<u></u>	"	⋖.	ELEV.	AS1	Hamme IM D1586, 23-N hamn	r: Automati Blows per ner, 0.76-n		Н	Plasti	ic & Liq	uid Limits	\oplus X		Vane n Vane		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER
ij⊒	DESCRIPTION	nscs	STRATA PLOT	DEPTH	BER	PE	% (N-VALUE	I O NF	Water	r Conte	nt (%)	+	Pock Q	ket Pen	ì	DDIT 18 TE	SERV	IOUN
ᆸ	Š	٦	ω -	(m)	NUMBER	TYPE	REC %	N-V			9 8		9 :	U 2007	300	900	₹₹	O B A	89
	ASPHALT (200 mm)			0.00 257.87					T	Ť				Ì	Ť	Ť		0.00 - 15.85 m: 25 bags of hole plug, 1 bag of silica sand	
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	SILTY SAND (SM) of slight plasticity, some	_	\ggg	257.03 1.04	2a	SS	83	5											
	gravel (FILL) Loose to dense	k	\ggg		2b	0,										М			
	Brown Moist	k k	\ggg				4	Ţ											
	- trace organics, trace rootlets between a depth of 1.0 m and 2.2 m	k k	\ggg		3	SS	58	4											
	dopar or 1.0 m and 2.2 m	k k	\ggg			03	2,0	1						4					
		k	\ggg	•					1										
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H H			XX	4.50	9	4	5	4	┩						4		1072713 5		
ack - 210-	SILT (ML) of slight plasticity and sand trace gravel, trace organics			253.57		T	oc.	+	1					1		11			
Diedrich D-50 Track 210 mm O.D. Hollow Stem Auger - 210-mm Hole Dia.	E Compact Brown				7	SS	83	23	:	Œ							MIS_202		
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O.D.																			
10 mm																			
2				251.80	8a				+										
	SILTY CLAY (CI) to sandy CLAYEY SILT- SILT (CL-ML), trace gravel (TILL)			6.27		SS	100	15											
	Stiff to hard				88		2	5											
	Brown to grey Moist																		
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		K	120 196																1
	Continued on Next Page																		Щ

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



MEMBER OF WSP

LOGGED: Matthew Montesano

CHECKED: ACK

Pre-draft

DATE: Jul 06, 2021 DATE:

START DATE: July 06, 2021 ELEVATION:

PROJECT: **Bradford Bypass** END DATE: July 09, 2021 COORDINATES: Lat: 44.130378° Long: -79.568995°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

258.07 m (CGVD28)

Sheet 2 of 2

HOLE LOC: Bradford Bypass - County Road 4

																		H	HOLE	E L	OC:	Bradford Bypass - County Road 4	
		Q	MATERIAL PROFILE					SAN	ИPLE	S		WA	ATER	CON	ΓENT	S	SH	EAR NG	R TH		ı (D	. σ	αs
DEPTH (m)	2	DRILL METHOD				ELEV.	AS	Hamm STM D1586 623-N ham	er: Automa	atic er 0.15	m .	НР	lastic &	Liguid	Limite		Nat \	/ane			LAB TESTING	ADDITIONAL	GROUNDWATER OBSERVATIONS
DEPTH (m)	┇	LME	DESCRIPTION	nscs	STRATA					⊱m drop	<u>"</u>	(%)	lastic & %) Vater Co Nonp	ontent ((%)	×⊕ ■ •○	Rem Pock Q	Vane et Per	1	E	<u> </u>	DITIC	UND
	5 5	DRIL		ı	STE	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE						U	0	0 0		8	AD	GRO
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			SILTY CLAY (CI) to sandy CLAYEY SILT- SILT (CL-ML), trace gravel (TILL) Stiff to hard Brown to grey Moist																				
			Brown to grey																				
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ä		Mollo					ľ																
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)EPT	нξ	C	ALE: 1:51																			NEV.	

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jul 06, 2021 DATE:

CLIENT: AECOM START DATE: July 12, 2021 ELEVATION: 258.04 m (CGVD28)

PROJECT: Bradford Bypass END DATE: July 13, 2021 COORDINATES: Lat: 44.130388° Long: -79.568829°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 1 of 2

MATERIAL PROFILE				l	SAM	PLES	3	W	ATER C	CONTE	NT	0-	SHE/	OT!!	1	σ
					Hammer	Automatic									무원	NO ON
DECODIDATION	SS	ATA	ELEV.		Hammer: M D1586, E 23-N hamm			H F	Plastic & L %) Vater Cor	Liquid Lir	mits	⊕	Nat Van Rem Va Pocket I	ne	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS
DESCRIPTION	nscs	STRATA	DEPTH (m)	JMBE	TYPE	SEC.	VALUI	NP	Nonpl	lastic			Q U		APD	ADD
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Moist						19-1										
	S					ę										
			}	2	SS	8-9-8	1	0							MIS_202 1072714	
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some gravel (FILL)		\bowtie	1.7/			6.4	K			4						
Grey				3	SS	9.	. 8						4			
	L-ML		}					┨								
	ō					4										
				4	SS	10-6-8	4	Он							1072714	
SILT (ML) of slight plasticity, some sand			255.07		,										2	
trace gravel			2.37			16	:		4							
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		M		9	SS	100	25	0							1072714	
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							-	\parallel							5	
		Ш														
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Hard																
Moist Grey						9	:	1								
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



MEMBER OF WSP

Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jul 12, 2021 DATE:

AECOM START DATE: July 12, 2021 ELEVATION: 258.04 m (CGVD28)

PROJECT: Bradford Bypass END DATE: July 13, 2021 COORDINATES: Lat: 44.130388° Long: -79.568829°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 2 of 2

		٥	MATERIAL PROFILE					SAN	MPLE	S	T	WA	ATER C	ONTE	ENT	T s	SH	IEA ENC					. o	K W
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-			Moist Grey																					
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-		2					14	SS	100	19-31-38-38	69													
									1	19-3														
- 16			Y																					
			CLAYEY SILT (CL) trace sand, trace gravel			241.69 16.35																		
-			CLAYEY SILT (CL) trace sand, trace gravel (TILL) Hard Grey																					
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			CLAYEY SILT (CL)	$\left\{ \right.$	HHO	240.24 17.80																		
- 18			Hard Grey Moist		\///	1				ε														
_			Molec		////	1	16	SS	100	15-58-42/105mm														
	\dashv		End of hole at 18.69 m.	_	<u> </u>	239.35		-	-	15-58-4	4													
- 19			End of Borehole																					
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- 20 L					•	•		. '			'										•		DEV/	•

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:



Pre-draft

REV:

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jul 12, 2021 DATE:

CLIENT: AECOM DATE: June 29, 2021 ELEVATION: 255.52 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.129614° Long: -79.568812°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

HOLE LOC: Bradford Bypass - County Road 4

Sheet 1 of 2

																	E LOC:	Bradford Bypass - County Road 4
٤	a l	MATERIAL PROFILE						1PLE			WATE	R CON	TENT	s	SHE	AR IGTH	G L	N N
DRILL RIG	Ĭ			<	ELEV.	AS'	Hamme TM D1586 323-N hami	r: Automa , Blows pe ner, 0.76-i	ic r 0.15 m n drop	Н	Plastic	c & Liqui	Limits	×	Nat Var Rem V	ne	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS
JRILI M	ILL M	DESCRIPTION	nscs	STRATA	DEPTH						Water	Content	(%)	⊕ ■	Pocket Q		DOTT B TE	DDIT
	5		_	N.	(m)	NUMBER	TYPE	REC %	DECOWS	- N		9 &	08	0	J 002	400	₹≦	O A A
	- 1	ASPHALT (180 mm)			0.00 255.34						Ť				Ť			
		SILTY SAND (SM), some gravel (FILL) Compact			0.18			- 2	SI-11-11-01									
		Brown Moist				_	SS	50	1-11-0	7	4							
			SM		}				+	1								
					}	2	SS	38	14	4 (MIS_202	
					254.06			,								M	1091014	
	Ī	SILT (ML), some sand to SILTY SAND (SM) some gravel (FILL)			1.46	<u> </u>		1										
		Compact to Dense Brown				က	SS	21	12	7								
		Moist																
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					251.78	25		ç	-6									
	ŀ	CLAYEY SILT (CL), trace sand, trace gravel, trace organics		1777	3.74													
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DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



MEMBER OF WSP

Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jun 29, 2021

DATE:

June 29, 2021 ELEVATION:

255.52 m (CGVD28) PROJECT: **Bradford Bypass**

COORDINATES: Lat: 44.129614° Long: -79.568812° PROJECT NO: INCLINATION: 90.0° 19136074 COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd.

HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4

Sheet 2 of 2

																			LOC:	Bradford Bypass - County Road 4
	OD	MATERIAL PROFILE						MPL			W	ATE	R CO	NTENT	s	SH TRI	IEAR ENG1	ΤΗ	le IG	SNS SNS
DEPTH (m)	DRILL METHOD		(0	<.	ELEV.	AS	Hamm STM D158 623-N han	ner: Auto 6, Blows nmer, 0.	omatic s per 0.1 .76-m dro		Н	Plastic	c & Liqu	id Limits	×	Nat Ren	Vane n Vane		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS GROUNDWATER GREENVATIONS
DEPT	ILL N	DESCRIPTION	nscs	STRATA	DEPTH	NUMBER	TYPE	REC %	BLOWS	N-VALUE	O V	Water	r Conten	t (%)	× ⊕ ■ • o	Poc Q	ket Pen		DDIT AB TE	SERY
	BR			S -	(m)	MUN	Т	R	BLC	√Λ-N			9 9		90 9	υ 200	300	400	Y V	O B A O G G G G G G G G G G G G G G G G G G
		Sandy CLAYEY SILT (CL), trace gravel to gravelly (TILL)			1															
		gravelly (TILL) Stiff to hard Brown to grey																		
		Moist										1								
11						10	SS	100	8-10-11-14	21										
									8-10											
														4						
													М				4			
12	Dia.						1									4				
	m Hole		١.		4			X	8											
×	210-m		C C			Ξ	SS	æ	8-10-12-18	22										
90 Trac	Nuger -								φ											
23 Diedrich D-90 Track	Stem /																			
Died	Hollow																			
	.0.D.																			
	210 mm O.D. Hollow Stem Auger - 210-mm Hole Dia.								-25											
14			L			12	SS	46	9-15-20-25	35	0			4					MIS_202 1091013	
									3,											
					240.73			1												
45		CLAYEY SILT-SILT (CL-ML) Hard		PLEP 13	14.79			1												
15		grey Moist	 																	
			CL-ML	11111		~		0	34-41											
					239.67	13	SS	100	22-21-34-41	22	a	H							MIS_202 109109	
16		End of hole at 15.85 m.		1	233.07															
		End of Borehole																		
17																				
18																				
19																				
20		· A. F. 4.54																		REV

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic

CLIENT:

AECOM



REV: Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE:

DATE: Jun 29, 2021

CLIENT: AECOM June 24, 2021 ELEVATION: 254.70 m (CGVD28)

PROJECT: **Bradford Bypass** COORDINATES: Lat: 44.129434° Long: -79.568551°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28

Sheet 1 of 2

- 1										_								E LOC:		l Bypas	ss - County	
<u>១</u>	HOD	MATERIAL PROFILE	I					/PLE		_			NTENT			RENG	TH	ING ING	ADDITIONAL OBSERVATIONS	ATER IONS		TRUCTION AND LATION DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV.			er: Automa i, Blows pe mer, 0.76-			H Plas (%)) Wat	stic & Lic	uid Limits	× ⊕ ■ ○		at Vane em Vane ocket Pe		ADDITIONAL LAB TESTING	OITION RVAT	GROUNDWATER OBSERVATIONS		
P	DRILI	BESONII HON	ns	STR	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	NP 8	Nonplas	tic S	0		300	400	ADE	ADI	GRO		
		ASPHALT (100 mm) SAND (SP) and Gravel, trace fines (FILL)	F	XXX	0.00 254.60	Ē			0	- 1	Ō	4	9	7	1	<u>α</u> κ	4 5	2			(a) + 1 (B) A	0.00 - 0.10 m bg
		Dense Brown			0.10	-	SS	50	01-C1-71-61	32	5							MIS_202				
		Moist	SP		<u> </u>													1072714 6				
		SILTY SAND (SM) of slight plasticity, some			253.70 1.00	2a	SS	28	17-07-61-0		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \											
		gravel (FILL) Loose to dense			1.00	2b	S	4,	9 ,								abla					
		Brown Moist						4		4			4									
						က	SS	50	11-6-1-0	16	0							MIS_202 1072714				
																		9				0.10 - 3.96 m bg Bentonite
			SM				ä		P -													
			0)			4	SS	100	8-11-01-0	21												
3																						
						2	SS	67	04-0-1	ກ	СH							MIS_202				
								•	0	4				4				1072715 0				
4	ei.				250.65	- Ga			o l				1									
	Hole Di	CLAYEY SILT (CL), trace sand, trace organics		///	4.05	g ₉	SS	100	0-4-0-0	2	C							MIS_202				
	03-mm	Firm Dark brown Moist		V///												41		1072715				
Diedrich D-50 Track	210 mm O.D. Hollow Stem Auger - 203-mm Hole Dia	Worst		/ ///		7	SS	83	4-0-0-4	10	0	,						MIS_202				
rich D-5	Stem A				1		0,	,	Š									1072715 2				
Died	Hollow			///																		
	m 0.D.	CLAYEY SILT (CL), some sand, trace gravel		THE PE	249.00 5.70																	3.96 - 7.62 m bg
6	210 m	CLAYEY SILT (CL), some sand, trace gravel to Sandy CLAYEY SILT-SILT (CL-ML), trace gravel (TILL)																				Sand
		Very stiff to hard Brown to grey Moist				80	SS	100	01-61-7-6	20	Ю Н							MIS_202				
						~	S	2	1-/-6	7								1072715				
7		Grey below a depth of 9.1m																				
			CL				Δ															
									=													
								0,70	Z/-40-43-30/135mm													
8						6	SS	100	0-45-0	8												
								3	7/7													
9																						
							Н	9	7	$-\parallel$									9.10 - 9.10 m: Grey below a depth of 9.1 m			
						10	SS	100	24-05-12-02	65	ОH							MIS_202 1072714	ueptn of 9.1 m			
						-	\vdash	- 18	7	-								7				

DEPTH SCALE: 1:51

HAMMER TYPE: Automatic



MEMBER OF WSP

Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jun 24, 2021

DATE:

CLIENT: AECOM DATE: June 24, 2021 ELEVATION: 254.70 m (CGVD28)

PROJECT: Bradford Bypass COORDINATES: Lat: 44.129434° Long: -79.568551°

PROJECT NO: 19136074 INCLINATION: 90.0° COORD SYS: Geographical Coordinates

LOCATION: Bradford, Ontario CONTRACTOR: Walker Drilling Ltd. HORZ DATUM: NAD83 VERT DATUM: CGVD28
HOLE LOC: Bradford Bypass - County Road 4

1.		О	MATERIAL PROFILE						ИPL			WA	TER CO	ONTEN	Г		HEAR ENG		۵۲	NS NS	# S	CONS	STRUCTION AND
-	בר ה	DRILL METHOD		SS	ATA TO	ELEV.		Hamme TM D1586 23-N ham				(%	nstic & Lic			Re	t Vane m Vane cket Pen	ı	ADDITIONAL LAB TESTING	TIONA	GROUNDWATER OBSERVATIONS		
Č	צ	DRILL	DESCRIPTION	nscs	STRATA	DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		Nonplas		00,00	100 N		400	ADDI LAB 1	ADDITIONAL OBSERVATIONS	GROUI		
			CLAYEY SILT (CL), some sand, trace gravel to Sandy CLAYEY SILT-SILT (CL-ML), trace gravel (TILL) Very stiff to hard Brown to grey Moist							41													
			Grey below a depth of 9.1m				11	SS		21-25-33-41	28		1										
		Jia.						2															
		3-mm Hole [242.30	12a	SS	100	20-48-60	108												
F 6	Diedrich D-50 Track	em Auger - 20	CLAYEY SILT (CL) Hard Grey Moist	CL		12.40	12b	S	5	20-4	10												
Č	Diedrick	210 mm O.D. Hollow Stem Auger - 203-mm Hole Dia																					
		210 mm O.					13	SS	100	3-57	100	•			1				MIS 202				
							1	S	10	34-43-57	10								1072714 8				
							14	SS	100	52-48/105mm													
	1		End of hole at 15.65 m.		///	239.05		0,	_	28-52-4													
			End of Borehole																				

DEPTH SCALE: 1:51 HAMMER TYPE: Automatic



REV: Pre-draft

LOGGED: Matthew Montesano CHECKED: ACK

DATE: Jun 24, 2021

DATE:



Appendix D

Laboratory Analysis Results



CLIENT NAME: AECOM CANADA LTD

105 COMMERCE VALLEY DR.W 7TH FLOOR

MARKHAM, ON L3T7W3

(905) 886-7022

ATTENTION TO: Kesh Appadurai

PROJECT: 60636190 - CR-4

AGAT WORK ORDER: 21T768662

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jul 09, 2021

PAGES (INCLUDING COVER): 17 VERSION*: 1

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

*Notes	I

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 17

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Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA)



Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

nnadurai

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO CANADA L4Z 1Y2

http://www.agatlabs.com

TEL (905)712-5100 FAX (905)712-5122

ATTENTION TO: Kesh Appadurai SAMPLED BY:Kesh A

SAMPLING SITE:

			Ο.	Reg. 153(511) - Metals (k Inorganics (Soil)
DATE RECEIVED: 2021-06-30						DATE REPORTED: 2021-07-09
	S		CRIPTION: PLE TYPE: SAMPLED:	HF-04-SS-2 Soil 2021-06-29	CV1-03-SS-2 Soil 2021-06-25	
Parameter	Unit	G/S	RDL	2682272	2682274	
Antimony	μg/g	40	8.0	<0.8	<0.8	
Arsenic	μg/g	18	1	1	2	
Barium	μg/g	670	2.0	37.6	40.8	
Beryllium	μg/g	8	0.4	<0.4	<0.4	
Boron	μg/g	120	5	<5	<5	
Boron (Hot Water Soluble)	μg/g	2	0.10	0.12	0.15	
Cadmium	μg/g	1.9	0.5	<0.5	<0.5	
Chromium	μg/g	160	5	29	23	
Cobalt	μg/g	80	0.5	3.7	3.8	
Copper	μg/g	230	1.0	7.1	8.0	
Lead	μg/g	120	1	7	13	
Molybdenum	μg/g	40	0.5	<0.5	<0.5	
Nickel	μg/g	270	1	6	6	
Selenium	μg/g	5.5	8.0	<0.8	<0.8	
Silver	μg/g	40	0.5	<0.5	<0.5	
Thallium	μg/g	3.3	0.5	<0.5	<0.5	
Uranium	μg/g	33	0.50	<0.50	<0.50	
Vanadium	μg/g	86	0.4	24.4	23.5	
Zinc	μg/g	340	5	23	32	
Chromium, Hexavalent	μg/g	8	0.2	<0.2	<0.2	
Cyanide, Free	μg/g	0.051	0.040	<0.040	<0.040	
Mercury	μg/g	0.27	0.10	<0.10	<0.10	
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	0.811	0.366	
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	N/A	9.54	4.48	
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.89	7.97	





Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

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

5835 COOPERS AVENUE

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

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

DATE RECEIVED: 2021-06-30 DATE REPORTED: 2021-07-09

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2682272-2682274 EC was 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. SAR is a calculated

parameter.

Analysis performed at AGAT Toronto (unless marked by *)

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SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

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

DATE RECEIVED: 2021-06-30						DATE REPORTED: 2021-07-0
	;	SAMPLE DESC	CRIPTION:	HF-04-SS-2		
		SAMF	PLE TYPE:	Soil		
		DATE S	SAMPLED:	2021-06-29		
Parameter	Unit	G/S	RDL	2682272		
Naphthalene	μg/g	0.2	0.05	<0.05		
Acenaphthylene	μg/g	0.093	0.05	0.06		
Acenaphthene	μg/g	2.5	0.05	0.19		
luorene	μg/g	6.8	0.05	0.33		
Phenanthrene	μg/g	12	0.05	1.21		
Anthracene	μg/g	0.16	0.05	0.53		
luoranthene	μg/g	2.8	0.05	1.41		
yrene	μg/g	28	0.05	1.16		
enz(a)anthracene	μg/g	0.92	0.05	0.46		
Chrysene	μg/g	9.4	0.05	0.59		
Benzo(b)fluoranthene	μg/g	3.2	0.05	0.62		
Benzo(k)fluoranthene	μg/g	3.1	0.05	0.26		
Benzo(a)pyrene	μg/g	0.31	0.05	0.38		
ndeno(1,2,3-cd)pyrene	μg/g	0.76	0.05	0.15		
Dibenz(a,h)anthracene	μg/g	0.7	0.05	<0.05		
enzo(g,h,i)perylene	μg/g	13	0.05	0.17		
and 2 Methlynaphthalene	μg/g	0.59	0.05	<0.05		
loisture Content	%		0.1	7.8		
Surrogate	Unit	Acceptabl	e Limits			
laphthalene-d8	%	50-1	40	77	<u> </u>	
Acridine-d9	%	50-1	40	77		
Terphenyl-d14	%	50-1	40	85		

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2682272 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 *)





SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

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

DATE RECEIVED: 2021-06-30 **DATE REPORTED: 2021-07-09** SAMPLE DESCRIPTION: HF-04-SS-2 SAMPLE TYPE: Soil DATE SAMPLED: 2021-06-29 **RDL** 2682272 Parameter Unit G/S F1 (C6 - C10) <5 μg/g F1 (C6 to C10) minus BTEX 25 5 <5 µg/g F2 (C10 to C16) 26 10 <10 µg/g F2 (C10 to C16) minus Naphthalene 10 <10 μg/g F3 (C16 to C34) 240 50 97 µg/g F3 (C16 to C34) minus PAHs µg/g 240 50 91 F4 (C34 to C50) μg/g 3300 50 87 Gravimetric Heavy Hydrocarbons μg/g 50 NA Moisture Content % 0.1 7.8 Surrogate Unit Acceptable Limits Toluene-d8 % Recovery 50-140 98 Terphenyl 60-140 95

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2682272 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 calculated parameter is non-accredited. The parameters that are components of the calculation are

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 *)

Certified By:



5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO

http://www.agatlabs.com

CANADA L4Z 1Y2

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SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

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

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh A

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

DATE RECEIVED: 2021-06-30					DATE REPORTED: 2021-07-09
	S	SAMPLE DESCR	RIPTION:	HF-04-SS-2	
		SAMPL	E TYPE:	Soil	
		DATE SA	MPLED:	2021-06-29	
Parameter	Unit	G/S	RDL	2682272	
Dichlorodifluoromethane	μg/g	1.5	0.05	<0.05	
Vinyl Chloride	ug/g	0.02	0.02	<0.02	
Bromomethane	ug/g	0.05	0.05	<0.05	
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	
Acetone	ug/g	0.5	0.50	<0.50	
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	
Methylene Chloride	ug/g	0.05	0.05	<0.05	
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	
Chloroform	ug/g	0.05	0.04	<0.04	
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	
1,1,1-Trichloroethane	ug/g	0.12	0.05	<0.05	
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	
Benzene	ug/g	0.02	0.02	<0.02	
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	
Trichloroethylene	ug/g	0.05	0.03	<0.03	
Bromodichloromethane	ug/g	0.05	0.05	<0.05	
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	
Гoluene	ug/g	0.2	0.05	<0.05	
Dibromochloromethane	ug/g	0.05	0.05	<0.05	
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	
Chlorobenzene	ug/g	0.083	0.05	<0.05	
Ethylbenzene	ug/g	0.05	0.05	<0.05	
m & p-Xylene	ug/g		0.05	<0.05	





SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

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

O Peg 153/511) VOCs (Sail)

				O. Reg.	153(511) - VOCS (5011)
DATE RECEIVED: 2021-06-30					DATE REPORTED: 2021-07-09
	SA	AMPLE DESC	CRIPTION:	HF-04-SS-2	
		SAME	PLE TYPE:	Soil	
		DATE S	SAMPLED:	2021-06-29	
Parameter	Unit	G/S	RDL	2682272	
Bromoform	ug/g	0.05	0.05	<0.05	
Styrene	ug/g	0.05	0.05	<0.05	
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	
o-Xylene	ug/g		0.05	<0.05	
1,3-Dichlorobenzene	ug/g	0.26	0.05	<0.05	
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	
1,2-Dichlorobenzene	ug/g	6.8	0.05	<0.05	
Xylenes (Total)	ug/g	0.091	0.05	<0.05	
1,3-Dichloropropene (Cis + Trans)	μg/g	0.05	0.04	<0.04	
n-Hexane	μg/g	2.5	0.05	<0.05	
Moisture Content	%		0.1	7.8	
Surrogate	Unit	Acceptab	le Limits		
Toluene-d8	% Recovery	50-1	40	81	
4-Bromofluorobenzene	% Recovery	50-1	40	84	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2682272 The sample was analyzed 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.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)





Certificate of Analysis

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

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

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

					Total PCBs (soil)
DATE RECEIVED: 2021-06-30					DATE REPORTED: 2021-07-09
		SAMPLE DES	CRIPTION:	HF-04-SS-2	
		SAMI	PLE TYPE:	Soil	
		DATES	SAMPLED:	2021-06-29	
Parameter	Unit	G/S	RDL	2682272	
Polychlorinated Biphenyls	μg/g	0.78	0.1	<0.1	
Moisture Content	%		0.1	7.8	
Surrogate	Unit	Acceptab	le Limits		
Decachlorobiphenyl	%	60-1	130	88	

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2682272 Results are based on the dry weight of soil extracted.

Analysis performed at AGAT Toronto (unless marked by *)

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:





Exceedance Summary

AGAT WORK ORDER: 21T768662

PROJECT: 60636190 - CR-4

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

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Kesh Appadurai

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
2682272	HF-04-SS-2	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Anthracene	μg/g	0.16	0.53
2682272	HF-04-SS-2	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benzo(a)pyrene	μg/g	0.31	0.38
2682272	HF-04-SS-2	ON 406/19 T2.1 IC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	Benzo(a)pyrene	μg/g	0.31	0.38



Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

SAMPLING SITE:

AGAT WORK ORDER: 21T768662 ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

				Soi	l Ana	alysis	 S								
RPT Date: Jul 09, 2021				UPLICATI			REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		eptable mits	Recovery	Lie	ptable nits	Recovery		ptable
		ld		'			Value	Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inor	ganics (Soil)														
Antimony	2649400		<0.8	<0.8	NA	< 0.8	124%	70%	130%	98%	80%	120%	87%	70%	130%
Arsenic	2649400		2	2	NA	< 1	93%	70%	130%	106%	80%	120%	103%	70%	130%
Barium	2649400		27.4	27.8	1.4%	< 2.0	108%	70%	130%	99%	80%	120%	97%	70%	130%
Beryllium	2649400		0.7	0.7	NA	< 0.4	109%	70%	130%	102%	80%	120%	107%	70%	130%
Boron	2649400		<5	<5	NA	< 5	105%	70%	130%	101%	80%	120%	84%	70%	130%
Boron (Hot Water Soluble)	2686242		0.22	0.22	NA	< 0.10	93%	60%	140%	96%	70%	130%	106%	60%	140%
Cadmium	2649400		<0.5	<0.5	NA	< 0.5	110%	70%	130%	100%	80%	120%	104%	70%	130%
Chromium	2649400		21	20	NA	< 5	104%	70%	130%	98%	80%	120%	105%	70%	130%
Cobalt	2649400		8.9	8.9	0.0%	< 0.5	99%	70%	130%	110%	80%	120%	107%	70%	130%
Copper	2649400		7.0	6.7	4.8%	< 1.0	95%	70%	130%	104%	80%	120%	104%	70%	130%
Lead	2649400		6	6	0.1%	< 1	93%	70%	130%	98%	80%	120%	95%	70%	130%
Molybdenum	2649400		<0.5	<0.5	NA	< 0.5	98%	70%	130%	107%	80%	120%	110%	70%	130%
Nickel	2649400		18	17	1.4%	< 1	98%	70%	130%	109%	80%	120%	105%	70%	130%
Selenium	2649400		<0.8	<0.8	NA	< 0.8	98%	70%	130%	98%	80%	120%	105%	70%	130%
Silver	2649400		<0.5	<0.5	NA	< 0.5	95%	70%	130%	109%	80%	120%	105%	70%	130%
Thallium	2649400		<0.5	<0.5	NA	< 0.5	99%	70%	130%	108%	80%	120%	111%	70%	130%
Uranium	2649400		0.69	0.71	NA	< 0.50	98%	70%	130%	106%	80%	120%	106%	70%	130%
Vanadium	2649400		28.6	26.9	6.2%	< 0.4	99%	70%	130%	108%	80%	120%	104%	70%	130%
Zinc	2649400		37	37	0.8%	< 5	100%	70%	130%	104%	80%	120%	110%	70%	130%
Chromium, Hexavalent	2679664		<0.2	<0.2	NA	< 0.2	96%	70%	130%	95%	80%	120%	74%	70%	130%
Cyanide, Free	2703258		<0.040	<0.040	NA	< 0.040	103%	70%	130%	82%	80%	120%	94%	70%	130%
Mercury	2649400		<0.10	<0.10	NA	< 0.10	102%	70%	130%	97%	80%	120%	82%	70%	130%
Electrical Conductivity (2:1)	2682271		0.230	0.229	0.4%	< 0.005	109%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	2690406		0.085	0.079	7.6%	NA									
pH, 2:1 CaCl2 Extraction	2703258		7.76	7.78	0.3%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.





Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

ATTENTION TO: Kesh Appadurai

AGAT WORK ORDER: 21T768662

SAMPLING SITE: SAMPLED BY:Kesh A

			Trac	ce Or	ganio	cs Ar	nalys	İS							
RPT Date: Jul 09, 2021				DUPLICAT	E		REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lir	ptable nits	Recovery	Lir	ptable nits	Recovery	Lin	ptable nits
								Lower	Upper		Lower	Upper		Lower	Uppe
O. Reg. 153(511) - PHCs F1 - F4	(with PAHs a	and VOC)	(Soil)												
F1 (C6 - C10)	2682282		<5	<5	NA	< 5	101%	60%	140%	94%	60%	140%	111%	60%	1409
F2 (C10 to C16)	2682272 2	2682272	< 10	< 10	NA	< 10	103%	60%	140%	110%	60%	140%	100%	60%	140
F3 (C16 to C34)	2682272 2	2682272	97	110	NA	< 50	104%	60%	140%	117%	60%	140%	105%	60%	140
F4 (C34 to C50)	2682272 2	2682272	87	83	NA	< 50	105%	60%	140%	105%	60%	140%	100%	60%	140
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	2662097		< 0.05	< 0.05	0.0%	< 0.05	89%	50%	140%	99%	50%	140%	96%	50%	140
Acenaphthylene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	95%	50%	140%	95%	50%	140
Acenaphthene	2662097		< 0.05	< 0.05	0.0%	< 0.05	95%	50%	140%	96%	50%	140%	99%	50%	140
- Fluorene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	86%	50%	140%	96%	50%	140
Phenanthrene	2662097		< 0.05	< 0.05	0.0%	< 0.05	101%	50%	140%	96%	50%	140%	96%	50%	140
Anthracene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	95%	50%	140%	101%	50%	140
Fluoranthene	2662097		< 0.05	< 0.05	0.0%	< 0.05	99%	50%	140%	96%	50%	140%	96%	50%	140
Pyrene	2662097		< 0.05	< 0.05	0.0%	< 0.05	95%	50%	140%	95%	50%	140%	98%	50%	140
Benz(a)anthracene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	85%	50%	140%	99%	50%	140
Chrysene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	96%	50%	140%	96%	50%	140
Benzo(b)fluoranthene	2662097		< 0.05	< 0.05	0.0%	< 0.05	101%	50%	140%	99%	50%	140%	98%	50%	140
Benzo(k)fluoranthene	2662097		< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	96%	50%	140%	101%	50%	140
Benzo(a)pyrene	2662097		< 0.05	< 0.05	0.0%	< 0.05	98%	50%	140%	95%	50%	140%	96%	50%	140
ndeno(1,2,3-cd)pyrene	2662097		< 0.05	< 0.05	0.0%	< 0.05	86%	50%	140%	99%	50%	140%	98%	50%	140
Dibenz(a,h)anthracene	2662097		< 0.05	< 0.05	0.0%	< 0.05	94%	50%	140%	86%	50%	140%	101%	50%	140
Benzo(g,h,i)perylene	2662097		< 0.05	< 0.05	0.0%	< 0.05	95%	50%	140%	96%	50%	140%	96%	50%	140
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	2686285		<0.05	<0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	73%	50%	140
/inyl Chloride	2686285		<0.02	<0.02	NA	< 0.02	104%	50%	140%	98%	50%	140%	114%	50%	140
Bromomethane	2686285		<0.05	< 0.05	NA	< 0.05	105%	50%	140%	100%	50%	140%	95%	50%	140
Trichlorofluoromethane	2686285		<0.05	<0.05	NA	< 0.05	107%	50%	140%	109%	50%	140%	92%	50%	140
Acetone	2686285		<0.50	<0.50	NA	< 0.50	82%	50%	140%	85%	50%	140%	95%	50%	140
1,1-Dichloroethylene	2686285		<0.05	<0.05	NA	< 0.05	95%	50%	140%	79%	60%	130%	72%	50%	140
Methylene Chloride	2686285		<0.05	<0.05	NA	< 0.05	96%	50%	140%	100%	60%	130%	107%	50%	140
Frans- 1,2-Dichloroethylene	2686285		<0.05	<0.05	NA	< 0.05	82%	50%	140%	113%	60%	130%	110%	50%	
Methyl tert-butyl Ether	2686285		<0.05	<0.05	NA	< 0.05	95%	50%	140%	107%	60%	130%	102%	50%	140
1,1-Dichloroethane	2686285		<0.03	<0.03	NA	< 0.02	81%	50%	140%	115%	60%	130%	89%	50%	
Methyl Ethyl Ketone	2686285		<0.50	<0.50	NA	< 0.50	89%	50%	140%	88%	50%	140%	99%	50%	140
Cis- 1,2-Dichloroethylene	2686285		<0.02	<0.02	NA	< 0.02	102%	50%	140%	91%	60%	130%	100%	50%	140
Chloroform	2686285		<0.02	<0.02	NA	< 0.02	104%	50%	140%	114%	60%	130%	111%	50%	
1,2-Dichloroethane	2686285		< 0.03	<0.04	NA	< 0.04	99%	50%	140%	107%	60%	130%	110%	50%	
1,1,1-Trichloroethane	2686285		<0.05	<0.05	NA	< 0.05	99 <i>%</i> 87%	50%	140%	87%		130%	83%	50%	140
Carbon Tetrachloride	2686285		<0.05	<0.05	NA	< 0.05	103%	50%	140%	81%	60%	130%	99%	50%	140

AGAT QUALITY ASSURANCE REPORT (V1)

Page 11 of 17

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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



AGAT WORK ORDER: 21T768662

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:Kesh A

	٦	Гrасе	Orga	anics	Ana	lysis	(Cor	ntin	ued)					
RPT Date: Jul 09, 2021			С	UPLICATI	E		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	Lie	ptable	Recovery		ptable nits
		Iu Iu					value	Lower	Upper		Lower	Upper		Lower	Upper
Benzene	2686285		<0.02	<0.02	NA	< 0.02	96%	50%	140%	82%	60%	130%	100%	50%	140%
1,2-Dichloropropane	2686285		<0.03	< 0.03	NA	< 0.03	107%	50%	140%	86%	60%	130%	91%	50%	140%
Trichloroethylene	2686285		<0.03	< 0.03	NA	< 0.03	104%	50%	140%	103%	60%	130%	91%	50%	140%
Bromodichloromethane	2686285		<0.05	<0.05	NA	< 0.05	83%	50%	140%	88%	60%	130%	94%	50%	140%
Methyl Isobutyl Ketone	2686285		<0.50	<0.50	NA	< 0.50	74%	50%	140%	94%	50%	140%	98%	50%	140%
1,1,2-Trichloroethane	2686285		<0.04	<0.04	NA	< 0.04	86%	50%	140%	98%	60%	130%	103%	50%	140%
Toluene	2686285		<0.05	<0.05	NA	< 0.05	106%	50%	140%	111%	60%	130%	117%	50%	140%
Dibromochloromethane	2686285		<0.05	<0.05	NA	< 0.05	94%	50%	140%	103%	60%	130%	106%	50%	140%
Ethylene Dibromide	2686285		<0.04	<0.04	NA	< 0.04	89%	50%	140%	84%	60%	130%	76%	50%	140%
Tetrachloroethylene	2686285		<0.05	<0.05	NA	< 0.05	98%	50%	140%	101%	60%	130%	108%	50%	140%
1,1,1,2-Tetrachloroethane	2686285		<0.04	<0.04	NA	< 0.04	90%	50%	140%	107%	60%	130%	100%	50%	140%
Chlorobenzene	2686285		<0.05	<0.05	NA	< 0.05	91%	50%	140%	97%	60%	130%	97%	50%	140%
Ethylbenzene	2686285		<0.05	<0.05	NA	< 0.05	106%	50%	140%	95%	60%	130%	95%	50%	140%
m & p-Xylene	2686285		<0.05	<0.05	NA	< 0.05	102%	50%	140%	106%	60%	130%	102%	50%	140%
Bromoform	2686285		<0.05	<0.05	NA	< 0.05	98%	50%	140%	116%	60%	130%	74%	50%	140%
Styrene	2686285		<0.05	<0.05	NA	< 0.05	92%	50%	140%	82%	60%	130%	97%	50%	140%
1,1,2,2-Tetrachloroethane	2686285		<0.05	<0.05	NA	< 0.05	86%	50%	140%	89%	60%	130%	95%	50%	140%
o-Xylene	2686285		<0.05	<0.05	NA	< 0.05	96%	50%	140%	84%	60%	130%	100%	50%	140%
1,3-Dichlorobenzene	2686285		<0.05	<0.05	NA	< 0.05	99%	50%	140%	94%	60%	130%	73%	50%	140%
1,4-Dichlorobenzene	2686285		<0.05	<0.05	NA	< 0.05	94%	50%	140%	103%	60%	130%	89%	50%	140%
1,2-Dichlorobenzene	2686285		<0.05	<0.05	NA	< 0.05	92%	50%	140%	103%	60%	130%	105%	50%	140%
n-Hexane	2686285		<0.05	<0.05	NA	< 0.05	101%	50%	140%	89%	60%	130%	107%	50%	140%
Total PCBs (soil)															
Polychlorinated Biphenyls	2679423		< 0.1	< 0.1	NA	< 0.1	102%	60%	140%	92%	60%	140%	105%	60%	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).



Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

AGAT WORK ORDER: 21T768662 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:Kesh A

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER

AGAT WORK ORDER: 21T768662

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

SAMPLING SITE:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	ORG-91-5009	CCME Tier 1 Method	BALANCE
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

AGAT WORK ORDER: 21T768662
ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY: Kesh A **PARAMETER** AGAT S.O.P LITERATURE REFERENCE ANALYTICAL TECHNIQUE modified from EPA 5035C and EPA Vinyl Chloride VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA VOL-91-5002 (P&T)GC/MS Bromomethane 8260D modified from EPA 5035C and EPA Trichlorofluoromethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Acetone VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA 1,1-Dichloroethylene VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA VOL-91-5002 (P&T)GC/MS Methylene Chloride 8260D modified from EPA 5035C and EPA Trans- 1,2-Dichloroethylene VOL-91-5002 (P&T)GC/MS modified from EPA 5035C and EPA Methyl tert-butyl Ether VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA 1,1-Dichloroethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Methyl Ethyl Ketone VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Cis- 1,2-Dichloroethylene VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Chloroform VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA VOL-91-5002 1.2-Dichloroethane (P&T)GC/MS 8260D modified from EPA 5035C and EPA 1.1.1-Trichloroethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Carbon Tetrachloride VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Benzene VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA VOL-91-5002 1,2-Dichloropropane (P&T)GC/MS 8260D modified from EPA 5035C and EPA Trichloroethylene VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Bromodichloromethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Methyl Isobutyl Ketone VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA 1,1,2-Trichloroethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA VOL-91-5002 (P&T)GC/MS Toluene 8260D modified from EPA 5035C and EPA Dibromochloromethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Ethylene Dibromide VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA Tetrachloroethylene VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA 1,1,1,2-Tetrachloroethane VOL-91-5002 (P&T)GC/MS 8260D modified from EPA 5035C and EPA (P&T)GC/MS Chlorobenzene VOL-91-5002 8260D

Ethylbenzene

(P&T)GC/MS

8260D

VOL-91-5002

modified from EPA 5035C and EPA

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190 - CR-4

SAMPLING SITE:

AGAT WORK ORDER: 21T768662 ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh A

		57 mm 225 5 m m m m m					
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE				
m & p-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
Bromoform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
Styrene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
o-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
Xylenes (Total)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
n-Hexane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS				
Toluene-d8	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS				
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS				
Polychlorinated Biphenyls	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD				
Decachlorobiphenyl	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD				



5335 Coopers Avenue Mississauga, Ontario L4Z 1Y2 Ph: 905.712,5100 Fax: 905.712.5122 webearth.agatlabs.com

Laboratory Use	Only		
Work Order #: 21	T76	866	2_
Cooler Quantity:	Mes	2	
Arrival Temperatures:	37	25	25
Custody Cool Intent	-		

Chain of Custody Record If this is a D	rinking Water sample, pleas	e use Drinking Water Chain of Cus	tody Form (p	otable v	vater inte	nded for I	uman co	nsumption	1)	Ar	rival '	Temp	eratu	res:	9	3:1	18	\$1	5	1
Report Information: Company: AECOM Canada - Markham		Regulatory Require	ments:		lo Reg	gulator	y Req	uireme	nt			y Sea	l Inta	oct:	□Y	/es	کم ا ا]No)]N/A
Contact: kesh.appadurai@AECOM.com Address: Phone: Fax: kesh.appadurai@AECOM.com kesh.appadurai@AECOM.com		Regulation 153/04 Table 1	Sewer Sanit Storm	ary		Regu CCM Prov. Object Othe	Water (Quality		Tu Re	gula sh T	roui Ar TA AT (F 3 Bus Days	T Rush St	archalige	TOPIVI	7	equire Business ness	s Days	Busines	SS
Project Information: Project: 60636190 - Bredford Byeass PD Site Location: Sampled By:	7R-4	Is this submission for Record of Site Condit	tion?		Repe	ort Gui Icate d	f Ana	ОП			1,5	Ple	ease	provid	le prio	or notific	cation fe	May Ap or rush	TAT	;
AGAT Quote #: PO: Please note: if quotation number is not provided, client will be Invoice Information: Bill Company: Contact: Address: Email:	billed full price for analysis. To Same: Yes No	Sample Matrix Legend B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water	Field Filtered - Metals, Hg, CrVI (Please Circle)	Metals and Inorganics	Metal Scan Hydride Forming Metals	ż	OC INO,/NO,	Nutrients: □TP □NH, □TKN □NO, □NO, □NO,NO, Notation: □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	tions 1 to 4			enols		Organochlorine Pesticides	TCLP Metals/Inorganics	90				
Sample Identification Date Sampled Sampled HF-DL-SS-2 Jul 29/21	# of Sample Matrix	Comments/ Special Instructions	Y/N	X Metals	Metal So Hydride	Client Co	□ Cr ⁶ · □	Nutrients:	X CCME Fractions	ABNS	X PAHs	Chlorophenols	X PCBs	Organoc	TCLP Me	Sewer Use				
CVI-03-SS-2 Jul 25/2	1 50,1			×																
		0																		
ampine Reliminished By (Print Name and Sign)	Date Time Date Solution Time Time	Samples Received By (Print Name) Samples Received By (Print Name)	e and Sign):	K	\			Date	<i>3</i> 1	02/	1 Tin	M/S	t°		N#‡	Page _		of		



CLIENT NAME: AECOM CANADA LTD

105 COMMERCE VALLEY DR.W 7TH FLOOR

MARKHAM, ON L3T7W3

(905) 886-7022

ATTENTION TO: Kesh Appadurai

PROJECT: 60636190-CR4

AGAT WORK ORDER: 21T775122

SOIL ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jul 26, 2021

PAGES (INCLUDING COVER): 25 VERSION*: 1

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

*Notes	

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 25

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

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

			O.	Reg. 153(3	orr) - Metais o	inorganics (Soil)
DATE RECEIVED: 2021-07-15			DATE REPORTED: 2021-07-26			
	S		CRIPTION: PLE TYPE: SAMPLED:	CR4-04 Soil 2021-07-14 2	HF-02 Soil 2021-07-15	
Parameter	Unit	G/S	RDL	2744970	2744976	
Antimony	μg/g	40	8.0	<0.8	<0.8	
Arsenic	μg/g	18	1	1	1	
Barium	μg/g	670	2.0	44.8	45.1	
Beryllium	μg/g	8	0.4	<0.4	<0.4	
Boron	μg/g	120	5	<5	<5	
Boron (Hot Water Soluble)	μg/g	2	0.10	0.20	0.17	
Cadmium	μg/g	1.9	0.5	<0.5	<0.5	
Chromium	μg/g	160	5	17	28	
Cobalt	μg/g	80	0.5	4.0	3.9	
Copper	μg/g	230	1.0	10.6	8.7	
ead	μg/g	120	1	10	19	
Nolybdenum	μg/g	40	0.5	1.1	<0.5	
Nickel	μg/g	270	1	6	6	
Selenium	μg/g	5.5	8.0	<0.8	<0.8	
Silver	μg/g	40	0.5	<0.5	<0.5	
Thallium	μg/g	3.3	0.5	<0.5	<0.5	
Jranium	μg/g	33	0.50	<0.50	<0.50	
/anadium	μg/g	86	0.4	26.0	24.6	
'inc	μg/g	340	5	37	30	
Chromium, Hexavalent	μg/g	8	0.2	<0.2	<0.2	
Cyanide, Free	μg/g	0.051	0.040	<0.040	<0.040	
Mercury	μg/g	0.27	0.10	<0.10	<0.10	
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	1.00	1.23	
Sodium Adsorption Ratio (2:1) Calc.)	N/A	12	N/A	9.34	12.2	
oH, 2:1 CaCl2 Extraction	pH Units		NA	7.93	7.82	





AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

DATE RECEIVED: 2021-07-15 DATE REPORTED: 2021-07-26

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2744970-2744976 EC was 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. SAR is a calculated

Analysis performed at AGAT Toronto (unless marked by *)



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

O. Rea	. 406/19	SPLP	Metals
--------	----------	------	--------

			oeg.	400/10 Of El Wickels
5				DATE REPORTED: 2021-07-26
S	AMPLE DES	CRIPTION:	HF-02	
	SAME	PLE TYPE:	Soil	
	DATE S	SAMPLED:	2021-07-15	
Unit	G/S	RDL	2744976	
μg/L	6	0.6	<0.6	
μg/L	-	5	<5	
μg/L	1000	100	<100	
μg/L	4	0.8	<0.8	
μg/L	5000	500	<500	
μg/L	0.5	0.20	<0.20	
μg/L	50	10	<10	
μg/L	3.8	0.3	<0.3	
μg/L	14	7.0	<7.0	
μg/L	-	1.0	1.6	
μg/L	23	1.5	1.8	
μg/L	78	10	<10	
μg/L	10	5.0	<5.0	
μg/L	0.3	0.10	<0.10	
μg/L	2	0.5	<0.5	
μg/L	20	2	<2	
μg/L	-	0.6	15.7	
μg/L	180	20	<20	
	Unit	SAMPLE DESI SAMI DATE S Unit G / S	SAMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED: Unit G / S RDL µg/L 6 0.6 µg/L - 5 µg/L 1000 100 µg/L 4 0.8 µg/L 5000 500 µg/L 0.5 0.20 µg/L 50 10 µg/L 3.8 0.3 µg/L 14 7.0 µg/L - 1.0 µg/L 23 1.5 µg/L 78 10 µg/L 78 10 µg/L 10 5.0 µg/L 0.3 0.10 µg/L 20 2 µg/L 20 2 µg/L 20 2 µg/L 20 2 µg/L - 0.6	SAMPLE DESCRIPTION: HF-02 SAMPLE TYPE: Soil DATE SAMPLED: 2021-07-15 Unit G/S RDL 2744976 µg/L 6 0.6 <0.6 µg/L - 5 <5 µg/L 1000 100 <100 µg/L 4 0.8 <0.8 µg/L 5000 500 <500 µg/L 0.5 0.20 <0.20 µg/L 50 10 <10 µg/L 3.8 0.3 <0.3 µg/L 14 7.0 <7.0 µg/L 14 7.0 <1.6 µg/L 23 1.5 1.8 µg/L 23 1.5 1.8 µg/L 78 10 <10 µg/L 10 5.0 <5.0 µg/L 10 5.0 <5.0 µg/L 10 5.0 <5.0 µg/L 23 0.10 <0.10 µg/L 2 0.5 <0.5 µg/L 10 5.0 <5.0 µg/L 10 5.0 <0.5 µg/L 2 0.5 <0.5 µg/L 2 0.5 <0.5 µg/L 2 0.5 <0.5

Comments:

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2744976

Leachate for metal testing was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003

be used for leachate testing of soil samples under O'Reg 406/19 by MECP. This is a validated, unaccredited procedure.

Analysis performed at AGAT Toronto (unless marked by *)



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

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

				0.110	9. 100(011)	71110 (0011)
DATE RECEIVED: 2021-07-15						DATE REPORTED: 2021-07-26
		SAMPLE DESC	RIPTION:	CR4-04	CR4-07	
		SAMP	LE TYPE:	Soil	Soil	
		DATE S	AMPLED:	2021-07-14	2021-07-14	
Parameter	Unit	G/S	RDL	2744970	2744974	
Naphthalene	μg/g	0.2	0.05	0.79	0.62	
Acenaphthylene	μg/g	0.093	0.05	0.41	0.13	
Acenaphthene	μg/g	2.5	0.05	1.83	0.98	
Fluorene	μg/g	6.8	0.05	3.50	1.30	
Phenanthrene	μg/g	12	0.05	11.4	4.95	
Anthracene	μg/g	0.16	0.05	3.00	1.19	
Fluoranthene	μg/g	2.8	0.05	6.84	2.50	
Pyrene	μg/g	28	0.05	6.55	2.34	
Benz(a)anthracene	μg/g	0.92	0.05	4.62	1.58	
Chrysene	μg/g	9.4	0.05	5.01	1.83	
Benzo(b)fluoranthene	μg/g	3.2	0.05	5.22	1.76	
Benzo(k)fluoranthene	μg/g	3.1	0.05	1.57	0.82	
Benzo(a)pyrene	μg/g	0.31	0.05	4.07	1.36	
Indeno(1,2,3-cd)pyrene	μg/g	0.76	0.05	1.42	0.19	
Dibenz(a,h)anthracene	μg/g	0.7	0.05	0.42	0.72	
Benzo(g,h,i)perylene	μg/g	13	0.05	1.55	0.72	
1 and 2 Methlynaphthalene	μg/g	0.59	0.05	1.21	1.05	
Moisture Content	%		0.1	8.3	14.2	
Surrogate	Unit	Acceptabl	e Limits			
Naphthalene-d8	%	50-1	40	82	89	
Acridine-d9	%	50-1	40	86	91	
Terphenyl-d14	%	50-1	40	92	99	

Comments:

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2744970-2744974 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 *)





SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

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

DATE RECEIVED: 2021-07-15 DATE REPORTED: 2021-07-26

	SA	AMPLE DESCR	IPTION:	CR4-07
		SAMPLE	E TYPE:	Soil
		DATE SAI	MPLED:	2021-07-14
Parameter	Unit	G/S	RDL	2744974
F1 (C6 - C10)	μg/g		5	<5
F1 (C6 to C10) minus BTEX	μg/g	25	5	<5
F2 (C10 to C16)	μg/g	26	10	<10
F2 (C10 to C16) minus Naphthalene	μg/g		10	<10
F3 (C16 to C34)	μg/g	240	50	99
F3 (C16 to C34) minus PAHs	μg/g	240	50	83
F4 (C34 to C50)	μg/g	3300	50	<50
Gravimetric Heavy Hydrocarbons	μg/g		50	NA
Moisture Content	%		0.1	14.2
Surrogate	Unit	Acceptable l	Limits	
Toluene-d8	% Recovery	50-140		74
Terphenyl	%	60-140		99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2744974 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 calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

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 *)





Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLING SITE:					SAMPLED BY:							
	O. Reg. 153(511) - VOCs (Soil)											
DATE RECEIVED: 2021-07-15					DATE REPORTED: 2021-07-26							
		SAMPLE DES	CRIPTION:	CR4-07								
		SAMI	PLE TYPE:	Soil								
		DATE S	SAMPLED:	2021-07-14								
Parameter	Unit	G/S	RDL	2744974								
Dichlorodifluoromethane	μg/g	1.5	0.05	<0.05								
Vinyl Chloride	ug/g	0.02	0.02	<0.02								
Bromomethane	ug/g	0.05	0.05	<0.05								
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05								
Acetone	ug/g	0.5	0.50	<0.50								
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05								
Methylene Chloride	ug/g	0.05	0.05	<0.05								
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05								
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05								
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02								
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50								
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02								
Chloroform	ug/g	0.05	0.04	<0.04								
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03								
1,1,1-Trichloroethane	ug/g	0.12	0.05	<0.05								
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05								
Benzene	ug/g	0.02	0.02	<0.02								
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03								
Trichloroethylene	ug/g	0.05	0.03	<0.03								
Bromodichloromethane	ug/g	0.05	0.05	<0.05								
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50								
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04								
Toluene	ug/g	0.2	0.05	<0.05								
Dibromochloromethane	ug/g	0.05	0.05	<0.05								
Ethylene Dibromide	ug/g	0.05	0.04	<0.04								
Tetrachloroethylene	ug/g	0.05	0.05	<0.05								
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04								
Chlorobenzene	ug/g	0.083	0.05	<0.05								
Ethylbenzene	ug/g	0.05	0.05	<0.05								
m & p-Xylene	ug/g		0.05	<0.05								





SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO

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

DATE RECEIVED: 2021-07-15					DATE REPORTED: 2021-07-2
	S	AMPLE DES	CRIPTION:	CR4-07	
		SAMI	PLE TYPE:	Soil	
		DATES	SAMPLED:	2021-07-14	
Parameter	Unit	G/S	RDL	2744974	
Bromoform	ug/g	0.05	0.05	<0.05	
Styrene	ug/g	0.05	0.05	<0.05	
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	
o-Xylene	ug/g		0.05	<0.05	
1,3-Dichlorobenzene	ug/g	0.26	0.05	<0.05	
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	
1,2-Dichlorobenzene	ug/g	6.8	0.05	<0.05	
Xylenes (Total)	ug/g	0.091	0.05	<0.05	
1,3-Dichloropropene (Cis + Trans)	μg/g	0.05	0.04	<0.04	

Comments:

n-Hexane

Toluene-d8

Moisture Content

4-Bromofluorobenzene

Surrogate

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2744974

The sample was analyzed 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.

0.05

0.1

2.5

Acceptable Limits

50-140

50-140

μg/g

%

Unit

% Recovery

% Recovery

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

< 0.05

14.2

94

110

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)





SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

\circ	Rea	406/19	SPLP	VOCs
U.	ncu.	400/13	- OF LF	v O C S

			O. Reg	1. 400/19 - SPLP VOCS
DATE RECEIVED: 2021-07-15				DATE REPORTED: 2021-07-26
	SA	AMPLE DESCRIPT	TON: CR4-07	
		SAMPLE T	YPE: Soil	
		DATE SAMP	LED: 2021-07-14	
Parameter	Unit	G/S RE	DL 2744974	
Bromomethane Leachate	μg/L	0.5 0.2	20 <0.20	
1,1-Dichloroethylene Leachate	μg/L	0.5 0.3	30 <0.30	
Trans 1,2-Dichloroethylene Leachate	μg/L	0.5 0.2	20 <0.20	
1,1-Dichloroethane Leachate	μg/L	- 0.3	<0.30	
Cis 1,2-Dichloroethylene Leachate	μg/L	0.5 0.2	20 <0.20	
Chloroform Leachate	μg/L	- 0.2	20 <0.20	
1,2-Dichloroethane Leachate	μg/L	0.5 0.2	20 <0.20	
Carbon Tetrachloride Leachate	μg/L	0.2 0.2	20 <0.20	
1,2-Dichloropropane Leachate	μg/L	0.55 0.2	20 <0.20	
Trichloroethylene Leachate	μg/L	0.5 0.2	20 <0.20	
1,1,2-Trichloroethane Leachate	μg/L	- 0.2	20 <0.20	
Ethylene Dibromide Leachate	μg/L	0.2 0.4	10 <0.10	
Tetrachloroethylene Leachate	μg/L	0.5 0.2	20 <0.20	
1,1,1,2-Tetrachloroethane Leachate	μg/L	- 0.	10 <0.10	
1,1,2,2-Tetrachloroethane Leachate	μg/L	0.5 0.4	10 <0.10	
I,4-Dichlorobenzene Leachate	μg/L	0.5 0.4	10 <0.10	
1,2-Dichlorobenzene Leachate	μg/L	0.55 0.4	10 <0.10	
1,3-Dichloropropene Total Leachate	μg/L	- 0.3	<0.30	
Surrogate	Unit	Acceptable Lim	nits	
Toluene-d8	% Recovery	50-140	94	

Comments:

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2744974

Leachate was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP. This is a validated, unaccredited procedure.

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 WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

O/ WIII EII VO OITE.					CANNIELD DI.
					SPLP PCBs
DATE RECEIVED: 2021-07-15					DATE REPORTED: 2021-07-26
		SAMPLE DESC	CRIPTION:	HF-02	
		SAME	PLE TYPE:	Soil	
		DATE S	SAMPLED:	2021-07-15	
Parameter	Unit	G/S	RDL	2744976	
PCBs	μg/L		0.1	<0.1	
Surrogate	Unit	Acceptab	le Limits		
Decachlorobiphenyl	%	50-1	40	72	

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

Analysis performed at AGAT Toronto (unless marked by *)

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:





ATTENTION TO: Kesh Appadurai

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: SAMPLED BY:

	Total PCBs (soil)											
ATE RECEIVED: 2021-07-15 DATE REPORTED: 2021-07-26												
		SAMPLE DES	CRIPTION:	HF-02								
	SAMPLE TYPE:			Soil								
		DATE SAMPLED:		2021-07-15								
Parameter	Unit	G/S	RDL	2744976								
Polychlorinated Biphenyls	μg/g	0.78	0.1	<0.1								
Moisture Content	%		0.1	11.9								
Surrogate	Unit	Acceptab	le Limits									
Decachlorobiphenyl	%	60-1	60-130									

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2744976 Results are based on the dry weight of soil extracted.

Analysis performed at AGAT Toronto (unless marked by *)





Exceedance Summary

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	1 and 2 Methlynaphthalene	μg/g	0.59	1.21
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	1-Methylnaphthalene	μg/g	0.59	0.80
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Acenaphthylene	μg/g	0.093	0.41
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Anthracene	μg/g	0.16	3.00
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benz(a)anthracene	μg/g	0.92	4.62
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benzo(a)pyrene	μg/g	0.31	4.07
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benzo(b)fluoranthene	μg/g	3.2	5.22
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Fluoranthene	μg/g	2.8	6.84
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Indeno(1,2,3-cd)pyrene	μg/g	0.76	1.42
2744970	CR4-04	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Naphthalene	μg/g	0.2	0.79
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	1 and 2 Methlynaphthalene	μg/g	0.59	1.05
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	2-Methylnaphthalene	μg/g	0.59	0.70
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Acenaphthylene	μg/g	0.093	0.13
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Anthracene	μg/g	0.16	1.19
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benz(a)anthracene	μg/g	0.92	1.58
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Benzo(a)pyrene	μg/g	0.31	1.36
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Dibenz(a,h)anthracene	μg/g	0.7	0.72
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PAHs (Soil)	Naphthalene	μg/g	0.2	0.62
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	Benzo(a)anthracene	μg/g	0.92	1.58
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	Benzo(a)pyrene	μg/g	0.31	1.36
2744974	CR4-07	ON 406/19 T2.1 IC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	Naphthalene	μg/g	0.2	0.62
2744976	HF-02	ON 406/19 T2.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.	N/A	12	12.2

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLING SITE:

AGAT WORK ORDER: 21T775122 ATTENTION TO: Kesh Appadurai

SAMPLED BY:

RPT Date: Jul 26, 2021				UPLICATE			REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SP	IKE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable	Recovery		ptable	Recovery		eptable mits
17WWWETER	Jacon.	ld	Zap // .	Sup //2	2		Value	Lower	Upper	. 1000 1 0.)	Lower	Upper		Lower	Uppe
O. Reg. 153(511) - Metals & Inor	ganics (Soil)											•			
Antimony	2733119		<0.8	<0.8	NA	< 0.8	128%	70%	130%	101%	80%	120%	103%	70%	130
Arsenic	2733119		5	5	0.0%	< 1	120%	70%	130%	110%	80%	120%	111%	70%	130
Barium	2733119		144	143	0.7%	< 2.0	110%	70%	130%	99%	80%	120%	113%	70%	130
Beryllium	2733119		1.1	1.2	NA	< 0.4	109%	70%	130%	96%	80%	120%	104%	70%	130
Boron	2733119		13	12	NA	< 5	92%	70%	130%	97%	80%	120%	87%	70%	1309
Boron (Hot Water Soluble)	2739776		<0.10	<0.10	NA	< 0.10	93%	60%	140%	101%	70%	130%	101%	60%	1409
Cadmium	2733119		< 0.5	<0.5	NA	< 0.5	95%	70%	130%	99%	80%	120%	110%	70%	1309
Chromium	2733119		38	37	2.7%	< 5	106%	70%	130%	106%	80%	120%	99%	70%	1309
Cobalt	2733119		14.5	14.4	0.7%	< 0.5	103%	70%	130%	103%	80%	120%	104%	70%	130
Copper	2733119		27.6	27.3	1.1%	< 1.0	94%	70%	130%	111%	80%	120%	102%	70%	1309
Lead	2733119		28	26	7.4%	< 1	102%	70%	130%	112%	80%	120%	104%	70%	1309
Molybdenum	2733119		<0.5	<0.5	NA	< 0.5	118%	70%	130%	112%	80%	120%	117%	70%	130°
Nickel	2733119		35	34	2.9%	< 1	105%	70%	130%	107%	80%	120%	109%	70%	130
Selenium	2733119		<0.8	<0.8	NA	< 0.8	131%	70%	130%	104%	80%	120%	106%	70%	130°
Silver	2733119		<0.5	<0.5	NA	< 0.5	104%	70%	130%	111%	80%	120%	106%	70%	1309
Thallium	2733119		<0.5	<0.5	NA	< 0.5	114%	70%	130%	106%	80%	120%	104%	70%	130
Uranium	2733119		0.64	0.62	NA	< 0.50	115%	70%	130%	100%	80%	120%	102%	70%	130°
Vanadium	2733119		48.7	48.2	1.0%	< 0.4	112%	70%	130%	102%	80%	120%	106%	70%	130°
Zinc	2733119		91	94	3.2%	< 5	100%	70%	130%	107%	80%	120%	108%	70%	130°
Chromium, Hexavalent	2746463		<0.2	<0.2	NA	< 0.2	101%	70%	130%	87%	80%	120%	87%	70%	1309
Cyanide, Free	2739776		<0.040	<0.040	NA	< 0.040	94%	70%	130%	96%	80%	120%	109%	70%	130
Mercury	2733119		0.12	0.11	NA	< 0.10	106%	70%	130%	99%	80%	120%	100%	70%	130°
Electrical Conductivity (2:1)	2739776		0.145	0.147	1.4%	< 0.005	109%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	2740616		10.4	10.2	1.9%	NA									
pH, 2:1 CaCl2 Extraction	2736682		7.78	7.76	0.3%	NA	101%	80%	120%						

Comments: For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

O. Reg. 406/19 SPLP Metals														
Antimony Leachate	2734598	<0.6	<0.6	NA	< 0.6	106%	70%	130%	102%	80%	120%	111%	70%	130%
Arsenic Leachate	2734598	<5	<5	NA	< 5	100%	70%	130%	99%	80%	120%	107%	70%	130%
Barium Leachate	2734598	<100	<100	NA	< 100	100%	70%	130%	101%	80%	120%	105%	70%	130%
Beryllium Leachate	2734598	<0.8	<0.8	NA	< 0.8	92%	70%	130%	89%	80%	120%	102%	70%	130%
Boron Leachate	2734598	<500	<500	NA	< 500	97%	70%	130%	95%	80%	120%	105%	70%	130%
Cadmium Leachate	2734598	<0.20	<0.20	NA	< 0.20	101%	70%	130%	101%	80%	120%	110%	70%	130%
Chromium Leachate	2734598	<10	<10	NA	< 10	104%	70%	130%	109%	80%	120%	115%	70%	130%
Cobalt Leachate	2734598	<0.3	< 0.3	NA	< 0.3	96%	70%	130%	99%	80%	120%	104%	70%	130%
Copper Leachate	2734598	<7.0	<7.0	NA	< 7.0	100%	70%	130%	104%	80%	120%	109%	70%	130%
Lead Leachate	2734598	3.2	<1.0	NA	< 1.0	99%	70%	130%	102%	80%	120%	107%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 13 of 25

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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



AGAT WORK ORDER: 21T775122

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

Soil Analysis (Continued)															
RPT Date: Jul 26, 2021 DUPLICATE REFERENCE MATERIAL METHOD BLANK SPIKE MATRIX SPIKE										IKE					
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	Lin	ptable nits	Recovery	1 1 1 1	eptable mits
		ld	·	·			Value	Lower	Upper	ĺ	Lower	Upper	ĺ	Lower	Upper
Molybdenum Leachate	2734598		2.5	2.4	NA	< 1.5	108%	70%	130%	108%	80%	120%	117%	70%	130%
Nickel Leachate	2734598		<10	<10	NA	< 10	101%	70%	130%	103%	80%	120%	108%	70%	130%
Selenium Leachate	2734598		<5.0	<5.0	NA	< 5.0	95%	70%	130%	94%	80%	120%	101%	70%	130%
Silver Leachate	2734598		<0.10	<0.10	NA	< 0.10	104%	70%	130%	105%	80%	120%	110%	70%	130%
Thallium Leachate	2734598		<0.5	<0.5	NA	< 0.5	99%	70%	130%	98%	80%	120%	103%	70%	130%
Uranium Leachate	2734598		<2	<2	NA	< 2	96%	70%	130%	93%	80%	120%	98%	70%	130%
Vanadium Leachate	2734598		2.3	2.2	NA	< 0.6	101%	70%	130%	106%	80%	120%	112%	70%	130%
Zinc Leachate	2734598		<20	<20	NA	< 20	100%	70%	130%	101%	80%	120%	108%	70%	130%

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.

CHARTERED SEARCH CHARTERED CHARTER CHARTERED C

AGAT WORK ORDER: 21T775122

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

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RPT Date: Jul 26, 2021			С	UPLICAT	E		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	IKE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery		ptable	Recovery		eptable mits
							Value	Lower	Upper		Lower	Upper		Lower	Uppe
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	2687085		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	99%	50%	140%	96%	50%	140%
Acenaphthylene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	95%	50%	140%	95%	50%	140%
Acenaphthene	2687085		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	96%	50%	140%	99%	50%	140%
Fluorene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	86%	50%	140%	96%	50%	140%
Phenanthrene	2687085		< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	96%	50%	140%	96%	50%	140%
Anthracene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	95%	50%	140%	101%	50%	140%
Fluoranthene	2687085		< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	96%	50%	140%	96%	50%	140%
Pyrene	2687085		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	95%	50%	140%	98%	50%	140%
Benz(a)anthracene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	85%	50%	140%	99%	50%	140%
Chrysene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	96%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	2687085		< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	99%	50%	140%	98%	50%	140%
Benzo(k)fluoranthene	2687085		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	96%	50%	140%	101%	50%	140%
Benzo(a)pyrene	2687085		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	95%	50%	140%	96%	50%	140%
Indeno(1,2,3-cd)pyrene	2687085		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	99%	50%	140%	98%	50%	140%
Dibenz(a,h)anthracene	2687085		< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	86%	50%	140%	101%	50%	140%
Benzo(g,h,i)perylene	2687085		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	96%	50%	140%	96%	50%	140%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	2742794 2	744074	<0.05	<0.05	NA	< 0.05	111%	50%	140%	78%	50%	140%	71%	50%	140%
Vinyl Chloride	2742794 2		<0.03	<0.03	NA	< 0.03	92%	50%	140%	108%	50%	140%	83%	50%	140%
Bromomethane	2742794 2		<0.02	<0.02	NA	< 0.02	86%	50%	140%	89%	50%	140%	84%	50%	140%
Trichlorofluoromethane	2742794 2		<0.05	<0.05	NA	< 0.05	91%	50%	140%	104%	50%	140%	79%	50%	140%
Acetone	2742794 2		<0.50	< 0.50	NA	< 0.50	99%	50%	140%	88%	50%	140%	92%	50%	140%
=								=-0/						=-0/	
1,1-Dichloroethylene	2744974 2		<0.05	<0.05	NA	< 0.05	117%	50%	140%	82%	60%	130%	85%	50%	140%
Methylene Chloride	2742794 2		<0.05	<0.05	NA	< 0.05	73%	50%	140%	111%	60%	130%	79%	50%	140%
Trans- 1,2-Dichloroethylene	2742794 2		<0.05	<0.05	NA	< 0.05	79%	50%	140%	86%	60%	130%	88%	50%	140%
Methyl tert-butyl Ether	2742794 2		<0.05	<0.05	NA	< 0.05	77%	50%	140%	75%	60%	130%	70%	50%	140%
1,1-Dichloroethane	2742794 2	/449/4	<0.02	<0.02	NA	< 0.02	102%	50%	140%	93%	60%	130%	93%	50%	140%
Methyl Ethyl Ketone	2742794 2	744974	<0.50	< 0.50	NA	< 0.50	87%	50%	140%	84%	50%	140%	83%	50%	140%
Cis- 1,2-Dichloroethylene	2742794 2	744974	<0.02	< 0.02	NA	< 0.02	117%	50%	140%	80%	60%	130%	86%	50%	140%
Chloroform	2742794 2	744974	<0.04	< 0.04	NA	< 0.04	110%	50%	140%	94%	60%	130%	74%	50%	140%
1,2-Dichloroethane	2742794 2	744974	<0.03	< 0.03	NA	< 0.03	93%	50%	140%	113%	60%	130%	112%	50%	140%
1,1,1-Trichloroethane	2742794 2	744974	<0.05	<0.05	NA	< 0.05	91%	50%	140%	103%	60%	130%	98%	50%	140%
Carbon Tetrachloride	2742794 2	744974	<0.05	<0.05	NA	< 0.05	80%	50%	140%	88%	60%	130%	84%	50%	140%
Benzene	2742794 2		<0.02	<0.02	NA	< 0.02	91%		140%	95%	60%	130%	85%		140%
1,2-Dichloropropane	2742794 2		<0.03	< 0.03	NA	< 0.03	89%		140%	110%		130%	103%		140%
Trichloroethylene	2742794 2		<0.03	<0.03	NA	< 0.03	82%		140%	99%	60%		97%		140%
Bromodichloromethane	2742794 2		<0.05	<0.05	NA	< 0.05	74%		140%	95%	60%	130%	76%		140%
Methyl Isobutyl Ketone	2742794 2		<0.50	<0.50	NA	< 0.50	102%	50%		81%		140%	81%	50%	

AGAT QUALITY ASSURANCE REPORT (V1)

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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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

AGAT WORK ORDER: 21T775122

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

Trace Organics Analysis (Continued)															
RPT Date: Jul 26, 2021				UPLICATI	E		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
		Sample				Method Blank	Measured		ptable nits	_		ptable nits	_		ptable
PARAMETER	Batch	ld '	Dup #1	Dup #2	RPD		Value	Lower	Upper	Recovery	Lower	Upper	Recovery	Lower	Upper
1,1,2-Trichloroethane	2742794	2744974	<0.04	<0.04	NA	< 0.04	85%	50%	140%	100%	60%	130%	93%	50%	140%
Toluene	2742794	2744974	<0.05	<0.05	NA	< 0.05	97%	50%	140%	80%	60%	130%	98%	50%	140%
Dibromochloromethane	2742794	2744974	<0.05	<0.05	NA	< 0.05	92%	50%	140%	78%	60%	130%	81%	50%	140%
Ethylene Dibromide	2742794	2744974	<0.04	<0.04	NA	< 0.04	76%	50%	140%	101%	60%	130%	115%	50%	140%
Tetrachloroethylene	2742794		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	108%	60%	130%	91%	50%	140%
1,1,1,2-Tetrachloroethane	2742794	2744974	<0.04	<0.04	NA	< 0.04	105%	50%	140%	83%	60%	130%	95%	50%	140%
Chlorobenzene	2742794	2744974	<0.05	<0.05	NA	< 0.05	79%	50%	140%	117%	60%	130%	96%	50%	140%
Ethylbenzene	2742794	2744974	<0.05	<0.05	NA	< 0.05	106%	50%	140%	112%	60%	130%	111%	50%	140%
m & p-Xylene	2742794	2744974	<0.05	<0.05	NA	< 0.05	106%	50%	140%	109%	60%	130%	97%	50%	140%
Bromoform	2742794	2744974	<0.05	<0.05	NA	< 0.05	76%	50%	140%	118%	60%	130%	71%	50%	140%
Styrene	2742794	2744974	< 0.05	<0.05	NA	< 0.05	85%	50%	140%	95%	60%	130%	79%	50%	140%
1,1,2,2-Tetrachloroethane	2742794	2744974	< 0.05	<0.05	NA	< 0.05	93%	50%	140%	113%	60%	130%	88%	50%	140%
o-Xylene	2742794	2744974	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	114%	60%	130%	98%	50%	140%
1,3-Dichlorobenzene	2742794	2744974	<0.05	<0.05	NA	< 0.05	87%	50%	140%	112%	60%	130%	88%	50%	140%
1,4-Dichlorobenzene	2742794	2744974	<0.05	<0.05	NA	< 0.05	93%	50%	140%	108%	60%	130%	76%	50%	140%
1,2-Dichlorobenzene	2742794	2744974	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	99%	60%	130%	73%	50%	140%
n-Hexane	2742794	2744974	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	72%	60%	130%	111%	50%	140%
4-Bromofluorobenzene	2742794		98	94	3.7%	< 1	NA			NA			79%		
O. Reg. 153(511) - PHCs F1 - F4 (v	with PAHs	and VOC)	(Soil)												
F1 (C6 - C10)	2747856	/	` <5	<5	NA	< 5	98%	60%	140%	102%	60%	140%	105%	60%	140%
F2 (C10 to C16)	2736706		< 10	< 10	NA	< 10	103%	60%	140%	110%	60%	140%	82%	60%	140%
F3 (C16 to C34)	2736706		< 50	< 50	NA	< 50	97%	60%	140%	101%	60%	140%	79%	60%	140%
F4 (C34 to C50)	2736706		< 50	< 50	NA	< 50	96%	60%	140%	76%	60%	140%	91%	60%	140%
O. Reg. 406/19 - SPLP VOCs															
Bromomethane Leachate	2744974	2744974	<0.20	<0.20	NA	< 0.20	97%	50%	140%	95%	50%	140%	97%	50%	140%
1,1-Dichloroethylene Leachate	2744974		<0.30	<0.30	NA	< 0.30	117%	50%	140%	82%	60%	130%	85%	50%	140%
Trans 1,2-Dichloroethylene	2744974		<0.20	<0.20	NA	< 0.20	83%		140%	88%	60%	130%	86%	50%	140%
Leachate 1,1-Dichloroethane Leachate	2744974	2744074	<0.30	<0.30	NA	< 0.30	91%	50%	140%	100%	60%	130%	97%	50%	140%
Cis 1,2-Dichloroethylene Leachate	2744974		<0.20	<0.30	NA	< 0.20	101%	50%	140%	92%	60%	130%	106%	50%	140%
Chloroform Leachate	2744074	2744074	<0.20	<0.20	NΙΛ	< 0.20	000/	E0%	1400/	000/	60%	1200/	06%	E00/-	130%
1,2-Dichloroethane Leachate	2744974 2744974		<0.20	<0.20 <0.20	NA NA	< 0.20	88% 106%		140% 140%	98%	60%	130% 130%	96% 85%	50% 50%	140%
			<0.20		NA NA	< 0.20				108%					
Carbon Tetrachloride Leachate 1,2-Dichloropropane Leachate	2744974		<0.20 <0.20	<0.20 <0.20	NA NA	< 0.20 < 0.20	102% 86%		140% 140%	100% 96%		130% 130%	84% 98%	50% 50%	140% 140%
Trichloroethylene Leachate	2744974		<0.20	<0.20	NA NA	< 0.20	91%		140%			130%		50%	
monioroeuryiene Leachate	2744974	Z144914	~ 0.20	\ U.2U	NA	\ 0.20	9170	50%	14070	112%	00%	130%	113%	50%	14070
1,1,2-Trichloroethane Leachate	2744974	2744974	<0.20	<0.20	NA	< 0.20	89%		140%	110%		130%	99%	50%	140%
Ethylene Dibromide Leachate	2744974	2744974	<0.10	<0.10	NA	< 0.10	90%	50%	140%	87%	60%	130%	90%	50%	140%
Tetrachloroethylene Leachate	2744974	2744974	<0.20	<0.20	NA	< 0.20	107%		140%	108%		130%	87%	50%	140%
1,1,1,2-Tetrachloroethane Leachate	2744974	2744974	<0.10	<0.10	NA	< 0.10	111%	50%	140%	91%	60%	130%	85%	50%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

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AGAT WORK ORDER: 21T775122

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

Trace Organics Analysis (Continued)															
RPT Date: Jul 26, 2021 DUPLICATE REFERENCE MATERIAL METHOD BLANK SPIKE MATRIX SPIKE															
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		otable nits	Recovery	Lin	ptable nits	Recovery	Lin	ptable nits
		ld	,				Value	Lower	Upper	,	Lower	Upper	,	Lower	Upper
1,1,2,2-Tetrachloroethane Leachate	2744974 2	2744974	<0.10	<0.10	NA	< 0.10	112%	50%	140%	101%	60%	130%	100%	50%	140%
1,4-Dichlorobenzene Leachate	2744974 2	2744974	<0.10	<0.10	NA	< 0.10	98%	50%	140%	94%	60%	130%	81%	50%	140%
1,2-Dichlorobenzene Leachate 2744974 2744974 <0.10 <0.10 NA < 0.10 116% 50% 140% 99% 60% 130% 101% 50% 140%									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).

SPLP PCBs

PCBs 2744976 2744976 < 0.1 < 0.1 NA < 0.1 103% 50% 140% 105% 50% 140% 91% 50% 140%

Total PCBs (soil)

Polychlorinated Biphenyls 2748412 < 0.1 < 0.1 NA < 0.1 99% 60% 140% 102% 60% 140% 88% 60% 140%





QA Violation

CLIENT NAME: AECOM CANADA LTD AGAT WORK ORDER: 21T775122
PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

RPT Date: Jul 26, 2021			REFEREN	ICE MAT	ΓERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Sample Id	Sample Description	Measured	Accep Lim	ite	Recovery	Lin	ptable nits	Recovery	Lin	ptable nits
	'		Value	Lower	Upper	,	Lower	Upper		Lower	Upper

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

Selenium CR4-04 131% 70% 130% 104% 80% 120% 106% 70% 130%

Comments: For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

AGAT WORK ORDER: 21T775122

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Antimony Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020E	BICP/MS
Arsenic Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020E	BICP/MS
Barium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020E	BICP-MS
Beryllium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020E	BICP-MS
Boron Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020E	BICP-MS



Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21T775122

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Cadmium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Cobalt Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Copper Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Lead Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Molybdenum Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Nickel Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Selenium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Silver Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Thallium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Uranium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Vanadium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Zinc Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

AGAT WORK ORDER: 21T775122 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLING SITE:

AGAT WORK ORDER: 21T775122 ATTENTION TO: Kesh Appadurai

SAMPLED BY:

OAIMI EINO OITE.		O/ (IVII EED D1.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLING SITE:

AGAT WORK ORDER: 21T775122 ATTENTION TO: Kesh Appadurai

SAMPLED BY:

SAMPLING SITE:		SAMPLED BY:	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Bromomethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,1-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Trans 1,2-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,1-Dichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Cis 1,2-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Chloroform Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,2-Dichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Carbon Tetrachloride Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,2-Dichloropropane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Trichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,1,2-Trichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Ethylene Dibromide Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
Tetrachloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,1,1,2-Tetrachloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS



Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21T775122 PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

OAIVII LIIVO OITL.		OAMI LLD D1.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,1,2,2-Tetrachloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,4-Dichlorobenzene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,2-Dichlorobenzene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	
1,3-Dichloropropene Total Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Polychlorinated Biphenyls	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD
Moisture Content	ORG-91-5009	CCME Tier 1 Method	BALANCE



GGTT Laboratories

5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 Ph: 905.712,5100 Fax: 905.712.5122 webearth.agatlabs.com

Laboratory Use	Only	-	10
Work Order #: 21	TT	15	12
Cooler Quantity:	Me	el	
Arrival Temperatures:	3.5	33	30
Custody Seal Intact:	□Yes	□No	□N/A

Chain of Custody Record Int	this is a Drin
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	a Drinking Water sample, pleas	e use Drinking Water Chain of Cus				_				Arriv	/al Ten	iperat	tures:	2	3,0	1 2	4	2.0
Report Information: Company: AECOM Canada - Markham		Regulatory Require	ments:	□ N	o Reg	ulat	ory Req	uireme	nt	Cus	tody Se	eal Int	tact:]Yes	1	No	□N/A
Contact: kesh.appadurai@AECOM.com Address:		Regulation 153/04 Table Indicate One	Sewer Sanita		1	□ Re	gulation :	558		Turr	-		Tim	1	V	equirec	1	
Phone: Reports to be sent to: 1. Email: Email: Fax:		☐Res/Park ☐Agriculture Soil Texture (Check One) ☐Coarse ☐Fine	Storm		-		ov. Water njectives (her			_	TAT	(Rush	-	ges Appl		Business	Activity is	usiness
Project Information: Project: 60636190 - Bradford ByPass PD Site Location: Sampled By: KOCh	1R4	Is this submission for Record of Site Condit	ion?			icate	indicate O	on			=	Please	e provi	ide pri	lor notifi	rcharges I lication fo and stat	r rush TA1	T
AGAT Quote #: PO: Please note: If quotation number is not provided, elient w	Il be billed full price for analysis.	Sample Matrix	5				(Check /	pplicable)	П				Т		1	3 _	2	
Invoice Information: Company: Contact: Address: Email:	Bill To Same: Yes No	B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water	Field Filtered - Metals, Hg. CrVI (Please Circle)	and Inorganics	Metal Scan Hydride Forming Metals	Client Custom Metals	: DB-HWS CI CN: - DEC DFOC DNO_/NO_ BIN CHE DPH DSAR	cits: OTP ONH, OTKN ONO DNO,NO,	ctions 1 to 4		PAHs		Organochlorine Pesticides	TCLP Metals/Inorganics	Use Proc. A	Contraction of the second	Pl Pl Mete	OCK)
Sample Identification Date Sample Sample CR4-04 July 14	d containers Sample Matrix	Comments/ Special Instructions	Y/N	X Metals and	Metal	Client	ORPs: □E	Nutrients:	CCME	ABNS	PAHS	PCBs	Organo	TCLP N	Sewer	100	57	
CR4-07 July14	6 Soil			3				>	X	3	<				×			
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Samples Relinquished By Pyrint Name and Samy	7/15/2\ 3	Samnles Received Ry (Print Nam	e and Some	_	_			Date	10		Time	1.71			Page	#	of	-:
amino reminostreo ovire incidente and olignic	Same / Italie	Samples Received By (Print Nam	e and Sign):					Date			Time			No.				



CLIENT NAME: AECOM CANADA LTD

105 COMMERCE VALLEY DR.W 7TH FLOOR

MARKHAM, ON L3T7W3

(905) 886-7022

ATTENTION TO: Kesh Appadurai

PROJECT: 60636190-CR 4 (Waste)

AGAT WORK ORDER: 21T796739

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Sep 13, 2021

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	

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 16

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AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

SAMPLING SITE:CR4						SAMPLED BY: Kesn with Golder
			Ο.	Reg. 153(511) - Metals &	k Inorganics (Soil)
DATE RECEIVED: 2021-09-02						DATE REPORTED: 2021-09-13
	S	AMPLE DES	CRIPTION:	CR4-11	CR4-02	
		SAM	PLE TYPE:	Soil	Soil	
		DATE	SAMPLED:	2021-08-30	2021-08-26	
Parameter	Unit	G/S	RDL	2923111	2923113	
Antimony	μg/g	40	0.8	<0.8	<0.8	
Arsenic	μg/g	18	1	3	4	
Barium	μg/g	670	2.0	154	26.2	
Beryllium	μg/g	8	0.4	0.6	<0.4	
Boron	μg/g	120	5	15	<5	
Boron (Hot Water Soluble)	μg/g	2	0.10	<0.10	<0.10	
Cadmium	μg/g	1.9	0.5	<0.5	<0.5	
Chromium	μg/g	160	5	25	10	
Cobalt	μg/g	80	0.5	8.6	2.9	
Copper	μg/g	230	1.0	15.4	4.9	
Lead	μg/g	120	1	7	2	
Molybdenum	μg/g	40	0.5	<0.5	<0.5	
Nickel	μg/g	270	1	16	4	
Selenium	μg/g	5.5	8.0	<0.8	<0.8	
Silver	μg/g	40	0.5	<0.5	<0.5	
Thallium	μg/g	3.3	0.5	<0.5	<0.5	
Uranium	μg/g	33	0.50	<0.50	<0.50	
Vanadium	μg/g	86	0.4	36.4	26.9	
Zinc	μg/g	340	5	45	16	
Chromium, Hexavalent	μg/g	8	0.2	<0.2	<0.2	
Cyanide, Free	μg/g	0.051	0.040	<0.040	<0.040	
Mercury	μg/g	0.27	0.10	<0.10	<0.10	
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	0.666	0.434	
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	N/A	8.52	6.96	

Certified By:



pH Units

pH, 2:1 CaCl2 Extraction

7.66

7.63



AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

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

DATE RECEIVED: 2021-09-02 DATE REPORTED: 2021-09-13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2923111-2923113 EC was 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. SAR is a calculated

parameter.

Analysis performed at AGAT Toronto (unless marked by *)

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AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

SAMPLING SITE. CR4					SAMPLED BY RESH WITH Golder
				O. Reg.	406/19 SPLP Metals
DATE RECEIVED: 2021-09-02					DATE REPORTED: 2021-09-13
		SAMPLE DES	CRIPTION:	CR4-02	
		SAMI	PLE TYPE:	Soil	
		DATE S	SAMPLED:	2021-08-26	
Parameter	Unit	G/S	RDL	2923113	
Antimony Leachate	μg/L	6	0.6	<0.6	
Arsenic Leachate	μg/L	-	5	<5	
Barium Leachate	μg/L	1000	100	<100	
Beryllium Leachate	μg/L	4	8.0	<0.8	
Boron Leachate	μg/L	5000	500	<500	
Cadmium Leachate	μg/L	0.5	0.20	<0.20	
Chromium Leachate	μg/L	50	10	<10	
Cobalt Leachate	μg/L	3.8	0.3	<0.3	
Copper Leachate	μg/L	14	7.0	<7.0	
Lead Leachate	μg/L	-	1.0	<1.0	
Molybdenum Leachate	μg/L	23	1.5	<1.5	
Nickel Leachate	μg/L	78	10	<10	
Selenium Leachate	μg/L	10	5.0	<5.0	
Silver Leachate	μg/L	0.3	0.10	<0.10	
Thallium Leachate	μg/L	2	0.5	<0.5	
Uranium Leachate	μg/L	20	2	<2	
Vanadium Leachate	μg/L	-	0.6	2.6	
Zinc Leachate	μg/L	180	20	<20	

Comments:

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind 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.

2923113

Leachate for metal testing was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP. This is a validated, unaccredited procedure.

be used for leachate testing of soil samples under O Reg 406/19 by MECP. This is a validated, unaccredited procedure

Analysis performed at AGAT Toronto (unless marked by *)

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AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.aqatlabs.com

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

OAIMI LING OITL.OIN					OAMI EED DT. Resti With Golder
				O. Reg.	153(511) - PAHs (Soil)
DATE RECEIVED: 2021-09-02					DATE REPORTED: 2021-09-13
	;	SAMPLE DES	CRIPTION:	CU-1-04	
		SAMI	PLE TYPE:	Soil	
			SAMPLED:	2021-08-26	
Parameter	Unit	G/S	RDL	2923109	
Naphthalene	μg/g	0.2	0.05	<0.05	
Acenaphthylene	µg/g	0.093	0.05	<0.05	
Acenaphthene	μg/g	2.5	0.05	<0.05	
Fluorene	μg/g	6.8	0.05	<0.05	
Phenanthrene	μg/g	12	0.05	<0.05	
Anthracene	μg/g	0.16	0.05	<0.05	
Fluoranthene	µg/g	2.8	0.05	<0.05	
Pyrene	μg/g	28	0.05	<0.05	
Benz(a)anthracene	μg/g	0.92	0.05	<0.05	
Chrysene	μg/g	9.4	0.05	<0.05	
Benzo(b)fluoranthene	µg/g	3.2	0.05	<0.05	
Benzo(k)fluoranthene	μg/g	3.1	0.05	<0.05	
Benzo(a)pyrene	μg/g	0.31	0.05	<0.05	
Indeno(1,2,3-cd)pyrene	μg/g	0.76	0.05	<0.05	
Dibenz(a,h)anthracene	μg/g	0.7	0.05	<0.05	
Benzo(g,h,i)perylene	μg/g	13	0.05	<0.05	
1 and 2 Methlynaphthalene	μg/g	0.59	0.05	<0.05	
Moisture Content	%		0.1	17.3	
Surrogate	Unit	Acceptab	le Limits		
Naphthalene-d8	%	50-1	140	89	
Acridine-d9	%	50-1	140	85	
Terphenyl-d14	%	50-1	140	96	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

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.

2923109 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 *)





AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste) 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

SAMPLING SITE.CR4				SAMFLED BT. Restr with Golder
			O. Reg. 1	53(511) - PHCs F1 - F4 (Soil)
DATE RECEIVED: 2021-09-02				DATE REPORTED: 2021-09-13
	S	AMPLE DESCRIPTION:	CR4-11	
		SAMPLE TYPE:	Soil	
		DATE SAMPLED:	2021-08-30	
Parameter	Unit	G/S RDL	2923111	
Benzene	μg/g	0.02 0.02	<0.02	
Toluene	μg/g	0.2 0.05	<0.05	
Ethylbenzene	μg/g	0.05	<0.05	
m & p-Xylene	μg/g	0.05	<0.05	
o-Xylene	μg/g	0.05	<0.05	
Xylenes (Total)	μg/g	0.091 0.05	<0.05	
F1 (C6 - C10)	μg/g	5	<5	
F1 (C6 to C10) minus BTEX	μg/g	25 5	<5	
F2 (C10 to C16)	μg/g	26 10	<10	
F3 (C16 to C34)	μg/g	240 50	<50	
F4 (C34 to C50)	μg/g	3300 50	<50	
Gravimetric Heavy Hydrocarbons	μg/g	50	NA	
Moisture Content	%	0.1	20.2	
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	60-140	82	
Terphenyl	%	60-140	81	





AGAT WORK ORDER: 21T796739 PROJECT: 60636190-CR 4 (Waste)

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

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE: CR4

ATTENTION TO: Kesh Appadurai SAMPLED BY: Kesh with Golder

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

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.

DATE RECEIVED: 2021-09-02 **DATE REPORTED: 2021-09-13**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind

2923111 Results are based on sample dry weight.

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

Xylenes 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 calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

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:

NPopukolof

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR 4 (Waste)

SAMPLING SITE: CR4

AGAT WORK ORDER: 21T796739

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh with Golder

5, 1111 21110 3112:3111								J, (IVII		1.110011	******	20.401			
				Soi	l Ana	alysis	3								
RPT Date: Sep 13, 2021			Г	UPLICATI	E		REFERENCE MATERIAL			METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		eptable mits	Recovery	Lir	ptable nits	Recovery	Lie	ptable nits
		ld					Value	Lower	Upper	_	Lower	Upper	_	Lower	Upper
O. Reg. 153(511) - Metals & Inor	ganics (Soil)														
Antimony	2927188		<0.8	<0.8	NA	< 0.8	123%	70%	130%	100%	80%	120%	106%	70%	130%
Arsenic	2927188		<1	<1	NA	< 1	119%	70%	130%	100%	80%	120%	105%	70%	130%
Barium	2927188		12.3	13.0	5.5%	< 2.0	107%	70%	130%	99%	80%	120%	98%	70%	130%
Beryllium	2927188		<0.4	<0.4	NA	< 0.4	106%	70%	130%	95%	80%	120%	113%	70%	130%
Boron	2927188		<5	<5	NA	< 5	89%	70%	130%	100%	80%	120%	114%	70%	130%
Boron (Hot Water Soluble)	2946202		0.11	0.11	NA	< 0.10	85%	60%	140%	98%	70%	130%	101%	60%	140%
Cadmium	2927188		<0.5	< 0.5	NA	< 0.5	116%	70%	130%	100%	80%	120%	107%	70%	130%
Chromium	2927188		<5	<5	NA	< 5	97%	70%	130%	100%	80%	120%	91%	70%	130%
Cobalt	2927188		1.6	1.6	NA	< 0.5	98%	70%	130%	93%	80%	120%	93%	70%	130%
Copper	2927188		2.9	3.1	NA	< 1.0	97%	70%	130%	98%	80%	120%	96%	70%	130%
Lead	2927188		2	2	NA	< 1	103%	70%	130%	94%	80%	120%	94%	70%	130%
Molybdenum	2927188		< 0.5	< 0.5	NA	< 0.5	99%	70%	130%	96%	80%	120%	95%	70%	130%
Nickel	2927188		2	2	NA	< 1	100%	70%	130%	96%	80%	120%	96%	70%	130%
Selenium	2927188		<0.8	<0.8	NA	< 0.8	135%	70%	130%	93%	80%	120%	98%	70%	130%
Silver	2927188		<0.5	<0.5	NA	< 0.5	114%	70%	130%	107%	80%	120%	113%	70%	130%
Thallium	2927188		<0.5	<0.5	NA	< 0.5	100%	70%	130%	96%	80%	120%	97%	70%	130%
Uranium	2927188		<0.50	< 0.50	NA	< 0.50	102%	70%	130%	99%	80%	120%	98%	70%	130%
Vanadium	2927188		8.0	8.2	2.5%	< 0.4	100%	70%	130%	89%	80%	120%	90%	70%	130%
Zinc	2927188		11	11	NA	< 5	102%	70%	130%	98%	80%	120%	112%	70%	130%
Chromium, Hexavalent	2930980		<0.2	<0.2	NA	< 0.2	97%	70%	130%	95%	80%	120%	101%	70%	130%
Cyanide, Free	2920645		<0.040	<0.040	NA	< 0.040	101%	70%	130%	98%	80%	120%	83%	70%	130%
Mercury	2927188		<0.10	<0.10	NA	< 0.10	115%	70%	130%	107%	80%	120%	108%	70%	130%
Electrical Conductivity (2:1)	2946202		0.099	0.102	3.0%	< 0.005	109%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	2946202		0.073	0.080	9.2%	NA									
pH, 2:1 CaCl2 Extraction	2930980		7.50	7.45	0.7%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

O. Reg. 406/19 SPLP Metals														
Antimony Leachate	2916559	<0.6	<0.6	NA	< 0.6	103%	70%	130%	100%	80%	120%	101%	70%	130%
Arsenic Leachate	2916559	<5	<5	NA	< 5	99%	70%	130%	97%	80%	120%	102%	70%	130%
Barium Leachate	2916559	<100	<100	NA	< 100	101%	70%	130%	100%	80%	120%	104%	70%	130%
Beryllium Leachate	2916559	<0.8	<0.8	NA	< 0.8	92%	70%	130%	92%	80%	120%	90%	70%	130%
Boron Leachate	2916559	<500	<500	NA	< 500	98%	70%	130%	99%	80%	120%	102%	70%	130%
	0040550	2.00				4040/	700/	4000/	000/	000/	4000/	10.10/	700/	4000/
Cadmium Leachate	2916559	<0.20	<0.20	NA	< 0.20	101%	70%	130%	99%	80%	120%	101%	70%	130%
Chromium Leachate	2916559	<10	<10	NA	< 10	101%	70%	130%	102%	80%	120%	104%	70%	130%
Cobalt Leachate	2916559	<0.3	<0.3	NA	< 0.3	100%	70%	130%	100%	80%	120%	101%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

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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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21T796739

PROJECT: 60636190-CR 4 (Waste)

ATTENTION TO: Kesh Appadurai

SAMPLED BY:Kesh with Golder

OAWII EIIVO OITE.OIV	I EINO STE. STA														
Soil Analysis (Continued)															
RPT Date: Sep 13, 2021	E		REFERENCE MATERIAL			METHOD	BLANK	SPIKE	MATRIX SPIK		KE				
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Lie	ptable nits	Recovery	Lie	ptable nits
		Iu	·	·			value	Lower	Upper	,	Lower	Upper		Lower	Upper
Copper Leachate	2916559		<7.0	<7.0	NA	< 7.0	97%	70%	130%	105%	80%	120%	106%	70%	130%
Lead Leachate	2916559		<1.0	<1.0	NA	< 1.0	100%	70%	130%	99%	80%	120%	102%	70%	130%
Molybdenum Leachate	2916559		2.2	2.2	NA	< 1.5	104%	70%	130%	108%	80%	120%	109%	70%	130%
Nickel Leachate	2916559		<10	<10	NA	< 10	102%	70%	130%	101%	80%	120%	103%	70%	130%
Selenium Leachate	2916559		<5.0	<5.0	NA	< 5.0	102%	70%	130%	94%	80%	120%	98%	70%	130%
Silver Leachate	2916559		<0.10	<0.10	NA	< 0.10	103%	70%	130%	101%	80%	120%	101%	70%	130%
Thallium Leachate	2916559		<0.5	<0.5	NA	< 0.5	100%	70%	130%	98%	80%	120%	101%	70%	130%
Uranium Leachate	2916559		<2	<2	NA	< 2	100%	70%	130%	100%	80%	120%	105%	70%	130%
Vanadium Leachate	2916559		1.3	1.4	NA	< 0.6	103%	70%	130%	101%	80%	120%	103%	70%	130%
Zinc Leachate	2916559		<20	<20	NA	< 20	97%	70%	130%	115%	80%	120%	119%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR 4 (Waste)

SAMPLING SITE: CR4

AGAT WORK ORDER: 21T796739

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh with Golder

Trace Organics Analysis																				
RPT Date: Sep 13, 2021		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						
		ld	·	·			Value	Lower	Upper	7 .						Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Soil)																				
Naphthalene	2930870		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	102%	50%	140%	84%	50%	140%					
Acenaphthylene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	96%	50%	140%	109%	50%	140%					
Acenaphthene	2930870		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	84%	50%	140%	109%	50%	140%					
Fluorene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	85%	50%	140%	96%	50%	140%					
Phenanthrene	2930870		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	96%	50%	140%	96%	50%	140%					
Anthracene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	85%	50%	140%	91%	50%	140%					
Fluoranthene	2930870		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	85%	50%	140%	94%	50%	140%					
Pyrene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	85%	50%	140%	93%	50%	140%					
Benz(a)anthracene	2930870		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	96%	50%	140%	92%	50%	140%					
Chrysene	2930870		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	85%	50%	140%	83%	50%	140%					
Benzo(b)fluoranthene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	81%	50%	140%	100%	50%	140%					
Benzo(k)fluoranthene	2930870		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	85%	50%	140%	92%	50%	140%					
Benzo(a)pyrene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	84%	50%	140%	93%	50%	140%					
Indeno(1,2,3-cd)pyrene	2930870		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	85%	50%	140%	94%	50%	140%					
Dibenz(a,h)anthracene	2930870		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	96%	50%	140%	104%	50%	140%					
Benzo(g,h,i)perylene	2930870		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	85%	50%	140%	99%	50%	140%					
O. Reg. 153(511) - PHCs F1 - F4 (Soil)																				
Benzene	2920651		<0.02	< 0.02	NA	< 0.02	81%	60%	140%	111%	60%	140%	92%	60%	140%					
Toluene	2920651		<0.05	<0.05	NA	< 0.05	107%	60%	140%	113%	60%	140%	110%	60%	140%					
Ethylbenzene	2920651		<0.05	<0.05	NA	< 0.05	85%	60%	140%	116%	60%	140%	89%	60%	140%					
m & p-Xylene	2920651		<0.05	<0.05	NA	< 0.05	109%	60%	140%	90%	60%	140%	107%	60%	140%					
o-Xylene	2920651		<0.05	<0.05	NA	< 0.05	87%	60%	140%	109%	60%	140%	85%	60%	140%					
F1 (C6 - C10)	2920651		<5	<5	NA	< 5	97%	60%	140%	99%	60%	140%	116%	60%	140%					
F2 (C10 to C16)	2939919		< 10	< 10	NA	< 10	115%	60%	140%	90%	60%	140%	76%	60%	140%					
F3 (C16 to C34)	2939919		< 50	< 50	NA	< 50	110%	60%	140%	88%	60%	140%	62%	60%	140%					
F4 (C34 to C50)	2939919		< 50	< 50	NA	< 50	92%	60%	140%	87%	60%	140%	94%	60%	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:

NPoprikolof

AGAT QUALITY ASSURANCE REPORT (V1)

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QA Violation

CLIENT NAME: AECOM CANADA LTD AGAT WORK ORDER: 21T796739
PROJECT: 60636190-CR 4 (Waste) ATTENTION TO: Kesh Appadurai

RPT Date: Sep 13, 2021			REFEREN	ICE MATE	ERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPII	KE
PARAMETER	Sample Id	Sample Description	Measured	Accept Limit	te l	Recovery	Lin	ptable nits	Recovery	Acceptable Limits	
		' '	Value	Lower	Jpper	<u> </u>	Lower	Upper		Lower	Upper

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

Selenium CR4-11 135% 70% 130% 93% 80% 120% 98% 70% 130%

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Method Summary

CLIENT NAME: AECOM CANADA LTD PROJECT: 60636190-CR 4 (Waste) SAMPLING SITE: CR4 AGAT WORK ORDER: 21T796739 ATTENTION TO: Kesh Appadurai SAMPLED BY:Kesh with Golder

		T	T
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis		and the different EDA 0050D and EDA	
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Соррег	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Antimony Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP/MS
Arsenic Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP/MS
Barium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Beryllium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS



Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR 4 (Waste)

SAMPLING SITE:CR4

AGAT WORK ORDER: 21T796739

ATTENTION TO: Kesh Appadurai

SAMPLED BY:Kesh with Golder

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Cadmium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Cobalt Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Copper Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Lead Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Molybdenum Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Nickel Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Selenium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Silver Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Thallium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Uranium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Vanadium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Zinc Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS

Method Summary

CLIENT NAME: AECOM CANADA LTD PROJECT: 60636190-CR 4 (Waste) SAMPLING SITE: CR4 AGAT WORK ORDER: 21T796739 ATTENTION TO: Kesh Appadurai SAMPLED BY:Kesh with Golder

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Benzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Toluene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID



Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR 4 (Waste)

SAMPLING SITE: CR4

AGAT WORK ORDER: 21T796739

ATTENTION TO: Kesh Appadurai

SAMPLED BY: Kesh with Golder

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID



AGAT Laboratories

5835 Coopers Avenue Ph: 905.712.5100 Fax: 905.712.5122

Laboratory Use Only Work Order #: 21 7 7 9 6 7 3 9 Mississauga, Ontario L4Z 1Y2 webearth.agatlabs.com Cooler Quantity:

Chain of C	Custody R	Record	If this is a Dr	Inking Water	sample, please	use Drinking Water Chain of Cus	stody Form (po	table w	ater intend	led for hun	ian consu	mption)		Arriv	al Ten	nperat	ures:	9	341	<u>3</u> 十	30		
Report Information Company:	nation: AECOM Canad	la - Markham				Regulatory Require	ments:	□ N	lo Regu	latory	Requir	emer	it	Custody Seal Intact: Yes No N/A									
Contact: Address:	kesh.appadurai(@AECOM.com				Regulation 153/04 Sewer Use Regulation 558 Table Indicate One Sanitary CCME						- 111	Turnaround Time (TAT) Required: Regular TAT Fito 7 Business Days										
Phone: Reports to be sent to: 1. Email: 2. Email:	kesh_appadurai(@AECOM,com	Fax:		- //	□ Res/Park ☑ Agriculture	Storm		Prov. Water Quality Objectives (PWQO) Other			- 11	Regular IAI 5 to 7 Business Days Rush TAT (Rush Surcharges Apply) 3 Business 2 Business 1 Business Days Days Days										
Project Information: Project: 60636190 - CR 4 (waste) Site Location: CR 4 Sampled By: Kesh with Golder						ls this submission for a Record of Site Condition?			Report Guideline on Certificate of Analysis Yes No					OR Date Required (Rush Surcharges May Apply): Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays									
AGAT Quote #: PO: Please note: If quotation number is not provided, client will be billed full price for analysis. Invoice Information: Bill To Same: Yes \ No \ Company:		Sample Matrix Legend B Biota GW Ground Water O Oil	letals, Hg, CrVI	etals, Hg, CrVI	letals, Hg, CrVI	letals, Hg, CrVI	letals, Hg, CrVI	etals, Hg, CrVI	etals, Hg. CrVI			JCN.	SAR SAR	MHLO	S. FL				Sa		tal.		
Contact: Address: Email:						P Paint S Soil SD Sediment SW Surface Water	Field Filtered - Metals, Hg, CrVI (Please Circle)	Metals and Inorganics	Metal Scan Hydride Forming Metals	com Metals	Hg DPH DNH,	□NO ₃ □NO ₂ □NO ₃ /ÑO ₂ Volatiles: □VOC □BTEX	A fens &		PAHs	Signalida	Organochlorine Pesticides	TCLP Metals/Inorganics	PLP Mota				
Sample Ide	entification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metal	Metal Scan Hydride Forr	Client	□ Total N Nutrients:	O NO O Volatiles:	8	ABNS	PAHS	PCBs	Organ	TCLP	Sewer				
COLL	-11	Aug 26 Aug 30		3	11			Y						1	1								
CP4	-02	Ay2b		1	И			X				- 15 - 17 - 17							×				
samples Relinquished By (Pr	int Name and Sign	1 1/)		099	Time	Samples Received By (Print N.	arne and Sign					Date			Time		- 01						
amples Pelinquished By (Pr	int Name and Sign	THV	· · · · · · · · · · · · · · · · · · ·	Carlo Date	A Time	Samples Received By (Print No.	ame and Sign):					Date	12	2	Time	34	46	Nei	Page /	of			
				1						- 12	7750	aile.	14212		-	- 22		<u> </u>					



CLIENT NAME: AECOM CANADA LTD

105 COMMERCE VALLEY DR.W 7TH FLOOR

MARKHAM, ON L3T7W3

(905) 886-7022

ATTENTION TO: Kesh Appadurai

PROJECT: 60636190-CR4

AGAT WORK ORDER: 21T813708

SOIL ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Nov 10, 2021

PAGES (INCLUDING COVER): 17 VERSION*: 1

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

*Notes	

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 17

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

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CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

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

			<u> </u>	Reg. 153(51	1) - Metals & Inorganics (Soil)
DATE RECEIVED: 2021-10-08					DATE REPORTED: 2021-11-10
	Si	AMPLE DES	CRIPTION:	CR4-09-SS2	
		SAM	PLE TYPE:	Soil	
		DATE	SAMPLED:	2021-10-06	
Parameter	Unit	G/S	RDL	3073358	
Antimony	μg/g	7.5	0.8	<0.8	
Arsenic	μg/g	11	1	4	
Barium	μg/g	390	2.0	53.3	
Beryllium	μg/g	4	0.4	<0.4	
Boron	μg/g	120	5	5	
Boron (Hot Water Soluble)	μg/g	1.5	0.10	0.13	
Cadmium	μg/g	1	0.5	<0.5	
Chromium	μg/g	160	5	16	
Cobalt	μg/g	22	0.5	4.0	
Copper	μg/g	140	1.0	11.9	
Lead	μg/g	45	1	6	
Molybdenum	μg/g	6.9	0.5	<0.5	
Nickel	μg/g	100	1	7	
Selenium	μg/g	2.4	0.8	<0.8	
Silver	μg/g	20	0.5	<0.5	
Thallium	μg/g	1	0.5	<0.5	
Uranium	μg/g	23	0.50	0.54	
Vanadium	μg/g	86	0.4	24.5	
Zinc	μg/g	340	5	33	
Chromium, Hexavalent	μg/g	8	0.2	<0.2	
Cyanide, Free	μg/g	0.051	0.040	<0.040	
Mercury	μg/g	0.24	0.10	<0.10	
Electrical Conductivity (2:1)	mS/cm	0.7	0.005	0.144	
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	4	N/A	0.192	
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.49	





Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

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

5835 COOPERS AVENUE

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

DATE RECEIVED: 2021-10-08 **DATE REPORTED: 2021-11-10**

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Ag 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. EC was 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. SAR is a calculated 3073358

Analysis performed at AGAT Toronto (unless marked by *)



CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

5835 COOPERS AVENUE

O. Reg. 153(511) - OC Pesticides (Soil)

				O. Reg. 153(511) - OC Pesticides (Soil)
DATE RECEIVED: 2021-10-08					DATE REPORTED: 2021-11-10
		SAMPLE DES	CRIPTION:	CR4-06-SS2	
		SAM	PLE TYPE:	Soil	
		DATE S	SAMPLED:	2021-10-04	
Parameter	Unit	G/S	RDL	3073364	
Hexachloroethane	μg/g	0.01	0.01	<0.01	
Gamma-Hexachlorocyclohexane	μg/g	0.01	0.005	<0.005	
Heptachlor	μg/g	0.05	0.005	<0.005	
Aldrin	μg/g	0.05	0.005	<0.005	
Heptachlor Epoxide	μg/g	0.05	0.005	<0.005	
Endosulfan I	μg/g		0.005	<0.005	
Endosulfan II	μg/g		0.005	<0.005	
Endosulfan	μg/g	0.04	0.005	<0.005	
Alpha-Chlordane	μg/g		0.005	<0.005	
gamma-Chlordane	μg/g		0.005	<0.005	
Chlordane	μg/g	0.05	0.007	<0.007	
op'-DDE	ug/g		0.005	<0.005	
pp'-DDE	μg/g		0.005	<0.005	
DDE	μg/g	0.05	0.007	<0.007	
op'-DDD	μg/g		0.005	<0.005	
pp'-DDD	μg/g		0.005	<0.005	
DDD	μg/g	0.05	0.007	<0.007	
op'-DDT	μg/g		0.005	<0.005	
pp'-DDT	μg/g		0.005	<0.005	
DDT (Total)	μg/g	0.078	0.007	<0.007	
Dieldrin	μg/g	0.05	0.005	<0.005	
Endrin	μg/g	0.04	0.005	<0.005	
Methoxychlor	μg/g	0.05	0.005	<0.005	
Hexachlorobenzene	μg/g	0.01	0.005	<0.005	
Hexachlorobutadiene	μg/g	0.01	0.01	<0.01	
Moisture Content	%		0.1	15.0	
wet weight OC	g		0.01	10.53	
Surrogate	Unit	Acceptab	le Limits		
TCMX	%	50-1	40	78	
Decachlorobiphenyl	%	50-1	40	94	





Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

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5835 COOPERS AVENUE

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2021-10-08 **DATE REPORTED: 2021-11-10**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Agricultural or Other Property Use

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.

3073364 Results are based on the dry weight of the soil.

DDT total is a calculated parameter. The calculated value is the sum of op'DDT and pp'DDT. DDD total is a calculated parameter. The calculated value is the sum of op'DDD and pp'DDD. DDE total is a calculated parameter. The calculated value is the sum of op'DDE and pp'DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane. The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

Certified By:

NPoprikolof



CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

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

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

				O. Re	g. 153(511) - I	PAHS (SOII)
DATE RECEIVED: 2021-10-08						DATE REPORTED: 2021-11-10
	5	SAMPLE DES	CRIPTION:	CR4-09-SS2	CR4-06-SS2	
		SAM	SAMPLE TYPE: DATE SAMPLED: 2		Soil	
		DATE S			2021-10-04	
Parameter	Unit	G/S	RDL	3073358	3073364	
Naphthalene	μg/g	0.2	0.05	<0.05	<0.05	
Acenaphthylene	μg/g	0.093	0.05	<0.05	<0.05	
Acenaphthene	μg/g	2.5	0.05	<0.05	<0.05	
Fluorene	μg/g	6.8	0.05	<0.05	<0.05	
Phenanthrene	μg/g	6.2	0.05	<0.05	<0.05	
Anthracene	μg/g	0.058	0.05	<0.05	<0.05	
Fluoranthene	μg/g	0.69	0.05	<0.05	<0.05	
Pyrene	μg/g	28	0.05	<0.05	<0.05	
Benz(a)anthracene	μg/g	0.5	0.05	<0.05	<0.05	
Chrysene	μg/g	7	0.05	<0.05	<0.05	
Benzo(b)fluoranthene	μg/g	3.2	0.05	<0.05	<0.05	
Benzo(k)fluoranthene	μg/g	3.1	0.05	<0.05	<0.05	
Benzo(a)pyrene	μg/g	0.31	0.05	<0.05	<0.05	
Indeno(1,2,3-cd)pyrene	μg/g	0.38	0.05	<0.05	<0.05	
Dibenz(a,h)anthracene	μg/g	0.57	0.05	<0.05	<0.05	
Benzo(g,h,i)perylene	μg/g	6.6	0.05	<0.05	<0.05	
1 and 2 Methlynaphthalene	μg/g	0.096	0.05	<0.05	<0.05	
Moisture Content	%		0.1	26.0	15.0	
Surrogate	Unit	Acceptab	le Limits			
Naphthalene-d8	%	50-1	40	61	71	
Acridine-d9	%	50-1	40	114	96	
Terphenyl-d14	%	50-1	40	103	90	

Comments:

RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Ag 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.

3073358-3073364 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 *)





Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

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

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

O. Reg. 558 - Benzo(a) pyrene

DATE RECEIVED: 2021-10-08

SAMPLE DESCRIPTION: CR-07-COM
SAMPLE TYPE: Soil

		DATES	SAMPLED:	2021-10-08				
Parameter	Unit	G/S	RDL	3073365				
Benzo(a)pyrene Leachate	mg/L	0.001	0.001	<0.001				
Surrogate	Unit	Acceptab	Acceptable Limits					
Acridine-d9	%	50-1	140	78				
Naphthalene-d8	%	50-1	140	84				
Terphenyl-d14	%	50-1	140	88				

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.

3073365 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.

Analysis performed at AGAT Toronto (unless marked by *)

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:





CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

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

5835 COOPERS AVENUE

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

OP Pesticides (Soil)

			DATE REPORTED: 2021-11-10
;	SAMPLE DESCRIPTION:	CR4-06-SS2	
	SAMPLE TYPE:		
	DATE SAMPLED:	2021-10-04	
Unit	G/S RDL	3073364	
μg/g	0.1	<0.1	
μg/g	0.5	<0.5	
μg/g	0.14	<0.14	
μg/g	0.2	<0.2	
μg/g	0.5	<0.5	
μg/g	0.2	<0.2	
μg/g	0.2	<0.2	
μg/g	0.4	<0.4	
%	0.1	15.0	
Unit	Acceptable Limits		
%	50-140	105	
	Unit	DATE SAMPLED: Unit G / S RDL μg/g 0.1 μg/g 0.5 μg/g 0.14 μg/g 0.2 μg/g 0.5 μg/g 0.5 μg/g 0.2 μg/g 0.2 μg/g 0.2 μg/g 0.2 μg/g 0.1 Unit Acceptable Limits	SAMPLE TYPE: Soil DATE SAMPLED: 2021-10-04 Unit G / S RDL 3073364 μg/g 0.1 <0.1 μg/g 0.5 <0.5 μg/g 0.14 <0.14 μg/g 0.2 <0.2 μg/g 0.5 <0.5 μg/g 0.5 <0.5 μg/g 0.14 <0.14 μg/g 0.5 <0.5 Unit Acceptable Limits

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

MPoprukolof



Certificate of Analysis

AGAT WORK ORDER: 21T813708

PROJECT: 60636190-CR4

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

CLIENT NAME: AECOM CANADA LTD

SAMPLING SITE:

ATTENTION TO: Kesh Appadurai

SAMPLED BY:

					Total PCBs (soil)
DATE RECEIVED: 2021-10-08					DATE REPORTED: 2021-11-10
		SAMPLE DESCR	RIPTION:	CR4-06-SS2	
		SAMPL	SAMPLE TYPE:		
		DATE SA	DATE SAMPLED:		
Parameter	Unit	G/S	RDL	3073364	
Polychlorinated Biphenyls	μg/g	0.35	0.1	<0.1	
Moisture Content	%		0.1	15.0	
Surrogate	Unit	Acceptable	Limits		
Decachlorobiphenyl	%	60-130	0	84	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Ag

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.

3073364 Results are based on the dry weight of soil extracted.

Analysis performed at AGAT Toronto (unless marked by *)





Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLING SITE:

AGAT WORK ORDER: 21T813708 ATTENTION TO: Kesh Appadurai

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				Soi	l Ana	alysis	6								
RPT Date: Nov 10, 2021				DUPLICATE			REFEREN	NCE MA	TERIAL	METHOD BLANK SPIKE			MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acceptable Limits		Recovery	Acceptable Limits		Recovery		ptable nits
		ld			Value	Lower	Upper	,	Lower Upper			Lower	Upper		
O. Reg. 153(511) - Metals & Inor	ganics (Soil)														
Antimony	3100848		<0.8	<0.8	NA	< 0.8	96%	70%	130%	109%	80%	120%	99%	70%	130%
Arsenic	3100848		3	3	NA	< 1	128%	70%	130%	114%	80%	120%	117%	70%	130%
Barium	3100848		42.2	45.2	6.9%	< 2.0	105%	70%	130%	104%	80%	120%	104%	70%	130%
Beryllium	3100848		< 0.4	<0.4	NA	< 0.4	99%	70%	130%	106%	80%	120%	105%	70%	130%
Boron	3100848		5	6	NA	< 5	98%	70%	130%	114%	80%	120%	108%	70%	130%
Boron (Hot Water Soluble)	3095704		0.28	0.29	NA	< 0.10	84%	60%	140%	96%	70%	130%	106%	60%	140%
Cadmium	3100848		<0.5	<0.5	NA	< 0.5	110%	70%	130%	107%	80%	120%	109%	70%	130%
Chromium	3100848		14	15	NA	< 5	109%	70%	130%	112%	80%	120%	110%	70%	130%
Cobalt	3100848		3.5	3.6	2.8%	< 0.5	108%	70%	130%	108%	80%	120%	107%	70%	130%
Copper	3100848		10.0	10.2	2.0%	< 1.0	100%	70%	130%	112%	80%	120%	106%	70%	130%
Lead	3100848		19	20	5.1%	< 1	109%	70%	130%	106%	80%	120%	103%	70%	130%
Molybdenum	3100848		<0.5	<0.5	NA	< 0.5	116%	70%	130%	115%	80%	120%	121%	70%	130%
Nickel	3100848		7	7	0.0%	< 1	114%	70%	130%	114%	80%	120%	111%	70%	130%
Selenium	3100848		<0.8	<0.8	NA	< 0.8	73%	70%	130%	109%	80%	120%	114%	70%	130%
Silver	3100848		<0.5	<0.5	NA	< 0.5	104%	70%	130%	111%	80%	120%	104%	70%	130%
Thallium	3100848		<0.5	<0.5	NA	< 0.5	115%	70%	130%	109%	80%	120%	109%	70%	130%
Uranium	3100848		<0.50	< 0.50	NA	< 0.50	120%	70%	130%	110%	80%	120%	112%	70%	130%
Vanadium	3100848		23.2	23.4	0.9%	< 0.4	116%	70%	130%	106%	80%	120%	109%	70%	130%
Zinc	3100848		52	53	1.9%	< 5	109%	70%	130%	111%	80%	120%	111%	70%	130%
Chromium, Hexavalent	3086422		<0.2	<0.2	NA	< 0.2	94%	70%	130%	96%	80%	120%	80%	70%	130%
Cyanide, Free	3096487		<0.040	<0.040	NA	< 0.040	99%	70%	130%	107%	80%	120%	96%	70%	130%
Mercury	3100848		<0.10	<0.10	NA	< 0.10	109%	70%	130%	105%	80%	120%	106%	70%	130%
Electrical Conductivity (2:1)	3095704		0.590	0.641	8.3%	< 0.005	108%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	3096484		39.0	38.7	0.8%	NA									
pH, 2:1 CaCl2 Extraction	3096487		7.39	7.40	0.1%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.



Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21T813708 PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

			Trac	e Org	ganio	cs Ar	alys	is							
RPT Date: Nov 10, 2021				UPLICATI	 E		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2		Method Blank	Measured	Acceptable Limits		Recovery	Acceptable Limits		Recovery		ptable nits
	Jacon.	ld	Sup ".	5 ap 112			Value	Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	2970884		< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	99%	50%	140%	111%	50%	140%
Acenaphthylene	2970884		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	98%	50%	140%	98%	50%	140%
Acenaphthene	2970884		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	96%	50%	140%	96%	50%	140%
Fluorene	2970884		0.07	< 0.05	NA	< 0.05	85%	50%	140%	95%	50%	140%	85%	50%	140%
Phenanthrene	2970884		0.24	0.16	NA	< 0.05	96%	50%	140%	85%	50%	140%	96%	50%	140%
Anthracene	2970884		0.05	< 0.05	NA	< 0.05	85%	50%	140%	96%	50%	140%	85%	50%	140%
Fluoranthene	2970884		0.14	0.14	NA	< 0.05	81%	50%	140%	85%	50%	140%	96%	50%	140%
Pyrene	2970884		0.31	0.23	NA	< 0.05	86%	50%	140%	96%	50%	140%	98%	50%	140%
Benz(a)anthracene	2970884		0.10	0.07	NA	< 0.05	92%	50%	140%	82%	50%	140%	98%	50%	140%
Chrysene	2970884		0.12	0.08	NA	< 0.05	81%	50%	140%	92%	50%	140%	85%	50%	140%
Benzo(b)fluoranthene	2970884		0.05	< 0.05	NA	< 0.05	98%	50%	140%	81%	50%	140%	96%	50%	140%
Benzo(k)fluoranthene	2970884		0.05	0.07	NA	< 0.05	96%		140%	82%	50%	140%	85%	50%	140%
Benzo(a)pyrene	2970884		0.05	< 0.05	NA	< 0.05	105%		140%	93%	50%	140%	96%	50%	140%
Indeno(1,2,3-cd)pyrene	2970884		< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	105%	50%	140%	85%	50%	140%
Dibenz(a,h)anthracene	2970884		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	118%	50%	140%	96%	50%	140%
Benzo(g,h,i)perylene	2970884		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	98%	50%	140%	85%	50%	140%
Total PCBs (soil)															
Polychlorinated Biphenyls	3072766		< 0.1	< 0.1	NA	< 0.1	97%	60%	140%	94%	60%	140%	84%	60%	140%
Comments: When the average of the	e sample and	l duplicate	results is	less than 5	x the RDL	, the Rela	tive Perce	nt Differ	ence (F	RPD) will b	oe indic	ated as	Not Applic	able (N	NA).
O. Reg. 558 - Benzo(a) pyrene															
Benzo(a)pyrene Leachate	3073365	3073365	< 0.001	< 0.001	NA	< 0.001	72%	50%	140%	91%	50%	140%	75%	50%	140%
O. Dan 450/544) OC Dankinidaa	(0-:1)														
O. Reg. 153(511) - OC Pesticides Hexachloroethane	` ,		z 0 01	- 0.01	NIA	- 0.01	070/	E00/	1400/	1020/	E00/	1400/	87%	50%	140%
	3159799		< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	103%	50%	140%			140%
Gamma-Hexachlorocyclohexane	3159799		< 0.005	< 0.005	NA	< 0.005	85%		140%	100%	50%	140%	101%	50%	140%
Heptachlor Aldrin	3159799 3159799		< 0.005 < 0.005	< 0.005 < 0.005	NA NA	< 0.005 < 0.005	90% 93%	50% 50%	140% 140%	104% 99%	50% 50%	140% 140%	100% 80%	50% 50%	140%
Heptachlor Epoxide	3159799		< 0.005	< 0.005	NA	< 0.005	93%		140%	104%	50%	140%	88%	50%	140%
Endoculfon I	2450700		٠,000	4 O OOF	NIA	- 0.005	000/	F00/	140%	4000/	F00/	140%	000/	F00/	140%
Endosulfan I	3159799		< 0.005	< 0.005	NA	< 0.005	92%			102%	50%		82%	50%	
Endosulfan II	3159799		< 0.005	< 0.005	NA	< 0.005	98%		140%	101%		140%	90%		140%
Alpha-Chlordane	3159799		< 0.005	< 0.005	NA NA	< 0.005	91%		140%	100%	50%	140%	85%	50%	140%
gamma-Chlordane op'-DDE	3159799 3159799		< 0.005 < 0.005	< 0.005 < 0.005	NA NA	< 0.005 < 0.005	90% 85%		140% 140%	99% 110%	50% 50%	140% 140%	86% 89%	50% 50%	140% 140%
•															
pp'-DDE	3159799		< 0.005	< 0.005	NA	< 0.005	87%		140%	110%	50%	140%	100%	50%	
op'-DDD	3159799		< 0.005	< 0.005	NA	< 0.005	99%		140%	106%	50%	140%	96%	50%	140%
pp'-DDD	3159799		< 0.005	< 0.005	NA	< 0.005	89%		140%	105%		140%	96%	50%	
op'-DDT	3159799		< 0.005	< 0.005	NA	< 0.005	94%		140%	115%	50%	140%	106%		140%
pp'-DDT	3159799		< 0.005	< 0.005	NA	< 0.005	83%	50%	140%	106%	50%	140%	108%	50%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

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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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



AGAT WORK ORDER: 21T813708

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 ATTENTION TO: Kesh Appadurai

SAMPLING SITE: SAMPLED BY:

Trace Organics Analysis (Continued)															
RPT Date: Nov 10, 2021				UPLICATI	E		REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample	Dup #1	Dup #2 RF	RPD	PD Method Blank			cceptable Limits	Recovery	Acceptable Limits	Recovery		ptable nits	
		ld		·				Lower	Upper		Lower	Upper]	Lower	Upper
Dieldrin	3159799		< 0.005	< 0.005	NA	< 0.005	92%	50%	140%	106%	50%	140%	91%	50%	140%
Endrin	3159799		< 0.005	< 0.005	NA	< 0.005	84%	50%	140%	105%	50%	140%	82%	50%	140%
Methoxychlor	3159799		< 0.005	< 0.005	NA	< 0.005	89%	50%	140%		50%	140%	104%	50%	140%
Hexachlorobenzene	3159799		< 0.005	< 0.005	NA	< 0.005	103%	50%	140%	98%	50%	140%	82%	50%	140%
Hexachlorobutadiene	3159799		< 0.01	< 0.01	NA	< 0.01	83%	50%	140%	101%	50%	140%	86%	50%	140%
OP Pesticides (Soil)															
Phorate	3073364 3	073364	< 0.1	< 0.1	NA	< 0.1	105%	50%	140%	78%	50%	140%	104%	50%	140%
Dimethoate	3073364 3	073364	< 0.5	< 0.5	NA	< 0.5	98%	50%	140%	98%	50%	140%	77%	50%	140%
Terbufos	3073364 3	073364	< 0.14	< 0.14	NA	< 0.14	85%	50%	140%	96%	50%	140%	85%	60%	140%
Diazinon	3073364 30	073364	< 0.2	< 0.2	NA	< 0.2	93%	50%	140%	93%	50%	140%	96%	50%	140%
Malathion	3073364 3	073364	< 0.5	< 0.5	NA	< 0.5	92%	50%	140%	105%	50%	140%	93%	50%	140%
Chlorpyrifos	3073364 3	073364	< 0.2	< 0.2	NA	< 0.2	105%	50%	140%	98%	50%	140%	93%	50%	140%
Parathion	3073364 3	073364	< 0.2	< 0.2	NA	< 0.2	77%	50%	140%	78%	50%	140%	91%	50%	140%
Azinphos-methyl	3073364 3	073364	< 0.4	< 0.4	NA	< 0.4	74%	50%	140%	88%	50%	140%	98%	50%	140%



Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLING SITE:

AGAT WORK ORDER: 21T813708 ATTENTION TO: Kesh Appadurai

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Соррег	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4 AT

ATTENTION TO: Kesh Appadurai

AGAT WORK ORDER: 21T813708

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis		UC 16 EDA 0570 0 00000 0	
Hexachloroethane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Heptachlor	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Aldrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Heptachlor Epoxide	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan I	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan II	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
Alpha-Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
gamma-Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
op'-DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
op'-DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
op'-DDT	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDT	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDT (Total)	ORG-91-5113	modified from EPA 3570, 3620C & 8081B	CALCULATION
Dieldrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Methoxychlor	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Hexachlorobenzene	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Hexachlorobutadiene	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
TCMX	ORG-91-5112	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Decachlorobiphenyl	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE

Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

SAMPLED BY:

AGAT WORK ORDER: 21T813708

ATTENTION TO: Kesh Appadurai

SAMPLING SITE:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
wet weight OC	ORG-91-5113		BALANCE
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene Leachate	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Phorate	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Dimethoate	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Terbufos	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS



Method Summary

CLIENT NAME: AECOM CANADA LTD

PROJECT: 60636190-CR4

AGAT WORK ORDER: 21T813708 ATTENTION TO: Kesh Appadurai

SAMPLING SITE:		SAMPLED BY:	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Diazinon	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Malathion	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Chlorpyrifos	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Parathion	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Azinphos-methyl	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Triphenyl phosphate (surr)	ORG-91-5103	modified from EPA 3570, 8141B & 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Polychlorinated Biphenyls	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	modified from EPA SW-846 3541 & 8082	GC/ECD
Moisture Content	ORG-91-5009	CCME Tier 1 Method	BALANCE



Samples Relinquished By (Print Name and Sign)

Mississauga, Ontario L4Z 1Y2 Ph: 905 712 5100 Fax: 905 712 5122

Laboratory Use	Only		
Work Order #: 21	T813	8000	
Cooler Quantity: Arrival Temperatures:	87	199 1	74
Custody Seal Intact:	□Yes	□No	□N/A

			cocartina girthar siconi	Cooler Quantity:	C //
Chain of Custody Record If this is a Drinking Water sample, please	use Drinking Water Chain of Custody Fo	rm (potable water intende	ed for human consumption)	Arrival Temperatures: 87 99	94_
Report Information: Company: AECOM Canada - Markham	Regulatory Requirement	s: No Regul	atory Requirement	Custody Seal Intact: Yes No	□N/A
Contact: kesh.appadurai@AECOM.com Address:	Table		Regulation 558	Turnaround Time (TAT) Required: Regular TAT 5 to 7 Business Days	
Phone: Reports to be sent to: 1. Email: Fax: kcsh,appadurai@AECOM.com	Soil Texture Region Region		Prov. Water Quality Objectives (PWQO) Other	Rush TAT (Rush Surcharges Apply)	1 Business Day
Project Information: Project: 60636190 - CR OA Site Location:	Is this submission for a Record of Site Condition? Yes No		Guideline on ate of Analysis	OR Date Required (Rush Surcharges May A Please provide prior notification for rus. *TAT is exclusive of weekends and statutory	h TAT
Sampled By: AGAT Quote #: PO: Please note: If quotation number is not provided, client will be billed full price for analysis. Invoice Information: Bill To Same: Yes No Company:	Sample Matrix Legend B Biota GW Ground Water	rcle)	CON	PAH	
Contact: Address: Email:	B Biota	C (Please Circle)	Nustom Metals □ B-HwS □ CI □ C □ FOC I N □ □ Hg □ pt Its: □ TP □ Nu □ No, □ No Hs: □ VoC □ B Fractions 1 to Δ	phenois ochlorine Pe Wetelschiore	
Sample Identification Date Sampled Fine # of Sample Containers Matrix Column 19 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	Comments/ Special Instructions	Metals Metals Hydride	ORPs: 0 ORPs:	ABNS ABNS Chlorop PCBS Organo TCLP M Sewer I	
CR4-06-552 044 1 CR4-07-Com OCI 081				X X X	
Samples Felinguished By (Pros. Name als/Norm)	Samples Received By (Print Name and Sig	70)	Date	1 2 021	1 5 B
Samples Relinquishey By (fint Name and Sign).	Samples Received by (Print Name and Sig	2	Date	Time S S 7	}

Samples Received By (Print Name and Sign)

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

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