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HYDROGEOLOGICAL INVESTIGATION



2093, 2097, 2101 Old Lakeshore Road & 2096, 2100 Lakeshore Road, Burlington, Ontario

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Project No. FE-P 19-9969

September 18, 2020

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Project Name:	Hydrogeological Investigation
Project Address:	2093, 2097, 2101 Old Lakeshore Road and 2096, 2100 Lakeshore Road, Burlington, Ontario
Project Number:	FE-P 19-9969
Issued on:	September 18, 2020
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1. INTRODUCTION

Fisher Environmental Limited (Fisher) was commissioned by Core FSC Lakeshore Limited & Core FSC Lakeshore GP Inc to conduct a Hydrogeological Investigation and provide an updated report for the proposed redevelopment of the properties municipally addressed as 2093, 2097 & 2101 Old Lakeshore Road and 2096 & 2100 Lakeshore Road, Burlington, hereinafter referred to as the 'Site'. This updated geotechnical report has been prepared in support of the resubmission of the OPA/ZBA application, previously submitted in August 2019.

The purpose of the hydrogeological investigation was to evaluate the groundwater conditions with respect to the proposed construction of a new mixed use residential/commercial building, in light of the revised building design comprising a 27-storey mixed use residential and commercial building that will have a shared podium linked to five (5) levels of underground parking.

A summary of updates in relation to the previous versions of the report is presented below:

- five (5) levels of underground parking are currently proposed, instead of four (4), as shown in the latest architectural drawings provided by Studio JCI dated September 4, 2020.
- the underside of the lowest slab level is now proposed at 14.1m below grade, instead of 12.05m below grade.
- for dewatering purposes, it was assumed that the entire uniform underground parking garage has an approximate construction area of 2,883.8 square metres, updated from 2,811 square metres in the previous report.
- the average construction dewatering flowrate for groundwater for five (5) underground levels is **64.34 m^3/day (64,340 L/day)**, compared to 53 m^3/day for four (4) underground parking levels. A factor of safety of 1.5 has been applied which results in a recommended construction dewatering flowrate of **96.50 m^3/day (96,500L/day)** for groundwater. No factor of safety was provided for four (4) underground parking levels.
- excess accumulated storm water in the excavation during construction, particularly following a period of heavy rainfall (25mm or more in a 24hrs period) has been conservatively approximated at maximum 72m^3, updated from 70m^3 in the previous report. A conservative average value of **52m^3** of accumulated precipitation should be added to the construction dewatering rate for planning purposes, updated from 50m^3 in the previous report.

- the recommended maximum construction dewatering rate, taking into consideration accumulated precipitation and accounting for seasonal variations, is **153.5 m^3/day (153,500 L/day)**, compared to 108 m^3/day for four (4) underground parking levels.
- for permanent drainage purposes, an average groundwater discharge rate of **60.16 m^3/day (60,160 L/day)** is currently estimated for five (5) underground parking levels, compared to 47 m^3/day for four (4) underground parking levels. A **factor of safety of at least 1.5** has been incorporated into the design of the permanent drainage system which results in a discharge rate of **90.25 m^3/day (90,250 L/day)**, compared to 71 m^3/day for four (4) underground parking levels.
- the subgrade portion of the elevator shaft should be designed as watertight.
- maximum drawdown influence zone for construction dewatering, for five (5) underground parking levels, could potentially extend to 22.66m from the edge of the excavation, compared to 30 m for four (4) underground parking levels.

2. SITE DESCRIPTIONS

Site Settings

The Site is located on the north side of Old Lakeshore Road and on the south side of Lakeshore Road, approximately 50m north of Lake Ontario, in downtown Burlington, Ontario. The Site is in a mixed commercial and residential area and is bounded by parking lots to the east and west and roadways to the north and south. The total Site area is approximately 0.3357 hectares.

At the time of the investigation, a 1-storey residential building with basement was located at 2096 Lakeshore Road. The remaining portions of the lot were mainly covered with asphalt pavement and utilized for parking. The previous building at 2100 Lakeshore Road was demolished and the unpaved area is now used for parking. A 2-storey residential building, with basement and a 2-storey commercial building, were located at 2093 & 2097 Old Lakeshore Road, respectively. The Carriage House restaurant occupied a 2-storey building located at 2101 Old Lakeshore Road. The northern portion of the land was paved and used for parking while the southern portion was landscaped grass at the time. Site and Location Plans are presented in Appendix A.

Topography

The Site, which is mostly flat, is graded towards Old Lakeshore Road and Lakeshore Road for drainage purposes and generally slopes gently from north to south, with elevation changes from approximately 82.2m in the northwest to 81.29m asl at the southeast corner of the Site.

Proposed Development

It was understood that the existing buildings will be demolished to permit the construction of a new 27-storey mixed use residential building that will have a shared podium linked to five (5) levels of underground parking.

Site plans by Studio JCI, dated September 4, 2020, show a grade average elevation of 81.5m asl, and the underside of the proposed lowest slab level at 14.1m below grade. It should be noted that the borehole locations for the investigation were restricted by the existing buildings. Therefore, further test pit investigations should be carried out prior to construction.

3. OTHER INVESTIGATIONS

Various Geotechnical and Hydrogeological Investigations

Fisher Environmental Ltd conducted preliminary geotechnical and hydrogeological investigations for the subject properties and submitted reports dated November 1, 2017 under FE-P 17-8409 and FE-P 17-8522, respectively. During those investigations, which were conducted concurrent to a Phase Two ESA, six (6) boreholes were advanced from approximate depths of 3.5m to 12m below existing surface grade. The geotechnical and hydrogeological reports were revised to account for the increase in the number of underground levels to four and reports submitted under FP 19-9255-Geo and 19-9256-Hydro, respectively, dated February 15, 2019. Two new boreholes (BH205 and BH206) were drilled during the investigation, over the period January 25 to February 5, 2019, to approximate depths of 15m (50') bgs.

The reports were further updated to reflect changes in number of underground levels and to detail results of analyses conducted for Halton Region proposed storm sewer parameters. The findings and recommendations of the updated Geotechnical and Hydrogeological Investigations were presented under Fisher Project No. 19-9570-GEO and 19-9969 HYDRO dated August 22 and December 19, 2019, respectively, and 19-9570 GEO dated September 18, 2020.

The investigations showed that the subsurface soils consist mainly of a layer of sand and silt fill extending generally to depths of 0.61m to 1.37m bgs with corresponding elevations between 80.29m

and 81.57m asl. The fill was underlain by very stiff to hard silt and clay which extended to depths of generally less than 2.3m. The silt and clay layers were underlain by clay and weathered shale, with shale of the Queenston Formation at depths generally from approximately 3.5m bgs (elevation of 78.5m asl).

4. SCOPE OF HYDROGEOLOGICAL INVESTIGATION

The Hydrogeological Investigation works were required to:

1) Establish groundwater conditions for the design of dewatering works, if required, prior to construction of the proposed building(s);
2) Determine the need for permanent drainage and
3) Conduct calculation/analyses of the groundwater quantity and quality to be used for the necessary permits applications prior to proceeding with construction dewatering and design of permanent drainage, if necessary.

The scope of this work generally consisted of the following:

- **Drilling/locating Monitoring Wells.** Drilling of, and locating existing, monitoring wells and reviewing / compiling the borehole logs and onsite / laboratory testing.
- **Data Evaluation.** Evaluating the results of soil types, groundwater static levels, ground surface elevation, groundwater quality, flow direction and other available hydrogeological data for the Site and their potential impact on the proposed development.
- **Hydraulic Conductivity Tests.** Conducting pumping and or slug tests in the newly installed monitoring wells and recording groundwater level drawdown and recovery to model / calculate hydraulic conductivity.
- **Groundwater Quality Analysis.** Carry out laboratory analyses on groundwater to determine compliance with the Halton Region Sewer Use By-Law.
- **Hydrogeological Report.** Prepare and submit a report detailing the findings and recommendations of the Hydrogeological Investigation.

5. FIELD AND LABORATORY WORKS

Public clearances were carried out by Ontario One-Call while private clearances were done by multi View Locates Inc on behalf of Fisher.

Subsurface Investigation

Field exploration for the initial hydrogeological investigation was carried out concurrent with drilling for a Phase Two ESA and geotechnical investigation over the period October 2 to 6 and November 20, 2017 and consisted of the advancement of six (6) boreholes (BH1 to BH6). Boreholes BH1 to BH3 and BH5 were drilled to approximate depths of 12.0m (40') while BH4 was drilled in the overburden soil to auger refusal at 3.5m below existing grade. Two boreholes, BH(MW)205 and BH(MW)206, were drilled over the period January 25 to February 5, 2019 to approximate depths of 15m (50') bgs. One borehole, BH(MW)301 was drilled on July 9, 2019 and extended to approximate depth of 19.38m bgs (62.67m asl).

The groundwater levels measured in MW106 and MW109, drilled during the Phase II ESA, were also used for the hydrogeological investigation. The boreholes were drilled at approximate locations as detailed in the Site Plan at Appendix A.

A CME-55 Truck mounted drill rig equipped with hollow stems from Terra Firma Services was used for all drilling work. Soil samples in the overburden soils were taken at regular intervals using a split–spoon sampler advanced by means of the Standard Penetration Test (SPT) which was conducted in general accordance with ASTM Specification D1586. Rock core samples were collected in boreholes BH1 to BH3, BH5, BH206, BH210 and BH301. Water was used as the flushing fluid for rock coring. Upon completion of drilling, the boreholes were backfilled with Bentonite as shown on the Log of Boreholes in Appendix B. All recovered soil and rock samples were placed in clear, sealable plastic bags in the field and were transported back to Fisher Environmental laboratory for further examination, characterization and laboratory analyses.

Additionally, all boreholes were instrumented as monitoring wells with 50mm diameter pipes and 10 feet (3.05m) slotted screens except MW2 and MW6 in which 20 feet (6.1m) and 25 feet (7.62m) long screens respectively were installed. A description of the subsurface conditions encountered at each borehole location is presented in Appendix B - Log of Boreholes.

Laboratory Analyses

Three (3) representative soil samples from boreholes BH3, BH4 and BH5 were selected and submitted to ALS Environmental laboratory for grain size distribution and hydrometer analyses. The laboratory results, which are presented in Appendix C, confirm the field descriptions for subsurface soils discussed in Section 6.0.

The soil samples recovered during the investigations were stored in the laboratory for a period of thirty (30) days and were discarded thereafter.

Chemical analyses of parameters under the existing sewer discharge bylaws and proposed storm sewer bylaws were conducted on groundwater samples from MW2, MW206 and MW301.

Site Survey

Fisher personnel surveyed the ground surface elevations of the boreholes/wells using the sanitary manhole cover (MH) located south of 2097 Old Lakeshore Road as a temporary benchmark (TBM). The TBM has an elevation of 81.38m above sea level as per site survey provided by ASKAN PILLER CORPORATION LTD dated October 4, 2017.

6. PAVEMENT, SOIL AND BEDROCK CONDITIONS

Surface and subsurface conditions encountered at borehole locations are shown in Appendix B - Log of Boreholes, and are summarized as follows:

- **PAVEMENT** – An asphalt pavement layer, 50mm to 150mm in thickness, was encountered at the surface of all boreholes except BH3 where coarse gravel was encountered to a depth of approximately 150mm.
- **FILL (Sand and Silt)** – A layer of fill was detected below the asphalt pavement in boreholes BH1, BH2, BH4 to BH6, BH205, BH206 and BH301 and below the layer of gravel in BH3. The fill generally comprised sand and silt, trace gravel with rootlets and extended in depth from 0.6m in BH2 to 1.37m in BH1. The sand and silt were loose to compact, brown to dark brown (mostly black in BH2) with black spots observed in BH3 and in a moist to dry state. A slight odour was detected in BH2 and BH5.

  It should be noted that the thickness and the condition of the sand and silt fill could vary significantly between and beyond the borehole locations. Therefore, further test pits investigations should be carried out during construction. The thicknesses of the fill layers encountered are summarized in Table 1.

Table 1: Summary of Depth and Elevation of Fill

Borehole No.	BH1	BH2	BH3	BH4	BH5	BH6	BH205	BH206	BH301
Borehole Ground Elevation (m asl)	81.66	82.18	81.64	81.91	81.67	82.15	82.01	81.97	82.05
Depth of Borehole (m)	12.20	12.25	12.30	3.51	12.22	6.10	15.55	15.62	19.38
Elev. at Bottom of BH (m asl)	69.46	69.93	69.34	78.40	69.45	76.05	66.46	66.35	62.67
Depth of Fill (m)	1.37	0.61	0.76	0.91	1.37	1.20	0.76	0.76	1.22
Elev. at Bottom of Fill (m asl)	80.29	81.57	80.88	81.00	80.30	80.95	81.25	81.21	80.83

- **SILT and CLAY –** Silt and clay with trace gravel and trace sand were encountered in BH1 to BH6, BH205, BH206 and BH301 below the layer of fill. The predominantly brown to dark brown silt and clay were dry to moist and of a very stiff to hard consistency with SPT 'N' values varying from 15 to 40 blows per 0.3m depth. Orange coloured spots were observed in BH3. The silt and clay in BH4 were mostly grey with dark spots and mostly red in BH5 to a depth of approximately 2.3m. Grey sand seams were also encountered in this layer.

- **CLAY and WEATHERED SHALE** – A moist to dry, red brown to brown clay with trace gravel was encountered in boreholes BH1 to BH3, BH5, BH205, BH206 and BH301 at depths generally below approximately 2.3m bgs. The clay layer was of a hard consistency with SPT 'N' values starting at 37 and increasing to over 100 at greater depths. Red brown clay with trace gravel and sand pockets was observed in BH4 from a depth of about 1.5m. The clay also contained fractured rock pieces and was of a hard consistency.

  Weathered shale was encountered at the end of drilling in the overburden soil in all boreholes. The red shale contained fractured pieces of grey siltstone. Drilling in the overburden soils terminated in weathered shale at auger refusal in all boreholes at depths varying from 3.1m to 3.96m.

- **SHALE (Queenston Formation)** – Rock coring into the predominantly red shale was carried out to approximate depths as follows:
  - 12m bgs in BH1 to BH3 and BH5,
  - 15m bgs in BH205 and BH206 and
  - 19.38m bgs in BH301.

  The weathered, very fine grained, red, relatively weak to medium strong, SHALE, thinly to medium bedded with slightly weathered to fresh, light grey, weak to medium strong SILTSTONE was encountered below the soil overburden in boreholes BH1 to BH3, BH5 and in BH205, BH206 and BH301. The thickness of the siltstone layers was generally between 20mm and 150mm with no

defined frequency. The shale was weathered just below the overburden soil becoming less weathered with depth. A band of weathered shale was generally observed between approximately 5.5m and 6.0m below existing grade in boreholes BH1, BH2 and BH3 and between 5.5m and 6.5m below existing grade in BH5. Weathered shale seams were generally encountered in the boreholes between approximately 11m and 12m below existing grade. Occasional water bearing weathered seams were observed at depths between 15 and 19m bgs in BH301.

7. HYDROGEOLOGICAL STUDY

A hydrogeological study for the subject Site was conducted based on the boreholes/wells' exploration, observation and Site/Laboratory testing. Groundwater details from eleven (11) monitoring wells were used for the hydrogeological study as outlined in the following. Six (6) wells, MW1 to MW6, were instrumented as testing and monitoring wells during the initial investigations in 2017. Two additional wells, MW205 and MW206, were installed at depths generally associated with up to 5 underground parking levels (well depths 15.55m and 15.62m) during the previous investigation. Two wells installed during a Phase II ESA, MW106 and MW109, were also used for the investigation. One monitoring well, MW301, was installed to 19.38m bgs (62.67m asl) on July 9, 2019. The eleven wells were constructed with 51mm PVC slotted screen pipes and risers as follows:

- MW1, MW3, MW5, MW106, MW109, MW205, MW206 & MW301 - 10' (3.05m) screens;
- MW4 – 5' (1.52m) long screen;
- MW2 – 20' (6.1m) long screen and
- MW6 – 25' (7.62m) long screen.

All boreholes, down to the bottom of the overburden soil, were observed to be dry on completion of drilling. Water was used as flushing fluid for coring into the shale in BH1 to BH3, BH5, BH205, BH206 and BH301; hence the degree of dryness/wetness on completion of drilling was not determined in these boreholes.

A clean silica sand pack was placed around each screen and isolated with bentonite extending to slightly below grade. The wells were used for hydrogeological slug and pump tests.

7.1 Hydrogeological Conditions

Review of the available surficial geological and hydrogeological information for the area shows that the Site is underlain generally with Coarse-textured glaciolacustrine deposits of sand, gravel, minor silt and

clay. Underlying bedrock is represented by shale, limestone, dolostone and siltstone of the Queenston Formation and is generally less than 10m below prevailing grade.

The subsoils and hydrogeological conditions were observed and recorded during both the Geotechnical and Hydrogeological Investigations. Based on the boreholes/wells' exploration, the water bearing media on the Site were dominated by weathered shale seams in the more intact rock at various depths. All monitoring wells were purged/developed and allowed to fully recover prior to carrying out groundwater level measurements and sampling. Measured groundwater depths and elevations are summarized in Table 2.

Table 2: Groundwater Levels and Elevations

Monitoring Well ID	Elev. at Ground (m)	Screen Length (m)	Depth of Well (m)	Groundwater Depth (m bgs)					Groundwater Elevation (m asl)				
				16-Oct-18	20-Nov-17	01-Dec-17	08-Feb-19	09-Aug-19	16-Oct-17	20-Nov-17	01-Dec-17	08-Feb-19	09-Aug-19
MW1	81.66	3.05	12.19	5.10	4.40	4.75	4.38	4.33	76.56	77.26	76.91	77.28	77.33
MW2	82.18	6.10	12.25	2.16	1.88	2.06	1.96	1.82	80.02	80.30	80.12	80.22	80.36
MW3	81.64	3.05	12.30	6.10	5.95	6.12	3.14	3.20	75.54	75.69	75.52	78.50	78.44
MW5	81.67	3.05	12.22	2.70	2.62	2.72	1.80	2.71	78.97	79.05	78.95	79.87	78.96
MW6	82.15	3.05	12.40	-	-	4.73	3.75	3.45	-	-	77.42	78.40	78.70
MW4	81.91	1.52	3.51	2.10	1.52	1.85	2.00	2.11	79.81	80.39	80.06	79.91	79.80
MW106	81.30	3.05	4.59	-	-	-	2.33	1.72	-	-	-	78.97	79.59
MW109	81.70	3.05	3.63	-	-	-	2.67	2.75	-	-	-	79.03	78.95
MW205	82.01	3.05	15.55	-	-	-	6.35	6.20	-	-	-	75.66	75.81
MW206	81.97	3.05	15.62	-	-	-	3.15	3.45	-	-	-	78.82	78.52
MW301	82.05	3.05	19.38	-	-	-	-	5.60	-	-	-	-	76.45

Notes to Table 2:

The following general comments regarding groundwater conditions at the Site are based on the groundwater level data and geotechnical investigation:

- Static groundwater levels measured on various dates were:
    - between 1.52m and 2.67m bgs (elevations of 80.39m and 78.87m asl) in the wells screened within the overburden soils and
    - between 1.88m and 6.35m bgs (elevations of 75.52m and 80.30m asl) in the wells screened within the bedrock.
- Two types of aquifers were encountered on the Site as interpreted from the hydrogeological conditions:
    - i) confined aquifers comprising weathered shale in the shale bedrock and
    - ii) semi-confined aquifer in the overburden soils/top of weathered shale.
- The direction of groundwater flow through the Site is generally southward, towards Lake Ontario.
- It was noted that there are significant differences in the groundwater levels measured in the monitoring wells. These may be attributed to perched pockets of water in the weathered shale seams encountered throughout the investigation.
- Given the proposed development with five (5) underground levels, the recommended footing depths would be at approximately 15.3m below the current ground surface or at an average elevation of 66.2m asl. Therefore, the footings for underground parking would extend below the local groundwater levels observed during the hydrogeology investigation.

7.2 Hydraulic Conductivity K Modeling Results

Pumping Tests

Pumping tests were conducted in the following wells screened within the bedrock:

- MW2 and MW6 during the investigation in 2017,
- MW205 and MW206 during the February 2019 and
- MW301 during the current investigation.

MW2 and MW3 were used as observation wells during the pumping of MW6 and MW2 respectively. MW2 and MW5 were used as observation wells during the pumping of MW205 and MW206 respectively.

Water levels were recorded using Levelogger Gold transducers and discharge measured by filling vessels of known capacity. Pumping of MW2, MW6, MW205 and MW206 yielded negligible flow quantities. Greater flow quantities were observed when pumping MW301.

Slug Tests

Rising head slug tests were carried out in four (4) monitoring wells, MW2 to MW5, during the investigation in 2017.

Pumping and Slug Tests Results

Aquifer Test Pro software was used to compute the Hydraulic Conductivity (K) values from the pumping and slug tests. The slug tests analyses were performed following the Hvorslev method. In both the slug and pumping tests analyses, it was assumed that the aquifer in the shale bedrock was confined, homogenous, isotropic and of uniform thickness. It was also assumed that the wells fully penetrated the aquifer, which is reasonable since the water bearing media comprise the weathered shale seams. For the tests in BH4 (overburden), it was assumed that the aquifer was semi-confined. The pumping tests analyses were conducted using Theis' method.

Hydraulic conductivity (K) values obtained from the slug and pumping tests were consistent and ranged in values from 5.5 x 10^{-9} m/s (0.00048 m/day) in MW6 to 7.75 x 10^{-7} m/s (0.067 m/day) in MW301, with an average value of 0.023 m/day. Hydraulic conductivities are summarized in Table 3 with details of the analyses presented in Appendix D.

Table 3: Hydraulic Conductivities

Testing Well	Hydraulic Conductivity, K			
	Slug Tests (m/s)		Pump Tests (m/s)	K_{max}, m/day
	Hvorslev	Bouwer & Rice		
MW2	1.32 x 10^{-7}	1.04 x 10^{-7}	3.1 x 10^{-7}	0.0268
MW3	1.83 x 10^{-7}	1.41 x 10^{-7}	--	0.0158
MW4	2.79 x 10^{-8}	2.14 x 10^{-8}	--	0.0024
MW5	9.72 x 10^{-9}	7.51 x 10^{-9}	--	0.0008
MW205	--	--	--	--
MW206	--	--	--	--
MW301	--	--	7.75 x 10^{-7}	0.067

Comments on hydraulic conductivity

The hydraulic conductivity values obtained from the slug and pumping tests are broadly consistent with values of 1 x 10^{-8} to 1 x 10^{-6} m/s reported in the Queenston Formation in the Burlington area. Additionally, the conditions encountered at the Site suggest that there are areas of localized perched water and water bearing seams of weathered shale. This could account, in part, for the lack of influence on the groundwater levels measured in the observation wells during the pumping tests.

It should also be noted that the pumping tests, conducted in MW205 and MW206, yielded negligible flow quantities at steady state. These were insufficient to model reliably the dewatering rates and show that the rock quality generally improved with depth, resulting in less groundwater yield.

In addition, the Queenston Formation shale bedrock is of low porosity and is generally recorded as being a poor-quality aquifer in the upper regions, although weathered and fractured shale at depths of 3m to 6m are known to provide reliable yields. Groundwater does however flow through various joints, fractures and faults in the shale bedrock. Typical historical well yields of approximately 13,824 L/day or 0.16 L/s on average are reported in the Queenston Formation shale bedrock in the Halton Region[1]. The water bearing media is also known to reduce with depth due to compaction and consolidation of the fine-grained rock since their deposition.

Notwithstanding the preceding, some amount of water bearing weathered shale were observed at approximately 15m bgs in MW301. The recovery of water levels (screened within this layer) was greater than in MW205 and MW206. This may be attributed to the more weathered shale layer encountered at this level as reflected in the lower compressive strength of the laboratory samples from BH301, relative to the other test results.

7.3 Grain Size Analysis for Hydraulic Conductivity K (Silt and Clay)

Representative overburden soil samples from the silt and clay layer in BH3, BH4 and BH5 were selected and submitted to ALS Environmental Laboratory for grain size distribution and hydrometer analyses. The results for the grain size distribution and hydrometer analyses are presented in Appendix C.

The effective D_{10} sizes obtained from the Grain Size Distribution Graph were used to estimate the hydraulic conductivity (K) of the overburden soils using Hazen's expression, Equation 1:

$$K=10^{-2} D^2_{10} (m/s) \qquad \text{Equation 1}$$

[1] Gore and Storrie et. al., 1995

The hydraulic conductivity values, based on grain size distribution, ranged from 1.00 x 10^{-12} (0.000086 mm/day) to 4.56 x 10^{-10} m/s (0.039mm/day) with an average of 0.02mm/day.

The hydraulic conductivities obtained from the D_{10} size estimates indicate that the silt and clay layer may be assumed to act as an aquitard for groundwater modelling purposes and that the weathered shale layer at the base of the overburden is the water bearing medium.

It should be noted that the estimated K values are expectedly lower than those obtained during the pumping and slug tests as the insitu tests are influenced by natural soil conditions such as weathered seams and fractures of shale which are not represented in the laboratory samples.

8. CONSTRUCTION DEWATERING & PERMANENT DRAINAGE

The depth of the footings for the proposed structure with five (5) underground parking levels is estimated at 15.3m below the existing grade with the lowest approximate elevation at 66.2m asl.

For the purposes of determining the groundwater dewatering requirements for the proposed development, two scenarios were considered;

i) construction dewatering and

ii) permanent drainage.

For dewatering purposes, it was assumed that the entire uniform underground parking garage has an approximate construction area of 2,883.8 square metres. An average groundwater level of 3.43m observed in the monitoring wells during the investigation was used for the dewatering calculations.

Hydraulic conductivity (K) values, modeled from the slug and pumping tests, varied between 0.00048 m/day and 0.067m/day in the weathered shale. The hydraulic conductivity values obtained using the D_{10} grain size analysis in the overburden soil (MW4) were negligible and as such any infiltration of water from the silt and clay layer may be ignored for the purpose of calculating the dewatering requirements.

The total Flow Rate in the weathered shale layer was calculated using the *Dupuit Forcheimer* expression, Equation 2:

$$\boldsymbol{Q = \frac{\pi \times k \times (H^2 - h_w{}^2)}{(ln\, R_0 - ln\, r_w)}} \qquad \textbf{Equation 2}$$

Where,

Q = discharge rate m^3/s,
r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s

8.1 Construction Dewatering

In order to estimate the construction dewatering requirements for the Site, it was assumed that the groundwater levels would be lowered to 1.0m below the proposed footing bases. The hydraulic conductivity obtained in MW301 testing was used for the calculations. Based on the calculations shown in Appendix E, the average construction dewatering flowrate for groundwater is **64.34 m^3/day (64,340 L/day)** for five (5) underground levels. A factor of safety of 1.5 should be applied, which results in a recommended construction dewatering rate **96.50 m^3/day (96,500L/day)** for groundwater.

During excavation into the bedrock, some amount of groundwater may however be encountered from seepage from the overburden soils and through more permeable seams. This can be removed through conventional sump pit pumping methods.

Accumulated Precipitation

Provisions should also be made to pump any excess accumulated storm water from the excavation during construction, particularly following a period of heavy rainfall (25mm or more in a 24hrs period will result in a conservative maximum volume of 72m^3 of accumulated water). Based on the low hydraulic conductivity of the shale bedrock at the five (5) underground parking level elevation, most of the precipitation will likely accumulate in the excavation for prolonged periods if not pumped out. A conservative average value of **50m^3** for accumulated precipitation should be added to the construction dewatering rate for planning purposes.

Seasonal High Groundwater Levels

Groundwater levels during the wet season are typically 1-2m above seasonal lows. Consequently, the amount of water for dewatering purposes will be influenced by the time of year that excavation takes place. A conservative value of **5 m^3/day** may be added to the calculated construction dewatering rates to account for seasonal variations.

Maximum Construction Dewatering Flowrate

The recommended maximum construction dewatering rate, taking into consideration accumulated precipitation and accounting for seasonal variations, is **153.5 m^3/day (153,500 L/day)** for planning purposes. It should be noted that, based on the conditions observed during the field investigations and conditions on new construction projects in proximity to the Site, construction dewatering using conventional sump pit pumping methods should be feasible on the Site provided pumps are adequately sized.

Permission to take water (PTTW)

As the calculated average construction **dewatering rate** (**64,340 litres/day**) for groundwater, before applying the factor of safety, is more than 50 m^3/day (50,000 L/day), registration on the MOECC Environmental Activity and Sector Registry (EASR) for Water Taking **is** required. The EASR is a risk-based environmental approvals program which allows businesses to register prescribed water taking activities in the EASR instead of obtaining a PTTW"[2]. Application for permission to take water (PTTW) from the MOECC would not be required as the daily flow is less than 400,000 litres.

8.2 Permanent Drainage

With the average footing elevation at approximately 66.20m and lowest P5 underside of slab at 67.40m asl, based on the observed groundwater conditions, a permanent drainage system will be required. In the absence of long-term groundwater monitoring, the seasonal highwater table was taken as 1m above the average groundwater levels observed on the Site. Groundwater level of 2.43m was used in the calculation of permanent drainage rates. For permanent drainage purposes, an average groundwater discharge rate of **60.16 m^3/day (60,160 L/day)** is estimated for five (5) underground parking levels. A **factor of safety of at least 1.5** should be incorporated into the design of the permanent drainage system which results in a discharge rate of **90.25 m^3/day (90,250 L/day)**. The subgrade portion of the elevator shaft should be designed as watertight.

8.3 Dewatering Influence Zone

Based on the calculations for dewatering quantities during the construction of underground parking levels / footing, the maximum groundwater drawdown influence zone could potentially extend to 22.66m, from the edge of the excavation, in the overburden soils and weathered shale seams. If the

[2] https://www.ontario.ca/page/guide-permit-take-water-application-form

excavation extends to the property boundaries, then there may be concerns of adverse impact on neighboring properties/facilities if a dewatering system is implemented.

As a precaution, a pre-construction survey of adjacent structures/roads should be carried out prior to the dewatering/shoring construction stage. Potential adverse impact on the adjacent structures, due to dewatering/shoring construction should be assessed, quantified and reviewed throughout the course of construction.

9. GROUNDWATER QUALITY

One (1) groundwater sample was collected from monitoring well MW2 on December 4, 2017 and submitted to Fisher Environmental Laboratory for chemical parameters analysis. The results were compared with **The Regional Municipality of Halton By-Law No. 2-03, Table 1 – Limits for Sanitary and Combined Sewer Discharge**. The results, which are presented in Appendix F, revealed compliance with all parameters under Table 1.

An additional groundwater sample, collected from MW206 on February 5, 2019 and submitted to ALS Laboratories for chemical parameters analyses under **Table 1 – Halton Sanitary Sewer By-Law No. 02-03 and Table 2 – Halton Storm Sewer By-Law No. 02-03.**, shows compliance with all parameters excepting:

Total Suspended Solids:	3660	vs 350 mg/L and
Iron (total)	51.1	vs 50.0 mg/L.

One groundwater sample, collected from MW301 on July 29, 2019 and submitted to ALS Laboratories for chemical parameters analyses under **Table 1 – Halton Sanitary Sewer By-Law No. 02-03 and Table 2 – Halton Storm Sewer By-Law No. 02-03.**, shows compliance with all parameters.

Additional tests were conducted in MW2 and MW301 in December 2019 based on a table of parameters and limits proposed for storm guidelines by the Region of Halton. The tests revealed compliance with all parameters excepting those listed in Table 4.

Table 4: Storm sewer exceedances

Parameter	Proposed Storm Sewer Limits	Unit	Results	
			MW2	MW301
Manganese (total)	0.05	mg/L	0.313	0.517
Nonylphenol ethoxylates	0.01	mg/L	-	<0.05
Suspended Solids (total)	15	mg/L	69.6	95.4

Treatment of the groundwater will be required prior to discharging to the storm sewer.

Results of the analyses are presented in Appendix F.

10. DISCUSSION

Hydraulic conductivity values from the slug and pumping tests vary between **9.72 x 10^{-9} m/s** (0.00048 m/day) and **7.75 x 10^{-7} m/s** (0.067 m/day). No, or insignificant groundwater drawdown was recorded in the observation wells during pumping from MW2, MW6, MW205 and MW206. Discharge rates during pumping from MW205 and MW206 were negligible. Additionally, the relatively high flow rates observed from MW2 and MW310 during the pumping tests are not considered representative of the prevailing groundwater conditions on the entire Site but rather point to localized regions of weathered / fractured shale acting as water bearing media. This is also reflected in the rock quality designation, in which the rock cores recovered from BH2 and BH301, at the depth of the well screens, were rated as fair and poor respectively, indicating the presence of fractures and weathering of the shale bedrock.

Hydraulic conductivity calculated from the D_{10} Grain size distribution shows that the silt and clay overburden can be considered to act as an aquitard with the underlying weathered shale comprising the upper aquifer.

For the purposes of construction dewatering, it is recommended that water be pumped from sump pits during excavation. Any weathered or fractured shale seams encountered should be cleaned as best as possible and the area grouted to reduce seepage into the excavation. Under observed worse-case conditions from the slug and pumping tests, **the maximum construction dewatering rate, which takes into consideration accumulated precipitation and seasonal high groundwater levels**, is approximately **153.5 m^3/day** or **153,500 litres/day** over the entire Site. Groundwater dewatering rate, not including accumulated precipitation, is **64.34 m^3/day or 64,340 litres/day**. A factor of safety of 1.5 should be applied, which results in a recommended construction dewatering rate **96.50 m^3/day (96,500L/day)** for groundwater. For permanent drainage, the **average** discharge rate is **60.16 m^3/day** or **60,160 litres/day**. A **factor of safety of at least 1.5** should be incorporated into the design of the permanent drainage system which results in a discharge rate of **90.25 m^3/day (90,250 L/day)**.

As the groundwater dewatering rate is more than 50,000 litres/day registration on the EASR is required. An application for PTTW is however not required as the daily discharge is less than 400,000 L/day. These recommendations should however be revised after a period of continuous monitoring of the groundwater levels particularly throughout the wet season. For permanent drainage, sump pits each with two pumps (one as backup) capable of extracting a minimum of 90,250 L/day (minimum FS 1.5) are recommended.

The most recent groundwater quality analysis for samples, taken below the proposed five (5) underground parking levels, show compliance with all parameters based on the existing Ontario Halton Sanitary Sewer By-Law No. 02-03 (MAR 2003): Halton Sanitary Sewer By-law No. 2-03 and Halton Storm Sewer By-Law No. 02-03.

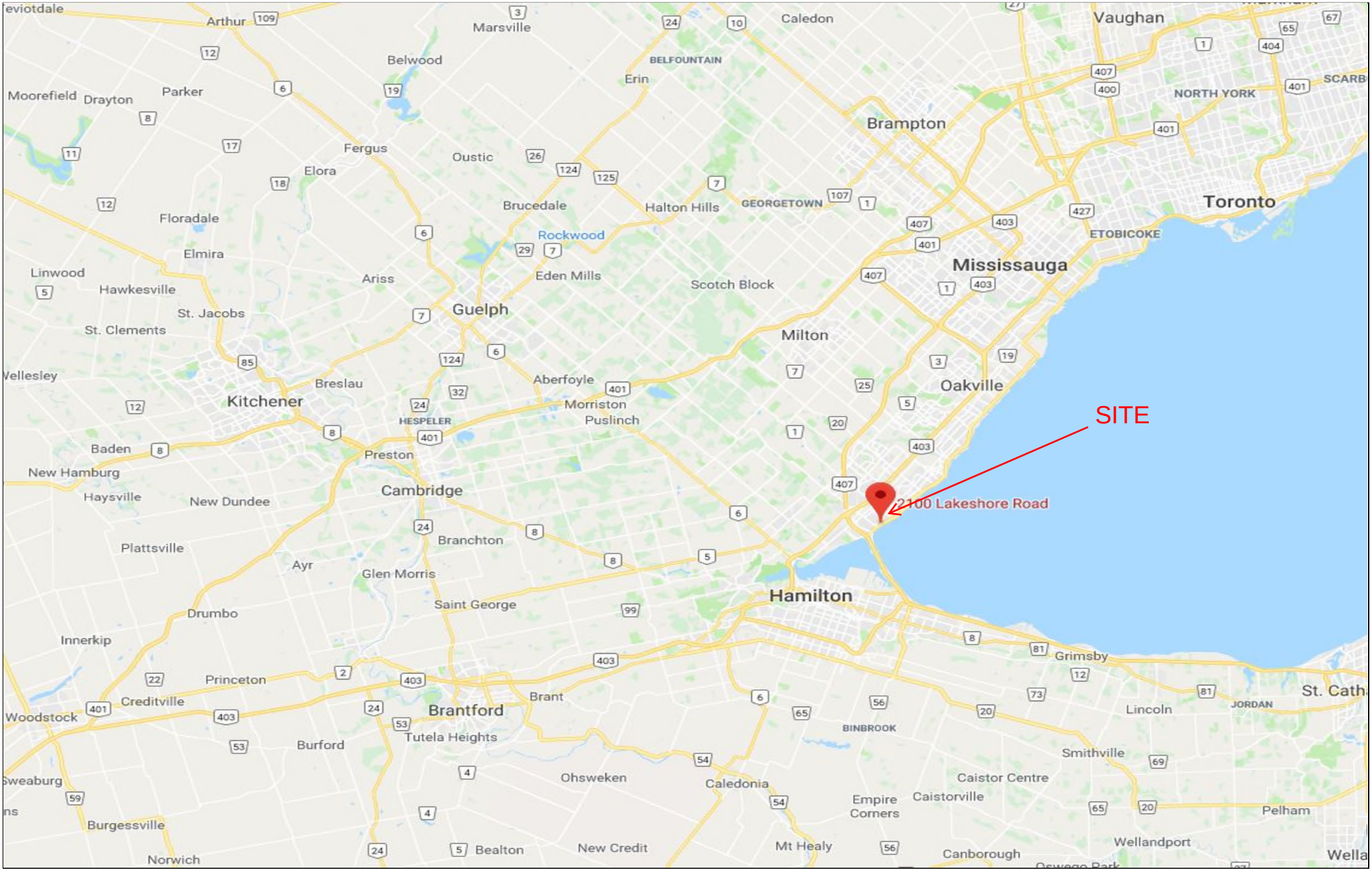
Chemical analyses of parameters included in the **newly proposed Storm Sewer Bylaw** show exceedances of Manganese, Nonylphenol Ethoxylates and total suspended solids. Treatment of the groundwater will therefore be required before discharging to the storm sewer.

11. LIMITATIONS

This report is limited in scope to those items specifically referenced in the text. The discussions and recommendations presented in this report are intended only as guidance for the named client, design engineers and those directly involved in the implementation and control of the project. The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction. Localized variations in the subsoil conditions may be present between and beyond the boreholes and should be verified during construction.

As more specific subsurface information becomes available during excavations on the Site, this report may be updated. Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soil and the potential reuse of these soils on/off Site. Contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

APPENDIX A – SITE AND LOCATION PLANS



Fisher Environmental Ltd.

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

KEY PLAN

N

LEGEND

PROJECT NAME AND ADDRESS

Hydrogeological Investigation

2093-2101 Old Lakeshore &
2096-2100 Lakehore RD,
BURLINGTON, ON

PROJECT NO.
FE-P 19-9571

DATE
August 14, 2019

SCALE
AS SHOWN

FIGURE A
SITE LOCATION MAP.



Fisher Environmental Ltd.

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

KEY PLAN

N

LEGEND

- EXISTING GEOTECHNICAL MONITORING WELL LOCATIONS
- GEOTECHNICAL MONITORING WELL LOCATIONS FEB 2019
- EXISTING PHASE II ESA WELL LOCATIONS
- GEOTECHNICAL MONITORING WELL JULY 2019

PROJECT NAME AND ADDRESS

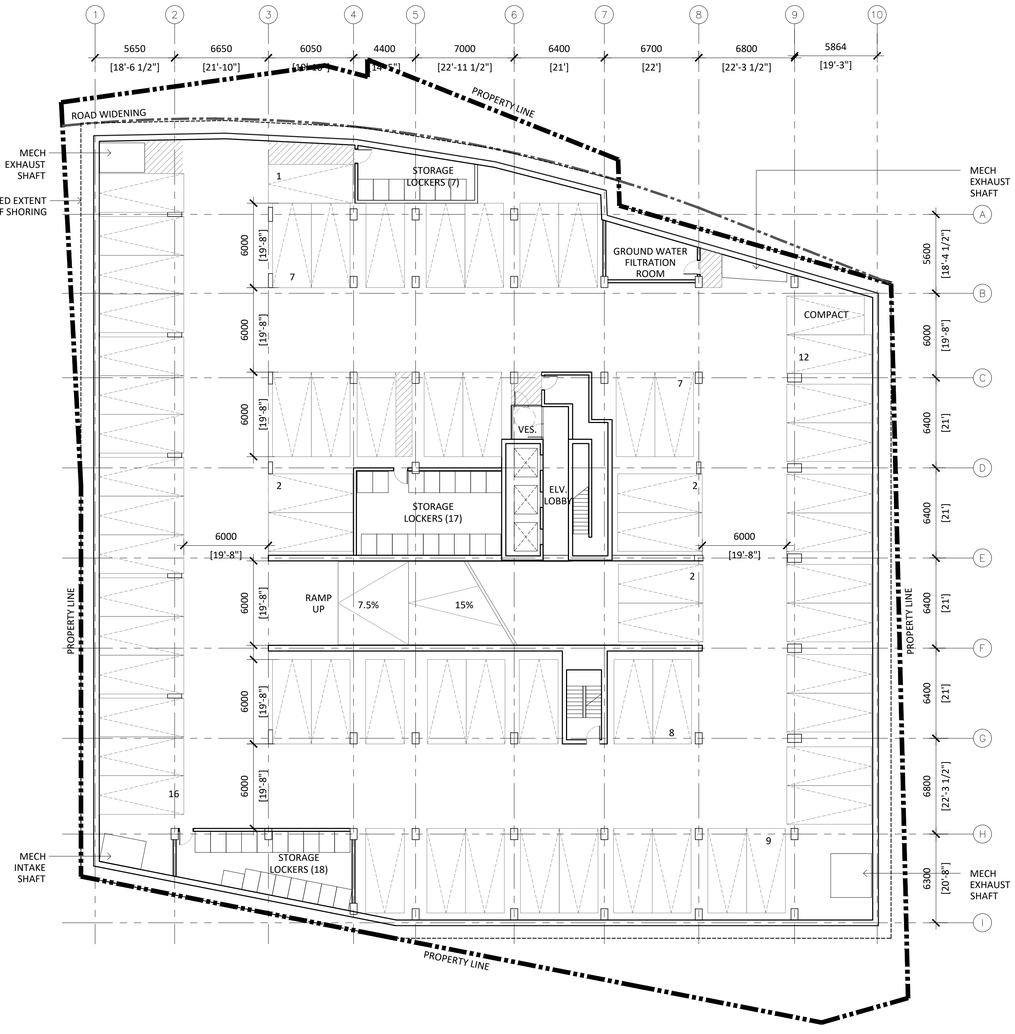
HYDROGEOLOGICAL INVESTIGATION

2093, 2097, 2101 Old Lakeshore Rd & 2096, 2100 Lakeshore Rd, Burlington, Ontario

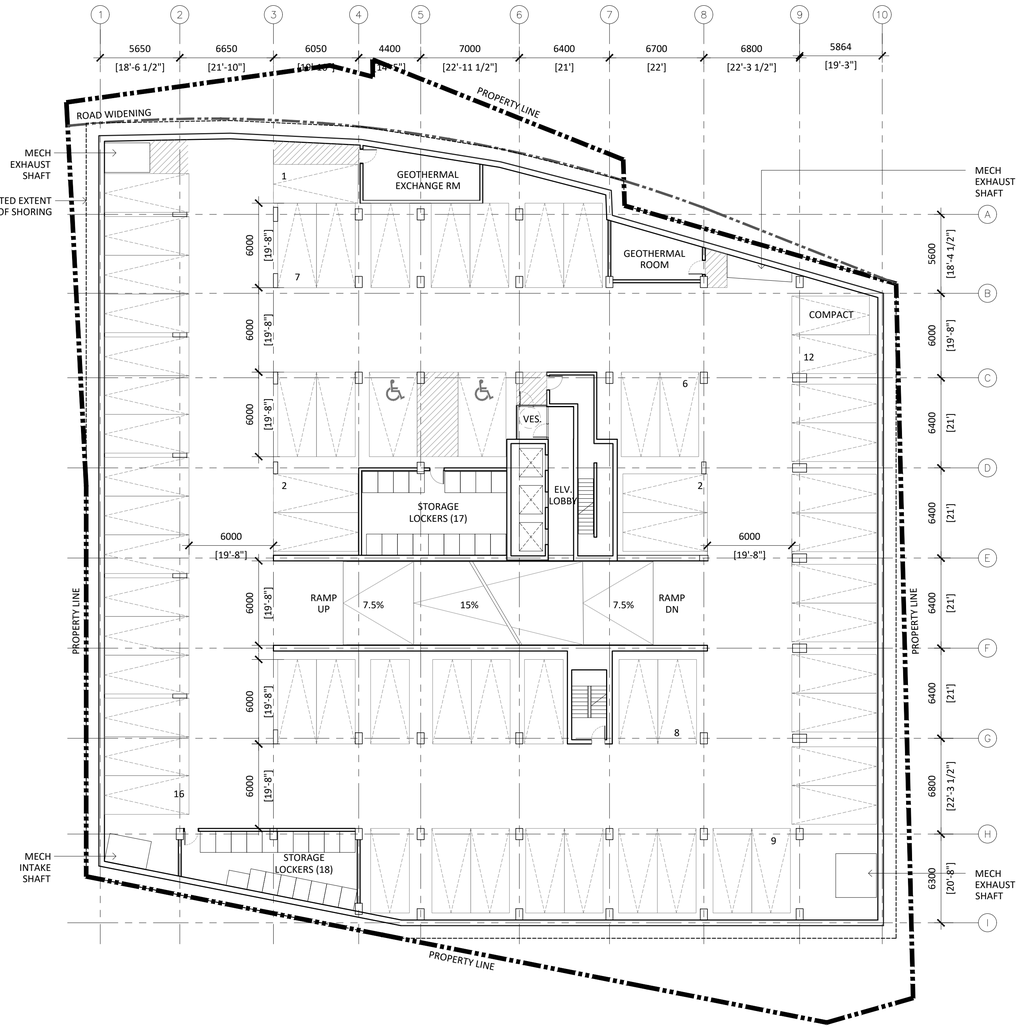
FIGURE 1:

SITE PLAN WITH MONITORING WELLS

PROJECT NO.	SHEET NO.
FE-P 19-9571	1
DATE: AUGUST 2019	
SCALE: AS SHOWN	



1 LEVEL P5
Scale: 1:200



2 LEVEL P4
Scale: 1:200

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3. Positions of exposed or finished mechanical or electrical devices, fittings, and fixtures are indicated on the Architectural drawings. The locations shown on the Architectural drawings govern over the Mechanical and Electrical drawings. Those items not clearly located will be located as directed by the Architect.

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CIVIL:

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150 Bermondsey Rd, Unit #200
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t. 416.750.7769

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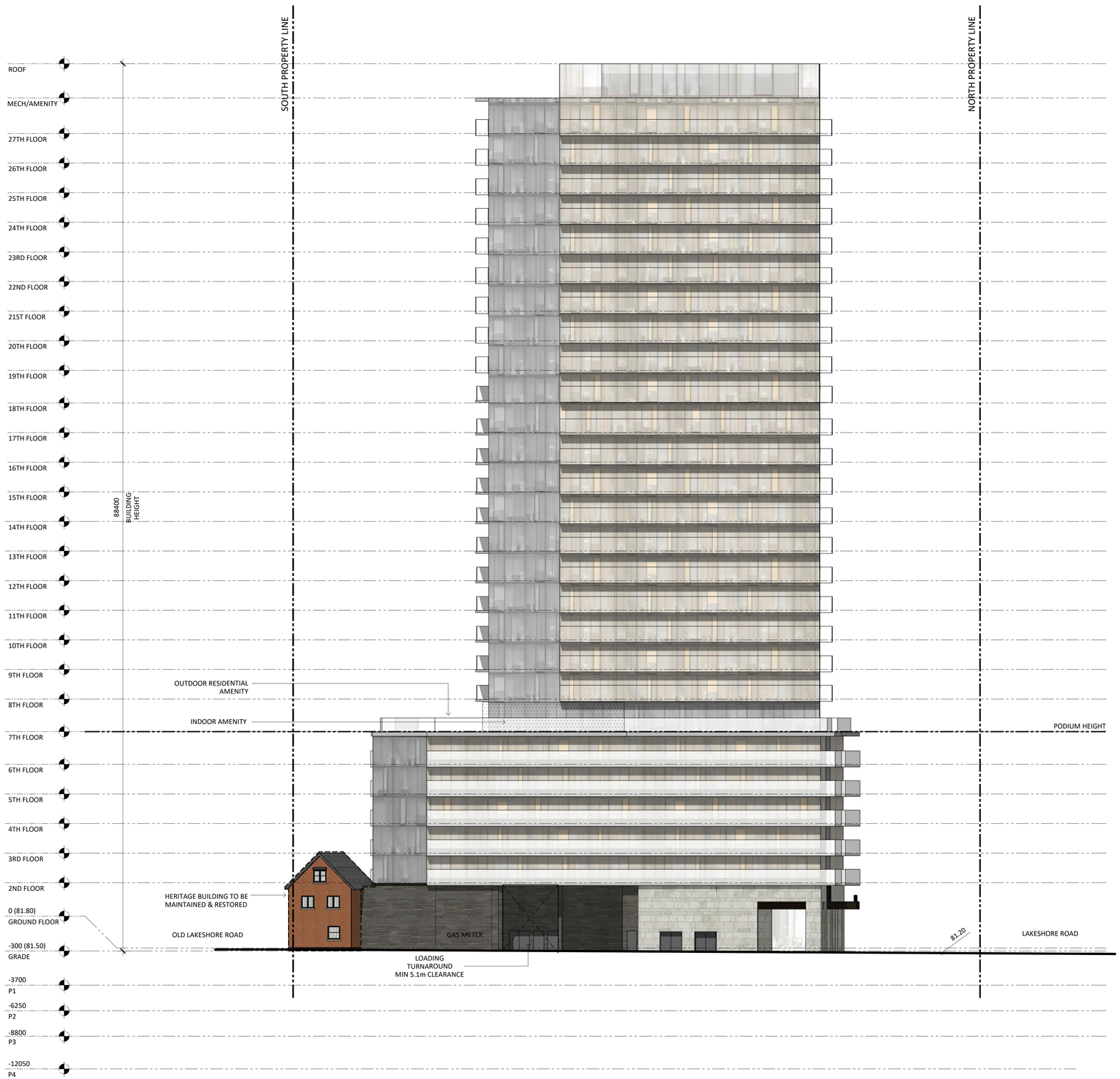
ADDRESS:
2096 - 2100 Lakeshore Rd, Burlington

FLOOR PLANS

PROJECT NO.: 1816
SCALE: 1:200
DATE: September 04, 2020
DRAWN BY:

DRAWING NO.:

A3.00



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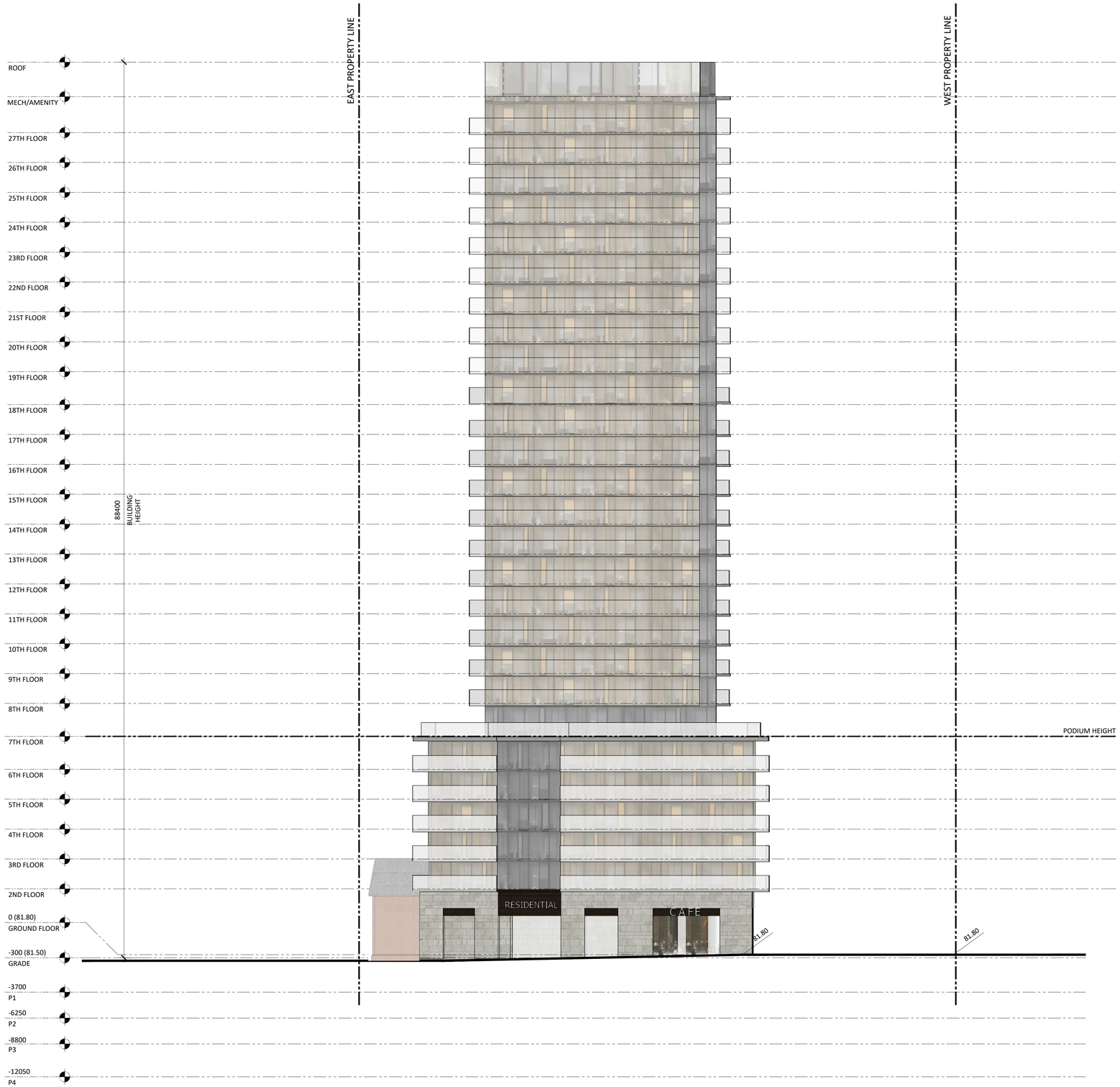
ADDRESS:
2096 - 2100 Lakeshore Rd, Burlington

EAST ELEVATION

PROJECT NO.: 1816
SCALE: 1:200
DATE: September 04, 2020
DRAWN BY:

DRAWING NO.:

A5.01



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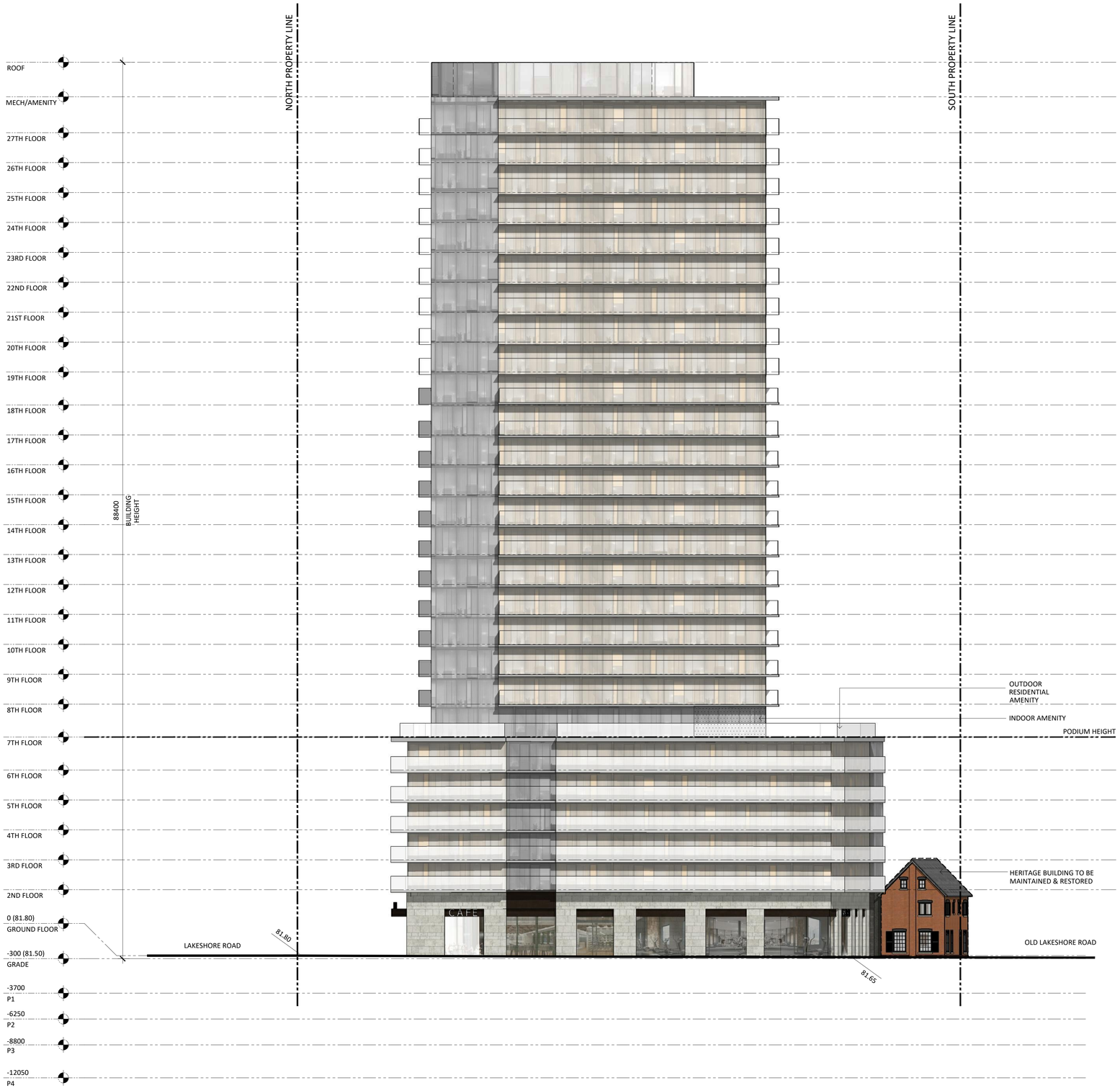
ADDRESS:
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NORTH ELEVATION

PROJECT NO.: 1816
SCALE: 1:200
DATE: September 04, 2020
DRAWN BY:

DRAWING NO.:

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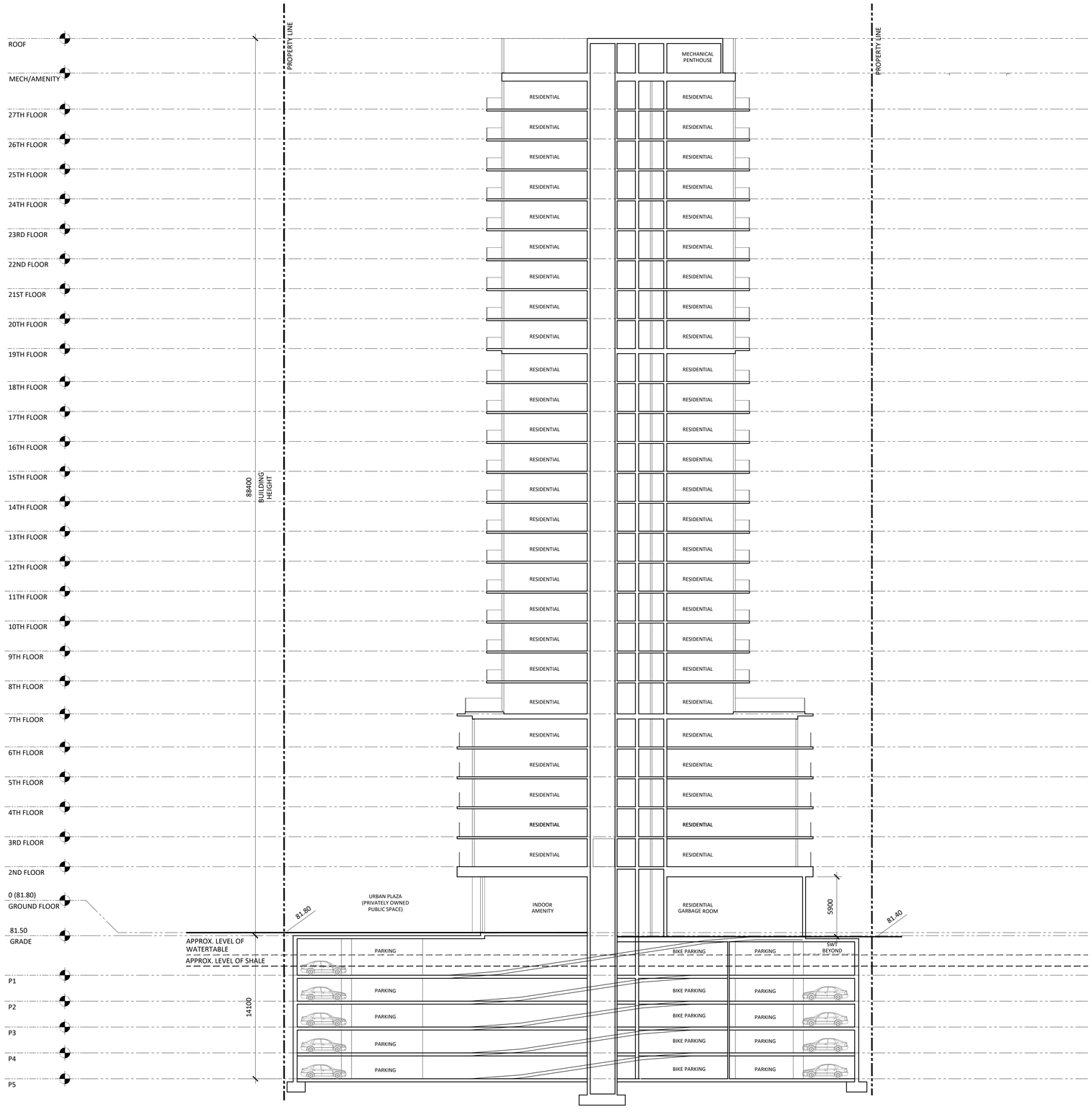
ADDRESS:
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WEST ELEVATION

PROJECT NO.: 1816
SCALE: 1:200
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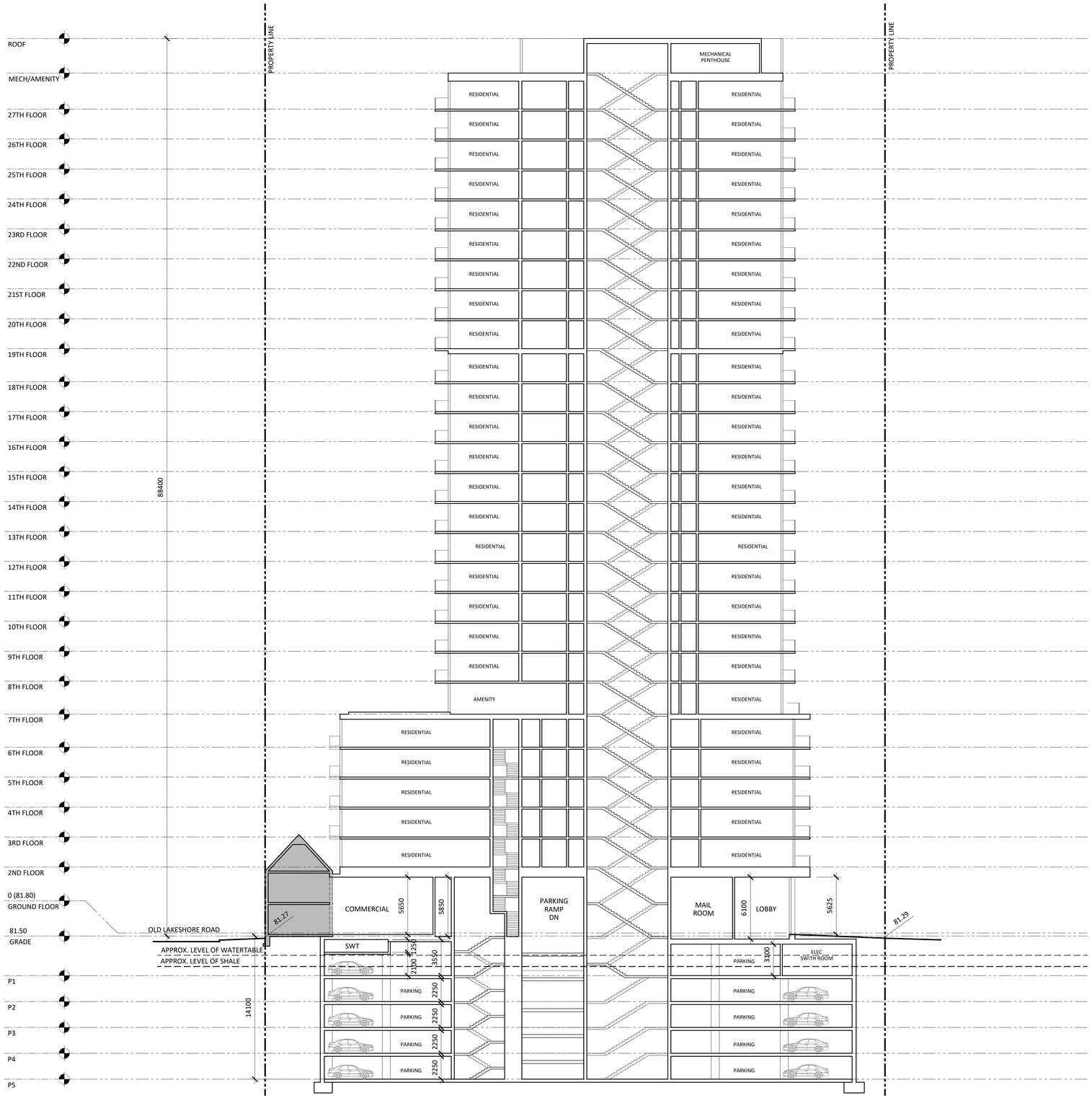
ADDRESS:
2096 - 2100 Lakeshore Rd, Burlington

SECTION A

PROJECT NO.: 1816
SCALE: 1:200
DATE: September 04, 2020
DRAWN BY:

DRAWING NO.:

A6.00



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BURLINGTON MIXED-USE BUILDING

ADDRESS:
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SECTION B

PROJECT NO.: 1816
SCALE: 1:200
DATE: September 04, 2020
DRAWN BY:

DRAWING NO.:

A6.01

APPENDIX B – LOG OF BOREHOLES

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH301(MW) SHEET. 1 of 2

PROJECT NO.: FE-P 19-9570Geo & 19-9571Hydro

PROJECT NAME: Geotechnical & Hydrogeological Investigation

LOCATION: 2097 Old Lakeshore Road, Burlington, ON

DRILLING METHOD: Mud Rotary

DRILLING DATE: 9 July, 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES Type	NO.	"N" VALUE	PENETRATION TESTING (SPT) ▲ / SHEAR STRENGTH (Kpa) ✤	VAPOUR READING (ppm) □ / MOISTURE CONTENT (%) ○	PIEZOMETER OR WELL CONSTRUCTION
		GROUND SURFACE (m asl)		82.05						
0	0	150mm Asphalt								
2		FILL: sand & silt, trace gravel, some roots, brown, slightly moist to dry.			SS	1	14			
4	1	1.22m		80.83	SS	2	17			
6		SILT & CLAY: trace gravel, trace sand, brown, slightly moist.			SS	3	38			
	2	2.13m		79.92						
8		CLAY: trace gravel, and sand seams, red, dry, hard.			SS	4	75			
10	3				SS	5	100+			
12		Weathered shale starts at 3.96m.								
	4	4.11m		77.94						
14		SHALE: Queenston formation, layered sedimentary deposit, grey siltstone layers, red, moist to dry, hard.			RC	6	Run=1.75m Rec=1.305m,75% RQD=70%			
16	5									
18										
20	6				RC	7	Run=1.95m Rec=1.350m,69% RQD=46%			
22										
24	7									
26					RC	8	Run=1.58m Rec=1.529m,97% RQD=96%			
28	8									
30					RC	9	Run=1.55m Rec=1.485m,96% RQD=93%			
32	9									
34										
36	10				RC	10	Run=1.50m Rec=1.423m,95% RQD=80%			
38										
40	11				RC	11	Run=1.60m Rec=1.159m,72% RQD=60%			
42										
44	12				RC	12	Run=1.448m Rec=1.23m,93% RQD=85%			
46										
48	13									
50	14									
	15	Continued								

Concrete

5.60

2" blank PVC

Bentonite Pellets

Groundwater Depth (m): On 9 August, 2019: 5.60m.

LOGGED: BL

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH301(MW) SHEET. 2 of 2

PROJECT NO.: FE-P 19-9570Geo & 19-9571Hydro

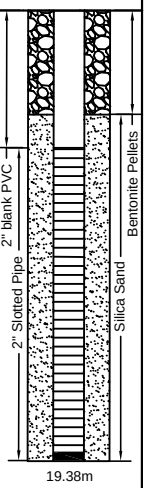
PROJECT NAME: Geotechnical & Hydrogeological Investigation

LOCATION: 2097 Old Lakeshore Road, Burlington, ON

DRILLING METHOD: Mud Rotary

DRILLING DATE: 9 July, 2019

SOIL PROFILE			SAMPLES			PENETRATION TESTING (SPT) ▲ 20 40 60 80 / SHEAR STRENGTH (Kpa) ✤ 40 80 120 160	VAPOUR READING (ppm) □ 20 40 60 80 / MOISTURE CONTENT (%) ○ 10 20 30 40	PIEZOMETER OR WELL CONSTRUCTION
DEPTH (feet) / (metres)	DESCRIPTION	STRATA PLOT / ELEV. DEPTH (m)	TYPE	Number	"N" VALUE			
50 / 16			RC	13	Run=1.60m Rec=1.075m,67% RQD=40%			
54 / 17			RC	14	Run=1.45m Rec=1.30m,90% RQD=62%			
58 / 18			RC	15	Run=1.60m Rec=1.365m,85% RQD=79%			
62 / 19	19.38m	62.67						
64 / 20	End of Borehole at 19.38 bgs MW installed at 19.38m.							
66 / 68 / 70 / 72 / 74 / 76 / 78 / 80 / 82 / 84 / 86 / 88 / 90 / 92 / 94 / 96 / 98 / 100								



Groundwater Depth (m): On 9 August, 2019: 5.60m.

LOGGED: BL

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH205 SHEET. 1 of 1

PROJECT NO.: FE-P 19-9255

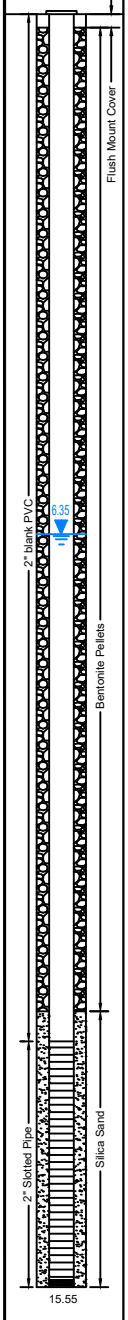
PROJECT NAME: GEOTECHNICAL/HYDRO

LOCATION: 2097 Old Lakeshore Rd., Burlington, ON

DRILLING METHOD: Diedrich D-120

DRILLING DATE: 8 FEB, 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUE	PENETRATION TESTING (SPT) ▲ 20 40 60 80 / SHEAR STRENGTH (Kpa) ✙ 40 80 120 160	VAPOUR READING (ppm) □ 20 40 60 80 / MOISTURE CONTENT (%) ○ 10 20 30 40	PIEZOMETER OR WELL CONSTRUCTION
		GROUND SURFACE (m asl)		81.01						
0	0	Asphalt ~75mm FILL: Sand and silt, trace gravel, dark brown, moist		81.25						
2	1	SILT CLAY: Trace gravel, trace sand, brown to dark brown, moist		79.72						
8	2	CLAY: Trace gravel, brown, slightly moist to dry		78.81						
10	3	Weathered SHALE, red with grey pieces, dry								
12	4	SHALE: (Queenston formation) layered sedimentary deposit, grey siltstone bands, red, moist to dry.			1	RC		RUN=1.55m REC=1.52m,98% RQD=81%		
16	5			77.08	2	RC		RUN=0.82m REC=0.82m,100% RQD=73%		
18				76.24	3			RUN=0.71m REC=0.71m,100% RQD=37%		
20	6			75.53	4	RC		RUN=1.5m REC=1.5m,100% RQD=76%		
26	8			74.03	5	RC		RUN=1.57m REC=1.57m,100% RQD=90%		
32	10			72.46	6	RC		RUN=1.58m REC=1.58m,100% RQD=86%		
36	11			70.88	7	RC		RUN=1.64m REC=1.64m,100% RQD=59%		
40	12	Lab sample at 12.70m BGS (Elevation at 69.3m ASL)		69.31	8	RC		RUN=1.55m REC=1.53m,99% RQD=93%		
46	14	Rock core lab sample recovered from 14.95m to 15.29m BGS (Elevation of 67.06m to 66.72m ASL)		67.80	9	RC		RUN=1.50m REC=1.50m,100% RQD=71%		
50	15			66.46						
52	16	End of BH at 15.53m (66.46m ASL)								
58	17									



Groundwater Depth (m): 6.35m

LOGGED: NL

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH206 SHEET. 1 of 1

PROJECT NO.: FE-P 19-9255

PROJECT NAME: GEOTECHNICAL/HYDRO

LOCATION: 2097 Old Lakeshore Rd., Burlington, ON

DRILLING METHOD: Diedrich D-120

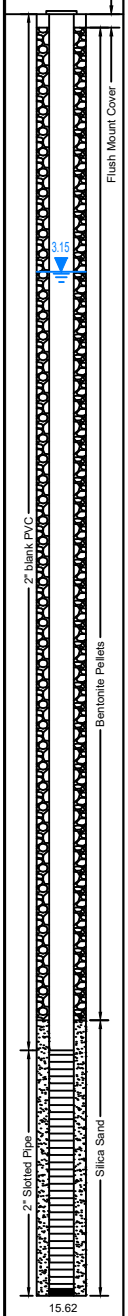
DRILLING DATE: 4 FEB, 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUE	PENETRATION TESTING (SPT) ▲ 20 40 60 80 / SHEAR STRENGTH (Kpa) ✙ 40 80 120 160	VAPOUR READING (ppm) □ 20 40 60 80 / MOISTURE CONTENT (%) ○ 10 20 30 40	PIEZOMETER OR WELL CONSTRUCTION
		GROUND SURFACE (m asl)		81.01						
0	0	Asphalt ~60mm								
2	1	FILL: Sandy silt, trace gravel, dark brown, dry		81.21						
4		SILTY CLAY: Trace gravel, brown to dark brown, moist								
6	2			79.86						
8		CLAY: Trace gravel, reddish brown, dry								
10	3			78.92						
		CLAY and weathered SHALE, red brown with grey bits, dry		78.62						
12	4	SHALE: (Queenston formation), layered sedimentary deposit, grey siltstone layers, red, moist to dry, very hard			1	RC	RUN=1.63m REC=1.36m,83% RQD=60%			
				76.99	2	RC	RUN=1.45m REC=1.45m,100% RQD=97%			
20	6			75.54	3	RC	RUN=1.55m REC=1.53m,99% RQD=85%			
24	7									
26	8			73.99	4	RC	RUN=1.52m REC=1.52m,100% RQD=100%			
30	9									
32	10			72.47	5	RC	RUN=1.55m REC=1.55m,100% RQD=95%			
34										
36	11			70.92	6	RC	RUN=1.54m REC=1.54m,100% RQD=82%			
38	12									
40				69.37	7	RC	RUN=1.55m REC=1.53m,99% RQD=93%			
42	13									
44										
46	14			67.82	8	RC	RUN=1.48m REC=1.48m,100% RQD=78%			
48	15									
50		Lab sample at 66.81m-66.38m (66.38m ASL)								
52	16			66.35						
		End of BH at 15.62m BGS (66.35m ASL)								
54										
56	17									
58										

Groundwater Depth (m): 3.15m on 5 Feb, 2019

LOGGED: NL

CHECKED: CW



FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH1 SHEET. 1 of 6

PROJECT NO.: FE-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2093 Old Lakeshore Rd

DRILLING METHOD: Hollow Stem

DRILLING DATE: 05 October 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		81.66			
0	0	FILL (50 mm Asphalt)					
2		SAND & SILT trace GRAVEL, dark brown, dry, loose to compact			1	SS	7
4	1	Slightly moist at 1.2m			2	SS	17
				80.29			
6	2	SILT & CLAY: Trace GRAVEL, trace SAND, brown, moist, hard			3	SS	34
				79.56			
8		CLAY: Light brown, moist, hard			4	SS	37
10	3						
		Weathered SHALE, Red with grey seams, dry hard		78.46	5	SS	100+
12				77.80			
	4	SHALE (Queenston formation), layered sedimentary deposit, grey Siltstone layers, red, moist to dry, hard					
16							
	5	Weathered seam at 5.5 to 6m					
20							
	6						
22		Solid core sticks (lengths > 200mm)					
24	7						
26							
	8	320mm long lab sample taken at 8.5m			1	RS	
28							
30	9						
32							
	10						
34							
36	11						
38							
	12						
40		End of Borehole at 12.19m		69.47			
42	13						
44							
46	14						
48							
50	15						

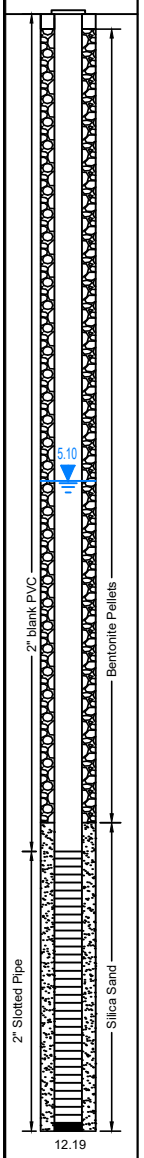
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 76.56m asl on Oct 15, 2017

LOGGED: ZV

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH2 SHEET. 2 of

PROJECT NO.: FF-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2096 Lakeshore Rd, Burlington

DRILLING METHOD: Hollow Stem

DRILLING DATE: 04 October 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
0	0	GROUND SURFACE (m asl)		82.18			
0	0	FILL (75mm of asphalt) SAND & SILT, trace gravel, black, moist, odour, loose		81.57	1	SS	6
4	1	SILT & CLAY: Trace GRAVEL, trace SAND, brown to dark brown, , moist, very stiff to hard			2	SS	16
6	2				3	SS	40
8	2	CLAY: Trace GRAVEL, brown, dry, hard		79.88	4	SS	48
10	3	Weathered SHALE: Red with grey pieces, dry, hard		78.13	5	SS	100+
12	4	SHALE: (Queenston formation) layered sedimentary deposit, grey siltstone layers, red, moist to dry, hard		78.83			
18	5	Weathered layer at 5.5 to 6m					
20	6						
22	7	Mostly solid core sticks recovered lengths > 200mm					
24	7						
26	8						
28	9	380mm long lab sample taken at 8.5m			2	RS	
30	9						
32	10						
34	10	Fractured at 10.3m - some micro defects observed					
36	11						
38	12	100mm Weathered seam at 12m					
40	12			69.93			
42	13	End of Borehole at 12.25 m					
44	13						
46	14						
48	15						
50							

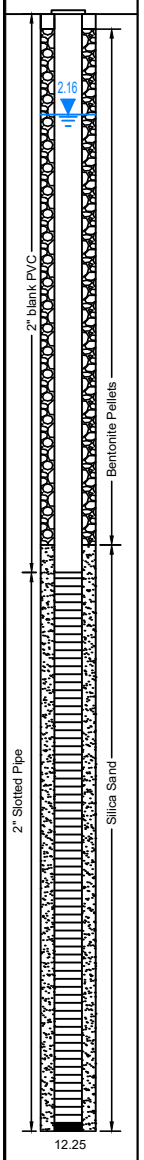
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 80.02m asl on Oct 16, 2017

LOGGED: ZV

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH3 SHEET. 3 of

PROJECT NO.: FF-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2100 Lakeshore Rd

DRILLING METHOD: Hollow Stem

DRILLING DATE: 03 October 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
0	0	GROUND SURFACE (m asl)		81.64			
		FILL (150mm of Gravel), SAND & SILT, trace gravel, brown, black spots, dry, loose		80.88	1	SS	4
4	1	SILT & CLAY: Trace Gravel, trace SAND, brown with orange spots, dry, very stiff to hard			2	SS	15
6	2				3	SS	100+
				79.34			
8		CLAY: Trace gravel, red brown, dry, grey pieces, hard			4	SS	59
10	3	Weathered SHALE @ 3.5m		78.13	5	SS	100+
12	4	SHALE: Queenston formation, layered sedimentary rock with grey Siltstone layers, red, moist to dry, hard					
18		Weathered layer 5.5 - 6m					
20	6						
22	7						
24							
26	8						
28							
30	9						
32							
34	10						
36	11	Weathered between 11 and 12m					
38							
40	12			69.34			
		End of Borehole at 12.30m					
42	13						
44							
46	14						
48							
50	15						

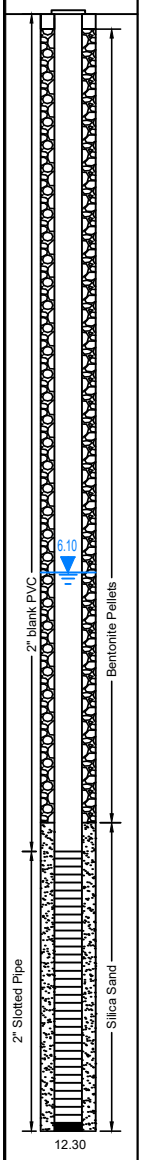
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 75.54m asl on Oct 16, 2017

LOGGED: ZV

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH4 SHEET. 4 of

PROJECT NO.: FF-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2097 Old Lakeshore Rd

DRILLING METHOD: Hollow Stem

DRILLING DATE: 02 October 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
0	0	GROUND SURFACE (m asl)		81.91			
		FILL (100mm asphalt) SAND & SILT, trace gravel, brown,dry, loose			1	SS	10
4	1	SILT & CLAY: trace gravel spots, grey, dry, very stiff		81.00	2	SS	27
				80.41			
6	2	CLAY: Trace gravel, sand seams, red brown, dry, hard			3	SS	32
8					4	SS	60
10	3	Auger refusal at 3.51m in fractured SHALE		78.40	5	SS	100+
		End of Borehole at 3.51m					

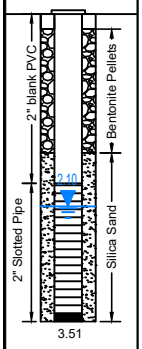
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 79.81m asl on Oct 16, 2017

LOGGED: ZV

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH5 SHEET. 5 of 6

PROJECT NO.: FF-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2101 Old Lakeshore Rd

DRILLING METHOD: Hollow Stem

DRILLING DATE: 02 October 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		81.67			
0	0	FILL (150mm asphalt) SAND & SILT, trace gravel, roots, slight odour, brown, dry, compact			1	SS	13
2	1				2	SS	18
4	1			80.30			
6	2	SILT & CLAY: With sand seams, red, dry, hard			3	SS	39
8	2			79.37			
8	2	CLAY: Trace gravel, sand seams, red, dry, hard			4	SS	100+
10	3			78.47	5	SS	100+
12	4	Weathered SHALE @ 3.2m					
14	4	SHALE: Queenston formation, layered sedimentary deposit, grey siltstone layers, red, moist to dry, hard					
16	5						
18	5						
20	6	Weathered 5.5 to 6.5m					
22	7	Soild core sticks i.e., recovered lengths > 200mm					
24	7						
26	8						
28	9						
30	9	Weathered 9.0 to 9.5m					
32	10						
34	10	400mm long lab sample taken at 10.2m			1	RS	
36	11						
38	12	Weathered 11.5 to 12m					
40	12			69.45			
42	13	End of Borehole at 12.22m					
44	13						
46	14						
48	14						
50	15						

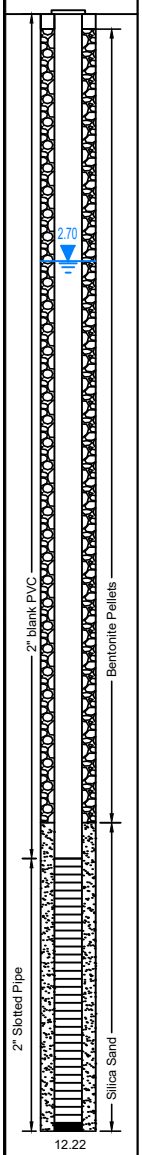
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 78.97m asl on Oct 16, 2017

LOGGED: ZV

CHECKED: CW

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH6(MW) SHEET. 6 of 6

PROJECT NO.: FE-P FF-P 17-8409 /19-9255

PROJECT NAME: Updated Geotechnical Investigation

LOCATION: 2097 Old Lakeshore Road

DRILLING METHOD: Hollow Stem

DRILLING DATE: 20 November 2017

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES Type	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		82.15			
0	0	FILL(asphalt 75mm): Sand and silt, trace gravel, dark brown, dry.					
4	1			80.95/ 1.20			
6	2	SILT and CLAY: Trace gravel, trace sand, brown, moist.		80.15/ 2.00			
8	3	CLAY: Brown, moist.					
12	4			78.15/ 4.00			
14		WEATHERED SHALE: Red with grey pieces, wet (hollow stem drilling 0-4.5m).		77.65/ 4.50			
16	5	SHALE: Layered sedimentary deposit with grey siltstone layers. (air rotary auger drilling from 4.5-12.4m).					
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						
34							
36	11						
38							
40	12			69.75/ 12.40			
		End of Borehole at 12.40m					
42	13						
44							
46	14						
48							
50	15						

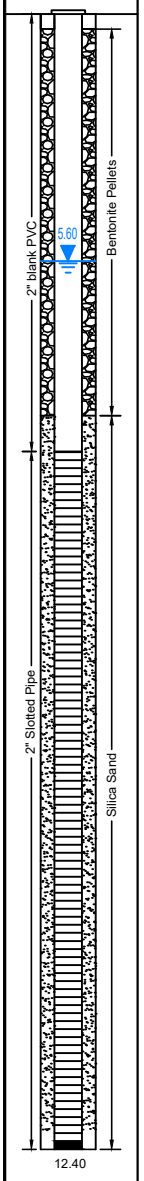
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): 5.60m on completion.

LOGGED: AH

CHECKED: CW

APPENDIX C – GRAIN SIZE AND HYDROMETER ANALYSES

FISHER ENVIRONMENTAL
ATTN: MARIUS VOINEA
15-400 ESNA PARK DRIVE
MARKHAM ON --

Date Received: 12-OCT-17
Report Date: 27-OCT-17 07:02 (MT)
Version: FINAL

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2006307

Project P.O. #: NOT SUBMITTED
Job Reference: 17-8409
C of C Numbers: 15-611631
Legal Site Desc:

Mathy Mahadeva
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

GRAIN SIZE DETERMINATIONS

Client:	FISHER ENVIRONMENTAL	Sample Location:	
Project Number:	23379	Sample ID:	BH3-SS2 (2.5' - 4,5')
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	06-10-17
Lab ID Number:	L2006307-1	Date Submitted:	12-10-17
		Date Completed:	26-10-17

Total Sample Weight	174	grams	Specific Gravity:	2.650	
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000	
% Past #10	0.948	* 100	Grav Factor:	1.606	
Sub Factor	3.300				

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	0.000	0.000	19.000	0.000	100.000
9.5 mm. DIA.:	6.000	3.448	9.500	3.448	96.552
NO. 4 SIEVE :	0.000	0.000	4.500	3.448	96.552
NO. 10 SIEVE :	3.000	1.724	2.000	5.172	94.828
NO. 20 SIEVE :	2.000	3.793	0.850	8.966	91.034
NO. 40 SIEVE :	1.000	1.897	0.425	10.862	89.138
NO. 60 SIEVE :	1.000	1.897	0.250	12.759	87.241
NO. 100 SIEVE:	1.000	1.897	0.150	14.655	85.345
NO. 200 SIEVE:	2.000	3.793	0.075	18.448	81.552

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	24.0	19.8	0.043	67.650	64.151
2.00	23.0	19.8	0.031	64.438	61.105
4.00	23.0	19.8	0.022	64.438	61.105
8.00	22.0	19.8	0.016	61.226	58.059
15.00	21.0	19.9	0.012	58.077	55.073
30.00	20.0	19.9	0.008	54.865	52.027
60.00	19.0	19.5	0.006	51.402	48.743
120.00	16.0	20.3	0.004	42.267	40.080
240.00	15.0	20.0	0.003	38.867	36.856
480.00	15.0	20.0	0.002	38.867	36.856
1440.00	13.0	20.0	0.001	32.442	30.764

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	3.45	> 4.5
% COARSE SAND :	1.72	2.0 - 4.5
% MEDIUM SAND :	5.69	0.425 - 2.0
% FINE SAND :	7.59	0.075 - 0.425
% SILT :	45.75	0.075 - 0.002
% CLAY :	35.80	< 0.002
% CLAY :	44.01	< 0.005

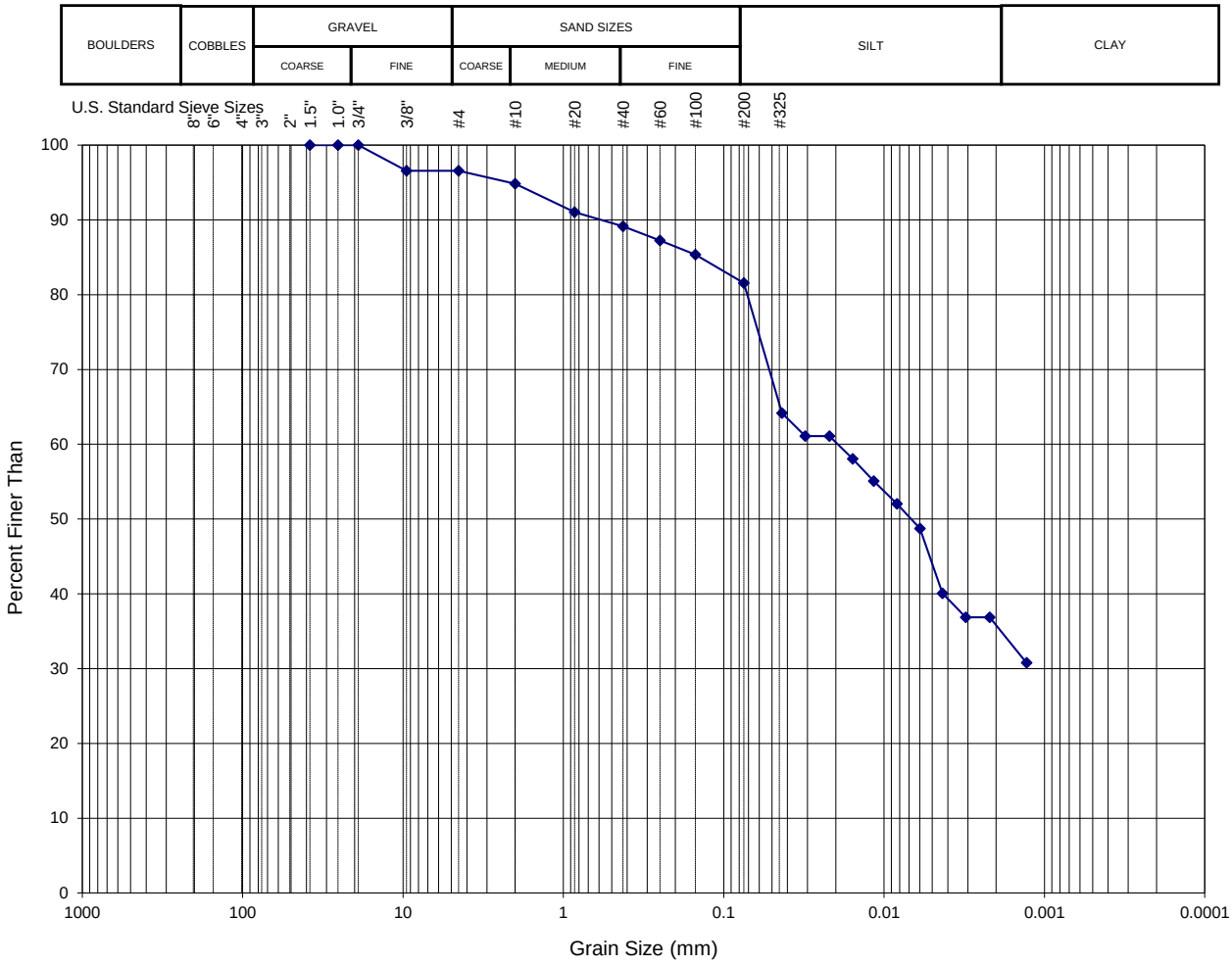
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

Project Name:	FISHER ENVIRONMENTAL
Project Number:	23379
Sample Location:	
Sample Number:	BH3-SS2 (2.5' - 4,5')
Sample Depth:	
Lab ID Number:	L2006307-1
Technician:	CB6
Sampler:	
Dates:	
Collected On:	06-10-17
Analyzed:	26-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SILT AND CLAY WITH SAND, TRACE GRAVEL	AND	36 - 50 %	GRAVEL	3	%
FINE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	15	%
ESTIMATED HAZEN NUMBER: 4.56E-08 cm/s	WITH	11 - 20 %	SILT + CLAY	82	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

GRAIN SIZE DETERMINATIONS

Client:	FISHER ENVIRONMENTAL	Sample Location:	
Project Number:	23379	Sample ID:	BH4-SS3 (5' - 7')
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	06-10-17
Lab ID Number:	L2006307-2	Date Submitted:	12-10-17
		Date Completed:	26-10-17

Total Sample Weight	226	grams	Specific Gravity:	2.650	
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000	
% Past #10	0.951	* 100	Grav Factor:	1.606	
Sub Factor	4.300				

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	0.000	0.000	19.000	0.000	100.000
9.5 mm. DIA.:	6.000	2.655	9.500	2.655	97.345
NO. 4 SIEVE :	1.000	0.442	4.500	3.097	96.903
NO. 10 SIEVE :	4.000	1.770	2.000	4.867	95.133
NO. 20 SIEVE :	0.000	0.000	0.850	4.867	95.133
NO. 40 SIEVE :	1.000	1.903	0.425	6.770	93.230
NO. 60 SIEVE :	0.000	0.000	0.250	6.770	93.230
NO. 100 SIEVE:	1.000	1.903	0.150	8.673	91.327
NO. 200 SIEVE:	2.000	3.805	0.075	12.478	87.522

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	30.0	19.8	0.040	86.923	82.692
2.00	28.0	19.8	0.029	80.499	76.581
4.00	27.0	19.8	0.021	77.287	73.525
8.00	26.0	19.8	0.015	74.075	70.469
15.00	24.0	19.9	0.011	67.713	64.417
30.00	22.0	19.9	0.008	61.289	58.306
60.00	21.0	19.5	0.006	57.826	55.012
120.00	18.0	20.3	0.004	48.691	46.321
240.00	16.0	20.0	0.003	42.079	40.031
480.00	16.0	20.0	0.002	42.079	40.031
1440.00	15.0	20.0	0.001	38.867	36.975

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	3.10	> 4.5
% COARSE SAND :	1.77	2.0 - 4.5
% MEDIUM SAND :	1.90	0.425 - 2.0
% FINE SAND :	5.71	0.075 - 0.425
% SILT :	47.95	0.075 - 0.002
% CLAY :	39.57	< 0.002
% CLAY :	50.89	< 0.005

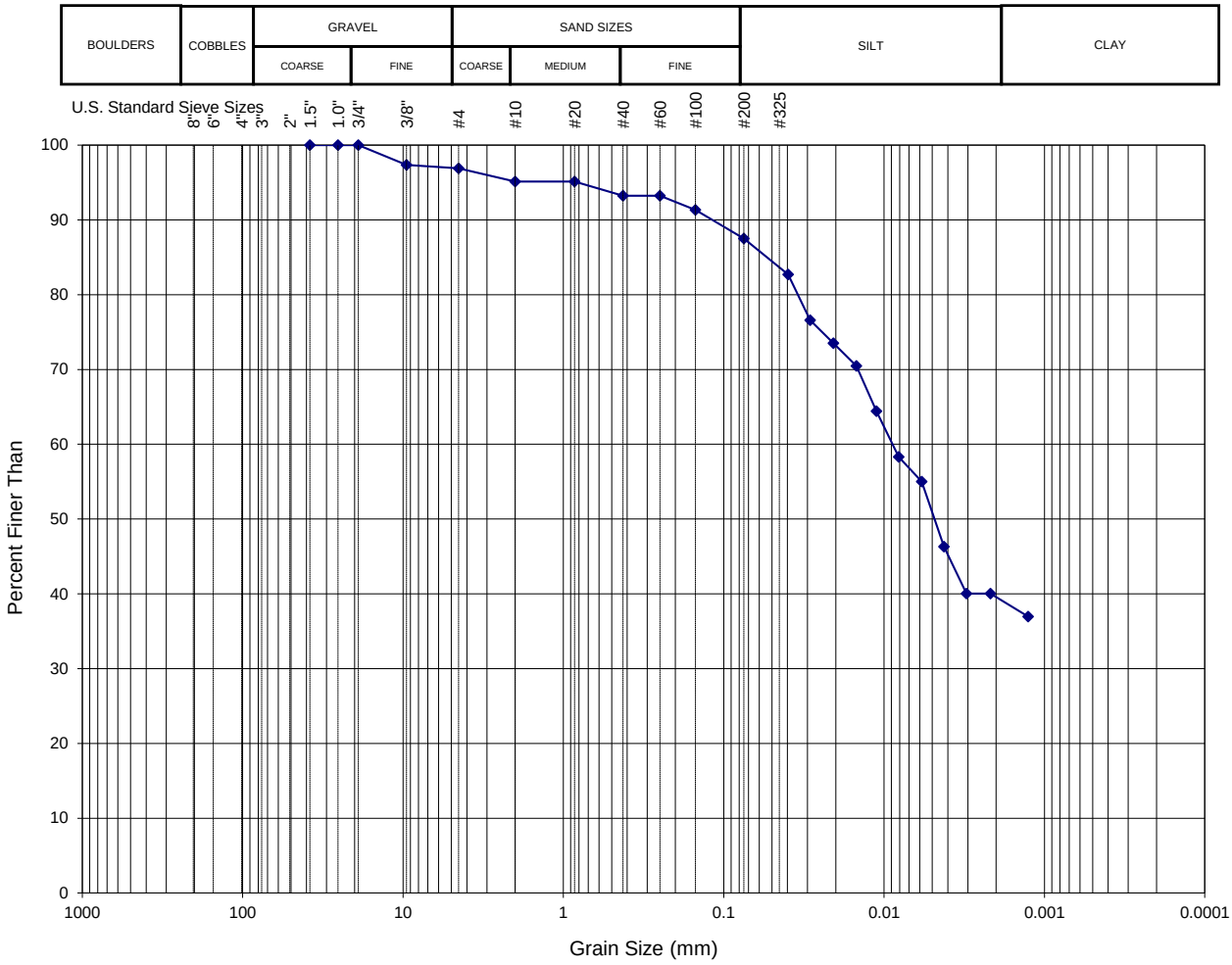
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

Project Name:	FISHER ENVIRONMENTAL
Project Number:	23379
Sample Location:	
Sample Number:	BH4-SS3 (5' - 7')
Sample Depth:	
Lab ID Number:	L2006307-2
Technician:	CB6
Sampler:	
Dates:	
Collected On:	06-10-17
Analyzed:	26-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SILT AND CLAY TRACE SAND, TRACE GRAVEL	AND	36 - 50 %	GRAVEL	3	%
FINE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	9	%
ESTIMATED HAZEN NUMBER: 1.19E-10 cm/s	WITH	11 - 20 %	SILT + CLAY	88	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

GRAIN SIZE DETERMINATIONS

Client:	FISHER ENVIRONMENTAL	Sample Location:	
Project Number:	23379	Sample ID:	BH5-SS2 (2.5' - 4,5')
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	06-10-17
Lab ID Number:	L2006307-3	Date Submitted:	12-10-17
		Date Completed:	26-10-17

Total Sample Weight	183	grams	Specific Gravity:	2.650	
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000	
% Past #10	1.000	* 100	Grav Factor:	1.606	
Sub Factor	3.660				

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	0.000	0.000	19.000	0.000	100.000
9.5 mm. DIA.:	0.000	0.000	9.500	0.000	100.000
NO. 4 SIEVE :	0.000	0.000	4.500	0.000	100.000
NO. 10 SIEVE :	0.000	0.000	2.000	0.000	100.000
NO. 20 SIEVE :	1.000	2.000	0.850	2.000	98.000
NO. 40 SIEVE :	1.000	2.000	0.425	4.000	96.000
NO. 60 SIEVE :	1.000	2.000	0.250	6.000	94.000
NO. 100 SIEVE:	1.000	2.000	0.150	8.000	92.000
NO. 200 SIEVE:	4.000	8.000	0.075	16.000	84.000

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	26.0	19.8	0.042	74.075	74.075
2.00	25.0	19.8	0.030	70.863	70.863
4.00	24.0	19.8	0.022	67.650	67.650
8.00	24.0	19.8	0.015	67.650	67.650
15.00	23.0	19.9	0.011	64.501	64.501
30.00	22.0	19.9	0.008	61.289	61.289
60.00	20.0	19.5	0.006	54.614	54.614
120.00	18.0	20.3	0.004	48.691	48.691
240.00	16.0	20.0	0.003	42.079	42.079
480.00	16.0	20.0	0.002	42.079	42.079
1440.00	15.0	20.0	0.001	38.867	38.867

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	0.00	> 4.5
% COARSE SAND :	0.00	2.0 - 4.5
% MEDIUM SAND :	4.00	0.425 - 2.0
% FINE SAND :	12.00	0.075 - 0.425
% SILT :	42.40	0.075 - 0.002
% CLAY :	41.60	< 0.002
% CLAY :	51.69	< 0.005

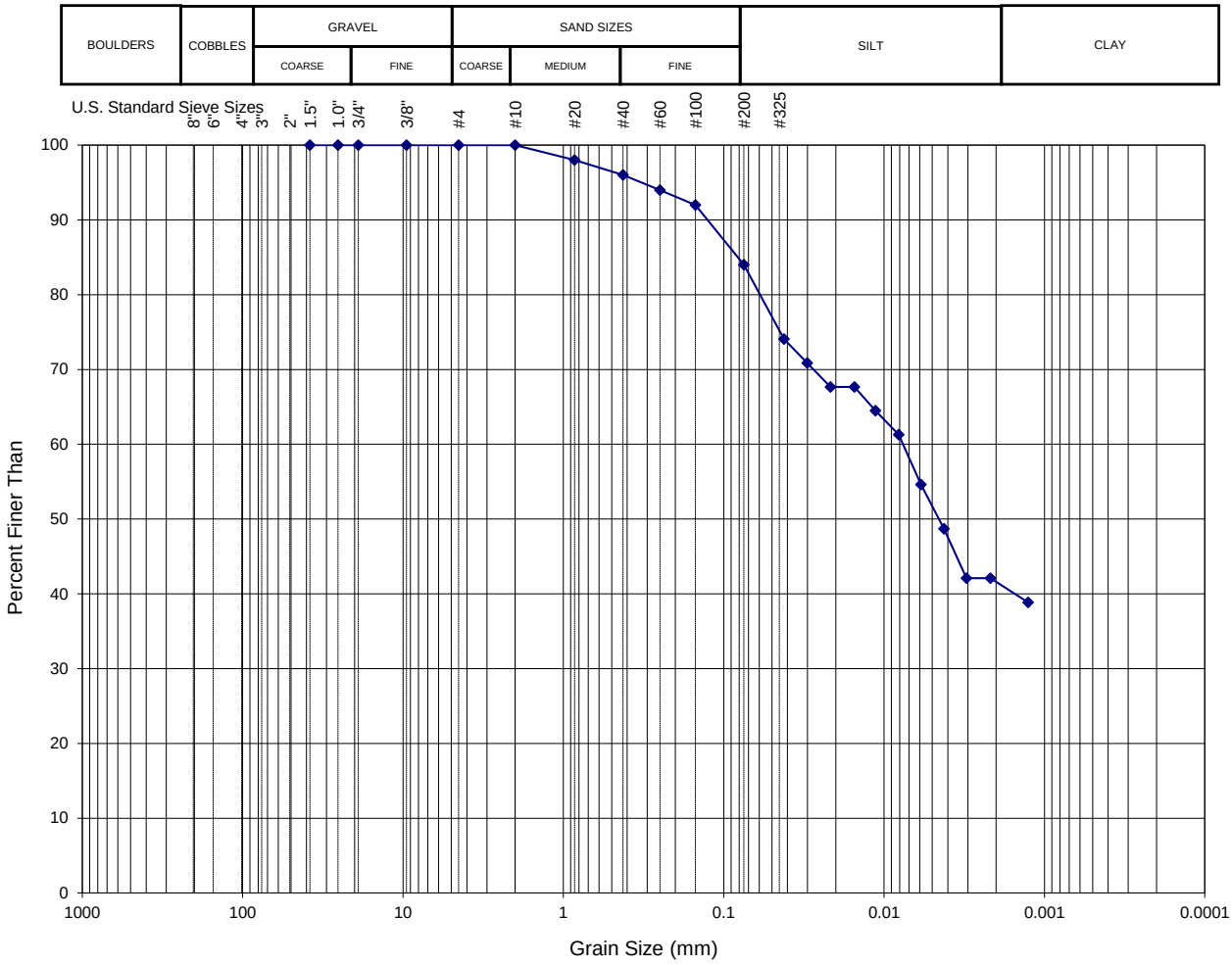
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

Project Name:	FISHER ENVIRONMENTAL
Project Number:	23379
Sample Location:	
Sample Number:	BH5-SS2 (2.5' - 4,5')
Sample Depth:	
Lab ID Number:	L2006307-3
Technician:	CB6
Sampler:	
Dates:	
Collected On:	06-10-17
Analyzed:	26-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SILT AND CLAY WITH SAND	AND	36 - 50 %	GRAVEL	0	%
FINE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	16	%
ESTIMATED HAZEN NUMBER: 1.00E-10 cm/s	WITH	11 - 20 %	SILT + CLAY	84	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2006307-COFC

COC Number: 15 - 611631

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	FISHER ENVIRONMENTAL LTD.	Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	MARIUS VOINEA	Quality Control (QC) Report with Report ☒ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	(905) 475-7755	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
Street:	400 ESNA PARK DR, #15	Email 1 or Fax	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	MARKHAM, ON	Email 2 marius@fisherenvironmental.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	L3R 3K2	Email 3	
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	17-8409	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2006307	ALS Contact: M	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	GRAIN SIZE + HYDROMETER	Number of Containers
1	BH3-SS2 (2.5'-4.5')	6/10/17		SOIL	X	1
2	BH4-SS3 (5'-7')	"		SOIL	X	1
3	BH5-SS2 (2.5'-4.5')	"		SOIL	X	1

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
21.3			18.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: MARIUS VOINEA	Date: Oct. 12/2017	Time: 2:10	Received by: CB	Date: Oct/12/17	Time: 14:10	Received by: RW	Date: 04-12-2017	Time: 16:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

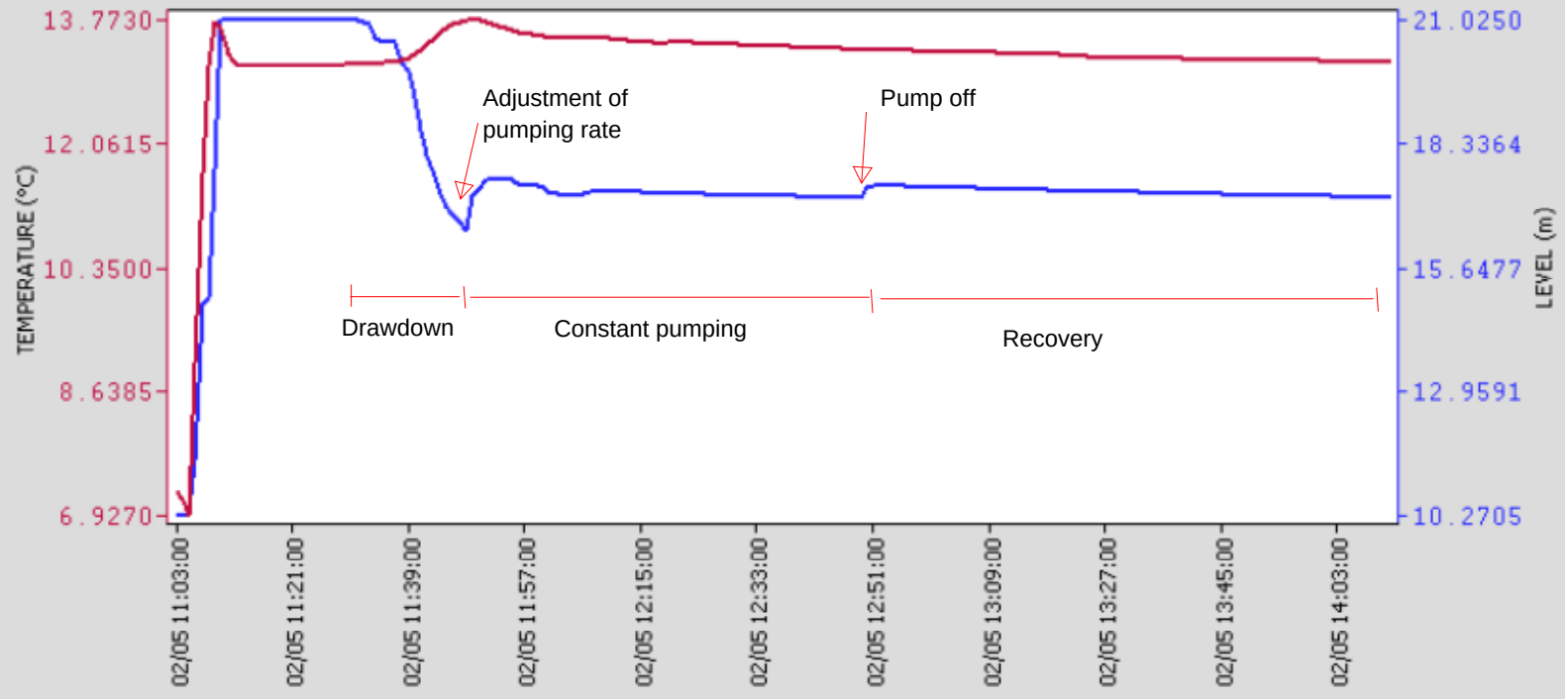
OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX D – HYDRAULIC CONDUCTIVITY ANALYSES

Figure E1: MW206 Hydrograph



Fisher Environmental Ltd.

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

KEY PLAN

N

LEGEND

PROJECT NAME AND ADDRESS

Hydrogeological Investigation

2093-2101 Old Lakeshore &
2096-2100 Lakehore RD,
BURLINGTON, ON

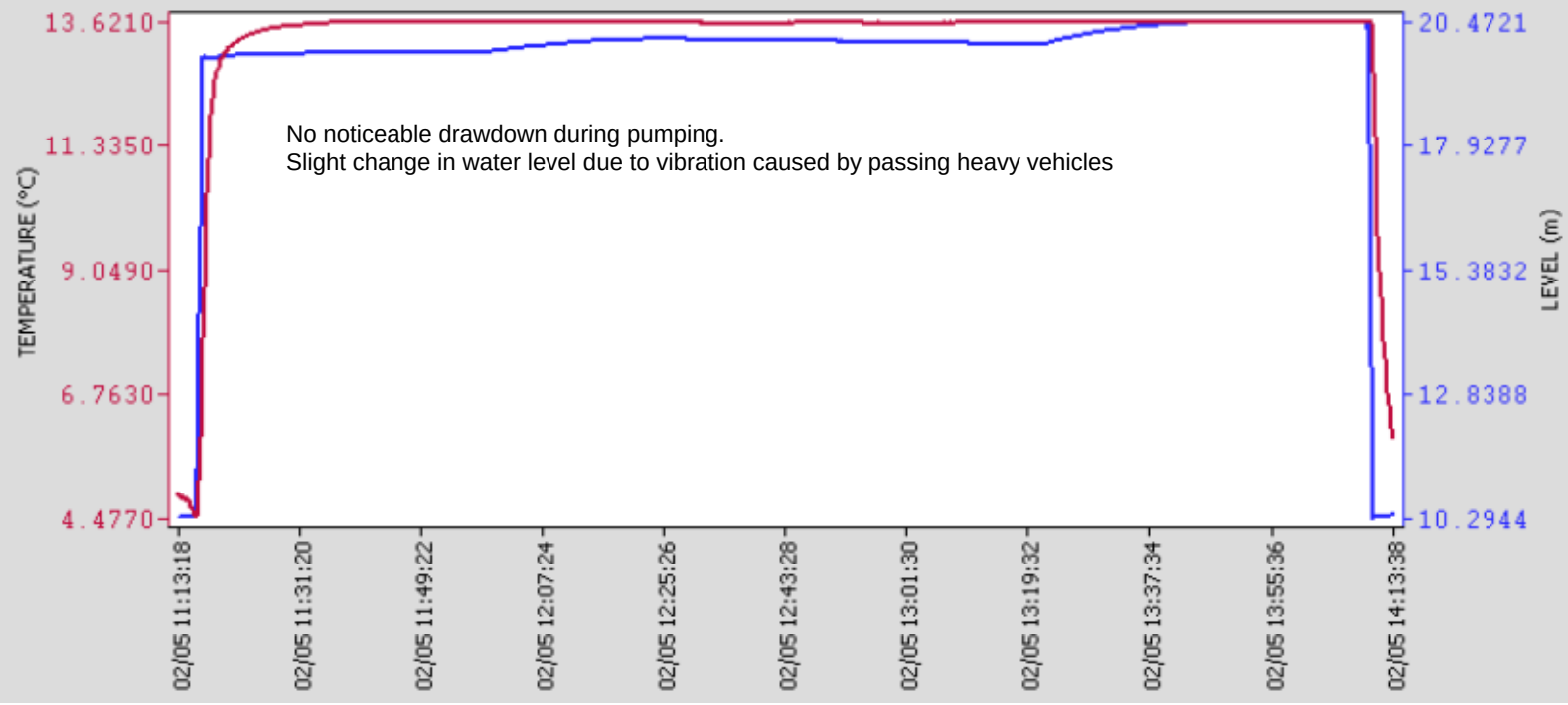
PROJECT NO.
FE-P 19-9256

DATE
February 13, 2019

SCALE
AS SHOWN

FIGURE E1
MW6 - Pumping Well.

Figure E2: MW5 Hydrograph



Fisher Environmental Ltd.

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755
Fax: 905 475-7718

KEY PLAN

N

LEGEND

PROJECT NAME AND ADDRESS

Hydrogeological Investigation

2093-2101 Old Lakeshore &
2096-2100 Lakehore RD,
BURLINGTON, ON

PROJECT NO.
FE-P 19-9256

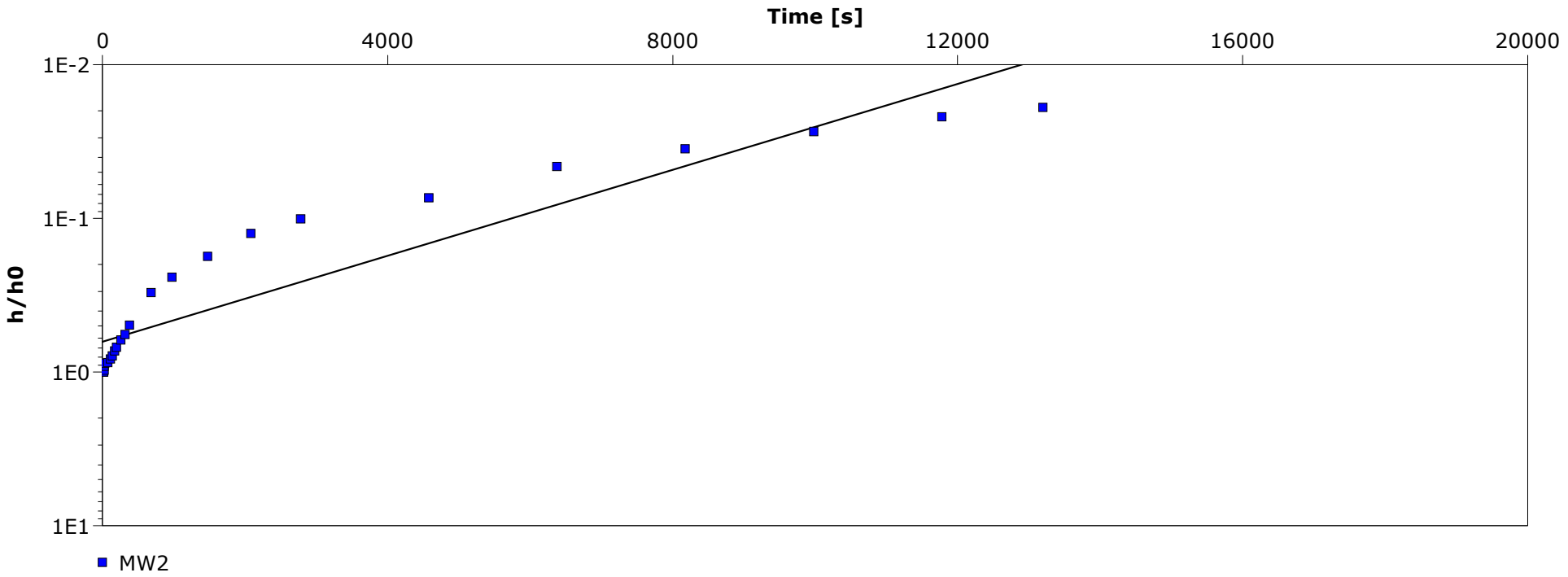
DATE
February 13, 2019

SCALE
AS SHOWN

FIGURE E4
MW2 - Observation Well

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW2	Test Well: MW2
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Hvorslev	Analysis Date: 12/6/2017
Aquifer Thickness: 6.10 m		

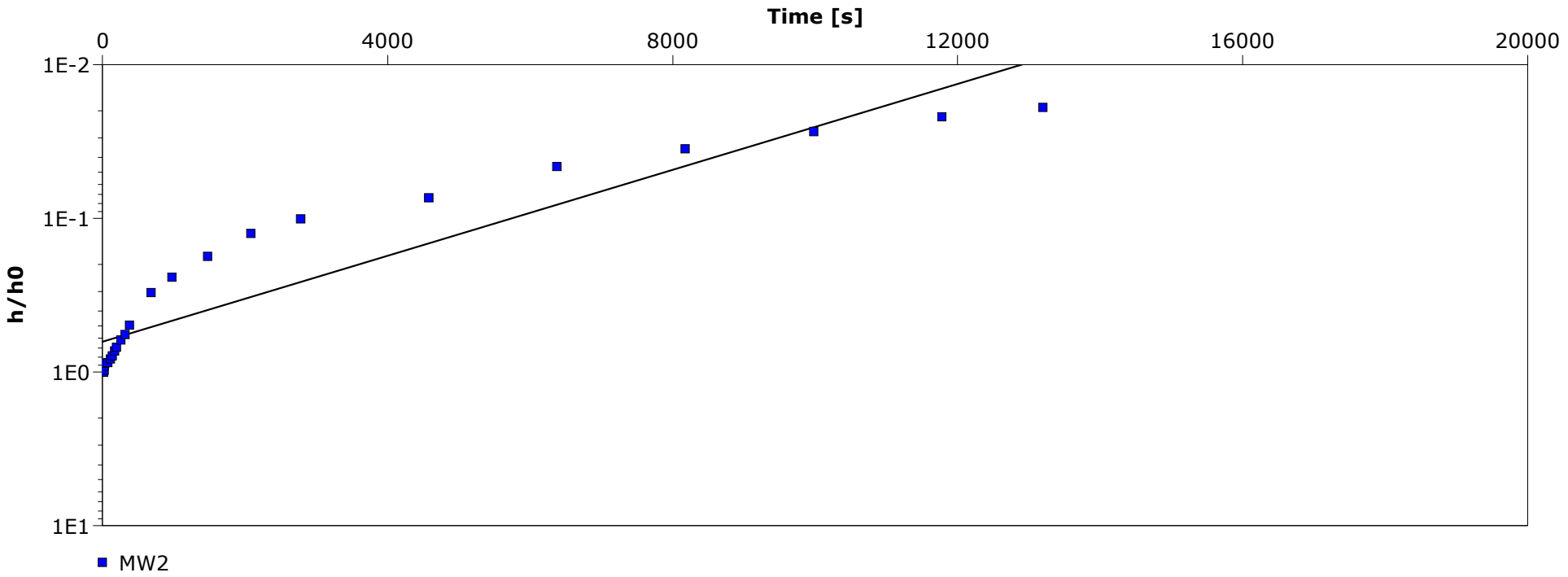


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW2	1.32×10^{-7}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW2	Test Well: MW2
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Bouwer & Rice	Analysis Date: 12/6/2017
Aquifer Thickness: 6.10 m		

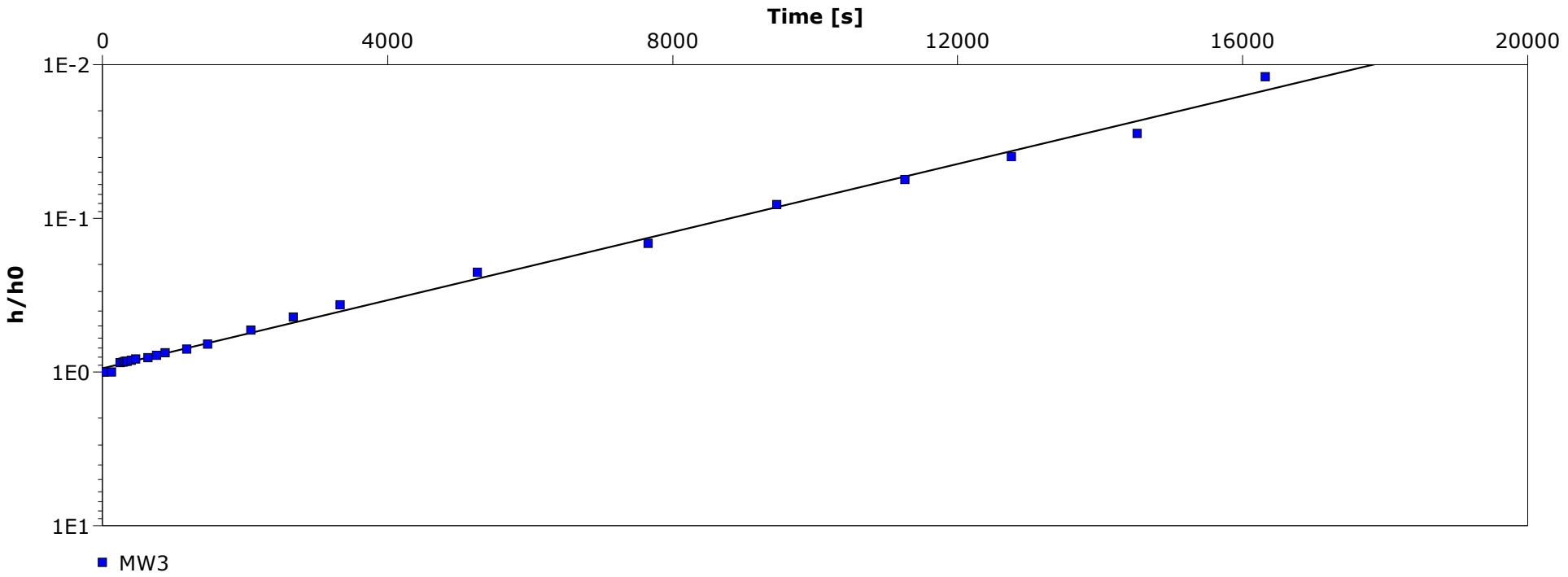


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW2	1.04×10^{-7}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW3	Test Well: MW3
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Hvorslev	Analysis Date: 12/6/2017
Aquifer Thickness: 3.05 m		

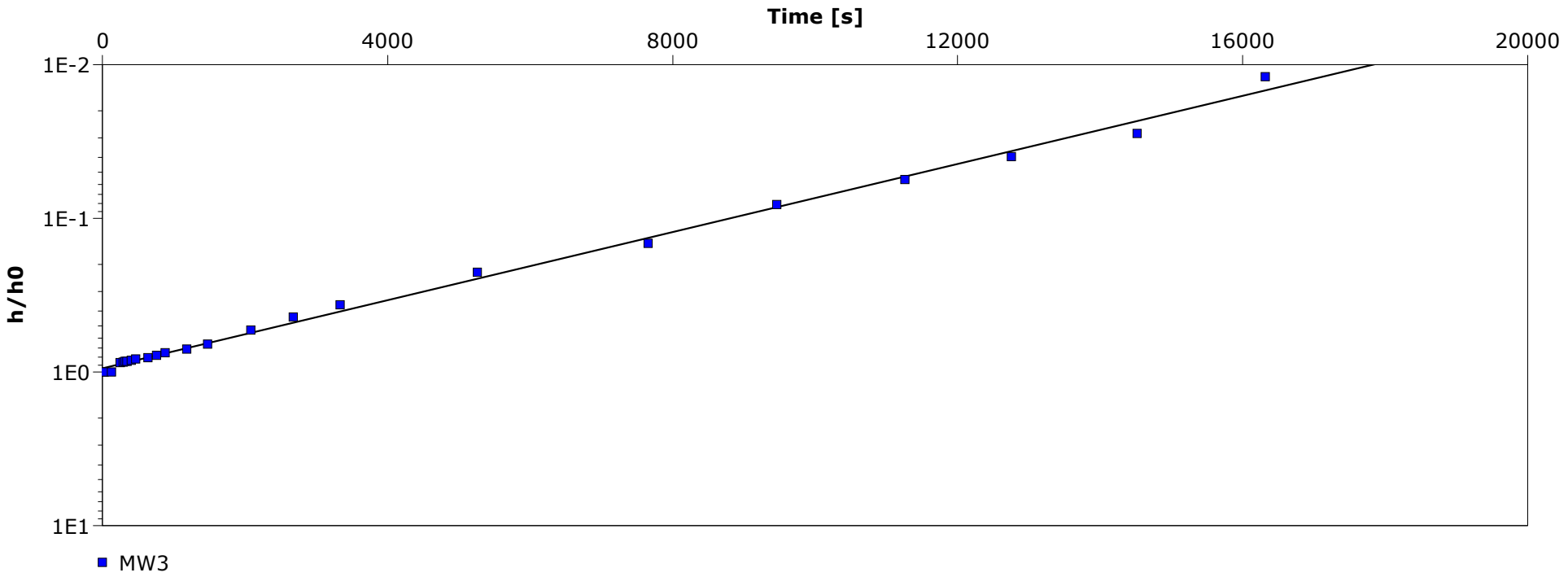


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW3	1.83×10^{-7}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW3	Test Well: MW3
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Bouwer & Rice	Analysis Date: 12/6/2017
Aquifer Thickness: 3.05 m		

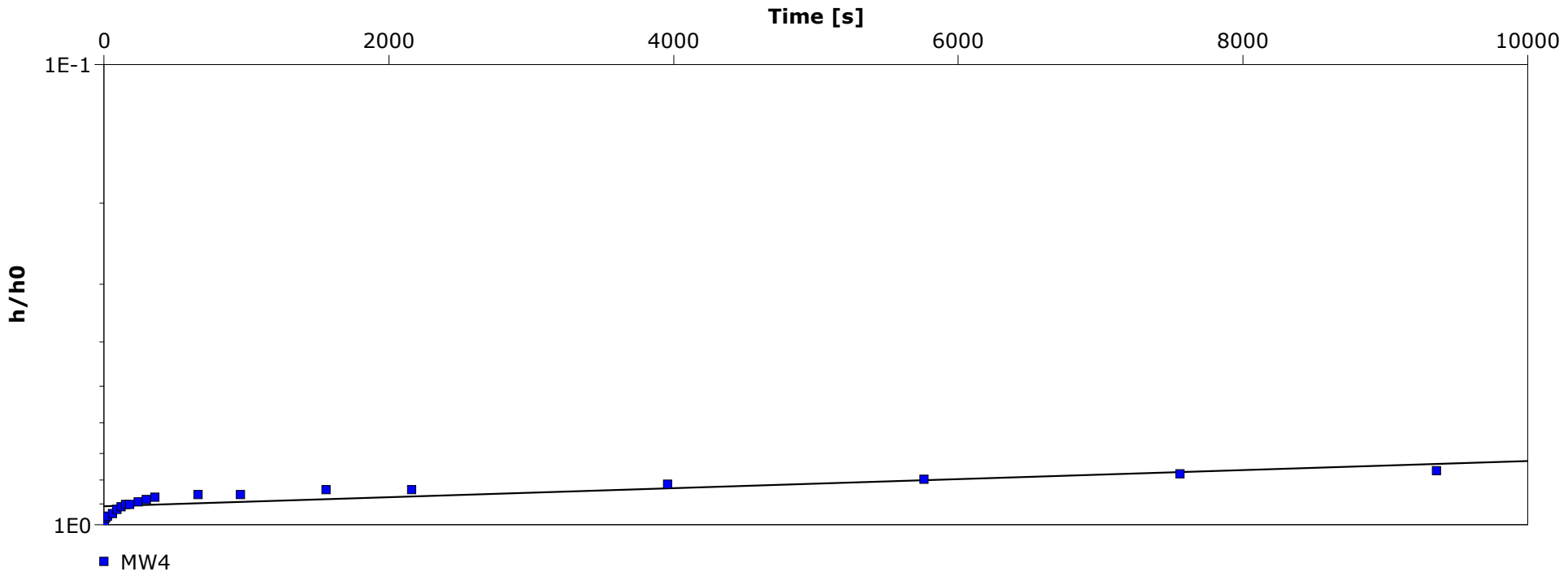


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW3	1.41×10^{-7}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW4	Test Well: MW4
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Hvorslev	Analysis Date: 12/6/2017
Aquifer Thickness: 0.51 m		

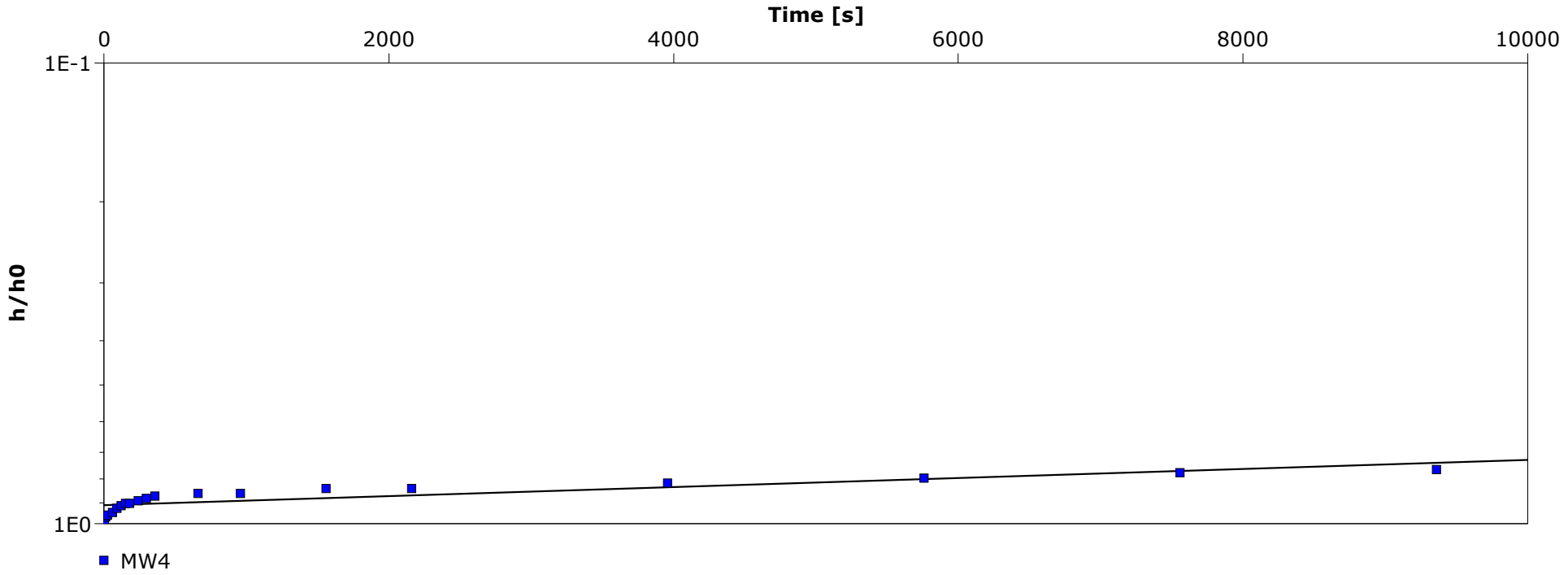


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW4	2.79×10^{-8}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: MW4	Test Well: MW4
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Bouwer & Rice	Analysis Date: 12/6/2017
Aquifer Thickness: 0.51 m		

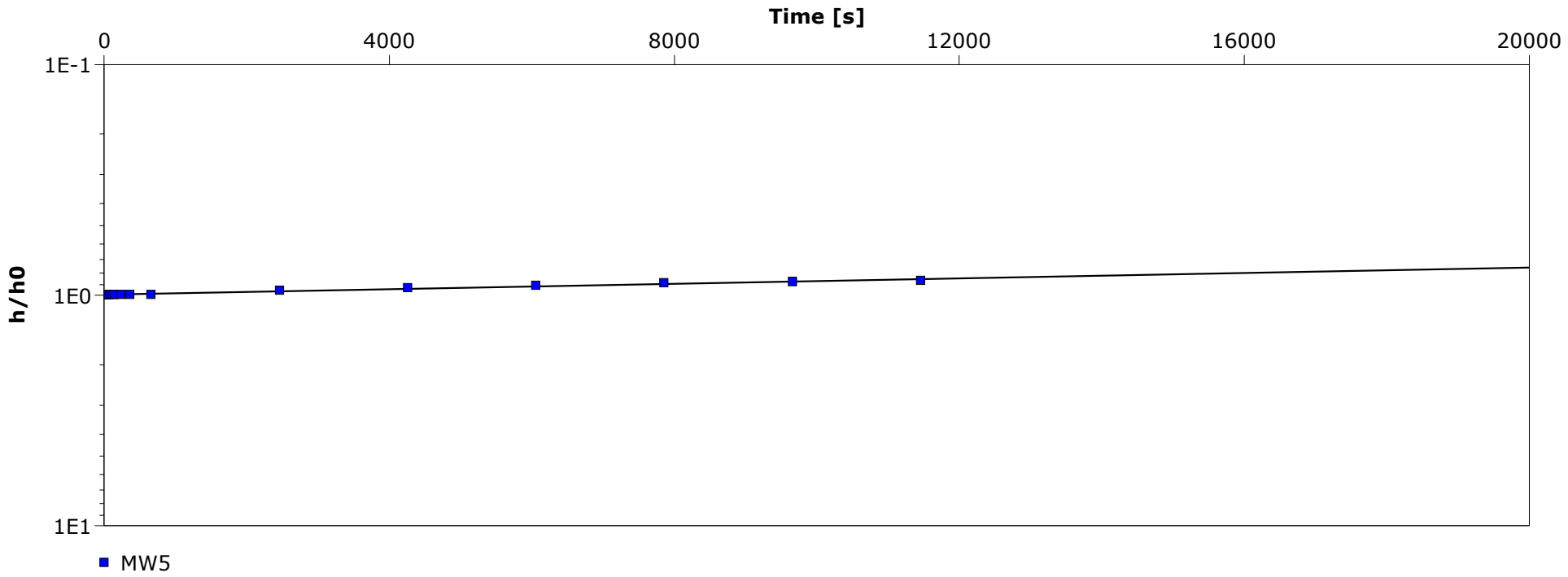


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW4	2.14×10^{-8}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

Location: 2096 Lakeshore Road	Slug Test: Slug Test MW5	Test Well: MW5
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Hvorslev	Analysis Date: 12/6/2017
Aquifer Thickness: 3.05 m		

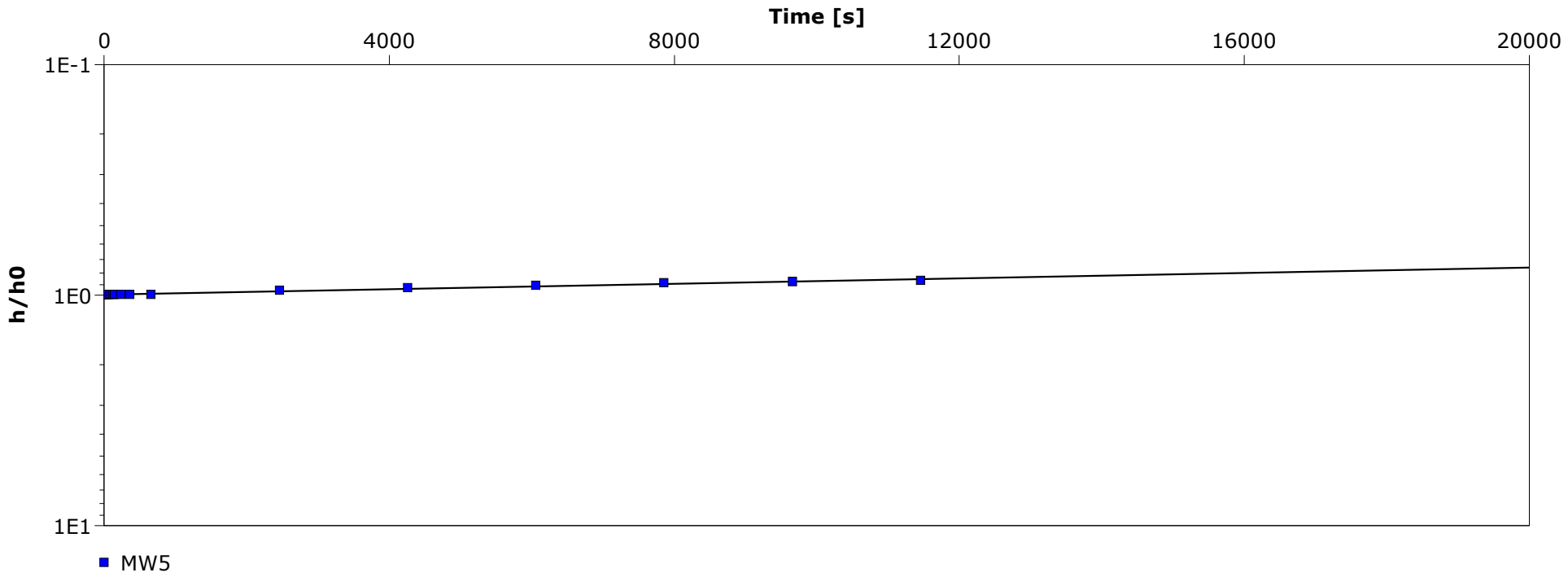


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW5	9.72×10^{-9}	

FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Slug Test Analysis Report**
	Project: Hydrogeology
	Number: 17-8522
	Client: Core Development

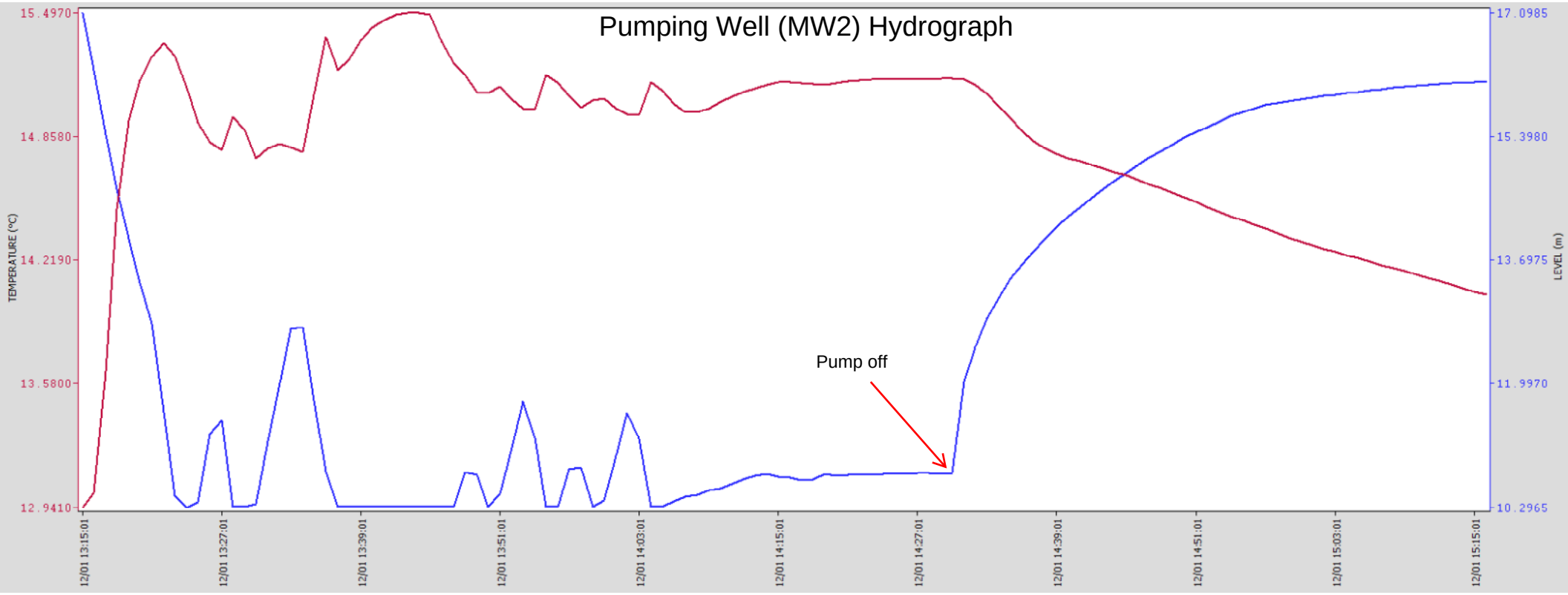
Location: 2096 Lakeshore Road	Slug Test: Slug Test MW5	Test Well: MW5
Test Conducted by: Frank/Clive		Test Date: 12/6/2017
Analysis Performed by: CW	Bouwer & Rice	Analysis Date: 12/6/2017
Aquifer Thickness: 3.05 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW5	7.51×10^{-9}	

Pump Tests Results - MW2



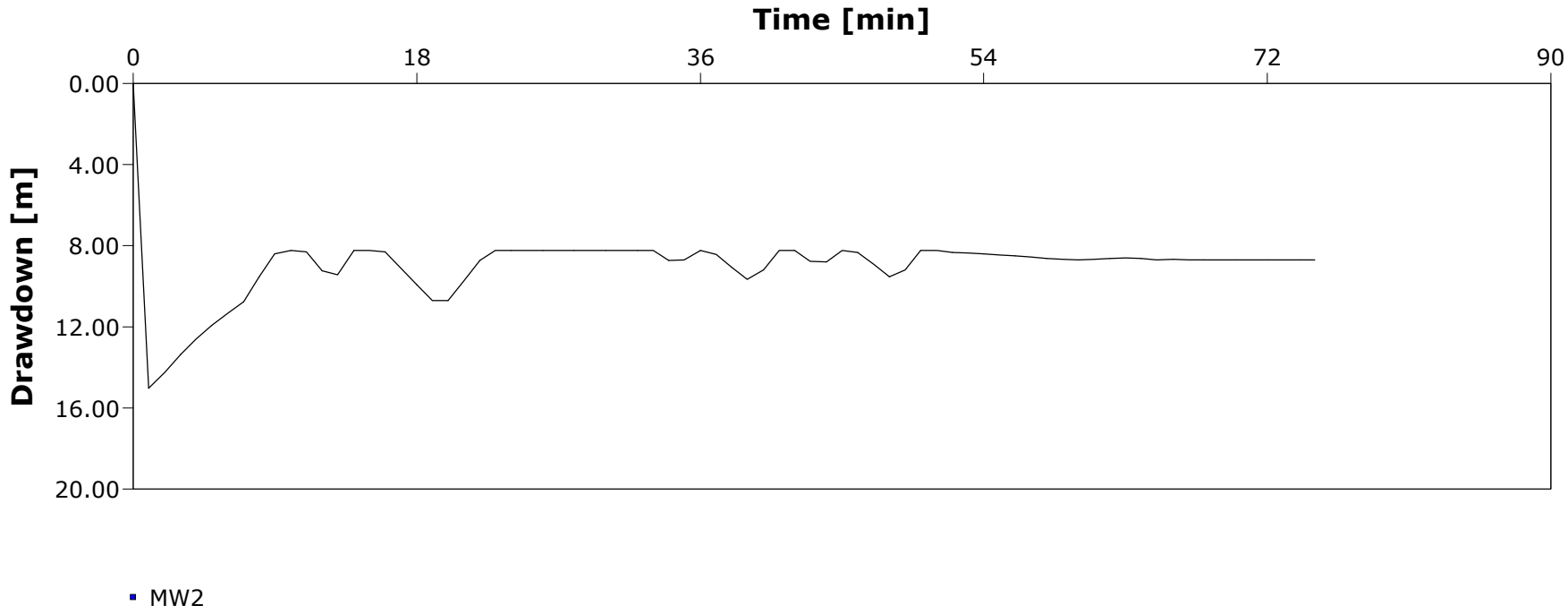
Drawdown

Steady pumping rate - with some minor disturbance

Recovery

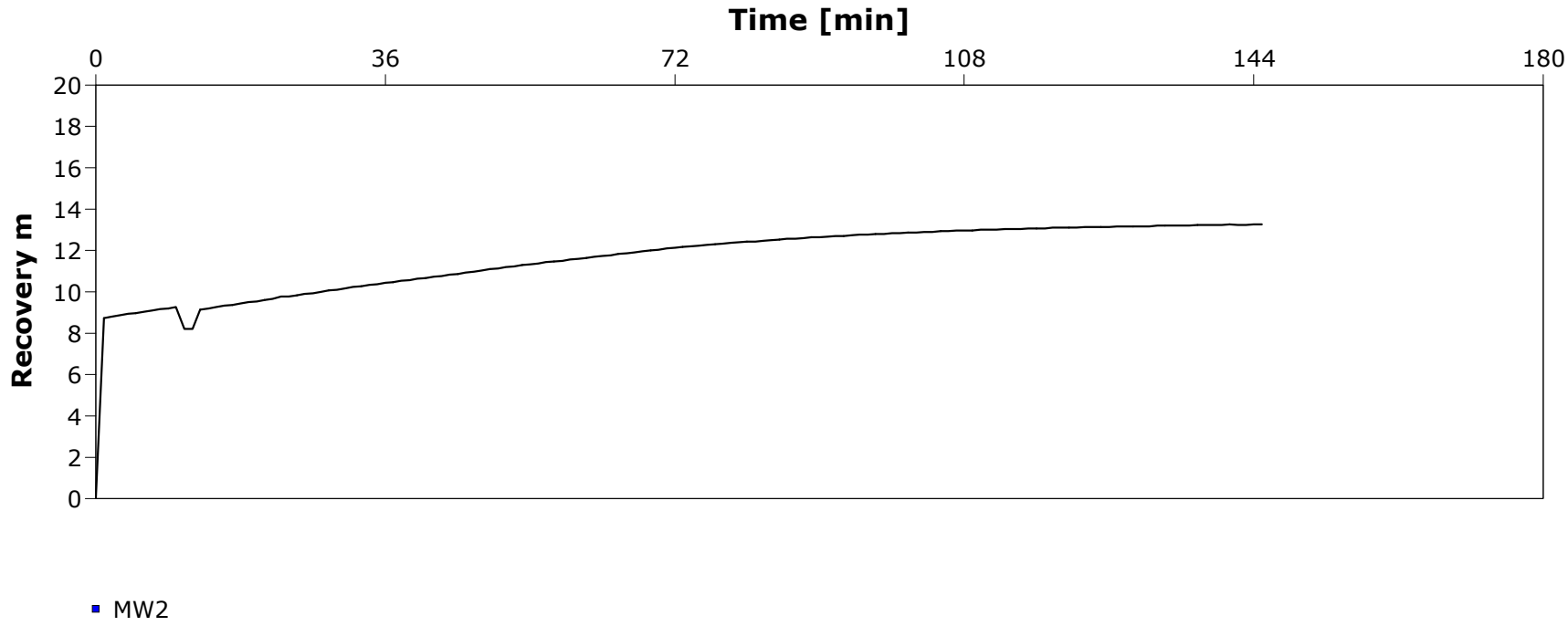
FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Pumping Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 17-8522
	Client: Core Development Group Inc

Location: 2096 Lakeshore Road, Burlington	Pumping Test: Drawdown	Pumping Well: MW2
Test Conducted by: CW		Test Date: 12/1/2017
Analysis Performed by: CW	Time-Drawdown	Analysis Date: 12/5/2017
Aquifer Thickness: 6.10 m	Discharge Rate: 1.67E-005 [m³/s]	

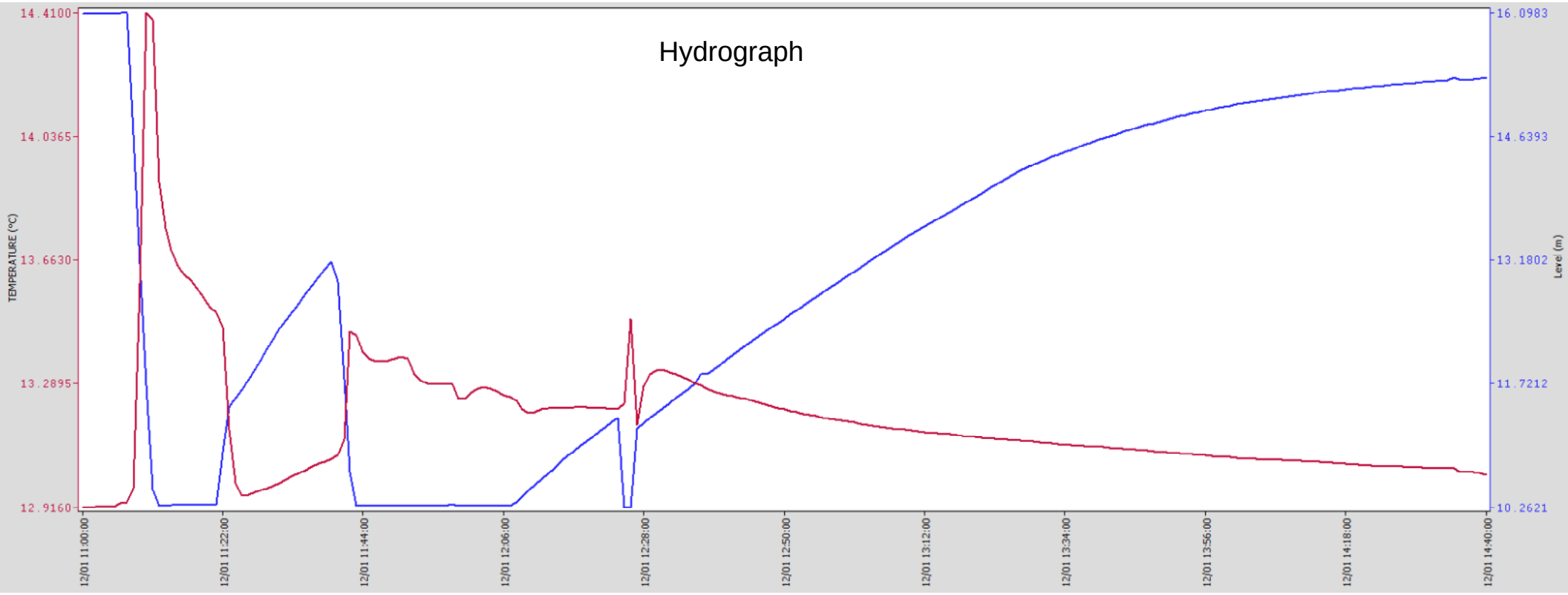


FISHER ENVIRONMENTAL LTD. **400 Esna Park Dr., #15** **Markham, ON L3R 3K2**	**Pumping Test Analysis Report**	E
	Project: Hydrogeological Investigation	
	Number: 17-8522	
	Client: Core Development Group Inc	

Location: 2096 Lakeshore Road, Burlington	Pumping Test: Recovery	Pumping Well: MW2
Test Conducted by:		Test Date: 12/5/2017
Analysis Performed by: CW	Recovery - Time/Drawdown	Analysis Date: 12/5/2017
Aquifer Thickness: 6.10 m	Discharge Rate: 1.67E-005 [m³/s]	

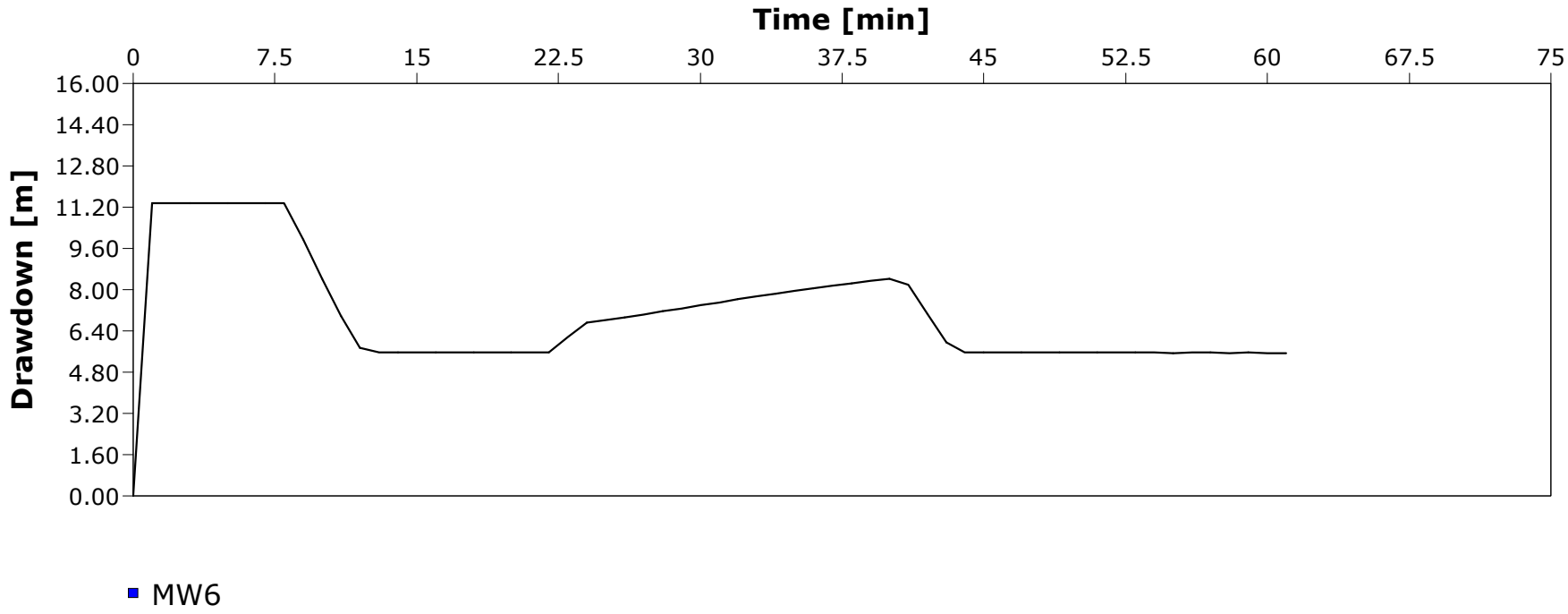


Pump Tests Results - MW6



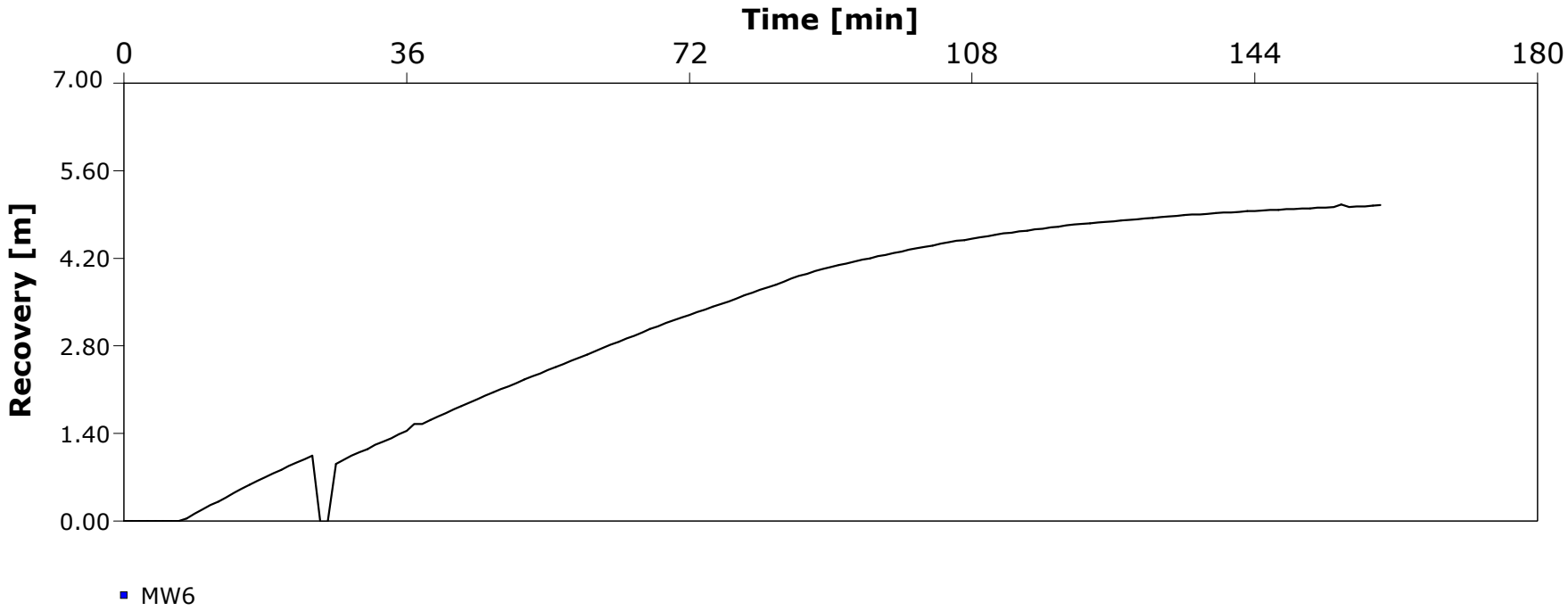
FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Pumping Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 17-8522
	Client: Core Development Group Inc

Location: 2097 Old Lakeshore Road, Burlington	Pumping Test: Pumping Test MW6	Pumping Well: MW6
Test Conducted by: CW		Test Date: 12/8/2017
Analysis Performed by: CW	MW6 Drawdown	Analysis Date: 12/8/2017
Aquifer Thickness: 7.62 m	Discharge Rate: 4E-006 [m³/s]	



FISHER ENVIRONMENTAL LTD. 400 Esna Park Dr., #15 Markham, ON L3R 3K2	**Pumping Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 17-8522
	Client: Core Development Group Inc

Location: 2097 Old Lakeshore Road, Burlington	Pumping Test: MW6 Recovery	Pumping Well: MW6
Test Conducted by: CW		Test Date: 12/8/2017
Analysis Performed by: CW	MW6	Analysis Date: 12/8/2017
Aquifer Thickness: 7.62 m	Discharge Rate: 4E-006 [m³/s]	



APPENDIX E – DEWATERING FLOWRATE ANALYSES

Construction Dewatering Calculation

Location: 2093-2101 Old Lakeshore & 2096-2100 Lakeshore RD, Burlington
Project: FE-P-19-9969 HydroGeo
Date: 2020-09-18

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Underside of P5 elevation (m asl)	Ground Surface Elev. (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Static water level		Well base elevation	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q, (m^3/s)	Q, (m^3/day)
					BGS (m)	Elevation (m asl)	(m)				Model	Adjusted								
Mix use building with five underground levels	67.40	81.50	66.20	65.20	3.43	78.07	65.00	13.07	0.2	12.87	22.66	52.96	30.30	2883.8	7.75E-07	170.78	3.97	3.41	7.45E-04	64.34

Dupuit Forcheimer Equation

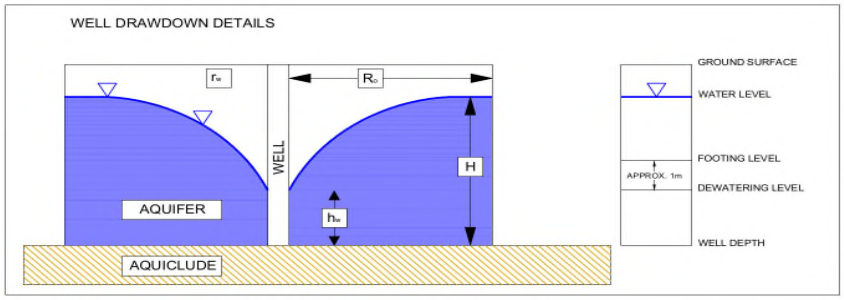
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$



Where:

r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

FISHER ENGINEERING

Permanent Drainage Rates

Location: *2093-2101 Old Lakeshore & 2096-2100 Lakeshore RD, Burlington*
Project: *FE-P-19-9969 HydroGeo*
Date: *2020-09-18*

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Underside of P5 elevation (m asl)	Ground Surface Elev. (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Static water level		Well base elevation (m asl)	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q, (m^3/s)	Q, (m^3/day)
					BGS (m)	Elevation (m asl)					Model	Adjusted								
Mix use building with five underground levels	67.40	81.50	66.20	66.90	2.43	79.07	66.70	12.37	0.2	12.17	21.43	51.73	30.30	2883.8	7.75E-07	152.98	3.95	3.41	6.96E-04	60.16

Dupuit Forcheimer Equation

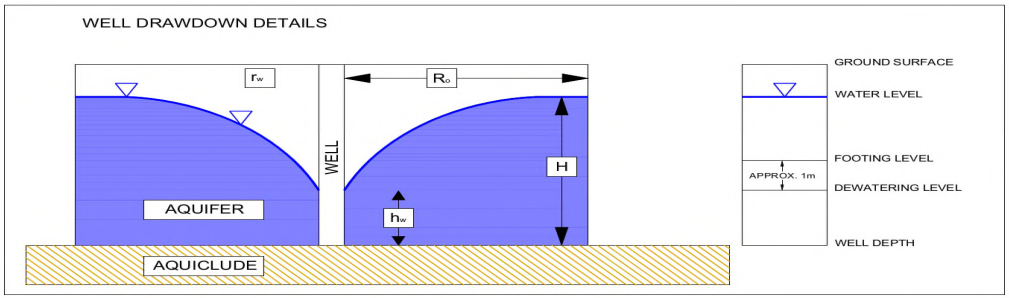
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$



Where:

r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

APPENDIX F – CHEMICAL ANALYSIS FOR SEWER DISCHARGE BY-LAW

FISHER ENVIRONMENTAL
ATTN: CLIVE
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Date Received: 27-NOV-19
Report Date: 19-DEC-19 14:28 (MT)
Version: FINAL REV. 5

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2388708

Project P.O. #: NOT SUBMITTED
Job Reference: 2093, 2097, 2101 OLD LAKESHORE AND 2096, 2100 LAKESHORE RD
C of C Numbers: 17-821538
Legal Site Desc:

Emily Hansen
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ANALYTICAL REPORT

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Sanitary Sewer By-Law No. 02-03						
(No parameter exceedances)						
Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Storm Sewer By-Law No, 02-03						
(No parameter exceedances)						

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
pH	pH units	6.00-10.0	6.5-8.5	7.45
Total Suspended Solids	mg/L	350	-	69.6

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Anions and Nutrients - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Fluoride (F)	mg/L	10	-	0.13 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	0.34
Phosphorus, Total	mg/L	10.0	-	0.0518
Sulfate (SO4)	mg/L	1500	-	54.9 DLDS

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Cyanide, Total	mg/L	2	-	<0.0020

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Bacteriological Tests - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	Unit	#1	#2	
E. Coli	CFU/100mL	-	200	1

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2	L2388708-1	27-NOV-19	BH2 (MW)
Aluminum (Al)-Total	mg/L	50	-	1.15		
Antimony (Sb)-Total	mg/L	5	-	0.00058		
Arsenic (As)-Total	mg/L	1	-	0.00155		
Beryllium (Be)-Total	mg/L	5	-	<0.00010		
Cadmium (Cd)-Total	mg/L	1	-	0.000013		
Chromium (Cr)-Total	mg/L	3	-	0.00209		
Cobalt (Co)-Total	mg/L	5	-	0.00086		
Copper (Cu)-Total	mg/L	3	-	0.0050		
Iron (Fe)-Total	mg/L	50	-	1.12		
Lead (Pb)-Total	mg/L	3	-	0.00122		
Manganese (Mn)-Total	mg/L	5	-	0.313		
Mercury (Hg)-Total	mg/L	0.05	-	<0.0000050		
Molybdenum (Mo)-Total	mg/L	5	-	0.00488		
Nickel (Ni)-Total	mg/L	3	-	0.00240		
Selenium (Se)-Total	mg/L	5	-	0.00160		
Silver (Ag)-Total	mg/L	5	-	0.000064		
Tin (Sn)-Total	mg/L	5	-	0.00022		
Titanium (Ti)-Total	mg/L	5	-	0.0143		
Zinc (Zn)-Total	mg/L	3	-	0.0068		

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Chromium, Hexavalent	ug/L	-	-	<0.50

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Aggregate Organics - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388708-1 Sample Date: 27-NOV-19 Sample ID: BH2 (MW)
BOD Carbonaceous	mg/L	300	-	<3.0 BODL
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	-	0.0032

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Volatile Organic Compounds - WATER

			Lab ID	L2388708-1
			Sample Date	27-NOV-19
			Sample ID	BH2 (MW)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Chloroform	ug/L	40	-	<1.0 OWP
1,2-Dichlorobenzene	ug/L	-	-	<0.50 OWP
1,3-Dichlorobenzene	ug/L	-	-	<0.50 OWP
1,4-Dichlorobenzene	ug/L	80	-	<0.50 OWP
cis-1,2-Dichloroethylene	ug/L	-	-	<0.50 OWP
Dichloromethane	ug/L	2000	-	<2.0 OWP
trans-1,3-Dichloropropene	ug/L	-	-	<0.50 OWP
1,1,1,2-Tetrachloroethane	ug/L	-	-	<0.50 OWP
Toluene	ug/L	16	-	<0.50 OWP
Trichloroethylene	ug/L	400	-	<0.50 OWP
m+p-Xylenes	ug/L	-	-	<1.0 OWP
Surrogate: 4-Bromofluorobenzene	%	-	-	95.3
Surrogate: 1,4-Difluorobenzene	%	-	-	96.8

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2388708-1	L2388708-2
			Sample Date	27-NOV-19	13-DEC-19
			Sample ID	BH2 (MW)	MW2
Analyte	**Unit**	**Guide Limits #1**	**#2**		
Acenaphthene	ug/L	-	-		<0.010
Acenaphthylene	ug/L	-	-		<0.010
Anthracene	ug/L	-	-		<0.010
Benzo(a)anthracene	ug/L	-	-		0.016
Benzo(a)pyrene	ug/L	-	-		0.019
Benzo(b)fluoranthene	ug/L	-	-		0.032
Benzo(ghi)perylene	ug/L	-	-		0.022
Benzo(k)fluoranthene	ug/L	-	-		<0.010
Chrysene	ug/L	-	-		0.037
Dibenzo(a,h)anthracene	ug/L	-	-		<0.010
Fluoranthene	ug/L	-	-		0.045
Fluorene	ug/L	-	-		<0.010
Indeno(1,2,3-cd)pyrene	ug/L	-	-		0.015
1-Methylnaphthalene	ug/L	-	-		<0.010
2-Methylnaphthalene	ug/L	-	-		<0.010
Naphthalene	ug/L	140	-	<0.020	<0.010
Perylene	ug/L	-	-		<0.010
Phenanthrene	ug/L	-	-		0.022
Pyrene	ug/L	-	-		0.043
Surrogate: 2-Fluorobiphenyl	%	-	-		78.0
Surrogate: d8-Naphthalene	%	-	-	101.1	
Surrogate: p-Terphenyl d14	%	-	-		63.7
Total PAHs	ug/L	5	-		0.251

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Phthalate Esters - WATER

			Lab ID	L2388708-2
			Sample Date	13-DEC-19
			Sample ID	MW2
		Guide Limits		
Analyte	Unit	#1	#2	
Bis(2-ethylhexyl)phthalate	ug/L	12	-	<4.0 DLM
Surrogate: 2-fluorobiphenyl	%	-	-	82.9
Surrogate: p-Terphenyl d14	%	-	-	75.3

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Semi-Volatile Organics - WATER

			Lab ID	L2388708-2
			Sample Date	13-DEC-19
			Sample ID	MW2
Analyte	**Unit**	**Guide Limits #1**	**#2**	
3,3'-Dichlorobenzidine	ug/L	2	-	<0.80 DLM
Di-n-butylphthalate	ug/L	80	-	<2.0 DLM
Surrogate: 2-Fluorobiphenyl	%	-	-	82.9
Surrogate: p-Terphenyl d14	%	-	-	75.3

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Phenolics - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2	L2388708-2	13-DEC-19	MW2
Pentachlorophenol	ug/L	5	-	<1.0 DLM		
Surrogate: 2,4,6-Tribromophenol	%	-	-	85.5		

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2			
				L2388708-1	27-NOV-19	BH2 (MW)
Aroclor 1242	ug/L	-	-	<0.020		
Aroclor 1248	ug/L	-	-	<0.020		
Aroclor 1254	ug/L	-	-	<0.020		
Aroclor 1260	ug/L	-	-	<0.020		
Surrogate: Decachlorobiphenyl	%	-	-	98.1		
Total PCBs	ug/L	-	-	<0.040		
Surrogate: Tetrachloro-m-xylene	%	-	-	81.1		

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Organic Parameters - WATER

		Guide Limits		
		Lab ID		L2388708-2
		Sample Date		13-DEC-19
		Sample ID		MW2
Analyte	**Unit**	**#1**	**#2**	
Bisphenol A	ug/L	-	-	<0.20
Nonylphenol	ug/L	-	-	<1.0
Nonylphenol Diethoxylates	ug/L	-	-	<0.10
Total Nonylphenol Ethoxylates	ug/L	-	-	<10
Nonylphenol Monoethoxylates	ug/L	-	-	<10 DLI
Octylphenol	ug/L	-	-	<1.0
Octylphenol Diethoxylates	ug/L	-	-	<0.50 DLI
Total Octylphenol Ethoxylates	ug/L	-	-	<10
Octylphenol Monoethoxylates	ug/L	-	-	<10 DLI

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLI	Detection Limit Raised: Dilution required to address Internal Standard response problems caused by matrix interference.
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

Reference Information

sediment.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-33DCBENZIDINE-WT	Water	3,3-Dichlorobenzidine	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-BIS-2-PHTH-WT	Water	Bis(2-ethylhexyl)phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-DNB-PHTH-WT	Water	Di-n-Butyl Phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.			
625-PCP-WT	Water	Pentachlorophenol	SW846 8270
BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.			
When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference			
CR-CR6-PWQO-IC-WT	Water	Chromium +6	EPA 7199
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-WW-MF-WT	Water	E. Coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200			
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NP,NPE-LCMS-WT	Water	Nonylphenols and Ethoxylates by LC/MS-MS	J. Chrom A849 (1999) p.467-482

Water samples are filtered and analyzed on LCMS/MS by direct injection.

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-NAPHTHALENE-WT	Water	Polyaromatic Hydrocarbons (PAHs)	SW846 8270

Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and analyzed by GC/MSD.

PAH-SUM-CALC-WT	Water	TOTAL PAH's	CALCULATION

Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.

PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.			
TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.			
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
Aqueous samples are analyzed by headspace-GC/MS.			

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-821538

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2388708 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-33DCBENZIDINE-WT	**Water**							
Batch R4945515								
WG3244032-2 LCS								
3,3'-Dichlorobenzidine			63.7		%		50-140	18-DEC-19
WG3244032-1 MB								
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-BIS-2-PHTH-WT	**Water**							
Batch R4945515								
WG3244032-2 LCS								
Bis(2-ethylhexyl)phthalate			113.3		%		50-140	18-DEC-19
WG3244032-1 MB								
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	18-DEC-19
Surrogate: 2-fluorobiphenyl			83.4		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-DNB-PHTH-WT	**Water**							
Batch R4945515								
WG3244032-2 LCS								
Di-n-butylphthalate			121.1		%		50-150	18-DEC-19
WG3244032-1 MB								
Di-n-butylphthalate			<1.0		ug/L		1	18-DEC-19
Surrogate: 2-Fluorobiphenyl			83.4		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-PAH-LOW-WT	**Water**							
Batch R4945228								
WG3244032-2 LCS								
1-Methylnaphthalene			92.8		%		50-140	18-DEC-19
2-Methylnaphthalene			82.1		%		50-140	18-DEC-19
Acenaphthene			97.2		%		50-140	18-DEC-19
Acenaphthylene			91.0		%		50-140	18-DEC-19
Anthracene			99.2		%		50-140	18-DEC-19
Benzo(a)anthracene			104.9		%		50-140	18-DEC-19
Benzo(a)pyrene			95.4		%		60-130	18-DEC-19
Benzo(b)fluoranthene			107.9		%		50-140	18-DEC-19
Benzo(ghi)perylene			98.5		%		50-140	18-DEC-19
Benzo(k)fluoranthene			91.3		%		50-140	18-DEC-19
Chrysene			114.2		%		50-140	18-DEC-19
Dibenzo(a,h)anthracene			102.3				50-140	

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R4945228								
WG3244032-2 LCS								
Dibenzo(a,h)anthracene			102.3		%		50-140	18-DEC-19
Fluoranthene			102.5		%		50-140	18-DEC-19
Fluorene			99.4		%		50-140	18-DEC-19
Indeno(1,2,3-cd)pyrene			102.1		%		50-140	18-DEC-19
Naphthalene			88.6		%		50-130	18-DEC-19
Perylene			82.6		%		50-140	18-DEC-19
Phenanthrene			101.1		%		50-140	18-DEC-19
Pyrene			100.3		%		50-140	18-DEC-19
WG3244032-1 MB								
1-Methylnaphthalene			<0.010		ug/L		0.01	18-DEC-19
2-Methylnaphthalene			<0.010		ug/L		0.01	18-DEC-19
Acenaphthene			<0.010		ug/L		0.01	18-DEC-19
Acenaphthylene			<0.010		ug/L		0.01	18-DEC-19
Anthracene			<0.010		ug/L		0.01	18-DEC-19
Benzo(a)anthracene			<0.010		ug/L		0.01	18-DEC-19
Benzo(a)pyrene			<0.010		ug/L		0.01	18-DEC-19
Benzo(b)fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Benzo(ghi)perylene			<0.010		ug/L		0.01	18-DEC-19
Benzo(k)fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Chrysene			<0.010		ug/L		0.01	18-DEC-19
Dibenzo(a,h)anthracene			<0.010		ug/L		0.01	18-DEC-19
Fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Fluorene			<0.010		ug/L		0.01	18-DEC-19
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	18-DEC-19
Naphthalene			<0.010		ug/L		0.01	18-DEC-19
Perylene			<0.010		ug/L		0.01	18-DEC-19
Phenanthrene			<0.010		ug/L		0.01	18-DEC-19
Pyrene			<0.010		ug/L		0.01	18-DEC-19
Surrogate: 2-Fluorobiphenyl			78.6		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			79.0		%		40-130	18-DEC-19
625-PCP-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PCP-WT	**Water**							
Batch R4945515								
WG3244032-2 LCS								
Pentachlorophenol			121.9		%		60-130	18-DEC-19
WG3244032-1 MB								
Pentachlorophenol			<0.50		ug/L		0.5	18-DEC-19
Surrogate: 2,4,6-Tribromophenol			82.5		%		40-150	18-DEC-19
BOD-C-WT	**Water**							
Batch R4931289								
WG3230781-6 DUP		**L2388408-1**						
BOD Carbonaceous		<3.0	<3.0	RPD-NA	mg/L	N/A	20	03-DEC-19
WG3230781-7 LCS								
BOD Carbonaceous			93.9		%		85-115	03-DEC-19
WG3230781-5 MB								
BOD Carbonaceous			<2.0		mg/L		2	03-DEC-19
CN-TOT-WT	**Water**							
Batch R4928715								
WG3230705-3 DUP		**L2388352-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	28-NOV-19
WG3230705-2 LCS								
Cyanide, Total			94.4		%		80-120	28-NOV-19
WG3230705-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	28-NOV-19
WG3230705-4 MS		**L2388352-1**						
Cyanide, Total			82.8		%		70-130	28-NOV-19
CR-CR6-PWQO-IC-WT	**Water**							
Batch R4941863								
WG3240755-4 DUP		**WG3240755-3**						
Chromium, Hexavalent		<0.50	<0.50	RPD-NA	ug/L	N/A	20	12-DEC-19
WG3240755-2 LCS								
Chromium, Hexavalent			101.4		%		80-120	12-DEC-19
WG3240755-1 MB								
Chromium, Hexavalent			<0.50		ug/L		0.5	12-DEC-19
WG3240755-5 MS		**WG3240755-3**						
Chromium, Hexavalent			99.3		%		70-130	12-DEC-19
EC-WW-MF-WT	**Water**							

Quality Control Report

Workorder: L2388708 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WW-MF-WT	**Water**							
Batch R4928742								
WG3230487-1 MB								
E. Coli			0		CFU/100mL		1	28-NOV-19
F-IC-N-WT	**Water**							
Batch R4930045								
WG3231676-14 DUP		**WG3231676-13**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3231676-12 LCS								
Fluoride (F)			102.3		%		90-110	29-NOV-19
WG3231676-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	29-NOV-19
WG3231676-15 MS		**WG3231676-13**						
Fluoride (F)			102.5		%		75-125	29-NOV-19
HG-T-CVAA-WT	**Water**							
Batch R4927737								
WG3230449-3 DUP		**WG3230449-5**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	28-NOV-19
WG3230449-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	28-NOV-19
WG3230449-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	28-NOV-19
WG3230449-4 MS		**WG3230449-6**						
Mercury (Hg)-Total			101.0		%		70-130	28-NOV-19
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-4 DUP		**WG3230179-3**						
Aluminum (Al)-Total		0.073	0.057	J	mg/L	0.016	0.1	29-NOV-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-NOV-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-NOV-19
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-NOV-19
Iron (Fe)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	29-NOV-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-NOV-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-4 DUP		**WG3230179-3**						
Manganese (Mn)-Total		0.0419	0.0428		mg/L	2.0	20	29-NOV-19
Molybdenum (Mo)-Total		0.00494	0.00517		mg/L	4.4	20	29-NOV-19
Nickel (Ni)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-NOV-19
Selenium (Se)-Total		0.00956	0.0109		mg/L	13	20	29-NOV-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-NOV-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	29-NOV-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3230179-2 LCS								
Aluminum (Al)-Total			102.6		%		80-120	29-NOV-19
Antimony (Sb)-Total			102.7		%		80-120	29-NOV-19
Arsenic (As)-Total			98.0		%		80-120	29-NOV-19
Beryllium (Be)-Total			99.6		%		80-120	29-NOV-19
Cadmium (Cd)-Total			98.1		%		80-120	29-NOV-19
Chromium (Cr)-Total			100.4		%		80-120	29-NOV-19
Cobalt (Co)-Total			93.8		%		80-120	29-NOV-19
Copper (Cu)-Total			98.1		%		80-120	29-NOV-19
Iron (Fe)-Total			97.1		%		80-120	29-NOV-19
Lead (Pb)-Total			99.5		%		80-120	29-NOV-19
Manganese (Mn)-Total			99.6		%		80-120	29-NOV-19
Molybdenum (Mo)-Total			94.8		%		80-120	29-NOV-19
Nickel (Ni)-Total			98.5		%		80-120	29-NOV-19
Selenium (Se)-Total			96.5		%		80-120	29-NOV-19
Silver (Ag)-Total			100.4		%		80-120	29-NOV-19
Tin (Sn)-Total			97.0		%		80-120	29-NOV-19
Titanium (Ti)-Total			98.8		%		80-120	29-NOV-19
Zinc (Zn)-Total			98.1		%		80-120	29-NOV-19
WG3230179-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	29-NOV-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	29-NOV-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	29-NOV-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-1 MB								
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	29-NOV-19
Iron (Fe)-Total			<0.010		mg/L		0.01	29-NOV-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	29-NOV-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-NOV-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	29-NOV-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-NOV-19
WG3230179-5 MS		**WG3230179-6**						
Aluminum (Al)-Total			92.3		%		70-130	29-NOV-19
Antimony (Sb)-Total			97.0		%		70-130	29-NOV-19
Arsenic (As)-Total			94.2		%		70-130	29-NOV-19
Beryllium (Be)-Total			92.6		%		70-130	29-NOV-19
Cadmium (Cd)-Total			95.8		%		70-130	29-NOV-19
Chromium (Cr)-Total			96.2		%		70-130	29-NOV-19
Cobalt (Co)-Total			91.1		%		70-130	29-NOV-19
Copper (Cu)-Total			97.1		%		70-130	29-NOV-19
Iron (Fe)-Total			95.3		%		70-130	29-NOV-19
Lead (Pb)-Total			94.8		%		70-130	29-NOV-19
Manganese (Mn)-Total			97.1		%		70-130	29-NOV-19
Molybdenum (Mo)-Total			90.6		%		70-130	29-NOV-19
Nickel (Ni)-Total			96.2		%		70-130	29-NOV-19
Selenium (Se)-Total			95.5		%		70-130	29-NOV-19
Silver (Ag)-Total			94.9		%		70-130	29-NOV-19
Tin (Sn)-Total			91.9		%		70-130	29-NOV-19
Titanium (Ti)-Total			94.9		%		70-130	29-NOV-19
Zinc (Zn)-Total			93.4		%		70-130	29-NOV-19
NP,NPE-LCMS-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R4944721								
WG3243683-3 DUP		**L2388708-2**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-19
Nonylphenol Monoethoxylates		<10	<10	RPD-NA	ug/L	N/A	30	17-DEC-19
Nonylphenol Diethoxylates		<0.10	<0.10	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol Monoethoxylates		<10	<10	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol Diethoxylates		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-19
Bisphenol A		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-19
WG3243683-2 LCS								
Nonylphenol			79.1		%		75-125	17-DEC-19
Nonylphenol Monoethoxylates			99.0		%		75-125	17-DEC-19
Nonylphenol Diethoxylates			105.0		%		75-125	17-DEC-19
Octylphenol			89.2		%		75-125	17-DEC-19
Octylphenol Monoethoxylates			110.5		%		75-125	17-DEC-19
Octylphenol Diethoxylates			107.0		%		75-125	17-DEC-19
Bisphenol A			106.0		%		75-125	17-DEC-19
WG3243683-1 MB								
Nonylphenol			<1.0		ug/L		1	17-DEC-19
Nonylphenol Monoethoxylates			<2.0		ug/L		2	17-DEC-19
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	17-DEC-19
Octylphenol			<1.0		ug/L		1	17-DEC-19
Octylphenol Monoethoxylates			<2.0		ug/L		2	17-DEC-19
Octylphenol Diethoxylates			<0.10		ug/L		0.1	17-DEC-19
Bisphenol A			<0.20		ug/L		0.2	17-DEC-19
WG3243683-4 MS		**L2388708-2**						
Nonylphenol			85.4		%		50-150	17-DEC-19
Nonylphenol Monoethoxylates			79.1		%		50-150	17-DEC-19
Nonylphenol Diethoxylates			102.2		%		50-150	17-DEC-19
Octylphenol			92.3		%		50-150	17-DEC-19
Octylphenol Monoethoxylates			83.0		%		50-150	17-DEC-19
Octylphenol Diethoxylates			92.6		%		50-150	17-DEC-19
Bisphenol A			81.5		%		50-150	17-DEC-19
OGG-SPEC-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-SPEC-WT	**Water**							
Batch R4940403								
WG3239283-2 LCS								
Oil and Grease, Total			89.4		%		70-130	11-DEC-19
Mineral Oil and Grease			78.9		%		70-130	11-DEC-19
WG3239283-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	11-DEC-19
Mineral Oil and Grease			<2.5		mg/L		2.5	11-DEC-19
P-T-COL-WT	**Water**							
Batch R4929822								
WG3232019-3 DUP		**L2388602-1**						
Phosphorus, Total		0.0081	0.0069		mg/L	16	20	02-DEC-19
WG3232019-2 LCS								
Phosphorus, Total			109.9		%		80-120	02-DEC-19
WG3232019-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	02-DEC-19
WG3232019-4 MS		**L2388602-1**						
Phosphorus, Total			126.4		%		70-130	02-DEC-19
PAH-NAPHTHALENE-WT	**Water**							
Batch R4930454								
WG3230150-2 LCS								
Naphthalene			84.5		%		50-130	03-DEC-19
WG3230150-1 MB								
Naphthalene			<0.020		ug/L		0.02	03-DEC-19
Surrogate: d8-Naphthalene			106.0		%		60-140	03-DEC-19
PCB-WT	**Water**							
Batch R4941608								
WG3239770-2 LCS								
Aroclor 1242			89.4		%		65-130	11-DEC-19
Aroclor 1248			81.6		%		65-130	11-DEC-19
Aroclor 1254			111.8		%		65-130	11-DEC-19
Aroclor 1260			127.5		%		65-130	11-DEC-19
WG3239770-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1248			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1254			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1260			<0.020		ug/L		0.02	11-DEC-19
Surrogate: Decachlorobiphenyl			106.6		%		50-150	11-DEC-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-WT	**Water**							
Batch R4941608								
WG3239770-1 MB								
Surrogate: Tetrachloro-m-xylene			58.3		%		50-150	11-DEC-19
PH-WT	**Water**							
Batch R4928383								
WG3230815-4 DUP		**WG3230815-3**						
pH		7.94	7.94	J	pH units	0.00	0.2	28-NOV-19
WG3230815-2 LCS								
pH			7.02		pH units		6.9-7.1	28-NOV-19
PHENOLS-4AAP-WT	**Water**							
Batch R4928410								
WG3230650-15 DUP		**L2388865-1**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-NOV-19
WG3230650-14 LCS								
Phenols (4AAP)			111.2		%		85-115	28-NOV-19
WG3230650-13 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	28-NOV-19
WG3230650-16 MS		**L2388865-1**						
Phenols (4AAP)			107.3		%		75-125	28-NOV-19
SO4-IC-N-WT	**Water**							
Batch R4930045								
WG3231676-14 DUP		**WG3231676-13**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3231676-12 LCS								
Sulfate (SO4)			102.5		%		90-110	29-NOV-19
WG3231676-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	29-NOV-19
WG3231676-15 MS		**WG3231676-13**						
Sulfate (SO4)			102.0		%		75-125	29-NOV-19
SOLIDS-TSS-WT	**Water**							
Batch R4930350								
WG3232726-2 LCS								
Total Suspended Solids			100.2		%		85-115	03-DEC-19
WG3232726-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-DEC-19
TKN-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4928025								
WG3230379-3 DUP		**L2388408-1**						
Total Kjeldahl Nitrogen		0.82	0.80		mg/L	3.3	20	28-NOV-19
WG3230379-2 LCS								
Total Kjeldahl Nitrogen			100.6		%		75-125	28-NOV-19
WG3230379-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	28-NOV-19
WG3230379-4 MS		**L2388408-1**						
Total Kjeldahl Nitrogen			88.4		%		70-130	28-NOV-19
VOC-ROU-HS-WT	**Water**							
Batch R4929795								
WG3232697-4 DUP		**WG3232697-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-DEC-19
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-DEC-19
m+p-Xylenes		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-DEC-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
trans-1,3-Dichloropropene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
WG3232697-1 LCS								
1,1,1,2-Tetrachloroethane			91.8		%		70-130	02-DEC-19
1,2-Dichlorobenzene			87.6		%		70-130	02-DEC-19
1,3-Dichlorobenzene			87.0		%		70-130	02-DEC-19
1,4-Dichlorobenzene			86.7		%		70-130	02-DEC-19
Chloroform			99.0		%		70-130	02-DEC-19
cis-1,2-Dichloroethylene			96.5		%		70-130	02-DEC-19
Dichloromethane			98.2		%		70-130	02-DEC-19
m+p-Xylenes			87.9		%		70-130	02-DEC-19
Toluene			90.5		%		70-130	02-DEC-19
trans-1,3-Dichloropropene			92.3		%		70-130	02-DEC-19
Trichloroethylene			97.3		%		70-130	02-DEC-19
WG3232697-2 MB								

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4929795								
WG3232697-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	02-DEC-19
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
1,3-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
Chloroform			<1.0		ug/L		1	02-DEC-19
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-DEC-19
Dichloromethane			<2.0		ug/L		2	02-DEC-19
m+p-Xylenes			<1.0		ug/L		1	02-DEC-19
Toluene			<0.50		ug/L		0.5	02-DEC-19
trans-1,3-Dichloropropene			<0.50		ug/L		0.5	02-DEC-19
Trichloroethylene			<0.50		ug/L		0.5	02-DEC-19
Surrogate: 1,4-Difluorobenzene			97.0		%		70-130	02-DEC-19
Surrogate: 4-Bromofluorobenzene			94.7		%		70-130	02-DEC-19
WG3232697-5 MS		**WG3232697-3**						
1,1,1,2-Tetrachloroethane			93.3		%		50-150	03-DEC-19
1,2-Dichlorobenzene			88.7		%		50-150	03-DEC-19
1,3-Dichlorobenzene			85.4		%		50-150	03-DEC-19
1,4-Dichlorobenzene			85.4		%		50-150	03-DEC-19
Chloroform			101.7		%		50-150	03-DEC-19
cis-1,2-Dichloroethylene			97.7		%		50-150	03-DEC-19
Dichloromethane			99.9		%		50-150	03-DEC-19
m+p-Xylenes			86.6		%		50-150	03-DEC-19
Toluene			89.4		%		50-150	03-DEC-19
trans-1,3-Dichloropropene			91.7		%		50-150	03-DEC-19
Trichloroethylene			97.9		%		50-150	03-DEC-19

Quality Control Report

Workorder: L2388708 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLI	Detection Limit Raised: Dilution required to address Internal Standard response problems caused by matrix interference.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2388708-COFC

COC Number: 17 - 821538

Page of

Report To	Contact and company name below will appear on the final report
Company:	Fisher Environmental
Contact:	Clive
Phone:	416-605-9722
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To [ ] YES [ ] NO
	Copy of Invoice with Report [ ] YES [ ] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [x] PDF [ ] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [ ] YES [ ] NO

[x] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [x] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: clive@fisherenvironmental.com

Email 2: frank

Email 3:

Invoice Distribution

Select Invoice Distribution: [x] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: clive@fisherenvironmental

Email 2: clive

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R]: [x] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days):
- 4 day [P4-20%] [ ]
- 3 day [P3-25%] [ ]
- 2 day [P2-50%] [ ]

EMERGENCY:
- 1 Business day [E - 100%] [ ]
- Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2388708RD

ALS Contact: E H

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS: Hydrocarbons	Sewer Bylaw	Storm + Sanitary	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	2093, 2097, 2101 Old Lakeshore and 2096, 2100 Lakeshore Rd, Burlington, ON								
	BH2 (MW)	27/11/2019		Water	✓				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [x] NO

Are samples for human consumption/ use? [ ] YES [x] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please compare results with storm & sanitary guides and highlight exceedances.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [x] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
[redacted]				11.3			

SHIPMENT RELEASE (client use)

Released by: Ryan Linder Date: NOV 27 2019 Time: 2:16pm

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: [redacted] Date: NOV [redacted] Time: 14:15

FINAL SHIPMENT RECEPTION (lab use only)

Received by: [redacted] Date: NOV 27/19 Time: 18:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

FISHER ENVIRONMENTAL
ATTN: CLIVE
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Date Received: 13-DEC-19
Report Date: 19-DEC-19 14:29 (MT)
Version: FINAL REV. 3

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2388710

Project P.O. #: NOT SUBMITTED
Job Reference: 19-9969
C of C Numbers: 17-821540
Legal Site Desc:

Emily Hansen
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ANALYTICAL REPORT

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit	Guideline

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Sanitary Sewer By-Law No. 02-03

(No parameter exceedances)

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Storm Sewer By-Law No, 02-03

(No parameter exceedances)

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388710-1 Sample Date: 27-NOV-19 Sample ID: MW301
pH	pH units	6.00-10.0	6.5-8.5	7.12
Total Suspended Solids	mg/L	350	-	95.4

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Anions and Nutrients - WATER

			Lab ID	L2388710-1
			Sample Date	27-NOV-19
			Sample ID	MW301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Fluoride (F)	mg/L	10	-	<0.40 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	8.05
Phosphorus, Total	mg/L	10.0	-	0.0384
Sulfate (SO4)	mg/L	1500	-	845 DLDS

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L2388710-1
			Sample Date	27-NOV-19
			Sample ID	MW301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Cyanide, Total	mg/L	2	-	<0.0020

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Bacteriological Tests - WATER

			Lab ID	L2388710-1
			Sample Date	27-NOV-19
			Sample ID	MW301
		Guide Limits		
Analyte	Unit	#1	#2	
E. Coli	CFU/100mL	-	200	0

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Total Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388710-1 Sample Date: 27-NOV-19 Sample ID: MW301
Aluminum (Al)-Total	mg/L	50	-	0.647 DLHC
Antimony (Sb)-Total	mg/L	5	-	0.0026 DLHC
Arsenic (As)-Total	mg/L	1	-	0.0023 DLHC
Beryllium (Be)-Total	mg/L	5	-	<0.0010 DLHC
Cadmium (Cd)-Total	mg/L	1	-	<0.000050 DLHC
Chromium (Cr)-Total	mg/L	3	-	0.0056 DLHC
Cobalt (Co)-Total	mg/L	5	-	<0.0010 DLHC
Copper (Cu)-Total	mg/L	3	-	<0.010 DLHC
Iron (Fe)-Total	mg/L	50	-	3.10 DLHC
Lead (Pb)-Total	mg/L	3	-	0.00057 DLHC
Manganese (Mn)-Total	mg/L	5	-	0.517 DLHC
Mercury (Hg)-Total	mg/L	0.05	-	<0.0000050
Molybdenum (Mo)-Total	mg/L	5	-	0.00397 DLHC
Nickel (Ni)-Total	mg/L	3	-	<0.0050 DLHC
Selenium (Se)-Total	mg/L	5	-	<0.00050 DLHC
Silver (Ag)-Total	mg/L	5	-	<0.00050 DLHC
Tin (Sn)-Total	mg/L	5	-	<0.0010 DLHC
Titanium (Ti)-Total	mg/L	5	-	0.0147 DLHC
Zinc (Zn)-Total	mg/L	3	-	<0.030 DLHC

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388710-1 Sample Date: 27-NOV-19 Sample ID: MW301
Chromium, Hexavalent	ug/L	-	-	<0.50

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Aggregate Organics - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388710-1 Sample Date: 27-NOV-19 Sample ID: MW301
BOD Carbonaceous	mg/L	300	-	<2.0
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	-	0.0073

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Volatile Organic Compounds - WATER

			Lab ID	L2388710-1
			Sample Date	27-NOV-19
			Sample ID	MW301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Benzene	ug/L	10	-	<0.50 OWP
Chloroform	ug/L	40	-	<1.0 OWP
1,2-Dichlorobenzene	ug/L	-	-	<0.50 OWP
1,3-Dichlorobenzene	ug/L	-	-	<0.50 OWP
1,4-Dichlorobenzene	ug/L	80	-	<0.50 OWP
cis-1,2-Dichloroethylene	ug/L	-	-	<0.50 OWP
Dichloromethane	ug/L	2000	-	<2.0 OWP
trans-1,3-Dichloropropene	ug/L	-	-	<0.50 OWP
Ethylbenzene	ug/L	160	-	<0.50 OWP
1,1,2,2-Tetrachloroethane	ug/L	-	-	<0.50 OWP
Tetrachloroethylene	ug/L	1000	-	<0.50 OWP
Toluene	ug/L	16	-	<0.50 OWP
Trichloroethylene	ug/L	400	-	<0.50 OWP
m+p-Xylenes	ug/L	-	-	<1.0 OWP
Surrogate: 4-Bromofluorobenzene	%	-	-	95.5
Surrogate: 1,4-Difluorobenzene	%	-	-	96.7

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polycyclic Aromatic Hydrocarbons - WATER

		Guide Limits			
Lab ID				L2388710-1	L2388710-2
Sample Date				27-NOV-19	13-DEC-19
Sample ID				MW301	MW301 (2)
Analyte	**Unit**	**#1**	**#2**		
Acenaphthene	ug/L	-	-		<0.010
Acenaphthylene	ug/L	-	-		<0.010
Anthracene	ug/L	-	-		<0.010
Benzo(a)anthracene	ug/L	-	-		0.044
Benzo(a)pyrene	ug/L	-	-		0.053
Benzo(b)fluoranthene	ug/L	-	-		0.089
Benzo(ghi)perylene	ug/L	-	-		0.062
Benzo(k)fluoranthene	ug/L	-	-		0.019
Chrysene	ug/L	-	-		0.086
Dibenzo(a,h)anthracene	ug/L	-	-		0.014
Fluoranthene	ug/L	-	-		0.112
Fluorene	ug/L	-	-		<0.010
Indeno(1,2,3-cd)pyrene	ug/L	-	-		0.044
1-Methylnaphthalene	ug/L	-	-		<0.010
2-Methylnaphthalene	ug/L	-	-		<0.010
Naphthalene	ug/L	140	-	<0.020	0.020
Perylene	ug/L	-	-		0.015
Phenanthrene	ug/L	-	-		0.040
Pyrene	ug/L	-	-		0.088
Surrogate: 2-Fluorobiphenyl	%	-	-		79.7
Surrogate: d8-Naphthalene	%	-	-	99.9	
Surrogate: p-Terphenyl d14	%	-	-		74.3
Total PAHs	ug/L	5	-		0.687

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Phthalate Esters - WATER

			Lab ID	L2388710-2
			Sample Date	13-DEC-19
			Sample ID	MW301 (2)
		Guide Limits		
Analyte	Unit	#1	#2	
Bis(2-ethylhexyl)phthalate	ug/L	12	-	<2.0
Surrogate: 2-fluorobiphenyl	%	-	-	86.4
Surrogate: p-Terphenyl d14	%	-	-	91.4

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Semi-Volatile Organics - WATER

			Lab ID	L2388710-2
			Sample Date	13-DEC-19
			Sample ID	MW301 (2)
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
3,3'-Dichlorobenzidine	ug/L	2	-	<0.40
Di-n-butylphthalate	ug/L	80	-	<1.0
Surrogate: 2-Fluorobiphenyl	%	-	-	86.4
Surrogate: p-Terphenyl d14	%	-	-	91.4

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Phenolics - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2			
				L2388710-2	13-DEC-19	MW301 (2)
Pentachlorophenol	ug/L	5	-	<0.50		
Surrogate: 2,4,6-Tribromophenol	%	-	-	98.4		

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polychlorinated Biphenyls - WATER

			Lab ID	L2388710-1
			Sample Date	27-NOV-19
			Sample ID	MW301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Aroclor 1242	ug/L	-	-	<0.020
Aroclor 1248	ug/L	-	-	<0.020
Aroclor 1254	ug/L	-	-	<0.020
Aroclor 1260	ug/L	-	-	<0.020
Surrogate: Decachlorobiphenyl	%	-	-	89.4
Total PCBs	ug/L	-	-	<0.040
Surrogate: Tetrachloro-m-xylene	%	-	-	71.6

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Organic Parameters - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2388710-2 Sample Date: 13-DEC-19 Sample ID: MW301 (2)
Bisphenol A	ug/L	-	-	2.12
Nonylphenol	ug/L	-	-	<1.0
Nonylphenol Diethoxylates	ug/L	-	-	<0.10
Total Nonylphenol Ethoxylates	ug/L	-	-	<50
Nonylphenol Monoethoxylates	ug/L	-	-	<50 DLI
Octylphenol	ug/L	-	-	<1.0
Octylphenol Diethoxylates	ug/L	-	-	<2.5 DLI
Total Octylphenol Ethoxylates	ug/L	-	-	<50
Octylphenol Monoethoxylates	ug/L	-	-	<50 DLI

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLI	Detection Limit Raised: Dilution required to address Internal Standard response problems caused by matrix interference.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

Reference Information

sediment.

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-33DCBENZIDINE-WT	Water	3,3-Dichlorobenzidine	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-BIS-2-PHTH-WT	Water	Bis(2-ethylhexyl)phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-DNB-PHTH-WT	Water	Di-n-Butyl Phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.			
625-PCP-WT	Water	Pentachlorophenol	SW846 8270
BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex. When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference			
CR-CR6-PWQO-IC-WT	Water	Chromium +6	EPA 7199
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-WW-MF-WT	Water	E. Coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NP,NPE-LCMS-WT	Water	Nonylphenols and Ethoxylates by LC/MS-MS	J. Chrom A849 (1999) p.467-482

Water samples are filtered and analyzed on LCMS/MS by direct injection.

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-NAPHTHALENE-WT	Water	Polyaromatic Hydrocarbons (PAHs)	SW846 8270

Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and analyzed by GC/MSD.

PAH-SUM-CALC-WT	Water	TOTAL PAH's	CALCULATION

Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.

PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260

Aqueous samples are analyzed by headspace-GC/MS.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-821540

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2388710 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-33DCBENZIDINE-WT	**Water**							
Batch	**R4945515**							
WG3244032-2	**LCS**							
3,3'-Dichlorobenzidine			63.7		%		50-140	18-DEC-19
WG3244032-1	**MB**							
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-BIS-2-PHTH-WT	**Water**							
Batch	**R4945515**							
WG3244032-2	**LCS**							
Bis(2-ethylhexyl)phthalate			113.3		%		50-140	18-DEC-19
WG3244032-1	**MB**							
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	18-DEC-19
Surrogate: 2-fluorobiphenyl			83.4		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-DNB-PHTH-WT	**Water**							
Batch	**R4945515**							
WG3244032-2	**LCS**							
Di-n-butylphthalate			121.1		%		50-150	18-DEC-19
WG3244032-1	**MB**							
Di-n-butylphthalate			<1.0		ug/L		1	18-DEC-19
Surrogate: 2-Fluorobiphenyl			83.4		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			104.9		%		40-130	18-DEC-19
625-PAH-LOW-WT	**Water**							
Batch	**R4945228**							
WG3244032-2	**LCS**							
1-Methylnaphthalene			92.8		%		50-140	18-DEC-19
2-Methylnaphthalene			82.1		%		50-140	18-DEC-19
Acenaphthene			97.2		%		50-140	18-DEC-19
Acenaphthylene			91.0		%		50-140	18-DEC-19
Anthracene			99.2		%		50-140	18-DEC-19
Benzo(a)anthracene			104.9		%		50-140	18-DEC-19
Benzo(a)pyrene			95.4		%		60-130	18-DEC-19
Benzo(b)fluoranthene			107.9		%		50-140	18-DEC-19
Benzo(ghi)perylene			98.5		%		50-140	18-DEC-19
Benzo(k)fluoranthene			91.3		%		50-140	18-DEC-19
Chrysene			114.2		%		50-140	18-DEC-19
Dibenzo(a,h)anthracene			102.3				50-140	

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R4945228								
WG3244032-2 LCS								
Dibenzo(a,h)anthracene			102.3		%		50-140	18-DEC-19
Fluoranthene			102.5		%		50-140	18-DEC-19
Fluorene			99.4		%		50-140	18-DEC-19
Indeno(1,2,3-cd)pyrene			102.1		%		50-140	18-DEC-19
Naphthalene			88.6		%		50-130	18-DEC-19
Perylene			82.6		%		50-140	18-DEC-19
Phenanthrene			101.1		%		50-140	18-DEC-19
Pyrene			100.3		%		50-140	18-DEC-19
WG3244032-1 MB								
1-Methylnaphthalene			<0.010		ug/L		0.01	18-DEC-19
2-Methylnaphthalene			<0.010		ug/L		0.01	18-DEC-19
Acenaphthene			<0.010		ug/L		0.01	18-DEC-19
Acenaphthylene			<0.010		ug/L		0.01	18-DEC-19
Anthracene			<0.010		ug/L		0.01	18-DEC-19
Benzo(a)anthracene			<0.010		ug/L		0.01	18-DEC-19
Benzo(a)pyrene			<0.010		ug/L		0.01	18-DEC-19
Benzo(b)fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Benzo(ghi)perylene			<0.010		ug/L		0.01	18-DEC-19
Benzo(k)fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Chrysene			<0.010		ug/L		0.01	18-DEC-19
Dibenzo(a,h)anthracene			<0.010		ug/L		0.01	18-DEC-19
Fluoranthene			<0.010		ug/L		0.01	18-DEC-19
Fluorene			<0.010		ug/L		0.01	18-DEC-19
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	18-DEC-19
Naphthalene			<0.010		ug/L		0.01	18-DEC-19
Perylene			<0.010		ug/L		0.01	18-DEC-19
Phenanthrene			<0.010		ug/L		0.01	18-DEC-19
Pyrene			<0.010		ug/L		0.01	18-DEC-19
Surrogate: 2-Fluorobiphenyl			78.6		%		40-130	18-DEC-19
Surrogate: p-Terphenyl d14			79.0		%		40-130	18-DEC-19
625-PCP-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PCP-WT	**Water**							
Batch R4945515								
WG3244032-2 LCS								
Pentachlorophenol			121.9		%		60-130	18-DEC-19
WG3244032-1 MB								
Pentachlorophenol			<0.50		ug/L		0.5	18-DEC-19
Surrogate: 2,4,6-Tribromophenol			82.5		%		40-150	18-DEC-19
BOD-C-WT	**Water**							
Batch R4931289								
WG3230781-6 DUP		**L2388408-1**						
BOD Carbonaceous		<3.0	<3.0	RPD-NA	mg/L	N/A	20	03-DEC-19
WG3230781-7 LCS								
BOD Carbonaceous			93.9		%		85-115	03-DEC-19
WG3230781-5 MB								
BOD Carbonaceous			<2.0		mg/L		2	03-DEC-19
CN-TOT-WT	**Water**							
Batch R4928715								
WG3230705-7 DUP		**L2388602-1**						
Cyanide, Total		0.0076	0.0077		mg/L	1.6	20	28-NOV-19
WG3230705-6 LCS								
Cyanide, Total			105.3		%		80-120	28-NOV-19
WG3230705-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	28-NOV-19
WG3230705-8 MS		**L2388602-1**						
Cyanide, Total			89.7		%		70-130	28-NOV-19
CR-CR6-PWQO-IC-WT	**Water**							
Batch R4941863								
WG3240755-4 DUP		**WG3240755-3**						
Chromium, Hexavalent		<0.50	<0.50	RPD-NA	ug/L	N/A	20	12-DEC-19
WG3240755-2 LCS								
Chromium, Hexavalent			101.4		%		80-120	12-DEC-19
WG3240755-1 MB								
Chromium, Hexavalent			<0.50		ug/L		0.5	12-DEC-19
WG3240755-5 MS		**WG3240755-3**						
Chromium, Hexavalent			99.3		%		70-130	12-DEC-19
EC-WW-MF-WT	**Water**							

Quality Control Report

Workorder: L2388710 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WW-MF-WT	**Water**							
Batch R4928742								
WG3230487-1 MB								
E. Coli			0		CFU/100mL		1	28-NOV-19
F-IC-N-WT	**Water**							
Batch R4930045								
WG3231676-14 DUP		**WG3231676-13**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3231676-12 LCS								
Fluoride (F)			102.3		%		90-110	29-NOV-19
WG3231676-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	29-NOV-19
WG3231676-15 MS		**WG3231676-13**						
Fluoride (F)			102.5		%		75-125	29-NOV-19
HG-T-CVAA-WT	**Water**							
Batch R4927737								
WG3230449-3 DUP		**WG3230449-5**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	28-NOV-19
WG3230449-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	28-NOV-19
WG3230449-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	28-NOV-19
WG3230449-4 MS		**WG3230449-6**						
Mercury (Hg)-Total			101.0		%		70-130	28-NOV-19
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-4 DUP		**WG3230179-3**						
Aluminum (Al)-Total		0.073	0.057	J	mg/L	0.016	0.1	29-NOV-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	29-NOV-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-NOV-19
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-NOV-19
Iron (Fe)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	29-NOV-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-NOV-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-4 DUP		**WG3230179-3**						
Manganese (Mn)-Total		0.0419	0.0428		mg/L	2.0	20	29-NOV-19
Molybdenum (Mo)-Total		0.00494	0.00517		mg/L	4.4	20	29-NOV-19
Nickel (Ni)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-NOV-19
Selenium (Se)-Total		0.00956	0.0109		mg/L	13	20	29-NOV-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	29-NOV-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-NOV-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	29-NOV-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3230179-2 LCS								
Aluminum (Al)-Total			102.6		%		80-120	29-NOV-19
Antimony (Sb)-Total			102.7		%		80-120	29-NOV-19
Arsenic (As)-Total			98.0		%		80-120	29-NOV-19
Beryllium (Be)-Total			99.6		%		80-120	29-NOV-19
Cadmium (Cd)-Total			98.1		%		80-120	29-NOV-19
Chromium (Cr)-Total			100.4		%		80-120	29-NOV-19
Cobalt (Co)-Total			93.8		%		80-120	29-NOV-19
Copper (Cu)-Total			98.1		%		80-120	29-NOV-19
Iron (Fe)-Total			97.1		%		80-120	29-NOV-19
Lead (Pb)-Total			99.5		%		80-120	29-NOV-19
Manganese (Mn)-Total			99.6		%		80-120	29-NOV-19
Molybdenum (Mo)-Total			94.8		%		80-120	29-NOV-19
Nickel (Ni)-Total			98.5		%		80-120	29-NOV-19
Selenium (Se)-Total			96.5		%		80-120	29-NOV-19
Silver (Ag)-Total			100.4		%		80-120	29-NOV-19
Tin (Sn)-Total			97.0		%		80-120	29-NOV-19
Titanium (Ti)-Total			98.8		%		80-120	29-NOV-19
Zinc (Zn)-Total			98.1		%		80-120	29-NOV-19
WG3230179-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	29-NOV-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	29-NOV-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	29-NOV-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4927485								
WG3230179-1 MB								
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	29-NOV-19
Iron (Fe)-Total			<0.010		mg/L		0.01	29-NOV-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	29-NOV-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	29-NOV-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	29-NOV-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	29-NOV-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	29-NOV-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	29-NOV-19
WG3230179-5 MS		**WG3230179-6**						
Aluminum (Al)-Total			92.3		%		70-130	29-NOV-19
Antimony (Sb)-Total			97.0		%		70-130	29-NOV-19
Arsenic (As)-Total			94.2		%		70-130	29-NOV-19
Beryllium (Be)-Total			92.6		%		70-130	29-NOV-19
Cadmium (Cd)-Total			95.8		%		70-130	29-NOV-19
Chromium (Cr)-Total			96.2		%		70-130	29-NOV-19
Cobalt (Co)-Total			91.1		%		70-130	29-NOV-19
Copper (Cu)-Total			97.1		%		70-130	29-NOV-19
Iron (Fe)-Total			95.3		%		70-130	29-NOV-19
Lead (Pb)-Total			94.8		%		70-130	29-NOV-19
Manganese (Mn)-Total			97.1		%		70-130	29-NOV-19
Molybdenum (Mo)-Total			90.6		%		70-130	29-NOV-19
Nickel (Ni)-Total			96.2		%		70-130	29-NOV-19
Selenium (Se)-Total			95.5		%		70-130	29-NOV-19
Silver (Ag)-Total			94.9		%		70-130	29-NOV-19
Tin (Sn)-Total			91.9		%		70-130	29-NOV-19
Titanium (Ti)-Total			94.9		%		70-130	29-NOV-19
Zinc (Zn)-Total			93.4		%		70-130	29-NOV-19
NP,NPE-LCMS-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R4944721								
WG3243683-3 DUP		**L2388708-2**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-19
Nonylphenol Monoethoxylates		<10	<10	RPD-NA	ug/L	N/A	30	17-DEC-19
Nonylphenol Diethoxylates		<0.10	<0.10	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol Monoethoxylates		<10	<10	RPD-NA	ug/L	N/A	30	17-DEC-19
Octylphenol Diethoxylates		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-19
Bisphenol A		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-19
WG3243683-2 LCS								
Nonylphenol			79.1		%		75-125	17-DEC-19
Nonylphenol Monoethoxylates			99.0		%		75-125	17-DEC-19
Nonylphenol Diethoxylates			105.0		%		75-125	17-DEC-19
Octylphenol			89.2		%		75-125	17-DEC-19
Octylphenol Monoethoxylates			110.5		%		75-125	17-DEC-19
Octylphenol Diethoxylates			107.0		%		75-125	17-DEC-19
Bisphenol A			106.0		%		75-125	17-DEC-19
WG3243683-1 MB								
Nonylphenol			<1.0		ug/L		1	17-DEC-19
Nonylphenol Monoethoxylates			<2.0		ug/L		2	17-DEC-19
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	17-DEC-19
Octylphenol			<1.0		ug/L		1	17-DEC-19
Octylphenol Monoethoxylates			<2.0		ug/L		2	17-DEC-19
Octylphenol Diethoxylates			<0.10		ug/L		0.1	17-DEC-19
Bisphenol A			<0.20		ug/L		0.2	17-DEC-19
WG3243683-4 MS		**L2388708-2**						
Nonylphenol			85.4		%		50-150	17-DEC-19
Nonylphenol Monoethoxylates			79.1		%		50-150	17-DEC-19
Nonylphenol Diethoxylates			102.2		%		50-150	17-DEC-19
Octylphenol			92.3		%		50-150	17-DEC-19
Octylphenol Monoethoxylates			83.0		%		50-150	17-DEC-19
Octylphenol Diethoxylates			92.6		%		50-150	17-DEC-19
Bisphenol A			81.5		%		50-150	17-DEC-19
OGG-SPEC-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-SPEC-WT	**Water**							
Batch R4940403								
WG3239283-2 LCS								
Oil and Grease, Total			89.4		%		70-130	11-DEC-19
Mineral Oil and Grease			78.9		%		70-130	11-DEC-19
WG3239283-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	11-DEC-19
Mineral Oil and Grease			<2.5		mg/L		2.5	11-DEC-19
P-T-COL-WT	**Water**							
Batch R4929822								
WG3232019-3 DUP		**L2388602-1**						
Phosphorus, Total		0.0081	0.0069		mg/L	16	20	02-DEC-19
WG3232019-2 LCS								
Phosphorus, Total			109.9		%		80-120	02-DEC-19
WG3232019-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	02-DEC-19
WG3232019-4 MS		**L2388602-1**						
Phosphorus, Total			126.4		%		70-130	02-DEC-19
PAH-NAPHTHALENE-WT	**Water**							
Batch R4930454								
WG3230150-2 LCS								
Naphthalene			84.5		%		50-130	03-DEC-19
WG3230150-1 MB								
Naphthalene			<0.020		ug/L		0.02	03-DEC-19
Surrogate: d8-Naphthalene			106.0		%		60-140	03-DEC-19
PCB-WT	**Water**							
Batch R4941608								
WG3239770-2 LCS								
Aroclor 1242			89.4		%		65-130	11-DEC-19
Aroclor 1248			81.6		%		65-130	11-DEC-19
Aroclor 1254			111.8		%		65-130	11-DEC-19
Aroclor 1260			127.5		%		65-130	11-DEC-19
WG3239770-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1248			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1254			<0.020		ug/L		0.02	11-DEC-19
Aroclor 1260			<0.020		ug/L		0.02	11-DEC-19
Surrogate: Decachlorobiphenyl			106.6		%		50-150	11-DEC-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-WT	**Water**							
Batch R4941608								
WG3239770-1 MB								
Surrogate: Tetrachloro-m-xylene			58.3		%		50-150	11-DEC-19
PH-WT	**Water**							
Batch R4928383								
WG3230815-4 DUP		**WG3230815-3**						
pH		7.94	7.94	J	pH units	0.00	0.2	28-NOV-19
WG3230815-2 LCS								
pH			7.02		pH units		6.9-7.1	28-NOV-19
PHENOLS-4AAP-WT	**Water**							
Batch R4928410								
WG3230650-15 DUP		**L2388865-1**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-NOV-19
WG3230650-14 LCS								
Phenols (4AAP)			111.2		%		85-115	28-NOV-19
WG3230650-13 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	28-NOV-19
WG3230650-16 MS		**L2388865-1**						
Phenols (4AAP)			107.3		%		75-125	28-NOV-19
SO4-IC-N-WT	**Water**							
Batch R4930045								
WG3231676-14 DUP		**WG3231676-13**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	29-NOV-19
WG3231676-12 LCS								
Sulfate (SO4)			102.5		%		90-110	29-NOV-19
WG3231676-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	29-NOV-19
WG3231676-15 MS		**WG3231676-13**						
Sulfate (SO4)			102.0		%		75-125	29-NOV-19
SOLIDS-TSS-WT	**Water**							
Batch R4930350								
WG3232726-2 LCS								
Total Suspended Solids			100.2		%		85-115	03-DEC-19
WG3232726-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-DEC-19
TKN-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4928025								
WG3230379-3 DUP		**L2388408-1**						
Total Kjeldahl Nitrogen		0.82	0.80		mg/L	3.3	20	28-NOV-19
WG3230379-2 LCS								
Total Kjeldahl Nitrogen			100.6		%		75-125	28-NOV-19
WG3230379-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	28-NOV-19
WG3230379-4 MS		**L2388408-1**						
Total Kjeldahl Nitrogen			88.4		%		70-130	28-NOV-19
VOC-ROU-HS-WT	**Water**							
Batch R4929795								
WG3232697-4 DUP		**WG3232697-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-DEC-19
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-DEC-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
m+p-Xylenes		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-DEC-19
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
trans-1,3-Dichloropropene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-DEC-19
WG3232697-1 LCS								
1,1,2,2-Tetrachloroethane			94.0		%		70-130	02-DEC-19
1,2-Dichlorobenzene			87.6		%		70-130	02-DEC-19
1,3-Dichlorobenzene			87.0		%		70-130	02-DEC-19
1,4-Dichlorobenzene			86.7		%		70-130	02-DEC-19
Benzene			100.6		%		70-130	02-DEC-19
Chloroform			99.0		%		70-130	02-DEC-19
cis-1,2-Dichloroethylene			96.5		%		70-130	02-DEC-19
Dichloromethane			98.2		%		70-130	02-DEC-19
Ethylbenzene			88.0		%		70-130	02-DEC-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4929795								
WG3232697-1 LCS								
m+p-Xylenes			87.9		%		70-130	02-DEC-19
Tetrachloroethylene			89.6		%		70-130	02-DEC-19
Toluene			90.5		%		70-130	02-DEC-19
trans-1,3-Dichloropropene			92.3		%		70-130	02-DEC-19
Trichloroethylene			97.3		%		70-130	02-DEC-19
WG3232697-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	02-DEC-19
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
1,3-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-DEC-19
Benzene			<0.50		ug/L		0.5	02-DEC-19
Chloroform			<1.0		ug/L		1	02-DEC-19
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-DEC-19
Dichloromethane			<2.0		ug/L		2	02-DEC-19
Ethylbenzene			<0.50		ug/L		0.5	02-DEC-19
m+p-Xylenes			<1.0		ug/L		1	02-DEC-19
Tetrachloroethylene			<0.50		ug/L		0.5	02-DEC-19
Toluene			<0.50		ug/L		0.5	02-DEC-19
trans-1,3-Dichloropropene			<0.50		ug/L		0.5	02-DEC-19
Trichloroethylene			<0.50		ug/L		0.5	02-DEC-19
Surrogate: 1,4-Difluorobenzene			97.0		%		70-130	02-DEC-19
Surrogate: 4-Bromofluorobenzene			94.7		%		70-130	02-DEC-19
WG3232697-5 MS		**WG3232697-3**						
1,1,2,2-Tetrachloroethane			98.2		%		50-150	03-DEC-19
1,2-Dichlorobenzene			88.7		%		50-150	03-DEC-19
1,3-Dichlorobenzene			85.4		%		50-150	03-DEC-19
1,4-Dichlorobenzene			85.4		%		50-150	03-DEC-19
Benzene			102.1		%		50-150	03-DEC-19
Chloroform			101.7		%		50-150	03-DEC-19
cis-1,2-Dichloroethylene			97.7		%		50-150	03-DEC-19
Dichloromethane			99.9		%		50-150	03-DEC-19
Ethylbenzene			86.8		%		50-150	03-DEC-19
m+p-Xylenes			86.6		%		50-150	03-DEC-19
Tetrachloroethylene			87.0		%		50-150	03-DEC-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4929795								
WG3232697-5 MS		**WG3232697-3**						
Toluene			89.4		%		50-150	03-DEC-19
trans-1,3-Dichloropropene			91.7		%		50-150	03-DEC-19
Trichloroethylene			97.9		%		50-150	03-DEC-19

Quality Control Report

Workorder: L2388710 Report Date: 19-DEC-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLI	Detection Limit Raised: Dilution required to address Internal Standard response problems caused by matrix interference.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2388710-COFC

COC Number: 17 - 821540

Page of

Report To	Contact and company name below will appear on the final report
Company:	Fisher Environmental
Contact:	Clwe
Phone:	416-605 9722
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To [ ] YES [ ] NO
	Copy of Invoice with Report [ ] YES [ ] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [x] PDF [ ] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report [x] YES [ ] NO
[x] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [x] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: clwe@fisherenvironmental.com
Email 2: frank
Email 3:

Invoice Distribution

Select Invoice Distribution: [x] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: elena
Email 2: clwe

Project Information

ALS Account # / Quote #:
#:
AFE:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Contact: E. H Sampler:

ALS Work Order # (lab use only): L2388710 RD

Turnaround Time (TAT) Options - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [x] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ] | 3 day [P3-25%] [ ] | 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ] | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS: Halton Region Sewer By-laws Guide 1 & 2	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	2093, 2097, 2101 Old Lakeshore Rd & 2016, 2100 Lakeshore Rd, Burlington, ON						
	MW 301	27/11/2019		Water	✓		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [x] NO
Are samples for human consumption/ use? [ ] YES [x] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please compare results with Sewer Sanitary and storm guidelines Table 1 & Table 2.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]
Ice Packs [x] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]
Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
1.2			11.3		

SHIPMENT RELEASE (client use)

Released by: Regina Randall Date: NOV 27th 2019 Time: 2:16pm

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: CB Date: Nov 27/19 Time: 14:15

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Nov 27/19 Time: 18:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

FISHER ENVIRONMENTAL
ATTN: CLIVE
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Date Received: 29-JUL-19
Report Date: 06-AUG-19 14:39 (MT)
Version: FINAL

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2318560

Project P.O. #:	NOT SUBMITTED
Job Reference:	19-9254
C of C Numbers:	17-638994
Legal Site Desc:	2097 Old Lakeshore Burlington, ON

Emily Hansen
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit	Guideline

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Sanitary Sewer By-Law No. 02-03

(No parameter exceedances)

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) - Halton Storm Sewer By-Law No, 02-03

(No parameter exceedances)

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2318560-1 Sample Date: 29-JUL-19 Sample ID: MW 301
pH	pH units	6.00-10.0	6.5-8.5	7.43
Total Suspended Solids	mg/L	350	-	3.4

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Anions and Nutrients - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Fluoride (F)	mg/L	10	-	0.36 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	6.47
Phosphorus, Total	mg/L	10.0	-	<0.0030
Sulfate (SO4)	mg/L	1500	-	393 DLDS

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Cyanide, Total	mg/L	2	-	<0.0020

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Bacteriological Tests - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
E. Coli	CFU/100mL	-	200	0

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Total Metals - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Aluminum (Al)-Total	mg/L	50	-	3.62 DLHC
Antimony (Sb)-Total	mg/L	5	-	<0.0010 DLHC
Arsenic (As)-Total	mg/L	1	-	0.0131 DLHC
Beryllium (Be)-Total	mg/L	5	-	<0.0010 DLHC
Cadmium (Cd)-Total	mg/L	1	-	<0.000050 DLHC
Chromium (Cr)-Total	mg/L	3	-	0.0085 DLHC
Cobalt (Co)-Total	mg/L	5	-	0.0026 DLHC
Copper (Cu)-Total	mg/L	3	-	0.011 DLHC
Iron (Fe)-Total	mg/L	50	-	14.3 DLHC
Lead (Pb)-Total	mg/L	3	-	0.00372 DLHC
Manganese (Mn)-Total	mg/L	5	-	0.500 DLHC
Mercury (Hg)-Total	mg/L	0.05	-	<0.0000050
Molybdenum (Mo)-Total	mg/L	5	-	0.00582 DLHC
Nickel (Ni)-Total	mg/L	3	-	0.0081 DLHC
Selenium (Se)-Total	mg/L	5	-	<0.00050 DLHC
Silver (Ag)-Total	mg/L	5	-	0.00083 DLHC
Tin (Sn)-Total	mg/L	5	-	0.0019 DLHC
Titanium (Ti)-Total	mg/L	5	-	0.0476 DLHC
Zinc (Zn)-Total	mg/L	3	-	<0.030 DLHC

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Aggregate Organics - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	Unit	#1	#2	
BOD Carbonaceous	mg/L	300	-	<2.0
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	-	0.0276

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

Volatile Organic Compounds - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Benzene	ug/L	10	-	<0.50 OWP
Chloroform	ug/L	40	-	<1.0 OWP
1,4-Dichlorobenzene	ug/L	80	-	<0.50 OWP
Dichloromethane	ug/L	2000	-	<2.0 OWP
Ethylbenzene	ug/L	160	-	<0.50 OWP
Tetrachloroethylene	ug/L	1000	-	<0.50 OWP
Toluene	ug/L	16	-	<0.50 OWP
Trichloroethylene	ug/L	400	-	<0.50 OWP
Surrogate: 4-Bromofluorobenzene	%	-	-	95.5
Surrogate: 1,4-Difluorobenzene	%	-	-	99.9

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2318560-1
			Sample Date	29-JUL-19
			Sample ID	MW 301
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Naphthalene	ug/L	140	-	<0.020
Surrogate: d8-Naphthalene	%	-	-	99.5

Guide Limit #1: Halton Sanitary Sewer By-Law No. 02-03
Guide Limit #2: Halton Storm Sewer By-Law No, 02-03

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

Reference Information

sediment.

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WW-MF-WT	Water	E. Coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.			
PAH-NAPHTHALENE-WT	Water	Polyaromatic Hydrocarbons (PAHs)	SW846 8270
Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and analyzed by GC/MSD.			
PH-WT	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.			
TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.			
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
Aqueous samples are analyzed by headspace-GC/MS.			

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-638994

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2318560 Report Date: 06-AUG-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-C-WT	**Water**							
Batch R4740032								
WG3119590-2 DUP		**L2318597-1**						
BOD Carbonaceous		<2.0	<2.0	RPD-NA	mg/L	N/A	20	04-AUG-19
WG3119590-3 LCS								
BOD Carbonaceous			93.4		%		85-115	04-AUG-19
WG3119590-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	04-AUG-19
CN-TOT-WT	**Water**							
Batch R4734869								
WG3121513-8 DUP		**L2319877-1**						
Cyanide, Total		0.0283	0.0284		mg/L	0.0	20	01-AUG-19
WG3121513-6 LCS								
Cyanide, Total			98.3		%		80-120	01-AUG-19
WG3121513-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	01-AUG-19
WG3121513-7 MS		**L2319877-1**						
Cyanide, Total			93.7		%		70-130	01-AUG-19
EC-WW-MF-WT	**Water**							
Batch R4731733								
WG3119186-3 DUP		**L2318597-2**						
E. Coli		2	0	DUP-H,J	CFU/100mL	2	2	31-JUL-19
WG3119186-1 MB								
E. Coli			0		CFU/100mL		1	31-JUL-19
F-IC-N-WT	**Water**							
Batch R4731546								
WG3118928-15 DUP		**WG3118928-13**						
Fluoride (F)		0.076	0.078		mg/L	2.2	20	30-JUL-19
WG3118928-12 LCS								
Fluoride (F)			100.4		%		90-110	30-JUL-19
WG3118928-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	30-JUL-19
WG3118928-14 MS		**WG3118928-13**						
Fluoride (F)			102.1		%		75-125	30-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4732429								
WG3119393-4 DUP		**WG3119393-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	31-JUL-19
WG3119393-2 LCS								

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4732429								
WG3119393-2 LCS								
Mercury (Hg)-Total			99.5		%		80-120	31-JUL-19
WG3119393-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	31-JUL-19
WG3119393-6 MS		**WG3119393-5**						
Mercury (Hg)-Total			89.8		%		70-130	31-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4731269								
WG3118723-4 DUP		**WG3118723-3**						
Aluminum (Al)-Total		0.0175	0.0176		mg/L	0.7	20	30-JUL-19
Antimony (Sb)-Total		0.00043	0.00044		mg/L	1.2	20	30-JUL-19
Arsenic (As)-Total		0.00059	0.00059		mg/L	0.1	20	30-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	30-JUL-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	30-JUL-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	30-JUL-19
Cobalt (Co)-Total		0.00030	0.00028		mg/L	5.0	20	30-JUL-19
Copper (Cu)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-JUL-19
Iron (Fe)-Total		0.239	0.236		mg/L	1.2	20	30-JUL-19
Lead (Pb)-Total		0.000095	0.000103		mg/L	8.4	20	30-JUL-19
Manganese (Mn)-Total		0.0214	0.0215		mg/L	0.6	20	30-JUL-19
Molybdenum (Mo)-Total		0.00582	0.00594		mg/L	2.0	20	30-JUL-19
Nickel (Ni)-Total		0.00214	0.00213		mg/L	0.2	20	30-JUL-19
Selenium (Se)-Total		0.000187	0.000185		mg/L	1.3	20	30-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	30-JUL-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	30-JUL-19
Titanium (Ti)-Total		0.00030	0.00038	J	mg/L	0.00008	0.0006	30-JUL-19
Zinc (Zn)-Total		0.0031	<0.0030	RPD-NA	mg/L	N/A	20	30-JUL-19
WG3118723-2 LCS								
Aluminum (Al)-Total			103.1		%		80-120	30-JUL-19
Antimony (Sb)-Total			104.0		%		80-120	30-JUL-19
Arsenic (As)-Total			99.9		%		80-120	30-JUL-19
Beryllium (Be)-Total			99.7		%		80-120	30-JUL-19
Cadmium (Cd)-Total			97.6		%		80-120	30-JUL-19
Chromium (Cr)-Total			102.1		%		80-120	30-JUL-19
Cobalt (Co)-Total			99.9		%		80-120	30-JUL-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4731269								
WG3118723-2 LCS								
Copper (Cu)-Total			99.5		%		80-120	30-JUL-19
Iron (Fe)-Total			97.3		%		80-120	30-JUL-19
Lead (Pb)-Total			103.1		%		80-120	30-JUL-19
Manganese (Mn)-Total			100.2		%		80-120	30-JUL-19
Molybdenum (Mo)-Total			105.5		%		80-120	30-JUL-19
Nickel (Ni)-Total			100.1		%		80-120	30-JUL-19
Selenium (Se)-Total			102.5		%		80-120	30-JUL-19
Silver (Ag)-Total			100.6		%		80-120	30-JUL-19
Tin (Sn)-Total			99.9		%		80-120	30-JUL-19
Titanium (Ti)-Total			100.4		%		80-120	30-JUL-19
Zinc (Zn)-Total			97.8		%		80-120	30-JUL-19
WG3118723-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	30-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	30-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	30-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	30-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	30-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	30-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	30-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	30-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	30-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	30-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	30-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	30-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	30-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	30-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	30-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	30-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	30-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	30-JUL-19
WG3118723-5 MS		**WG3118723-6**						
Aluminum (Al)-Total			96.7		%		70-130	30-JUL-19
Antimony (Sb)-Total			99.5		%		70-130	30-JUL-19
Arsenic (As)-Total			97.1		%		70-130	30-JUL-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4731269								
WG3118723-5 MS		**WG3118723-6**						
Beryllium (Be)-Total			98.2		%		70-130	30-JUL-19
Cadmium (Cd)-Total			92.7		%		70-130	30-JUL-19
Chromium (Cr)-Total			97.7		%		70-130	30-JUL-19
Cobalt (Co)-Total			96.0		%		70-130	30-JUL-19
Copper (Cu)-Total			94.5		%		70-130	30-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	30-JUL-19
Lead (Pb)-Total			94.8		%		70-130	30-JUL-19
Manganese (Mn)-Total			N/A	MS-B	%		-	30-JUL-19
Molybdenum (Mo)-Total			99.5		%		70-130	30-JUL-19
Nickel (Ni)-Total			94.3		%		70-130	30-JUL-19
Selenium (Se)-Total			99.2		%		70-130	30-JUL-19
Silver (Ag)-Total			94.7		%		70-130	30-JUL-19
Tin (Sn)-Total			95.3		%		70-130	30-JUL-19
Titanium (Ti)-Total			97.3		%		70-130	30-JUL-19
Zinc (Zn)-Total			91.5		%		70-130	30-JUL-19
OGG-SPEC-WT	**Water**							
Batch R4734195								
WG3118824-2 LCS								
Oil and Grease, Total			92.0		%		70-130	30-JUL-19
Mineral Oil and Grease			81.4		%		70-130	30-JUL-19
WG3118824-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	30-JUL-19
Mineral Oil and Grease			<2.5		mg/L		2.5	30-JUL-19
P-T-COL-WT	**Water**							
Batch R4740010								
WG3123133-3 DUP		**L2315278-1**						
Phosphorus, Total		0.0062	0.0047	J	mg/L	0.0015	0.006	06-AUG-19
WG3123133-2 LCS								
Phosphorus, Total			102.0		%		80-120	06-AUG-19
WG3123133-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	06-AUG-19
WG3123133-4 MS		**L2315278-1**						
Phosphorus, Total			79.0		%		70-130	06-AUG-19
PAH-NAPHTHALENE-WT	**Water**							

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-NAPHTHALENE-WT	**Water**							
Batch R4730666								
WG3118855-2 LCS								
Naphthalene			95.5		%		50-130	30-JUL-19
WG3118855-1 MB								
Naphthalene			<0.020		ug/L		0.02	30-JUL-19
Surrogate: d8-Naphthalene			106.5		%		60-140	30-JUL-19
PH-WT	**Water**							
Batch R4737149								
WG3121570-4 DUP		**WG3121570-3**						
pH		7.91	7.91	J	pH units	0.00	0.2	01-AUG-19
WG3121570-2 LCS								
pH			7.02		pH units		6.9-7.1	01-AUG-19
PHENOLS-4AAP-WT	**Water**							
Batch R4730911								
WG3119128-11 DUP		**L2318737-1**						
Phenols (4AAP)		0.0052	0.0058		mg/L	11	20	30-JUL-19
WG3119128-10 LCS								
Phenols (4AAP)			101.6		%		85-115	30-JUL-19
WG3119128-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	30-JUL-19
WG3119128-12 MS		**L2318737-1**						
Phenols (4AAP)			107.4		%		75-125	30-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4731546								
WG3118928-15 DUP		**WG3118928-13**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	30-JUL-19
WG3118928-12 LCS								
Sulfate (SO4)			102.4		%		90-110	30-JUL-19
WG3118928-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-JUL-19
WG3118928-14 MS		**WG3118928-13**						
Sulfate (SO4)			101.2		%		75-125	30-JUL-19
SOLIDS-TSS-WT	**Water**							
Batch R4737142								
WG3121208-3 DUP		**L2319739-2**						
Total Suspended Solids		2400	2430		mg/L	1.5	20	02-AUG-19
WG3121208-2 LCS								
Total Suspended Solids			100.6		%		85-115	02-AUG-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-WT	**Water**							
Batch R4737142								
WG3121208-1 MB								
Total Suspended Solids			<2.0		mg/L		2	02-AUG-19
TKN-WT	**Water**							
Batch R4740108								
WG3124216-3 DUP		**L2318911-1**						
Total Kjeldahl Nitrogen		19.9	17.1		mg/L	15	20	06-AUG-19
WG3124216-2 LCS								
Total Kjeldahl Nitrogen			99.2		%		75-125	06-AUG-19
WG3124216-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	06-AUG-19
WG3124216-4 MS		**L2318911-1**						
Total Kjeldahl Nitrogen			N/A	MS-B	%		-	06-AUG-19
VOC-ROU-HS-WT	**Water**							
Batch R4739594								
WG3122547-4 DUP		**WG3122547-3**						
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-AUG-19
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-AUG-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-AUG-19
WG3122547-1 LCS								
1,4-Dichlorobenzene			99.7		%		70-130	02-AUG-19
Benzene			100.2		%		70-130	02-AUG-19
Chloroform			97.6		%		70-130	02-AUG-19
Dichloromethane			96.1		%		70-130	02-AUG-19
Ethylbenzene			98.6		%		70-130	02-AUG-19
Tetrachloroethylene			98.1		%		70-130	02-AUG-19
Toluene			97.9		%		70-130	02-AUG-19
Trichloroethylene			95.5		%		70-130	02-AUG-19
WG3122547-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	06-AUG-19
Benzene			<0.50		ug/L		0.5	06-AUG-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4739594								
WG3122547-2 MB								
Chloroform			<1.0		ug/L		1	06-AUG-19
Dichloromethane			<2.0		ug/L		2	06-AUG-19
Ethylbenzene			<0.50		ug/L		0.5	06-AUG-19
Tetrachloroethylene			<0.50		ug/L		0.5	06-AUG-19
Toluene			<0.50		ug/L		0.5	06-AUG-19
Trichloroethylene			<0.50		ug/L		0.5	06-AUG-19
Surrogate: 1,4-Difluorobenzene			98.7		%		70-130	06-AUG-19
Surrogate: 4-Bromofluorobenzene			95.2		%		70-130	06-AUG-19
WG3122547-5 MS		**WG3122547-3**						
1,4-Dichlorobenzene			97.1		%		50-150	06-AUG-19
Benzene			102.7		%		50-150	06-AUG-19
Chloroform			102.4		%		50-150	06-AUG-19
Dichloromethane			102.2		%		50-150	06-AUG-19
Ethylbenzene			91.3		%		50-150	06-AUG-19
Tetrachloroethylene			91.7		%		50-150	06-AUG-19
Toluene			92.6		%		50-150	06-AUG-19
Trichloroethylene			94.9		%		50-150	06-AUG-19

Quality Control Report

Workorder: L2318560 Report Date: 06-AUG-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: CLIVE

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

- 9254

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 - 638994

Page of

Report To	Contact and company name below will appear on the final report
Company:	Fisher Environmental
Contact:	Clive
Phone:	416 605 9722
Company address below will appear on the final report	
Street:	
City/Province:	
Postal Code:	

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: clive@fisherenvironmental.com
Email 2: frank@fisherenvironmental.com
Email 3:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: elena@fisher
Email 2: clive@fisher

Project Information

ALS Account # / Quote #:
Job #: 19-9254
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2318560
ALS Contact: Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Halton Region ✓
Sewer discharge
Bylaws
Not Filtered

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	SAMPLES ON HOLD	Sample is hazardous (please provide further details	NUMBER OF CONTAINERS
-1	MW 301	29/07/2019		water			
	Project: 19-9254						
	2097 Old Lakeshore						
	Burlington ON						

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
15	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Ben Fostaty	Date: July 29/19	Time:	Received by:	Date: July 29/19	Time: 10:00	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").

1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations expire after three years.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices, surcharges and additional fees will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting the analytical results.
8. Test Results are Not Guaranteed. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store; soil and water samples for 45 days from date of receipt, tissue/biota samples for 6 months from date of receipt, air samples or re-usable media for 14 days from date of receipt, and microbiological samples for 3 days from date of receipt.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the samples according to paragraph 10, after which ALS will invoice the Client and discard the sample. Each sample is subject to a minimum $5.00 hold fee. Longer hold periods are available upon request. See paragraph 12.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with GHS and TDG regulations, and must provide appropriate Safety Data that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H_2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of $25.00.
21. Re-Tests. ALS reserves the right to re-test any samples that remains in its possession. Re-tests requested by the Client may be charged.
22. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary or punitive damages, whether foreseeable or unforeseeable (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets) incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 8, 15, 16, 22 and 24, as the applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
24. Notice of Liability. Notwithstanding paragraph 23, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
25. Third Party Service Provider Indemnity. Should the Client require ALS to forward samples and/or obtain services from a third party service provider, the Client will provide ALS notice in writing. The Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
26. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
28. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and terms and conditions will automatically lapse if the offer has not been accepted, and samples not delivered to ALS, within the Closing Date.
29. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period).(b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.

FISHER ENVIRONMENTAL LABORATORIES

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MARKHAM, ONT. L3R 3K2
TEL: 905 475-7755
FAX: 905 475-7718
www.fisherenvironmental.com

Client: Core Developments
Address:
Tel.:
E-mail:
Attn.: Sarah Chu

F.E. Job #: 17-7673
Project Name: Hydrogeological Investigation
Project ID: FE-P-17-8522
Date Sampled: 4-Dec-17
Date Received: 4-Dec-17
Date Reported: 12-Dec-17
Location: 2096 Lakeshore Road
Burlington, ON

Certificate of Analysis

Analysis Requested:	Sewer Testing – The Regional Municipality of Halton By-law No. 2-03
Sample Description:	1 Water Sample

Parameter	***17-7673-1*** MW2		* Table 1 - Limits for Sanitary and Combined Sewers Discharge
	Unit (mg/L or specific)		
Conventional and Others			
pH (SU)	7.15		6.0 - 10.0
Temperture (^{o}C)	4.3		60
Cyanide (total)	<0.02		2
Fluoride	0.33		10
Total Kjeldahl Nitrogen	<1		100
Oil & grease - animal & vegetable (non-mineral)	<1		150
Oil & grease - mineral & synthetic	<1		15
Phenolics (4AAP)	<0.05		1.0
Phosphorous (total)	<0.1		10
Suspended Solids (total)	85		350
Sulphate	83		1500

* The Regional Municipality of Halton By-law No. 2-03. Table 1 - Limits for Sanitary and Combined Sewer Discharge.

Results relate only to the items tested

Client: Core Developments ***F.E. Job #:*** 17-7673

QA/QC Report

Parameter	Blank	RL	LCS	AR	Duplicate	AR
	(mg/L or specific)		Recovery (%) or specific		RPD (%) or specific	
Conventional and Others						
pH (SU)	nd	nd	7.02	6.90-7.10	0.03	<0.3
Temperture (^{o}C)	nd	nd	4.0	3.0-5.0	0.0	<1.0
Cyanide (total)	<0.02	0.02	103	70-130	0.0	0-30
Fluoride	<0.1	0.1	96	70-130	2.2	0-30
Total Kjeldahl Nitrogen	<1	1	112	70-130	0.0	0-30
Oil & grease - animal & vegetable (non-mineral)	<1	1	nd	nd	0.0	0-30
Oil & grease - mineral & synthetic	<1	1	nd	nd	0.0	0-30
Phenolics (4AAP)	<0.05	0.05	102	70-130	3.3	0-30
Phosphorous (total)	<0.1	0.1	87	80-120	0.0	0-30
Suspended Solids (total)	<1	1	nd	nd	nd	0-30
Sulphate	<1	1	99	80-120	5.1	0-20

LEGEND:

< result obtained was below RL (Reporting Limit);
Nd - No Data;
LCS - Laboratory Control Sample;
AR - Acceptable Range;
RPD - Relative Percent Difference.

ANALYTICAL METHODS:

Methods used by Fisher Environmental Lab comply with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.3120-B.

Results relate only to the items tested

Client: Core Developments ***F.E. Job #:*** 17-7673

Certificate of Analysis

Analysis Requested:	Sewer Testing – The Regional Municipality of Halton By-law No. 2-03
Sample Description:	1 Water Sample

Parameter	***17-7673-1*** MW2		* Table 1 - Limits for Sanitary and Combined Sewers Discharge
	Unit (mg/L)		
Metals			
Aluminum (total)	0.013		50
Antimony (total)	<0.002		5
Arsenic (total)	<0.003		1.0
Beryllium (total)	<0.002		5
Cadmium (total)	<0.001		1.0
Chromium (total)	0.021		3
Cobalt (total)	<0.001		5
Copper (total)	0.002		3
Iron (total)	0.35		50
Lead (total)	<0.003		3
Manganese (total)	0.087		5
Mercury (total)	<0.0005		0.05
Molybdenum (total)	0.006		5
Nickel (total)	0.002		3
Selenium (total)	<0.003		5
Silver (total)	<0.001		5
Tin (total)	<0.002		5
Titanium (total)	<0.002		5
Zinc (total)	0.002		3

* The Regional Municipality of Halton By-law No. 2-03. Table 1 - Limits for Sanitary and Combined Sewer Discharge.

Results relate only to the items tested

Client: Core Developments ***F.E. Job #:*** 17-7673

QA/QC Report

Parameter	Blank	RL	LCS	AR	Duplicate	AR
	(mg/L)		Recovery (%)		RPD (%)	
Metals						
Aluminum (total)	<0.01	0.01	102	80-120	0.0	0-20
Antimony (total)	<0.002	0.002	101	80-120	0.0	0-20
Arsenic (total)	<0.003	0.003	102	80-120	0.0	0-20
Beryllium (total)	<0.002	0.002	102	80-120	0.0	0-20
Cadmium (total)	<0.001	0.001	100	80-120	0.0	0-20
Chromium (total)	<0.002	0.002	114	80-120	6.8	0-20
Cobalt (total)	<0.001	0.001	101	80-120	6.2	0-20
Copper (total)	<0.001	0.001	103	80-120	8.8	0-20
Iron (total)	<0.005	0.005	103	80-120	7.9	0-20
Lead (total)	<0.003	0.003	106	80-120	0.0	0-20
Manganese (total)	<0.003	0.003	118	80-120	9.8	0-20
Mercury (total)	<0.0005	0.0005	102	80-120	0.0	0-20
Molybdenum (total)	<0.001	0.001	101	80-120	2.0	0-20
Nickel (total)	<0.001	0.001	89	80-120	11	0-20
Selenium (total)	<0.003	0.003	112	80-120	0.0	0-20
Silver (total)	<0.001	0.001	100	80-120	0.0	0-20
Tin (total)	<0.002	0.002	Nd	80-120	3.6	0-20
Titanium (total)	<0.002	0.002	107	80-120	0.0	0-20
Zinc (total)	<0.002	0.002	102	80-120	3.0	0-20

LEGEND:

< result obtained was below RL (Reporting Limit);
Nd - No Data;
LCS - Laboratory Control Sample;
AR - Acceptable Range obtained from historical data;
RPD - Relative Percent Difference.

ANALYTICAL METHODS:

Metals by ICP #F-1, Rev.4.5, Standard Operation Procedure for determination of Metals by the Inductively Coupled Plasma- Optical. Method used by Fisher Environmental Lab complies with the Standard Methods for the Examination of Water and Wastewater, 20th Ed.3120-B.

Results relate only to the items tested

Client: Core Developments ***F.E. Job #:*** 17-7673

Certificate of Analysis

Analysis Requested:	Sewer Testing – The Regional Municipality of Halton By-law No. 2-03
Sample Description:	1 Water Sample

Parameter	***17-7673-1*** MW2		* Table 1 - Limits for Sanitary and Combined Sewers Discharge
	Unit (mg/L)		
Organic Compounds			
Benzene	<0.002		0.01
Chloroform	<0.002		0.04
1,4-dichlorobenzene	<0.002		0.08
Ethylbenzene	<0.002		0.16
Methylene chloride	<0.002		2.0
Naphthalene	0.036		0.14
Tetrachloroethylene	<0.002		1.0
Toluene	<0.002		0.016
Trichloroethylene	<0.002		0.4

* The Regional Municipality of Halton By-law No. 2-03. Table 1 - Limits for Sanitary and Combined Sewer Discharge.

Results relate only to the items tested

QA/QC Report

Parameter	Blank	RL	LCS	AR	Duplicate	AR
	(mg/L)		Recovery (%)		RPD (%)	
Organic Compounds						
Benzene	<0.002	0.002	95	70-130	0.0	0-30
Chloroform	<0.002	0.002	92	70-130	7.0	0-30
1,4-dichlorobenzene	<0.002	0.002	97	70-130	0.0	0-30
Ethylbenzene	<0.002	0.002	107	70-130	0.0	0-30
Methylene chloride	<0.002	0.002	100	70-130	0.0	0-30
Naphthalene	<0.002	0.002	119	70-130	0.0	0-30
Tetrachloroethylene	<0.002	0.002	106	70-130	0.0	0-30
Toluene	<0.002	0.002	116	70-130	6.0	0-30
Trichloroethylene	<0.002	0.002	102	70-130	0.0	0-30

LEGEND:

< result obtained was below RL (Reporting Limit);
LCS - Laboratory Control Sample;
AR - Acceptable Range obtained from historical data;
RPD - Relative Percent Difference.

ANALYTICAL METHODS:

VOCs - Method #F-14, Rev. 2.1, Standard Operating Procedures for the Determination of Volatile Organic Compounds in Water and Soil Samples by Purge and Trap / GC/MS. Method used by Fisher Environmental Lab complies with the reference methods for the Examination of Water and Wastewater, 20th Ed. 6220 Purge &Trap GC Method.

Semi-VOCs - Method #F-8, Rev. 2.0, Standard Operating Procedures for determination of Semi-Volatile Organic Compounds by GC-MS. Methods used by Fisher Environmental Lab complies with the reference methods for the Examination of Water and Wastewater, 20th Ed. 6220 GC-MS Method.

Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results relate only to the items tested

FISHER ENVIRONMENTAL
ATTN: WALTER WANG
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2

Date Received: 04-DEC-17
Report Date: 11-DEC-17 14:46 (MT)
Version: FINAL

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2030624

Project P.O. #: NOT SUBMITTED
Job Reference: 17-7673
C of C Numbers: 15-611608
Legal Site Desc:

Mathy Mahadeva
Account Manager

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ANALYTICAL GUIDELINE REPORT

17-7673

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2030624-1 17-7673-1 MW2 Sampled By: CLIENT on 04-DEC-17 @ 10:00 Matrix: WATER									
Bacteriological Tests									
E. Coli	0		0	CFU/100mL	06-DEC-17		200		
Aggregate Organics									
BOD	<2.0		2.0	mg/L	11-DEC-17	300			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) = [Suite] - ON-SAN+STORM-HALTON

#1: Halton Sanitary Sewer By-Law No. 02-03

#2: Halton Storm Sewer By-Law No, 02-03

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BOD-WT	Water	BOD	APHA 5210 B

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

EC-MF-WT	Water	E. coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

15-611608

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.

Quality Control Report

Workorder: L2030624 Report Date: 11-DEC-17

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: WALTER WANG

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-WT	**Water**							
Batch R3909827								
WG2679141-2 DUP		**L2030349-2**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	20	11-DEC-17
WG2679141-3 LCS								
BOD			96.8		%		85-115	11-DEC-17
WG2679141-1 MB								
BOD			<2.0		mg/L		2	11-DEC-17
EC-MF-WT	**Water**							
Batch R3905509								
WG2677584-3 DUP		**L2030624-1**						
E. Coli		0	0		CFU/100mL	0.0	65	06-DEC-17
WG2677584-1 MB								
E. Coli			0		CFU/100mL		1	06-DEC-17

Quality Control Report

Workorder: L2030624 Report Date: 11-DEC-17

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON L3R 3K2
Contact: WALTER WANG

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2030624-COFC

COC Number: 15 - 611608

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Fisher Environmental	Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Walter Wang	Quality Control (QC) Report with Report ☒ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Phone:		☒ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	On File	Email 1 or Fax	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2	
Postal Code:		Email 3	

Invoice To		Invoice Distribution	
	Same as Report To ☐ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
	Copy of Invoice with Report ☐ YES ☐ NO		
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	17-7673	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2030624	ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BOD	E. Coli	Number of Containers
	17-7673-1 MW2	04-12-17	10:00am	Water	V	V	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	Halton Sewer Use By-Law.
Are samples for human drinking water use? ☐ YES ☒ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
10.3	7.8		8.4 °C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Walter	Dec 4. 2017	1:00pm		Dec 04/17	13:55		04-Dec-17	16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

FISHER ENVIRONMENTAL
ATTN: CLIVE WIGGAN
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Date Received: 05-FEB-19
Report Date: 12-FEB-19 08:27 (MT)
Version: FINAL

Client Phone: 905-475-7755

Certificate of Analysis

Lab Work Order #: L2228829

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 17-639710
Legal Site Desc:

Emily Hansen
Account Manager

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Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2228829-1 MW206-HALTON REGION SEWER BY LAW							
Sampled By: CLIENT on 05-FEB-19 @ 15:24							
Matrix: WATER							
Physical Tests							
pH	8.34		0.10	pH units	06-FEB-19	6.00-10.0	6.5-8.5
Total Suspended Solids	3660	DLHC	20	mg/L	08-FEB-19	*350	
Anions and Nutrients							
Fluoride (F)	0.98	DLM	0.10	mg/L	06-FEB-19	10	
Total Kjeldahl Nitrogen	2.5	DLM	1.5	mg/L	09-FEB-19	100	
Phosphorus, Total	2.22	DLHC	0.030	mg/L	08-FEB-19	10.0	
Sulfate (SO4)	36.3	DLM	1.5	mg/L	06-FEB-19	1500	
Cyanides							
Cyanide, Total	0.0088		0.0020	mg/L	06-FEB-19	2	
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	07-FEB-19		200
Total Metals							
Aluminum (Al)-Total	32.9	DLHC	0.50	mg/L	06-FEB-19	50	
Antimony (Sb)-Total	<0.010	DLHC	0.010	mg/L	06-FEB-19	5	
Arsenic (As)-Total	0.026	DLHC	0.010	mg/L	06-FEB-19	1	
Beryllium (Be)-Total	<0.010	DLHC	0.010	mg/L	06-FEB-19	5	
Cadmium (Cd)-Total	<0.00050	DLHC	0.00050	mg/L	06-FEB-19	1	
Chromium (Cr)-Total	0.058	DLHC	0.050	mg/L	06-FEB-19	3	
Cobalt (Co)-Total	0.046	DLHC	0.010	mg/L	06-FEB-19	5	
Copper (Cu)-Total	<0.10	DLHC	0.10	mg/L	06-FEB-19	3	
Iron (Fe)-Total	51.1	DLHC	1.0	mg/L	06-FEB-19	*50	
Lead (Pb)-Total	0.0287	DLHC	0.0050	mg/L	06-FEB-19	3	
Manganese (Mn)-Total	2.73	DLHC	0.050	mg/L	06-FEB-19	5	
Mercury (Hg)-Total	0.000011		0.000010	mg/L	06-FEB-19	0.05	
Molybdenum (Mo)-Total	0.141	DLHC	0.0050	mg/L	06-FEB-19	5	
Nickel (Ni)-Total	0.071	DLHC	0.050	mg/L	06-FEB-19	3	
Selenium (Se)-Total	0.0410	DLHC	0.0050	mg/L	06-FEB-19	5	
Silver (Ag)-Total	<0.0050	DLHC	0.0050	mg/L	06-FEB-19	5	
Tin (Sn)-Total	<0.010	DLHC	0.010	mg/L	06-FEB-19	5	
Titanium (Ti)-Total	0.209	DLHC	0.030	mg/L	06-FEB-19	5	
Zinc (Zn)-Total	<0.30	DLHC	0.30	mg/L	06-FEB-19	3	
Aggregate Organics							
BOD Carbonaceous	<3.0	BODL	3.0	mg/L	11-FEB-19	300	
Oil and Grease, Total	<5.0		5.0	mg/L	05-FEB-19		
Animal/Veg Oil & Grease	<5.0		5.0	mg/L	07-FEB-19	150	
Mineral Oil and Grease	<2.5		2.5	mg/L	05-FEB-19	15	
Phenols (4AAP)	0.0011		0.0010	mg/L	06-FEB-19	1.0	
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L	06-FEB-19	10	
Chloroform	3.3	OWP	1.0	ug/L	06-FEB-19	40	
1,4-Dichlorobenzene	<0.50	OWP	0.50	ug/L	06-FEB-19	80	
Dichloromethane	<2.0	OWP	2.0	ug/L	06-FEB-19	2000	
Ethylbenzene	<0.50	OWP	0.50	ug/L	06-FEB-19	160	
Tetrachloroethylene	<0.50	OWP	0.50	ug/L	06-FEB-19	1000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) = [Suite] - ON-SAN+STORM-HALTON

#1: Halton Sanitary Sewer By-Law No. 02-03

#2: Halton Storm Sewer By-Law No, 02-03

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2228829-1	MW206-HALTON REGION SEWER BY LAW									
Sampled By:	CLIENT on 05-FEB-19 @ 15:24									
Matrix:	WATER									
Volatile Organic Compounds										
	Toluene	0.74	OWP	0.50	ug/L	06-FEB-19	16			
	Trichloroethylene	<0.50	OWP	0.50	ug/L	06-FEB-19	400			
	Surrogate: 4-Bromofluorobenzene	94.7		70-130	%	06-FEB-19				
	Surrogate: 1,4-Difluorobenzene	102.3		70-130	%	06-FEB-19				
Polycyclic Aromatic Hydrocarbons										
	Naphthalene	0.087		0.020	ug/L	08-FEB-19	140			
	Surrogate: d8-Naphthalene	101.0		60-140	%	08-FEB-19				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Halton Santitary Sewer By-law No. 02-03 (MAR, 2003) = [Suite] - ON-SAN+STORM-HALTON

#1: Halton Sanitary Sewer By-Law No. 02-03

#2: Halton Storm Sewer By-Law No, 02-03

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BOD-C-WT	Water	BOD Carbonaceous	APHA 5210 B (CBOD)

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-WW-MF-WT	Water	E. Coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-NAPHTHALENE-WT	Water	Polyaromatic Hydrocarbons (PAHs)	SW846 8270

Sample is extracted at neutral pH using separate aliquots of dichloromethane with a modified separatory funnel technique, extracts are then concentrated and analyzed by GC/MSD.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

Reference Information

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260

Aqueous samples are analyzed by headspace-GC/MS.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-639710

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2228829 Report Date: 12-FEB-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A

Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-C-WT	**Water**							
Batch R4499727								
WG2984204-2 DUP		**L2228887-6**						
BOD Carbonaceous		2.8	2.8		mg/L	2.9	20	11-FEB-19
WG2984204-3 LCS								
BOD Carbonaceous			95.5		%		85-115	11-FEB-19
WG2984204-1 MB								
BOD Carbonaceous			<2.0		mg/L		2	11-FEB-19
CN-TOT-WT	**Water**							
Batch R4493549								
WG2983968-3 DUP		**L2229064-5**						
Cyanide, Total		0.0020	0.0021		mg/L	2.4	20	06-FEB-19
WG2983968-2 LCS								
Cyanide, Total			85.5		%		80-120	06-FEB-19
WG2983968-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	06-FEB-19
WG2983968-4 MS		**L2229064-5**						
Cyanide, Total			90.5		%		70-130	06-FEB-19
EC-WW-MF-WT	**Water**							
Batch R4493067								
WG2983794-3 DUP		**L2229061-2**						
E. Coli		0	0		CFU/100mL	0.0	65	07-FEB-19
WG2983794-1 MB								
E. Coli			0		CFU/100mL		1	07-FEB-19
F-IC-N-WT	**Water**							
Batch R4494216								
WG2983913-4 DUP		**WG2983913-3**						
Fluoride (F)		0.075	0.074		mg/L	1.3	20	06-FEB-19
WG2983913-2 LCS								
Fluoride (F)			103.0		%		90-110	06-FEB-19
WG2983913-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	06-FEB-19
WG2983913-5 MS		**WG2983913-3**						
Fluoride (F)			103.0		%		75-125	06-FEB-19
HG-T-CVAA-WT	**Water**							
Batch R4491171								
WG2983795-4 DUP		**WG2983795-3**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	06-FEB-19
WG2983795-2 LCS								

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4491171								
WG2983795-2 LCS								
Mercury (Hg)-Total			97.3		%		80-120	06-FEB-19
WG2983795-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	06-FEB-19
WG2983795-6 MS		**WG2983795-5**						
Mercury (Hg)-Total			92.4		%		70-130	06-FEB-19
MET-T-CCMS-WT	**Water**							
Batch R4491055								
WG2983670-4 DUP		**WG2983670-3**						
Aluminum (Al)-Total		0.132	0.129		mg/L	1.9	20	06-FEB-19
Antimony (Sb)-Total		0.00059	0.00056		mg/L	4.5	20	06-FEB-19
Arsenic (As)-Total		0.00060	0.00062		mg/L	4.7	20	06-FEB-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-FEB-19
Cadmium (Cd)-Total		0.0000436	0.0000419		mg/L	3.9	20	06-FEB-19
Chromium (Cr)-Total		0.00144	0.00141		mg/L	1.8	20	06-FEB-19
Cobalt (Co)-Total		0.00118	0.00118		mg/L	0.4	20	06-FEB-19
Copper (Cu)-Total		0.0036	0.0035		mg/L	2.9	20	06-FEB-19
Iron (Fe)-Total		0.274	0.235		mg/L	15	20	06-FEB-19
Lead (Pb)-Total		0.00184	0.00165		mg/L	11	20	06-FEB-19
Manganese (Mn)-Total		0.0998	0.0995		mg/L	0.3	20	06-FEB-19
Molybdenum (Mo)-Total		0.00486	0.00490		mg/L	0.9	20	06-FEB-19
Nickel (Ni)-Total		0.00502	0.00481		mg/L	4.3	20	06-FEB-19
Selenium (Se)-Total		0.000149	0.000170		mg/L	13	20	06-FEB-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	06-FEB-19
Tin (Sn)-Total		0.00015	0.00012	J	mg/L	0.00003	0.0002	06-FEB-19
Titanium (Ti)-Total		0.00470	0.00489		mg/L	3.8	20	06-FEB-19
Zinc (Zn)-Total		0.128	0.123		mg/L	3.9	20	06-FEB-19
WG2983670-2 LCS								
Aluminum (Al)-Total			99.3		%		80-120	06-FEB-19
Antimony (Sb)-Total			100.3		%		80-120	06-FEB-19
Arsenic (As)-Total			97.6		%		80-120	06-FEB-19
Beryllium (Be)-Total			96.8		%		80-120	06-FEB-19
Cadmium (Cd)-Total			97.2		%		80-120	06-FEB-19
Chromium (Cr)-Total			102.5		%		80-120	06-FEB-19
Cobalt (Co)-Total			97.4		%		80-120	06-FEB-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4491055								
WG2983670-2 LCS								
Copper (Cu)-Total			97.7		%		80-120	06-FEB-19
Iron (Fe)-Total			102.1		%		80-120	06-FEB-19
Lead (Pb)-Total			100.8		%		80-120	06-FEB-19
Manganese (Mn)-Total			98.4		%		80-120	06-FEB-19
Molybdenum (Mo)-Total			100.8		%		80-120	06-FEB-19
Nickel (Ni)-Total			103.7		%		80-120	06-FEB-19
Selenium (Se)-Total			100.2		%		80-120	06-FEB-19
Silver (Ag)-Total			100.6		%		80-120	06-FEB-19
Tin (Sn)-Total			98.3		%		80-120	06-FEB-19
Titanium (Ti)-Total			97.0		%		80-120	06-FEB-19
Zinc (Zn)-Total			100.2		%		80-120	06-FEB-19
WG2983670-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	06-FEB-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	06-FEB-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	06-FEB-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	06-FEB-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	06-FEB-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	06-FEB-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	06-FEB-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	06-FEB-19
Iron (Fe)-Total			<0.010		mg/L		0.01	06-FEB-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	06-FEB-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	06-FEB-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	06-FEB-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	06-FEB-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	06-FEB-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	06-FEB-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	06-FEB-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	06-FEB-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	06-FEB-19
WG2983670-5 MS		**WG2983670-6**						
Aluminum (Al)-Total			98.0		%		70-130	06-FEB-19
Antimony (Sb)-Total			98.8		%		70-130	06-FEB-19
Arsenic (As)-Total			95.3		%		70-130	06-FEB-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4491055								
WG2983670-5 MS		**WG2983670-6**						
Beryllium (Be)-Total			91.4		%		70-130	06-FEB-19
Cadmium (Cd)-Total			95.6		%		70-130	06-FEB-19
Chromium (Cr)-Total			96.7		%		70-130	06-FEB-19
Cobalt (Co)-Total			93.9		%		70-130	06-FEB-19
Copper (Cu)-Total			92.6		%		70-130	06-FEB-19
Iron (Fe)-Total			86.9		%		70-130	06-FEB-19
Lead (Pb)-Total			92.2		%		70-130	06-FEB-19
Manganese (Mn)-Total			N/A	MS-B	%		-	06-FEB-19
Molybdenum (Mo)-Total			N/A	MS-B	%		-	06-FEB-19
Nickel (Ni)-Total			93.9		%		70-130	06-FEB-19
Selenium (Se)-Total			95.9		%		70-130	06-FEB-19
Silver (Ag)-Total			96.0		%		70-130	06-FEB-19
Tin (Sn)-Total			95.5		%		70-130	06-FEB-19
Titanium (Ti)-Total			99.4		%		70-130	06-FEB-19
Zinc (Zn)-Total			94.7		%		70-130	06-FEB-19
OGG-SPEC-WT	**Water**							
Batch R4492828								
WG2983663-2 LCS								
Oil and Grease, Total			102.6		%		70-130	05-FEB-19
Mineral Oil and Grease			92.9		%		70-130	05-FEB-19
WG2983663-3 LCSD		**WG2983663-2**						
Oil and Grease, Total		102.6	95.1		%	7.6	40	05-FEB-19
Mineral Oil and Grease		92.9	85.4		%	8.4	40	05-FEB-19
WG2983663-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	05-FEB-19
Mineral Oil and Grease			<2.5		mg/L		2.5	05-FEB-19
P-T-COL-WT	**Water**							
Batch R4495869								
WG2984860-3 DUP		**L2229178-1**						
Phosphorus, Total		0.327	0.322		mg/L	1.5	20	08-FEB-19
WG2984860-2 LCS								
Phosphorus, Total			100.8		%		80-120	08-FEB-19
WG2984860-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	08-FEB-19
WG2984860-4 MS		**L2229178-1**						

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-COL-WT	**Water**							
Batch R4495869								
WG2984860-4 MS		**L2229178-1**						
Phosphorus, Total			N/A	MS-B	%		-	08-FEB-19
PAH-NAPHTHALENE-WT	**Water**							
Batch R4496370								
WG2983662-2 LCS								
Naphthalene			102.0		%		50-130	08-FEB-19
WG2983662-3 LCSD		**WG2983662-2**						
Naphthalene		102.0	96.6		%	5.5	50	08-FEB-19
WG2983662-1 MB								
Naphthalene			<0.020		ug/L		0.02	08-FEB-19
Surrogate: d8-Naphthalene			117.0		%		60-140	08-FEB-19
PH-WT	**Water**							
Batch R4493028								
WG2983769-8 DUP		**WG2983769-7**						
pH		7.38	7.38	J	pH units	0.00	0.2	06-FEB-19
WG2983769-6 LCS								
pH			6.98		pH units		6.9-7.1	06-FEB-19
PHENOLS-4AAP-WT	**Water**							
Batch R4491674								
WG2984114-3 DUP		**L2229061-8**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-FEB-19
WG2984114-2 LCS								
Phenols (4AAP)			91.3		%		85-115	06-FEB-19
WG2984114-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	06-FEB-19
WG2984114-4 MS		**L2229061-8**						
Phenols (4AAP)			87.9		%		75-125	06-FEB-19
SO4-IC-N-WT	**Water**							
Batch R4494216								
WG2983913-4 DUP		**WG2983913-3**						
Sulfate (SO4)		2.85	2.84		mg/L	0.4	20	06-FEB-19
WG2983913-2 LCS								
Sulfate (SO4)			101.7		%		90-110	06-FEB-19
WG2983913-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	06-FEB-19
WG2983913-5 MS		**WG2983913-3**						

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4494216								
WG2983913-5 MS		**WG2983913-3**						
Sulfate (SO4)			100.5		%		75-125	06-FEB-19
SOLIDS-TSS-WT	**Water**							
Batch R4495629								
WG2984507-3 DUP		**L2228635-1**						
Total Suspended Solids		693	684		mg/L	1.3	20	08-FEB-19
WG2984507-2 LCS								
Total Suspended Solids			100.4		%		85-115	08-FEB-19
WG2984507-1 MB								
Total Suspended Solids			<2.0		mg/L		2	08-FEB-19
TKN-WT	**Water**							
Batch R4498189								
WG2985282-7 DUP		**L2229061-8**						
Total Kjeldahl Nitrogen		0.18	0.21		mg/L	14	20	09-FEB-19
WG2985282-6 LCS								
Total Kjeldahl Nitrogen			102.3		%		75-125	09-FEB-19
WG2985282-5 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	09-FEB-19
WG2985282-8 MS		**L2229061-8**						
Total Kjeldahl Nitrogen			107.2		%		70-130	09-FEB-19
VOC-ROU-HS-WT	**Water**							
Batch R4490308								
WG2982357-4 DUP		**WG2982357-3**						
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-FEB-19
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-FEB-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-FEB-19
WG2982357-1 LCS								
1,4-Dichlorobenzene			98.0		%		70-130	06-FEB-19
Benzene			99.9		%		70-130	06-FEB-19
Chloroform			97.6		%		70-130	06-FEB-19

Quality Control Report

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4490308								
WG2982357-1 LCS								
Dichloromethane			101.7		%		70-130	06-FEB-19
Ethylbenzene			89.1		%		70-130	06-FEB-19
Tetrachloroethylene			95.1		%		70-130	06-FEB-19
Toluene			93.7		%		70-130	06-FEB-19
Trichloroethylene			96.8		%		70-130	06-FEB-19
WG2982357-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	06-FEB-19
Benzene			<0.50		ug/L		0.5	06-FEB-19
Chloroform			<1.0		ug/L		1	06-FEB-19
Dichloromethane			<2.0		ug/L		2	06-FEB-19
Ethylbenzene			<0.50		ug/L		0.5	06-FEB-19
Tetrachloroethylene			<0.50		ug/L		0.5	06-FEB-19
Toluene			<0.50		ug/L		0.5	06-FEB-19
Trichloroethylene			<0.50		ug/L		0.5	06-FEB-19
Surrogate: 1,4-Difluorobenzene			102.2		%		70-130	06-FEB-19
Surrogate: 4-Bromofluorobenzene			96.7		%		70-130	06-FEB-19
WG2982357-5 MS		**WG2982357-3**						
1,4-Dichlorobenzene			101.8		%		50-150	06-FEB-19
Benzene			99.7		%		50-150	06-FEB-19
Chloroform			96.9		%		50-150	06-FEB-19
Dichloromethane			96.9		%		50-150	06-FEB-19
Ethylbenzene			93.7		%		50-150	06-FEB-19
Tetrachloroethylene			103.3		%		50-150	06-FEB-19
Toluene			97.2		%		50-150	06-FEB-19
Trichloroethylene			99.9		%		50-150	06-FEB-19

Quality Control Report

Workorder: L2228829 Report Date: 12-FEB-19

Client: FISHER ENVIRONMENTAL
15-400 ESNA PARK DRIVE
MARKHAM ON N/A
Contact: CLIVE WIGGAN

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 639710

Page of

Report To	Contact and company name below will appear on the final report
Company:	Fisher Environmental Ltd.
Contact:	Clive Biggan
Phone:	
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: clive@fisherenvironmental.com

Email 2: allen@fisher-environmental.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: elena@fisherenvironmental.com

Email 2: clive@fisherenvironmental.com

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

Project Information

ALS Account # / Quote #:

Job #:

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only): L2229829

ALS Contact: Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Halton Region Sewer Bylaw

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW206 - Halton Region Sewer Bylaw	05-Feb-19	15:24				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C			
9.5°C						

SHIPMENT RELEASE (client use)

Released by: A. Choi Date: Feb 5, 2019 Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Date: 2/5/2019 Time: 3:25 pm

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Proposed Storm Sewer Bylaw Parameters

Parameter	Limit	Unit	Results	
			MW2	MW301
Arsenic (total)	0.02	mg/L	0.00155	0.0023
Benzene	0.002	mg/L	<0.00050	<0.00050
Biochemical Oxygen Demand	15	mg/L	<3.0	<2.0
Bis (2-ethylhexyl) phthalate	0.0088	mg/L	<0.004	<0.0020
Cadmium (total)	0.008	mg/L	0.000013	<0.000050
Chloroform	0.002	mg/L	<0.001	<0.001
Chromium (hexavalent)	0.04	mg/L	<0.00050	<0.00050
Chromium (total)	0.08	mg/L	0.00209	0.0056
Copper (total)	0.04	mg/L	0.005	<0.010
Cyanide (total)	0.02	mg/L	<0.0020	<0.0020
Dichlorobenzene, 1, 2-	0.0056	mg/L	<0.00050	<0.00050
Dichlorobenzene, 1, 4-	0.0068	mg/L	<0.00050	<0.00050
Dichlorobenzidine, 3,3'-	0.0008	mg/L	<0.00080	<0.00040
Dichloroethylene, Cis-1,2-	0.0056	mg/L	<0.00050	<0.00050
Dichloropropylene, Trans-1,3-	0.0056	mg/L	<0.00050	<0.00050
Di-n-butyl phthalate	0.015	mg/L	<0.002	<0.0010
Ethyl benzene	0.002	mg/L	<0.00050	<0.00050
Lead (total)	0.12	mg/L	0.00122	0.00057
Manganese (total)	0.05	mg/L	0.313	0.517
Mercury (total)	0.0004	mg/L	<0.0000050	<0.0000050
Methylene chloride	0.0052	mg/L	<0.002	<0.002
Nickel (total)	0.08	mg/L	0.0024	<0.0050
Nonylphenol ethoxylates	0.01	mg/L	<0.01	<0.05
Nonylphenols	0.001	mg/L	<0.001	<0.001
PCBs	0.0004	mg/L	<0.000040	<0.000040
Pentachlorophenol	0.002	mg/L	<0.001	<0.00050
pH	6.5 to 8.5		7.45	7.12
Phenolics (4AAP)	0.008	mg/L	0.0032	0.0073
Phosphorus (total)	0.4	mg/L	0.0518	0.0384
Selenium (total)	0.02	mg/L	0.0016	<0.00050
Silver (total)	0.12	mg/L	0.000064	<0.00050
Suspended Solids (total)	15	mg/L	69.6	95.4
Temperature	< 30	°C	12.95	11.3
Tetrachlorethane, 1, 1, 2, 2-	0.017	mg/L	<0.00050	<0.00050
Tetrachloroethylene	0.0044	mg/L	<0.00050	<0.00050
Toluene	0.002	mg/L	<0.00050	<0.00050
Total PAHs	0.002	mg/L	0.000251	0.000687
Trichloroethylene	0.0076	mg/L	<0.00050	<0.00050
Xylenes (total)	0.0044	mg/L	<0.001	<0.001
Zinc (total)	0.04	mg/L	0.0068	<0.03