Geotechnical Engineering

Environmental Engineering

Hydrogeology

Archaeological Studies

Geological Engineering

Materials Testing

Building Science

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

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

patersongroup

Groundwater Impact Assessment
Proposed Industrial Development

5368 Boundary Road &
6150 Thunder Road
Ottawa (Carlsbad Springs), Ontario

Prepared For

Avenue 31 Capital Incorporated

December 17, 2020

Report PH4139-REP.01R1

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APPENDICES

1.0 INTRODUCTION

Paterson Group Inc. (Paterson) was retained by Avenue 31 Capital Incorporated to carry out a groundwater impact assessment for a proposed industrial development to be constructed at 5368 Boundary Road & 6150 Thunder Road, Ottawa (Carlsbad Springs), Ontario. The proposed development is expected to consist of one large slab-on-grade structure and two smaller slab-on-grade structures, with associated parking and landscaped areas. Presently, the subject site is vacant of any structures and consists primarily of forested land. Reference should be made to Paterson Drawing PH4139-7 - Site Plan for the site location and general proposed site layout.

The subject site is located in the rural area of the city where the Carlsbad Trickle System (CTS) is available as a municipal water supply for the proposed development. No municipal wastewater services are available, and as such, a private wastewater treatment facility with surface discharge is being proposed to handle the wastewater generated by the main building of the proposed development. The treatment facility is proposed to discharge highly treated effluent to an unnamed drain near the northern side of the property, which outlets to the Bear Brook Municipal Drain located northwest of the property north of Thunder Road. The proposed Industrial Buildings 2 and 3 are smaller slab-on-grade structures that are being considered for future development. Both sites would require connection to the main treatment facility or have a smaller private sewage system. Based on the current configuration, the systems are estimated to have a design volume in the range of approximately 3,000 to 4,000 L/day. The locations of these buildings are shown on Paterson Drawing PH4139-7 - Site Plan as Industrial Bldg 2 and Industrial Bldg 3.

The purpose of this study has been to carry out a groundwater impact assessment to determine the potential impacts related to a surficial discharge of the highly treated sewage effluent within an unnamed drain and associated surficial surface connections. Paterson has approached a manufacturer of Modified Sequencing Batch Reactor (MSBR) package plants and Membrane Bioreactor (MBR) package plants for the design, supply and commissioning of a sewage treatment solution for the proposed development.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and recommendations pertaining to the private services for the subject development as it is understood at the time of writing this report.

2.0 BACKGROUND

2.1 Subject Site

The subject property fronts onto the west side of Boundary Road and Thunder Road and is located south of Highway 417. Specifically, the property is located at 5368 Boundary Road and 6150 Thunder Road, in the City of Ottawa (Carlsbad Springs), Ontario (refer to Paterson Drawing PH4139-7 - Site Plan included in Appendix 2). The property is irregular in shape and has an approximate land area of 17.6 ha. The property is zoned Rural Countryside with an RU zoning designation.

The property located directly to the southeast of the subject site on the east side of Boundary Road is being developed as the Capital Region Resource Recovery Centre (CRRRC). The site is to include usages of a landfill, petroleum hydrocarbon contaminated soil treatment/storage areas, compost processing, organic processing/pre-processing facility, construction and demolition material processing facility, sludge dewatering pond and many further proposed applications. The related hydrogeological studies in support of the proposed CRRRC development were performed by Golder Associates, as per the City of Ottawa development applications website.

The property located directly east of the subject site on the east side of Boundary Road has been developed as an Amazon Distribution Warehouse. The main purpose of the building is the distribution of parcels to the surrounding areas. The warehouse uses a package plant treatment system that discharges highly treated effluent to a surficial drain that is tributary to the Regimbald Drain and is similar to the proposed plan for the subject site. An Environmental Compliance Approval (ECA) was required to be obtained for the surface discharge of their wastewater effluent. Reference should be made to ECA #2849-BCFKST, included in Appendix 4.

Presently, the site is composed of vacant land with a forested area on the northern half and the southern half cleared of trees and regraded in 2019. The total topographic relief across the development area is on the order of 2 m. The drain on-site transmits surficial flows to the Bear Brook Municipal Drain located approximately 1.3 km northwest of the site on a seasonal (intermittent) basis. The Bear Brook Municipal Drain has been classified by the Department of Fisheries and Oceans (DFO) as a Class E Drain, which indicates that the Drain has permanent flow, contains sensitive fish species and has a restricted activity timing window during spring months. Refer to Paterson Drawing PH4139-2 - Municipal Drainage Plan for the alignment of the existing municipal drains and ditches.

2.2 Proposed Treatment System(s)

There is currently a single private sewage collection and treatment facility option that has been selected for review. The facility is proposed to have a surface discharge of the treated effluent to the nearby unnamed drain that connects to the Bear Brook Municipal Drain approximately 1.3 km northwest of the site, north of Thunder Road. The chosen system will consist of either a Modified Sequencing Batch Reactor (MSBR) package plant or a Membrane Bioreactor (MBR) package plant. The system will be based upon the following design parameters, which are the same as the values provided for the existing ECA for surface discharge at the Adjacent Amazon Property:

Table 1: Design Parameters

Parameter	Design Value	Unit
Average Daily Flow (ADF)	30	m^3/day
Maximum Daily Flow (MDF)	90	m^3/day
Ambient Temperatures	-30 to 35	°C

Table 2: Influent Wastewater Characteristics

Parameter	Unit	Design Value
Biochemical Oxygen Demand (BOD5)	mg/L	250
Total Suspended Solids (TSS)	mg/L	400
Total Kjeldahl Nitrogen (TKN)	mg/L	150
Total Phosphorous (TP)	mg/L	10
Fat, Oil and Grease (FOG)	mg/L	<30
Water Temperature	°C	8 to 25
Alkalinity	mg/L as CaCO3	500

Table 3: Effluent Discharge Quality

Parameter	Unit	Regulatory Limit	Design Value
Biochemical Oxygen Demand (BOD5)	mg/L	<10	5
Total Suspended Solids (TSS)	mg/L	<10	1
Ammonia Nitrogen (NH3-N)	mg/L	<1	0.5
Total Phosphorous (TP)	mg/L	<0.1	0.05
E. Coli	MPN/100 mL	<200	0

Based upon a cursory review of the facility option being reviewed, the available options are expected to meet or exceed the regulatory requirements to treat raw sewage of domestic quality and discharge in accordance with MECP guidelines. The discharge of the final effluent will be coordinated with the MECP, MTO and the City of Ottawa. An MECP Environmental Compliance Approval will be filed with the MECP for approval, along with any other required permits.

2.3 Surrounding Land Uses

The general zoning in the area immediately surrounding the subject site consists of the following:

- ❏ RU - Rural Countryside
- ❏ RH - Rural Heavy Industrial
- ❏ RC - Rural Commercial

The zoning outside of these areas generally transitions into RG - Rural General Industrial, O1A - Parks and Open Space and EP - Environmental Protection zones. Refer to Paterson Drawing PH4139 - 4 - Zoning and Land Use for zone locations and designations.

The specific land uses for the above zones are summarized below.

- ❏ North:
  - Highway 417.
  - Park and Open Spaces - Golf course.
  - Rural Countryside - Vacant properties - forested, grassed, and swamp.
  - Environmental Protection - Vacant property - treed, grassed, and swamp.

❑ East:
- Rural Heavy Industrial - Capital Region Resource Recovery Centre.
- Rural Heavy Industrial - Aggregate extraction and storage operations.
- Rural Heavy Industrial - Single residence and wrecking yard.
- Rural General Industrial - Various small businesses - includes construction contracting and wrecking yard.
- Rural Commercial - Gas bar and retail store.

South
- Rural Countryside - Vacant Properties - forested, grassed and swamp.
- Rural Countryside - Two residences on the southwest side of Boundary Road.
- Rural Heavy Industrial - Aggregate extraction and storage operations.

❑ West
- Rural Countryside - Vacant forested land.

2.4 Regional and Site Geology

Published surficial geology mapping for the area in the vicinity of the subject site indicates that the site is underlain by a thin, intermittent surficial silty sand to sand layer which is underlain by a thick layer of brown to grey silty clay stratum. The silty clay is underlain by glacial till prior to encountering bedrock.

Based on site specific investigative works carried out by this firm (Paterson Report No. PG5161-1, dated August 18, 2020), the general subsoil profile encountered at the test locations consists of topsoil, being approximately to 0.1 to 0.3 m thick followed by a silty sand to sand stratum that was encountered in a very loose to compact state and extended up to 3.8 m below ground surface (bgs). Silty clay was encountered below the silty sand layer, and was always the final layer encountered, with a maximum depth reached of 21.2 m bgs, based upon dynamic cone penetration test refusals. There were two grain size analyses and one atterberg limits test performed as part of the geotechnical investigation, the results of which are attached in Appendix 3. Bedrock and glacial till was not encountered during the geotechnical investigation and it was inferred that a glacial till layer overlies the shale bedrock of the Carlsbad formation. Reference should be made to Paterson Drawing PG5161-1 - Test Hole Location Plan and the associated Soil Profile and Test Data sheets in Appendix 3 for specific details of the soil profiles encountered at each test hole location.

The overburden across the site ranges in thickness from approximately 25 to 35 m based upon dynamic cone penetration testing, water well supply installation and available published information on the surrounding properties. This information closely coincides with the available mapping from Natural Resources Canada for Drift Thickness.

The Ontario Geologic Survey mapping indicates that the subject lands are underlain by shale of the Carlsbad formation. Reference should be made to Paterson Drawings PH4139-5 - Surficial Geology and PH4139-6 - Bedrock Geology for details regarding the regional and site geology.

3.0 METHOD OF STUDY

3.1 Geotechnical/Environmental Investigations

The environmental investigation was conducted on December 18, 2018, at which point a total of 3 boreholes were extended to a maximum depth of 4.4 m bgs. The geotechnical investigation was conducted between June 30 and July 2, 2020, during which time an additional 7 boreholes were extended to a maximum depth of 21.2 m bgs.

The test holes were completed in accessible areas using a track-mounted auger drill rig operated by a two-person crew. The fieldwork was carried out under the full-time supervision of our personnel under the direction of a senior engineer.

Sampling and In Situ Testing

Soil samples were recovered using a 50 mm diameter split-spoon sampler or from the auger flights. The split-spoon and auger samples were classified onsite and placed in sealed plastic bags. All samples were transported to our laboratory. The depths at which the split-spoon, Shelby tubes and auger samples were recovered from the boreholes are shown as SS and AU, respectively, on the Soil Profile and Test Data sheets in Appendix 3.

A Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm. This testing was done in general accordance with ASTM D1586-11 - Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.

Undrained shear strength testing, using a vane apparatus, was carried out at regular intervals of depth in cohesive soils. The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) at 2 borehole locations. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

3.2 Overburden Groundwater Observation

The groundwater level was recorded at each borehole location and the values were measured in either piezometers or groundwater monitoring wells using an electronic water level tape. The depths at which water was encountered in each test hole is indicated on the Soil Profile and Test Data sheets in Appendix 3.

4.0 HYDROGEOLOGICAL SITE SETTING

4.1 REGIONAL GROUNDWATER FLOW DIRECTION

The groundwater data compiled by Paterson as part of the environmental and geotechnical investigations suggests that the local flow direction in the upper silty sand and underlying silty clay stratum is in a west to northwest direction within the boundaries of the subject site. This is consistent with expectations of the regional groundwater flow direction in the area, which is expected to trend in a western direction, towards the various unnamed and Municipal Drains west of the site. In addition, the shallow bedrock aquifer is shown to flow towards the northwest.

A review of the MECP online water well records (WWR) database indicates that there are several mapped water well locations within a 1.25 km radius surrounding the site. After reviewing the WWR, the majority of the well records identified were found to be either monitoring wells or abandoned wells, with a small number of domestic and commercial water supply wells found to exist within this radius. Within a 500 m radius from the subject site, there was 1 domestic/commercial water supply well identified. The majority of the monitoring wells identified were installed recently for the investigations and approvals for a major development (Capital Region Resource Recovery Centre) located to the southeast of the subject site. The nearby WWR have been attached in Appendix 1, with the mapped water wells in the surrounding area shown on Paterson Drawing PH4139 -1 - MECP Water Well Location Plan in Appendix 2.

As shown on the aforementioned Paterson drawing, there are no wells located downgradient and within 500 m radius of the subject site. Additionally, wells in the area are typically accessing the water supply aquifer either at the interface of the glacial till stratum and the Carlsbad formation, or the deeper bedrock aquifer. As previously noted, the CTS is available in the surrounding area, and will be used at subject site to provide municipal water supply to the proposed development.

4.2 LOCAL HYDROGEOLOGY

The shallow groundwater flow in the silty sand overburden stratum is generally influenced by topographical factors and may be affected by local barriers such as Highway 417, Boundary Road and Thunder Road. The underlying silty clay stratum has minimal groundwater flow due to the low hydraulic conductivity and is considered to provide very limited recharge to the till or bedrock aquifers.

The shallow groundwater flow in the silty sand stratum is expected to move horizontally

in the upper aquifer until it discharges into local ditches, swales, tile drains, municipal drains and/or watercourses. Groundwater intercepted by ditches, swales or tile drains will re-direct the groundwater directly to the larger surface water system.

The subject site is located at the eastern edge of the Bear Brook Mid 3 subwatershed. The boundary of the subwatershed is located at Boundary Road, with the other side of the subwatershed divide becoming the Shaw's Creek subwatershed. The location of the subwatershed boundary at the eastern edge of the subject site provides further confirmation of the expected westward flow direction in the area.

4.3 SURFICIAL DRAINAGE SYSTEM

There are multiple ditches within the surrounding area that direct water towards either the Rochon Municipal Drain located southwest of the site or the Bear Brook Municipal Drain located northwest of the site.

The unnamed drain located at the northern part of the subject site collects surface flows from east of Thunder Road as well as the roadside ditches adjacent to Thunder Road. The unnamed drain transmits surficial flows in an east to west direction to the Bear Brook Municipal Drain, located approximately 1.3 km northwest of the site, on a seasonal (intermittent) basis.

Bear Brook Municipal Drain is one of the larger watercourses in the region, and receives flows from multiple municipal drains throughout it's channel length, which flows north above Highway 417 before flowing east. The Bear River Municipal Drain and the Rochon Municipal Drain (to the west to southwest of the site) are not expected to receive any drainage from the subject site.

5.0 GROUNDWATER AND SURFACE WATER QUALITY

Paterson sampled the surficial flows of the drain located at the northern side of the property at 3 locations (western, central and eastern sides) for baseline values of nitrogen species in November 2020. Reference should be made to the analytical test results included in Appendix 4. The results did not show exceedances of the Ontario drinking water standards (ODWS) for the nitrogen species in the water samples at that time. Nitrate concentrations in all samples were non-detectable (i.e. <0.1 mg/L).

5.1 GROUNDWATER IMPACT ASSESSMENT

Paterson's previous work on-site included laboratory grain size distribution testing and atterberg limits testing of the silty clay stratum. See attached grain size distribution curves and atterberg limits results attached in Appendix 3. The distribution curves can be inferred to indicate that the hydraulic conductivity of the silty clay stratum is very low and would create a very low permeability layer (i.e. $1x10^{-7}$ to $1x10^{-10}$ m/sec). The low hydraulic conductivity of the silty clay provides isolation of the till and Carlsbad shale bedrock aquifer from any potential surficial infiltration. As such, the isolation of the lower aquifers provide separation of the surrounding water supply wells from potential surficial effects.

The surficial flow test results from the Paterson 2020 report are as follows:

Table 4: Summary of Nitrogen Species Testing Within Drain - November 11, 2020

Parameter	Units	X1	X2	X3	Guideline (ODWS)
N-NO2	mg/L	≤0.10	≤0.10	≤0.10	1
N-NO3	mg/L	≤0.10	≤0.10	≤0.10	10
pH	-	8.16	8.19	8.19	6.5-8.5
N-NH3	mg/L	≤0.010	≤0.010	≤0.010	
TKN	mg/L	0.798	0.628	0.879	

The testing was compared to the ODWS and there were no previous exceedances of the on-site values. There are no PWQO guidelines for these parameters and as such, there are no exceedances.

5.2 SURFACE WATER IMPACT ASSESSMENT

The review of the surface water system provided an overview of the potential surficial connections to the shallow aquifer system. These consisted of potential water supply wells, on-site ditches/swales, municipal drains, and watercourses.

After reviewing the MECP water well mapping in the downgradient direction of the unnamed drain and surrounding area, it was not observed that there are water supply wells in proximity to the unnamed drain. Reference should be made to Paterson Drawing PH4139-1 - MECP Water Well Location Plan in Appendix 2.

The discharge point for the treated effluent is proposed to be to the drain running east to west across the northern side of the property, which connects to the Bear Brook Municipal Drain approximately 1.3 km northwest of the site. It should be noted that the City of Ottawa performs a Baseline Surface Water Monitoring Program, which includes two locations, within Bear Brook Creek. The City of Ottawa water quality database notes that there are various exceedances of the PWQO within the final receiver Bear Brook Creek.

As the treated effluent discharge is expected to meet or exceed the MECP guidelines for a direct surface discharge of treated sewage effluent, it is not required that the treated effluent be diluted to meet MECP guidelines. The reasonable use for the water downgradient of the subject site is drinking water. As such, the maximum discharge of nitrates for the proposed development is 2.5 mg/L at the property boundaries. Based on the quality of the effluent from the proposed options, the PWQO will be met or exceeded.

While it is expected that the treated effluent discharge will meet or exceed the MECP guidelines and will not negatively impact the surface water flows, the MECP, City of Ottawa and MTO will continue to be consulted throughout the ECA process. Further evaluation of the proposed effluent can be performed once a specific treatment facility is chosen.

6.0 CONCLUSIONS

Based on the information contained within the body of this study, the following conclusions can be drawn:

1. The proposed site is located in an isolated area with generally rural industrial zoning.

2. The subject site will be serviced by a municipal water supply (CTS), which extends down Thunder Road and Boundary Road south of the site and adjoining properties.

3. The proposed direct discharge of treated sewage effluent is anticipated to meet and/or exceed the MECP guidelines for direct surface discharge. The specific sewage facility is still in the process of being reviewed at the time of writing this report.

4. The Bear Brook Municipal Drain has been classified by the Department of Fisheries and Oceans (DFO) as a Class E Drain, which indicates that the Drain has permanent flow, contains sensitive fish species and has a restricted activity timing window during spring months. However, as the Drain is located approximately 1.3 km downstream of the discharge location, and treated effluent is expected to meet the MECP guidelines for direct discharge, it is not expected to negatively impact the natural systems within the Drain downstream.

5. Based upon the deep silty clay stratum (>20 m) underlying the site; which provides isolation between the proposed treated effluent surface discharge, there will be no negative impacts on the till or Carlsbad Shale bedrock aquifers from the proposed discharge at the subject site.

6. The proposed treated effluent surface discharge to the unnamed drain is not expected to negatively impact the surface water in the area considering that the proposed MSBR or MBR package plants will provide effluent quality design values at less than half of the regulatory limit for the parameters: BOD5, TSS, Ammonia, Total Phosphorous and E. Coli.

7. The subject site is an ideal location for the proposed treated effluent surface discharge due to the lack of potential downstream receptors and the industrial nature of the neighbouring properties.

7.0 STATEMENT OF LIMITATIONS

The recommendations provided in this report are in accordance with our present understanding of the project.

A hydrogeological review of this nature is a limited sampling of a site. The recommendations are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around the test locations. Should any conditions at the site be encountered which differ from those at the test locations, we request notification immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Avenue 31 Capital Incorporated or their agent(s) is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Michael Laflamme, P.Geo.

Michael S. Killam, P.Eng.

APPENDIX 1

PUBLISHED MECP WATER WELL RECORDS

Ministry of the Environment
Ontario
OTTAWA - CARLETON

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1525164 MUNICIP 15002 CON. CON 09

COUNTY OR DISTRICT [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Gloucester | CON. BLOCK, TRACT, SURVEY, ETC 9 | LOT 1

[redacted] Carlsbad Springs | DATE COMPLETED DAY 3 MO 5 YR 90

RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Yellow	Sand	Loam	Loose	0	2
Blue	Clay		Dense	2	70
Grey	Till		Packed	70	77
Grey	Limestone		Layered	77	100

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41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
95	1 ☐ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	77
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		77	100
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
2	77	Clay

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	25 GPM	1 HOURS 0 MINS

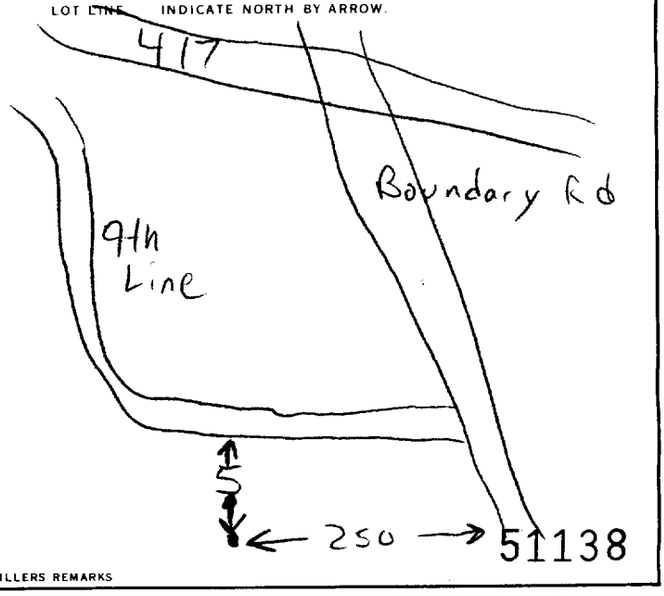
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
6 FEET	40 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	16 FEET	26 FEET	36 FEET	40 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	40 FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	40 FEET	25 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☒ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Roy's LBR Ltd | WELL CONTRACTOR'S LICENCE NUMBER: 4609

ADDRESS: Cornwall

NAME OF WELL TECHNICIAN: Roger Rox | WELL TECHNICIAN'S LICENCE NUMBER: T-0330

SIGNATURE OF TECHNICIAN/CONTRACTOR | SUBMISSION DATE DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 4609 | DATE RECEIVED DEC 04 1990

DATE OF INSPECTION | INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)
A012415
A012415

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10[th] of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only					
MUN	16002	CON	OF	LOT	02

Well Owner's Information and Location of Well Information

[redacted]

Plan 50M-136 Pt BLK1 Cumberland (Ottawa) RP2-3 RP50R26420

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
145 Ardeum Rd. Carlsbad Springs	Carlsbad Spring	

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	18	465747	5020692	Magellan	☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth (feet / ~~Metres~~) From	To
Brown	Sandy soil	clay		0	5
grey	clay			5	15
blue	clay			15	95
grey	hard pan	gravel		95	109
grey	rock			109	110

Hole Diameter

Depth Metres From	To	Diameter ~~Centimetres~~
0	110	6"

Water Record

Water found at Metres	Kind of Water
110' m ☐ Gas ☐ Other:	☐ Fresh ☑ Salty ☐ Sulphur ☐ Minerals
___ m ☐ Gas ☐ Other:	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
___ m ☐ Gas ☐ Other:	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
6 1/4	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	188	0	109'
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

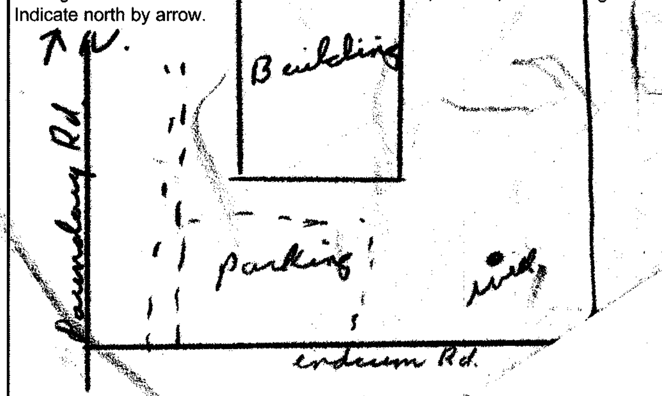
	Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Pumping test method: Sub.	Static Level	2.60		2.77
Pump intake set at - (metres) 52'	1	2.70	1	2.65
Pumping rate - (litres/min) 4?				
Duration of pumping 1 hrs + ___ min	2	2.70	2	2.64
Final water level end of pumping ___ metres	3	2.70	3	2.63
Recommended pump type. ☐ Shallow ☑ Deep	4	2.72	4	2.62
Recommended pump depth. 50' ~~metres~~	5	2.72	5	2.61
Recommended pump rate. 5 (litres/min)	10	2.72	10	2.60
	15	2.74	15	2.60
If flowing give rate - (litres/min)	20	2.74	20	2.60
	25	2.75	25	2.60
If pumping discontinued, give reason.	30	2.75	30	2.60
	40	2.75	40	2.60
	50	2.76	50	2.60
	60	2.77	60	2.60

Plugging and Sealing Record ☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	30'	grout.	3 bag.

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Method of Construction

☑ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☐ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

Water Use

☑ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☐ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

☑ Water Supply ☐ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other)

Audit No. Z 12477

Date Well Completed (YYYY MM DD): 2004 05 27

Was the well owner's information package delivered? ☑ Yes ☐ No

Date Delivered (YYYY MM DD): 2004 05 27

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
Maurice Cayer Ltd	1517

Business Address (street name, number, city etc.): Casselman ont

Name of Well Technician (last name, first name)	Well Technician's Licence No.

Signature of Technician/Contractor: x Maurice Cayer

Date Submitted (YYYY MM DD): 2004 ... ...

Ministry Use Only

Data Source	Contractor 1517
Date Received (YYYY MM DD): AUG 18 2004	Date of Inspection (YYYY MM DD)
Remarks	Well Record Number 1534876

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐ Cette formule est disponible en français

Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☒ Imperial

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
6000 Nineth Line Rd	Cumberland	2	9

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Region	Carlsbad Springs	Ontario	K0A1K0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	464625	5021884		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
		Clean Stone		0	12
		Betonite Hole Plug		12	14

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* ____

Well Use

☐ Public ☐ Commercial ☒ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
Not in use
☐ Other, *specify* ____

Water Details

Water found at Depth (m/ft)	Kind of Water	
	☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____
	☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____
	☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* ____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

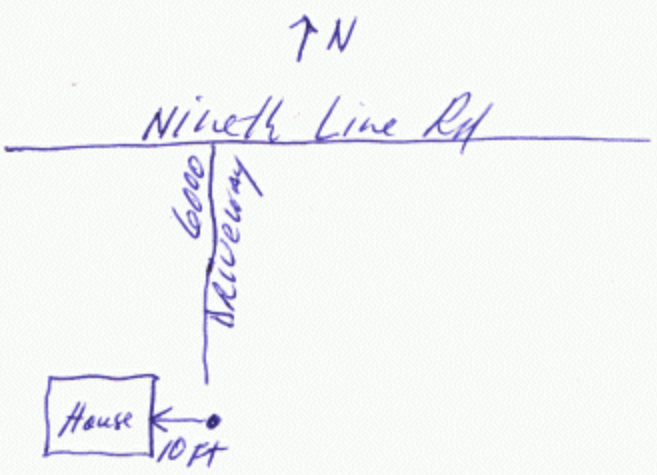
Well production *(l/min / GPM)*

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: Cement Casing Dug well Abandone.

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Raymond Pump + Well	7260

Business Address (Street Number/Name)	Municipality
417 Main St, St-Albert Ont	Nation

Province	Postal Code	Business E-mail Address
Ont.	K0A3C0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139872399	Raymond Jacques

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0264		2008091 5

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☒ No		2008091 5

Ministry Use Only

Audit No. Z 87900

SEP 24 2008

Received

0506E (12/2007)

Ministry's Copy

Ontario — Ministry of the Environment and Climate Change

Well Tag No. (A 236242) Tag#: A 236242

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☒ Metric ☐ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Boundry Road Development Inc.	N/A	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
16766 Transcanadienne Suite 500	Kirland	Qc.	H9H4M7	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5371 Boundry Road	Cumberland	21	11

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa	Cumberland Spring	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	465300	5021483		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Fill	clay, Stone	Hard	0	1.8
Brown	clay	Silt	Hard	1.8	3.9
Grey	clay		Soft	3.9	21.0
Grey	gravel	Silt, Sand	packed	21.0	60.96 ~~60.96~~ 22.25
Grey	shale		layered	22.25	60.96

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	24.99	cinent grout	1.5 m^3

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
15.55	Steel	.48	4.6	24.99
15.32	Open Hole		24.99	60.96

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth	Kind of Water	
27 (m/ft) ☐ Gas	☐ Fresh ☑ Untested ☐ Other, *specify*	
52 (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, *specify*	
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	24.99	24.9
24.99	60.9	

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☒ Other, *specify* cloud

If pumping discontinued, give reason:

Pump intake set at (m/ft): 60

Pumping rate (l/min / GPM): 42

Duration of pumping: 1 hrs + ____ min

Final water level end of pumping (m/ft): 5.75

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft): 58

Recommended pump rate (l/min / GPM): 66

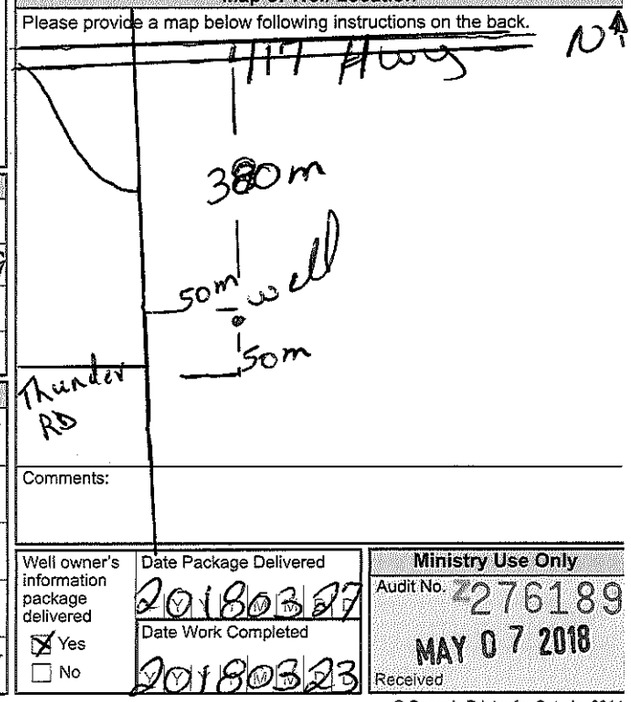
Well production (l/min / GPM): 75

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	3.83		5.75
1	4.42	1	4.64
2	4.61	2	4.36
3	4.75	3	4.26
4	4.78	4	4.23
5	4.79	5	4.18
10	4.96	10	4.10
15	5.16	15	4.03
20	5.24	20	3.95
25	5.31	25	3.89
30	5.32	30	3.85
40	5.62	40	3.83
50	5.70	50	3.83
60	5.75	60	3.83

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Bourgeois Well Drilling Ltd.	7417

Business Address (Street Number/Name)	Municipality
14245 Conc. 10-11	Guyler

Province	Postal Code	Business E-mail Address
On	K0A1R0	N/A

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139875291	GENIER, MICHAEL

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3493		2018 03 26

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	2018 03 27	Audit No. Z276189
	Date Work Completed: 2018 03 23	MAY 07 2018 Received

0506E (2014/11) Ministry's Copy

Ontario

Map: Well records

This map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available in the Open Data catalogue.

Go Back to Map

Well ID

Well ID Number: 7320860
Well Audit Number: *Z300222*
Well Tag Number: *A249297*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	357 ENTREPRENEUR CRESCENT
Township	CUMBERLAND TOWNSHIP
Lot	
Concession	
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 465777.00 Northing: 5020916.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	CLAY	SILT	STNS	0 m	3.7 m
GREY	CLAY	SILT	SOFT	3.7 m	21.3 m
GREY	GRVL	SAND	PCKD	21.3 m	22.6 m
GREY	SHLE			22.6 m	28.9 m

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
0 m	12.1 m	CONCRETE GROUT	

Method of Construction & Well Use

Method of Construction	Well Use
Air Percussion	Commercial Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
15.55 cm	STEEL	-6 m	23.1 m
15.32 cm	OPEN HOLE	23.1 m	28.9 m

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7417

Results of Well Yield Testing

After test of well yield, water was	CLEAR
If pumping discontinued, give reason	
Pump intake set at	27 m
Pumping Rate	13 LPM
Duration of Pumping	1 h:0 m
Final water level	21.61 m
If flowing give rate	
Recommended pump depth	27 m

Recommended pump rate	15 LPM
Well Production	
Disinfected?	Y

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL	9.62 m		
1	10.49 m	1	20.79 m
2	10.73 m	2	19.58 m
3	11.15 m	3	19.27 m
4	11.53 m	4	19 m
5	11.7 m	5	18.5 m
10	13.38 m	10	16.91 m
15	14.71 m	15	14.99 m
20	15.88 m	20	13.21 m
25	16.87 m	25	12.83 m
30	17.77 m	30	10.99 m
40	19.4 m	40	9.74 m
45		45	
50	20.65 m	50	9.69 m
60	1.61 m	60	9.6 m

Water Details

Water Found at Depth	Kind
27 m	Untested

Hole Diameter

Depth From	Depth To	Diameter
0 m	12.1 m	24.9 cm
12.1 m	28.9 m	15.23 cm

Audit Number: Z300222

Date Well Completed: October 05, 2018

Date Well Record Received by MOE: October 25, 2018

Updated: January 24, 2020

APPENDIX 2

PH4139-1 - MECP WATER WELL LOCATION PLAN

PH4139-2 - MUNICIPAL DRAIN PLAN

PH4139-3 - SURFICIAL GROUNDWATER FLOW

PH4139-4 - ZONING AND LAND USE

PH4139-5 - SURFICIAL GEOLOGY

PH4139-6 - BEDROCK GEOLOGY

PH4139-7 - SITE PLAN

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consulting engineers

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

NO.	REVISIONS	DATE	INITIAL
0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

MECP WATER WELL MAP

Scale: 1:7500	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-1
Approved by: MK	Revision No.: 0

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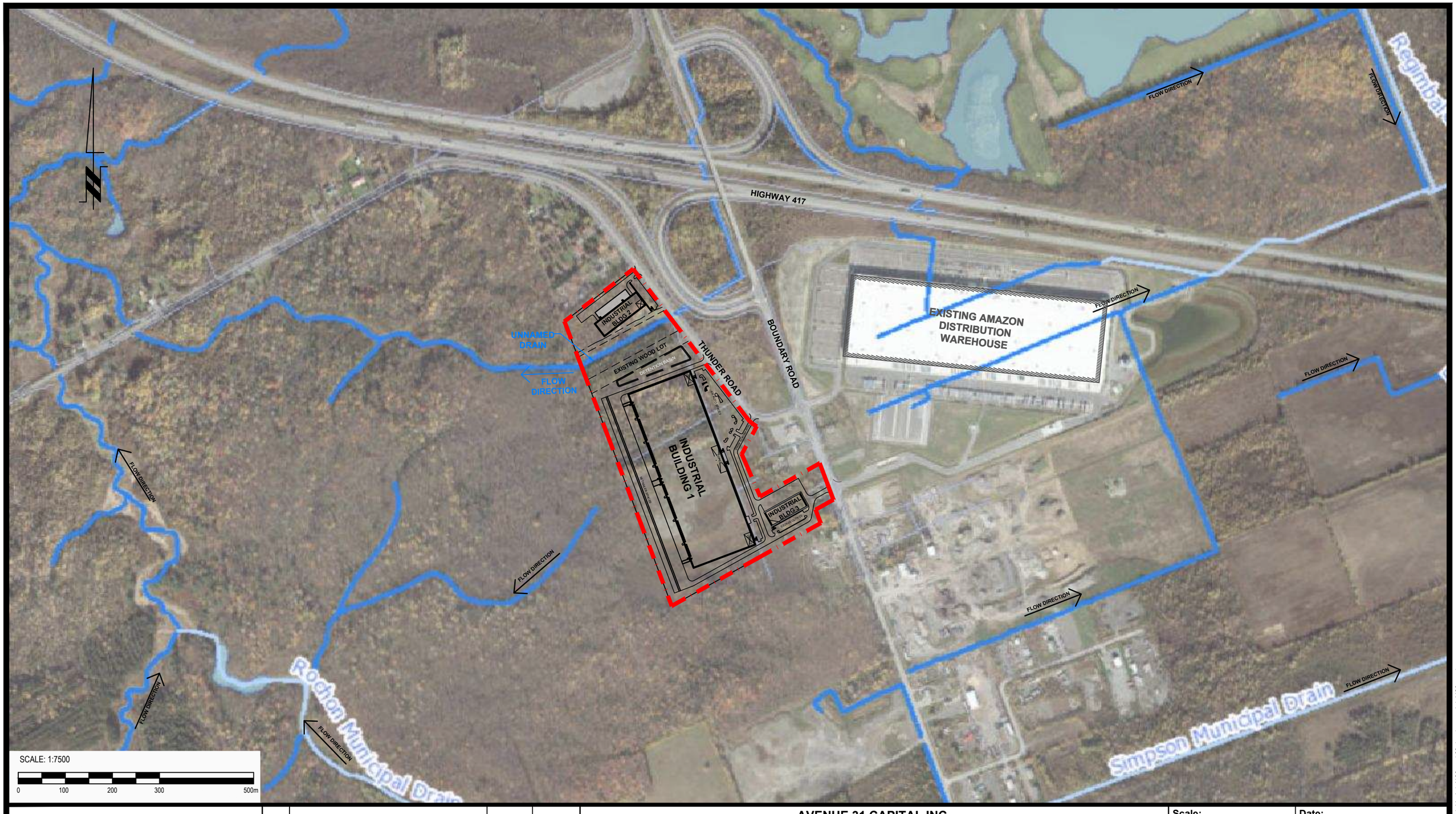

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AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

MUNICIPAL DRAINAGE PLAN

Scale: 1:7500	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-2
Approved by: MK	Revision No.: 0

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HIGHWAY 417

THUNDER ROAD

BOUNDARY ROAD

Ninth Line Rd

EXISTING AMAZON DISTRIBUTION WAREHOUSE

INDUSTRIAL BLDG 2

UNNAMED DRAIN

FLOW DIRECTION

EXISTING WOOD LOT

DETENTION BASIN

INDUSTRIAL BUILDING 1

INDUSTRIAL BLDG 3

BH 1
77.22
(76.3)

BH 2
76.76
(76.3)

BH 2
76.90
(76.5)

76.32
76.34
76.36
76.38
76.40
76.42
76.44
76.46
76.48

(0.001m/m)

LEGEND:

- MONITORING WELL LOCATION
- 76.90 GROUND SURFACE ELEVATION (m)
- (76.50) GROUNDWATER SURFACE ELEVATION (m)
- 76.34 GROUNDWATER CONTOUR(m)
- (0.001m/m) GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

SCALE: 1:5000

0 50 100 150 200 250 300m

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NO.	REVISIONS	DATE	INITIAL
0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

SURFICIAL GROUNDWATER FLOW

Scale: 1:5000	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-3
Approved by: MK	Revision No.: 0

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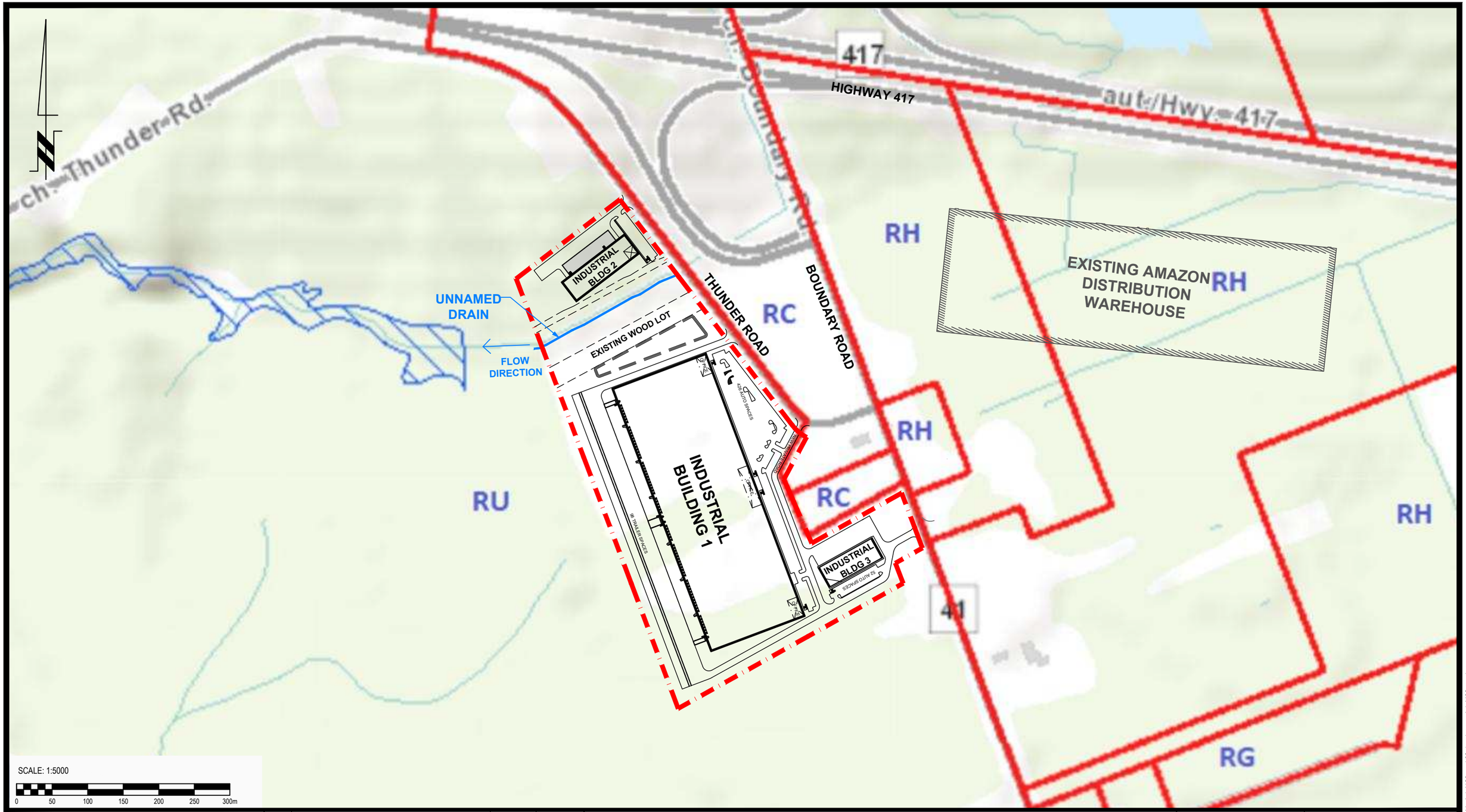

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NO.	REVISIONS	DATE	INITIAL
0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

ZONING AND LAND USE PLAN

Scale: 1:5000	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-4
Approved by: MK	Revision No.: 0

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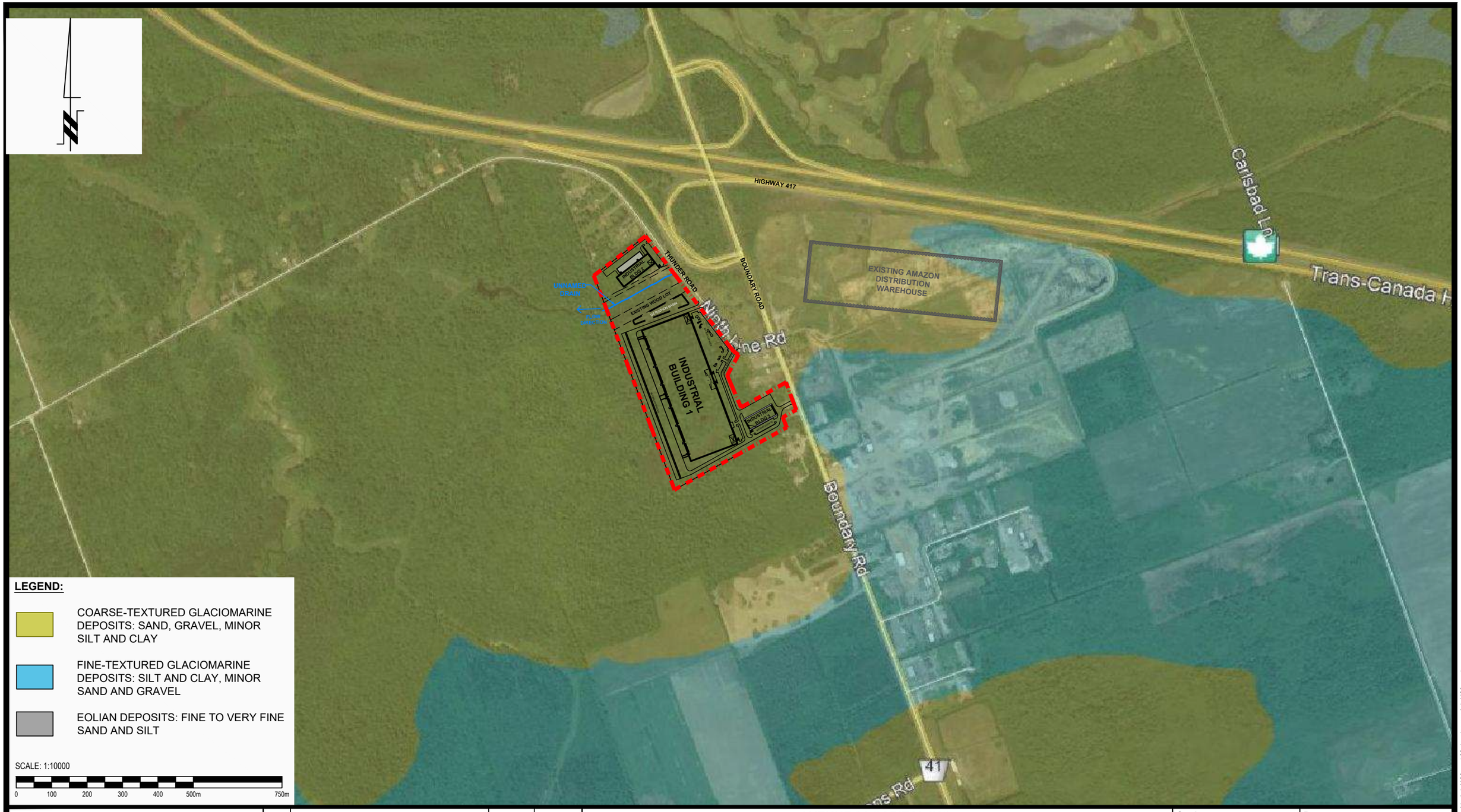

LEGEND:

- COARSE-TEXTURED GLACIOMARINE DEPOSITS: SAND, GRAVEL, MINOR SILT AND CLAY
- FINE-TEXTURED GLACIOMARINE DEPOSITS: SILT AND CLAY, MINOR SAND AND GRAVEL
- EOLIAN DEPOSITS: FINE TO VERY FINE SAND AND SILT

SCALE: 1:10000

0 100 200 300 400 500m 750m

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0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

SURFICIAL GEOLOGY

Scale: 1:5000	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-5
Approved by: MK	Revision No.: 0

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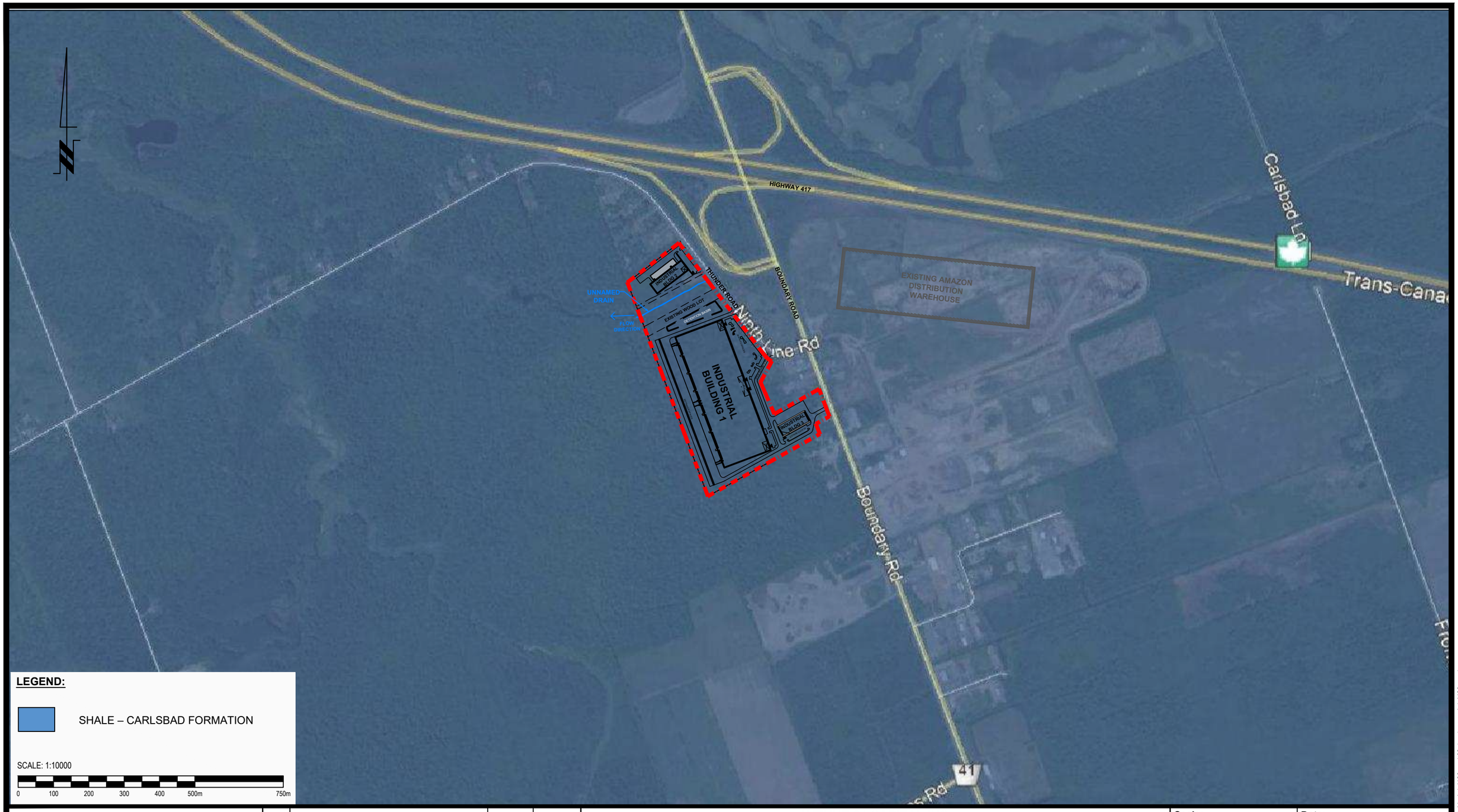

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NO.	REVISIONS	DATE	INITIAL
0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

BEDROCK GEOLOGY

Scale: 1:5000	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: **PH4139-6**
Approved by: MK	Revision No.: 0

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BOUNDARY ROAD

THUNDER ROAD

NEW PRIVATE ROAD

INDUSTRIAL BLDG 3

52 AUTO SPACES

426 AUTO SPACES

OFFICE

OFFICE

OFFICE

INDUSTRIAL BUILDING 1

INDUSTRIAL BLDG 2

X1 - UPSTREAM SAMPLE LOCATION

FLOW DIRECTION

DETENTION BASIN

X2 - ONSITE SAMPLE LOCATION

FLOW DIRECTION

EXISTING WOOD LOT

PROPOSED LOCATION FOR SEWAGE SYSTEM TREATMENT PLANT

98 TRAILER SPACES

UNNAMED DRAIN

X3 - DOWNSTREAM SAMPLE LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

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154 Colonnade Road South
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NO.	REVISIONS	DATE	INITIAL
0			

AVENUE 31 CAPITAL INC.

GROUNDWATER IMPACT ASSESSMENT
5369 BOUNDARY ROAD AND 6150 THUNDER ROAD

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:2000	Date: 12/2020
Drawn by: RCG	Report No.: PH4139-REP.01
Checked by: ML	Dwg. No.: PH4139-7
Approved by: MK	Revision No.: 0

p:\autocad drawings\hydrogeology\ph4\xx\ph4139 - exit96 development\ph4139 rev.dwg

APPENDIX 3

PG5161 - GRAIN SIZE DISTRIBUTION CURVES

PG5161 - ATTERBERG LIMITS RESULTS

PG5161 - SOIL PROFILE AND TEST DATA

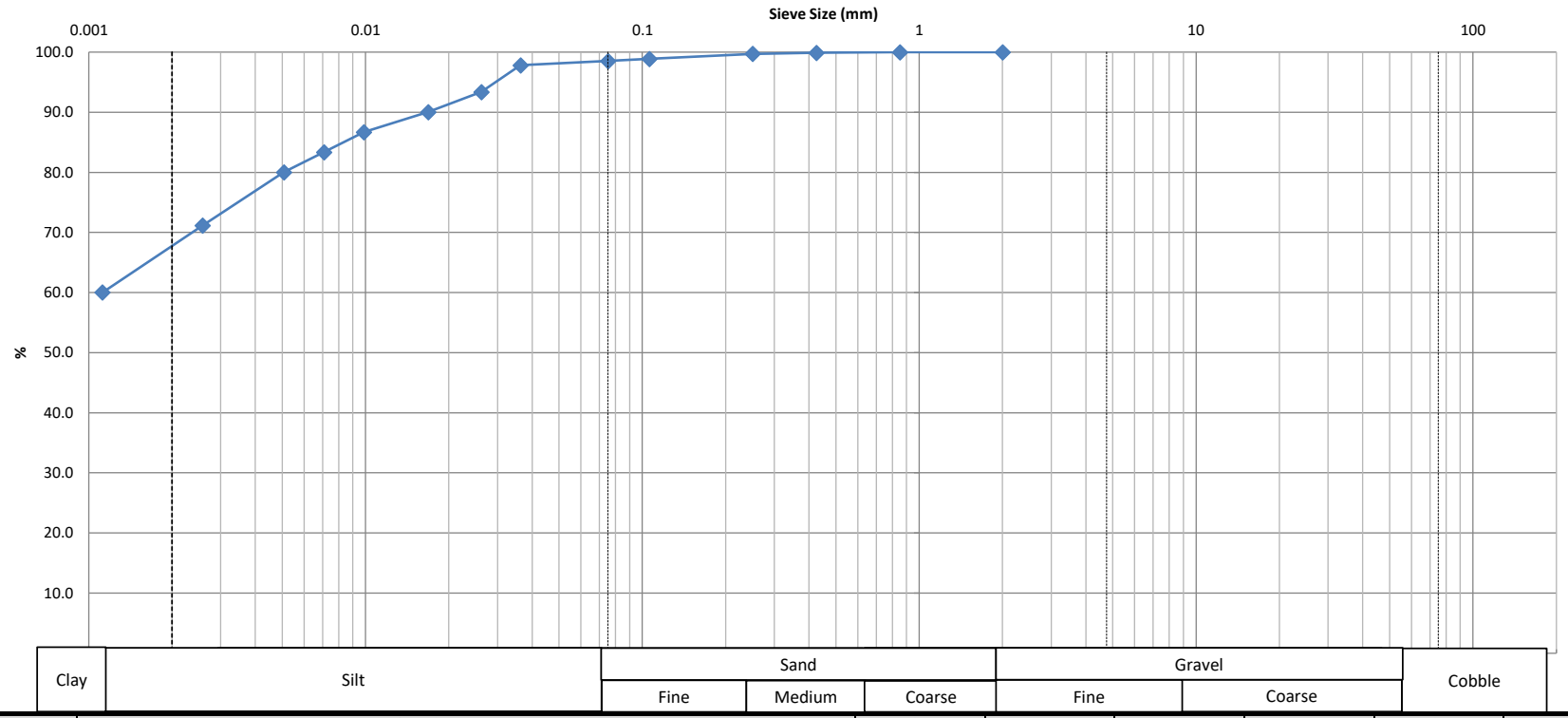
PE4480 - SOIL PROFILE AND TEST DATA

PG5161-1 - TEST HOLE LOCATION PLAN

patersongroup
consulting engineers

SIEVE ANALYSIS **ASTM C136**

CLIENT:	Exit 96 Developments	DEPTH:	5' - 7'	FILE NO:	PG5161
CONTRACT NO.:		BH OR TP No.:	BH6 SS3	LAB NO:	18125
PROJECT:	Thunder Road @ Boundary Road			DATE RECEIVED:	22-Jul-20
				DATE TESTED:	23-Jul-20
DATE SAMPLED:	22-Jul-20			DATE REPORTED:	0-Jan-00
SAMPLED BY:	A.C.			TESTED BY:	DB



Identification	Soil Classification				MC(%)	LL	PL	PI	Cc	Cu
					40.3					
	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)		Clay (%)	
					0.0	1.5	28.0		70.5	

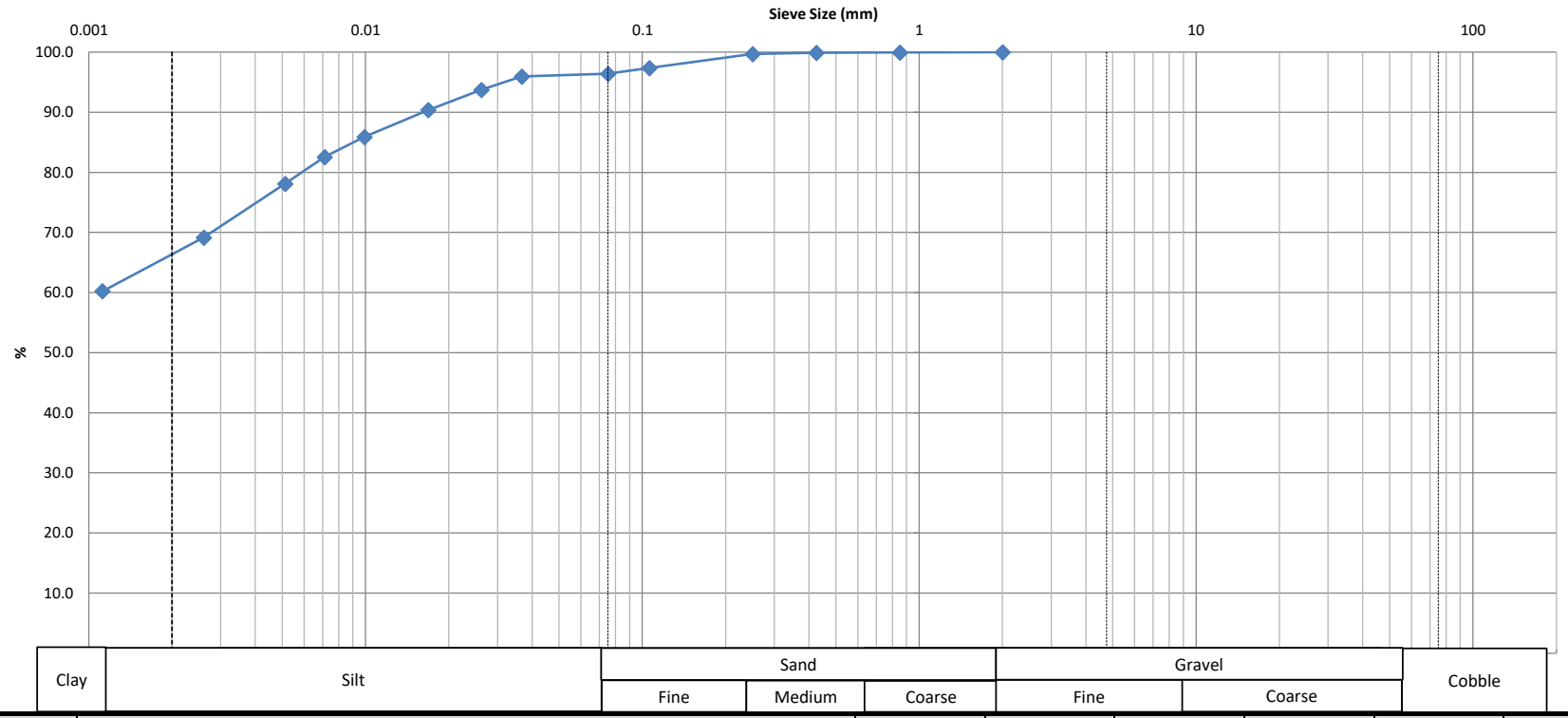
Comments:

REVIEWED BY:	Curtis Beadow	Joe Fosyth, P. Eng.

patersongroup
consulting engineers

SIEVE ANALYSIS **ASTM C136**

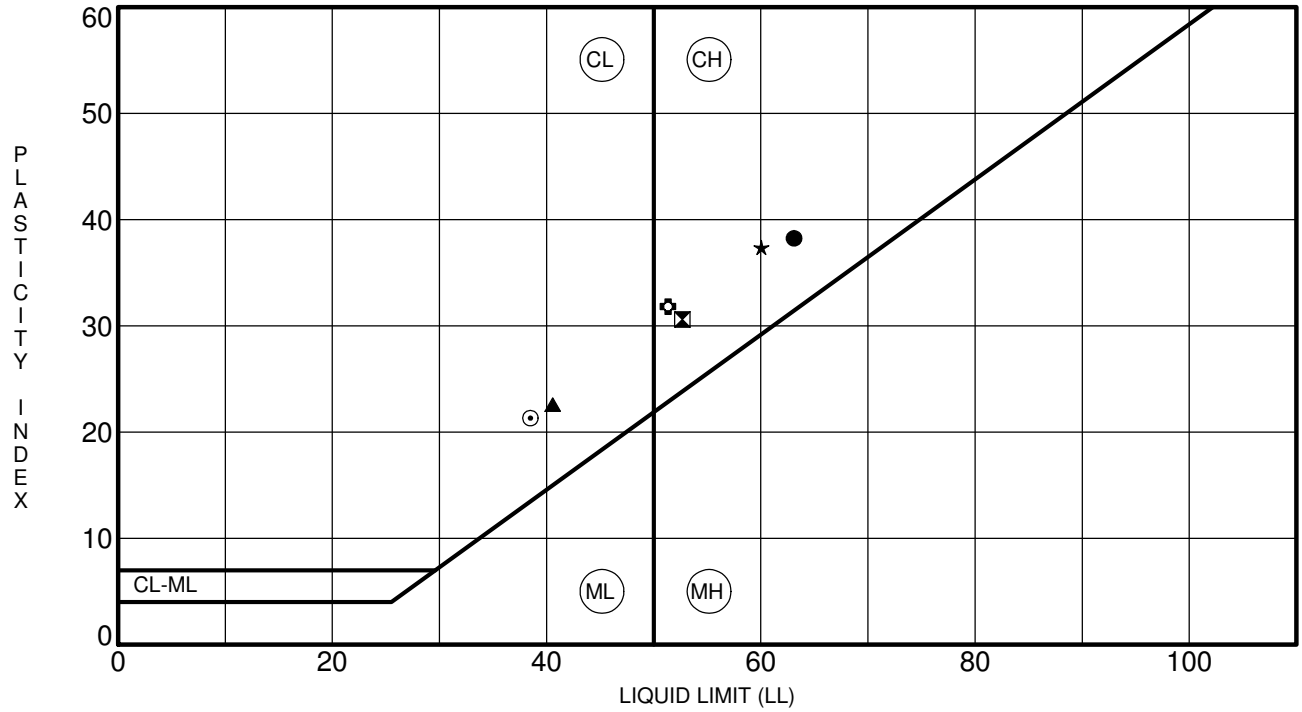
CLIENT:	Exit 96 Developments	DEPTH:	5' - 7 '	FILE NO:	PG5161
CONTRACT NO.:		BH OR TP No.:	BH2 SS3	LAB NO:	18126
PROJECT:	Thunder Road @ Boundary			DATE RECEIVED:	22-Jul-20
				DATE TESTED:	23-Jul-20
DATE SAMPLED:	22-Jul-20			DATE REPORTED:	1-Aug-20
SAMPLED BY:	A.C.			TESTED BY:	DB



Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						38.7					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	3.6		25.9		70.5	

Comments:

REVIEWED BY:	Curtis Beadow	Joe Fosyth, P. Eng.



Specimen Identification			LL	PL	PI	Fines	Classification
●	**BH 1-20**	**SS 2**	**63**	**25**	**38**		**CH - Inorganic clays of high plasticity**
⊠	**BH 2-20**	**SS 2**	**53**	**22**	**31**		**CH - Inorganic clays of high plasticity**
▲	**BH 3-20**	**SS 2**	**41**	**18**	**23**		**CL - Inorganic clays of low plasticity**
★	**BH 4-20**	**SS 2**	**60**	**23**	**37**		**CH - Inorganic clays of high plasticity**
⊙	**BH 5-20**	**SS 2**	**38**	**17**	**21**		**CL - Inorganic clays of low plasticity**
✿	**BH 6-20**	**SS 3**	**51**	**20**	**32**		**CH - Inorganic clays of high plasticity**

CLIENT **Exit 96 Developments** FILE NO. **PG5161**

PROJECT **Geotechnical Investigation - Prop. Warehouse Development - Thunder Road** DATE **30 Jun 20**

patersongroup Consulting Engineers
154 Colonnade Road South, Ottawa, Ontario K2E 7J5

ATTERBERG LIMITS' RESULTS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

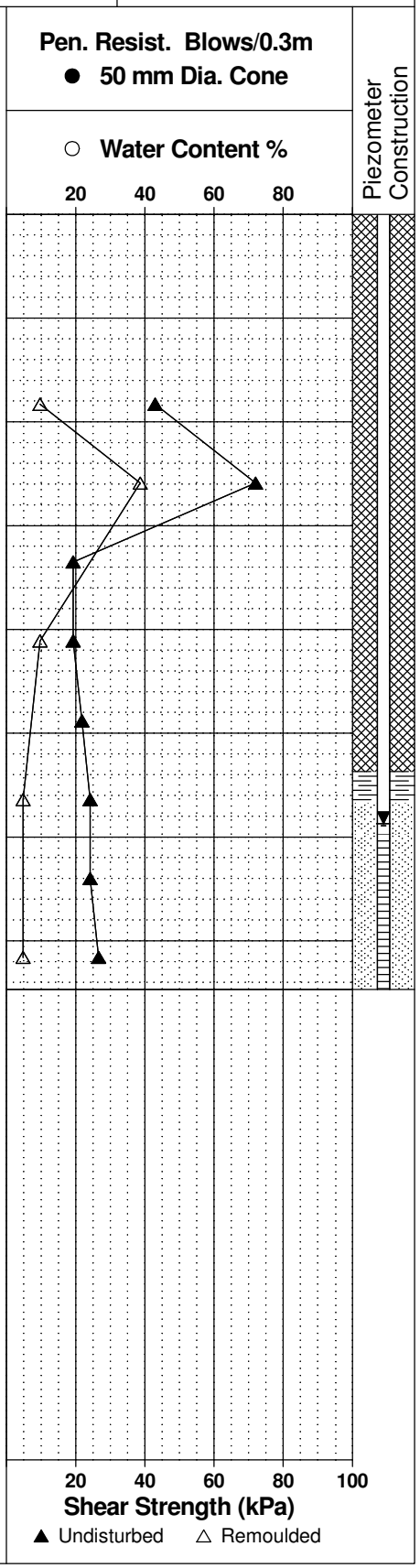
FILE NO. PG5161

REMARKS

HOLE NO. BH 1-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.32
TOPSOIL 0.25		AU	1				
Brown **SILTY SAND** 0.38		SS	2	83	3	1	75.32
Firm, brown **SILTY SAND**						2	74.32
- soft to firm and grey by 3.0m depth						3	73.32
						4	72.32
						5	71.32
						6	70.32
7.47						7	69.32
End of Borehole							
(GWL @ 5.87m - July 22, 2020)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

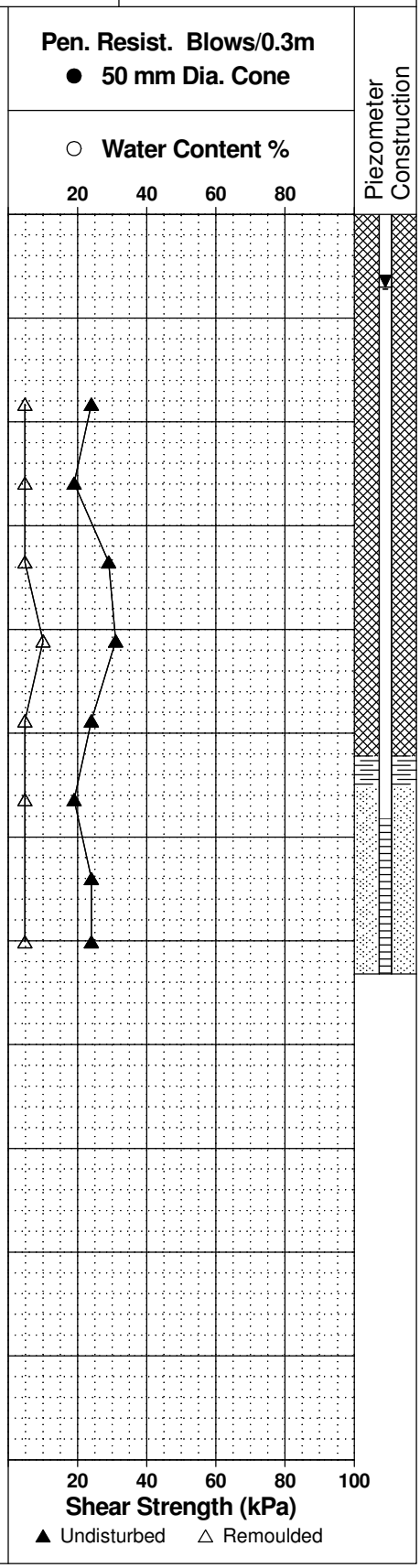
FILE NO. PG5161

REMARKS

HOLE NO. BH 2-20

BORINGS BY Track-Mount Power Auger **DATE** July 1, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.62
Very loose, brown **SILTY SAND,** some organics		AU	1				
0.56							
Brown **SILTY SAND** with sand seams		SS	2	79	3	1	75.62
1.52							
						2	74.62
						3	73.62
Firm to soft, grey **SILTY CLAY**						4	72.62
						5	71.62
						6	70.62
7.32						7	69.62
Dynamic Cone Penetration Test commenced at 7.32m depth. Cone pushed to 19.5m depth.						8	68.62
						9	67.62
						10	66.62
						11	65.62
						12	64.62



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

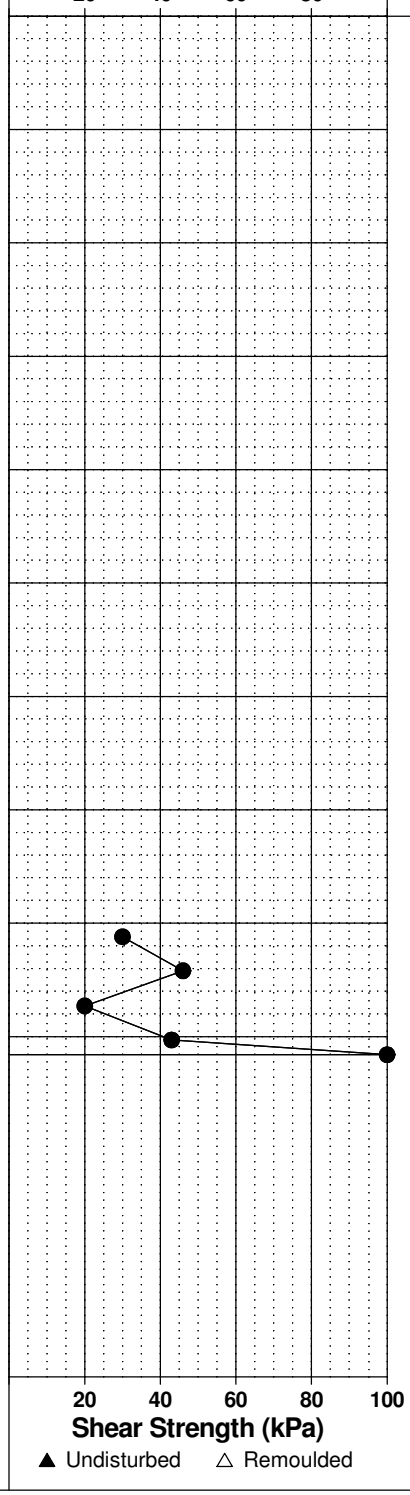
FILE NO. PG5161

REMARKS

HOLE NO. BH 2-20

BORINGS BY Track-Mount Power Auger **DATE** July 1, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						12	64.62		
						13	63.62		
						14	62.62		
						15	61.62		
						16	60.62		
						17	59.62		
						18	58.62		
						19	57.62		
						20	56.62		
21.16						21	55.62		
End of Borehole									
Practical DCPT refusal at 21.16m depth									
(GWL @ 0.70m - July 22, 2020)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

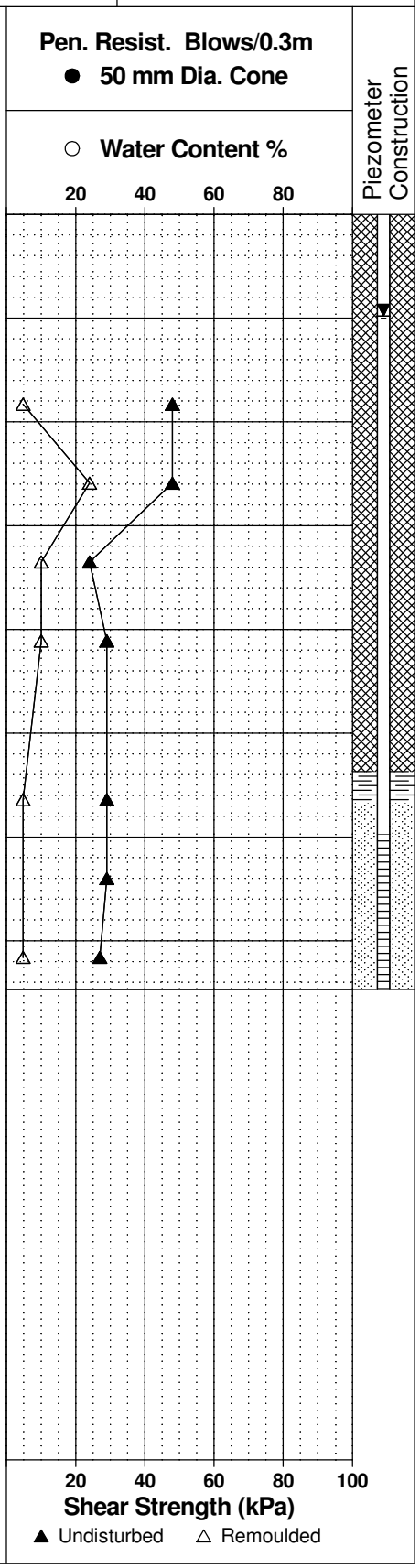
FILE NO. PG5161

REMARKS

HOLE NO. BH 3-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.90
Loose, brown **SILTY SAND,** some organics, trace clay		AU	1				
		SS	2	58	8	1	75.90
1.27							
Firm, brow **SILTY CLAY**						2	74.90
- grey by 3.0m depth						3	73.90
						4	72.90
		SS	3	100	1	5	71.90
						6	70.90
						7	69.90
7.47							
End of Borehole							
(GWL @ 0.98m - July 22, 2020)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

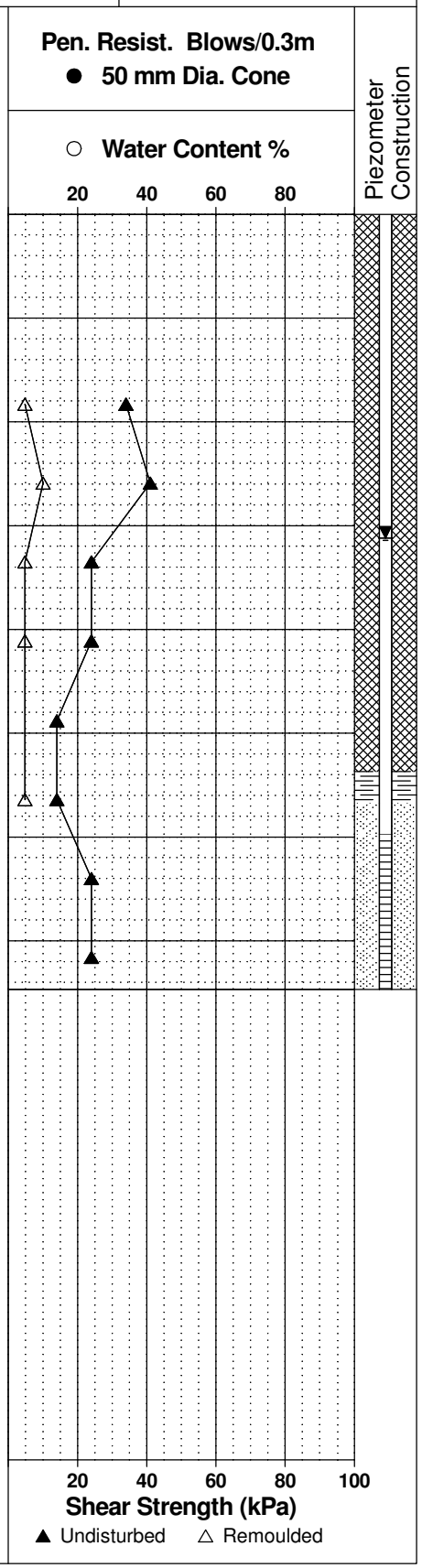
FILE NO. PG5161

REMARKS

HOLE NO. BH 4-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.46
TOPSOIL 0.08		AU	1				
Very loose, brown **SILTY SAND,** trace organics 0.60		SS	2	46	2	1	75.46
						2	74.46
Firm, brown **SILTY CLAY**						3	73.46
- soft and grey by 3.0m depth						4	72.46
						5	71.46
						6	70.46
7.47						7	69.46
End of Borehole							
(GWL @ 3.12m - July 22, 2020)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5161

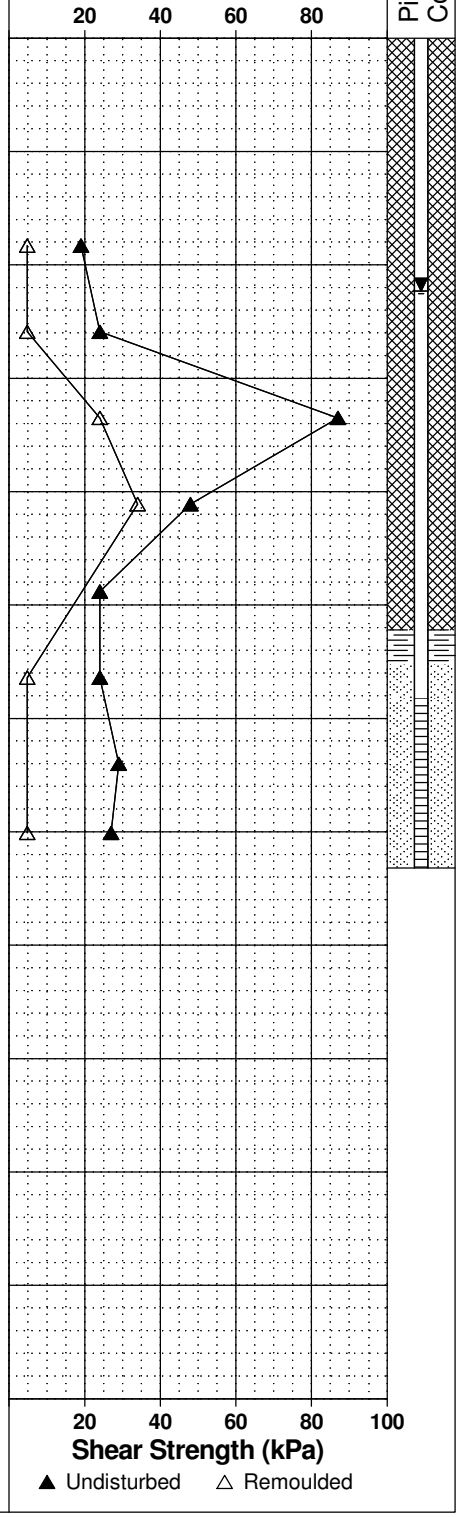
REMARKS

HOLE NO. BH 5-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	77.03
TOPSOIL 0.10		AU	1				
Loose, brown **SILTY SAND,** trace organics		SS	2	42	4	1	76.03
1.30							
Firm, brown **SILTY CLAY** 1.52						2	75.03
						3	74.03
Soft to firm, grey **SILTY CLAY,** trace sand seams						4	73.03
						5	72.03
						6	71.03
7.32						7	70.03
Dynamic Cone Penetration Test commenced at 7.32m depth. Cone pushed to 15.2m depth.						8	69.03
						9	68.03
						10	67.03
						11	66.03
						12	65.03

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**



Piezometer Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

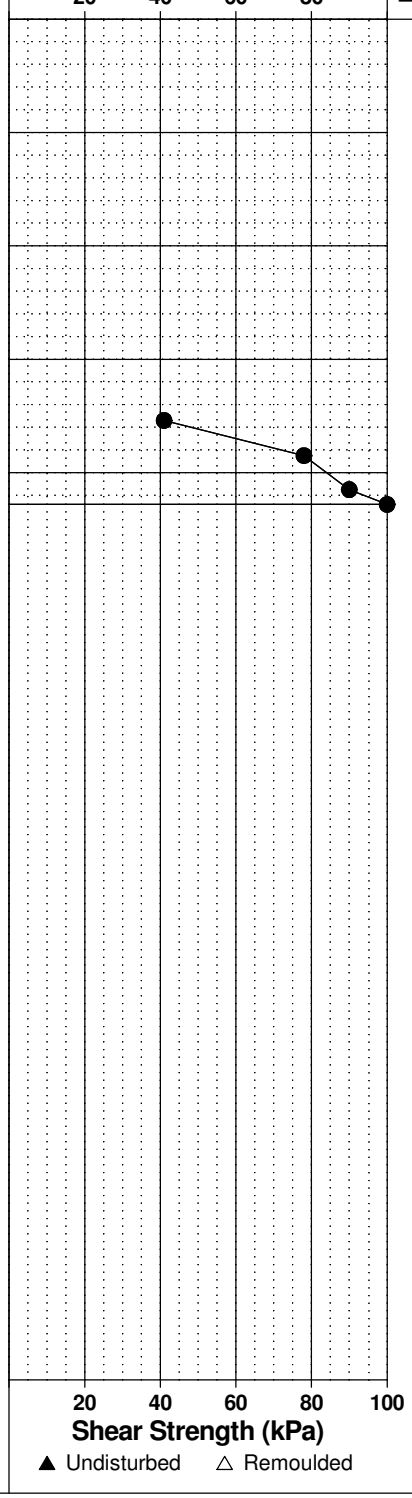
FILE NO. PG5161

REMARKS

HOLE NO. BH 5-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0			
						12	65.03		
						13	64.03		
						14	63.03		
						15	62.03		
						16	61.03		
16.28									
End of Borehole Practical DCPT refusal at 16.28m depth (GWL @ 2.23m - July 22, 2020)									



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

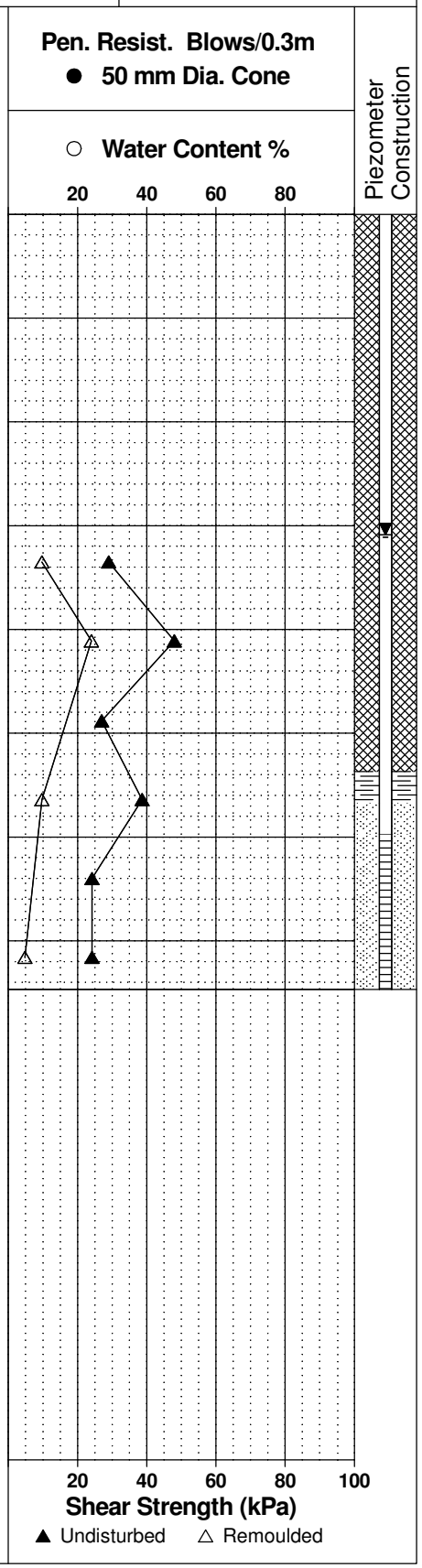
FILE NO. PG5161

REMARKS

HOLE NO. BH 6-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.93
Compact, brown **SILTY SAND**		AU	1				
		SS	2	33	10	1	75.93
1.37							
		SS	3	100	1	2	74.93
						3	73.93
Firm to soft, grey **SILTY CLAY**						4	72.93
						5	71.93
						6	70.93
7.47						7	69.93
End of Borehole							
(GWL @ 3.09m - July 22, 2020)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Warehouse Development - Thunder Road
Ottawa, Ontario

DATUM Geodetic

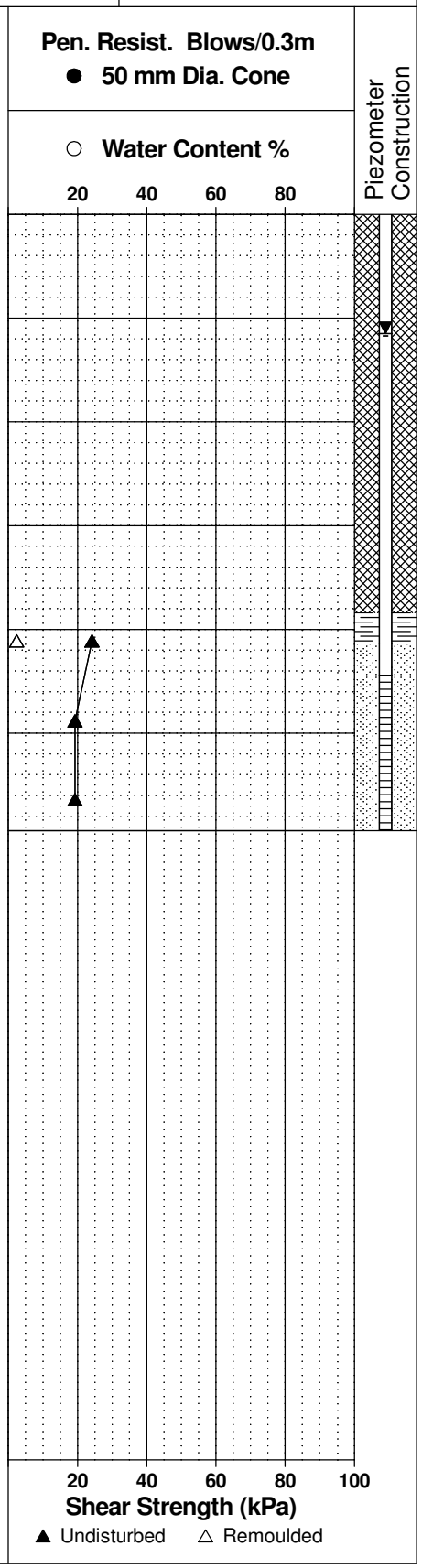
FILE NO. PG5161

REMARKS

HOLE NO. BH 7-20

BORINGS BY Track-Mount Power Auger **DATE** June 30, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.90
TOPSOIL 0.15		AU	1				
FILL: Brown silty sand 0.81		SS	2	100	2	1	75.90
Very loose, brown **SILTY SAND** with clay		SS	3	100	W	2	74.90
- grey by 2.3m depth						3	73.90
3.81						4	72.90
Soft, grey **SILTY CLAY**						5	71.90
5.94							
End of Borehole							
(GWL @ 1.15m - July 22, 2020)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
5368 Boundary Road and 6150 Thunder Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE4480

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** December 19, 2019

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	77.22
TOPSOIL							
0.30		AU	1				
Loose, brown **SILTY SAND**		SS	2	42	6	1	76.22
1.52							
		SS	3	83	W	2	75.22
Brown **SILTY CLAY**							
		SS	4	83	W		
- grey by 2.7m depth						3	74.22
		SS	5	71	9		
						4	73.22
		SS	6	96	W		
4.42							
End of Borehole							
(GWL @ 0.93m - Jan. 14, 2019)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
5368 Boundary Road and 6150 Thunder Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE4480

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** December 19, 2019

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.76
TOPSOIL							
0.25		AU	1				
Very loose, brown **SILTY SAND**						1	75.76
1.07		SS	2	38	2		
Brown **SILTY CLAY**		SS	3	88	W	2	74.76
- grey by 2.2m depth		SS	4	83	4		
		SS	5	100	W	3	73.76
		SS	6	100	W	4	72.76
4.42							
End of Borehole							
(GWL @ 0.46m - Jan. 14, 2019)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
5368 Boundary Road and 6150 Thunder Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE4480

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** December 19, 2019

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.90
TOPSOIL							
0.30		AU	1				
Very loose, brown **SILTY SAND**							
0.97		SS	2	88	3	1	75.90
		SS	3	12	W	2	74.90
Brown **SILTY CLAY**							
		SS	4	100	W		
- grey by 3.0m depth						3	73.90
		SS	5	92	W		
						4	72.90
		SS	6	100	W		
4.42							
End of Borehole							
(GWL @ 0.42m - Jan. 14, 2019)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

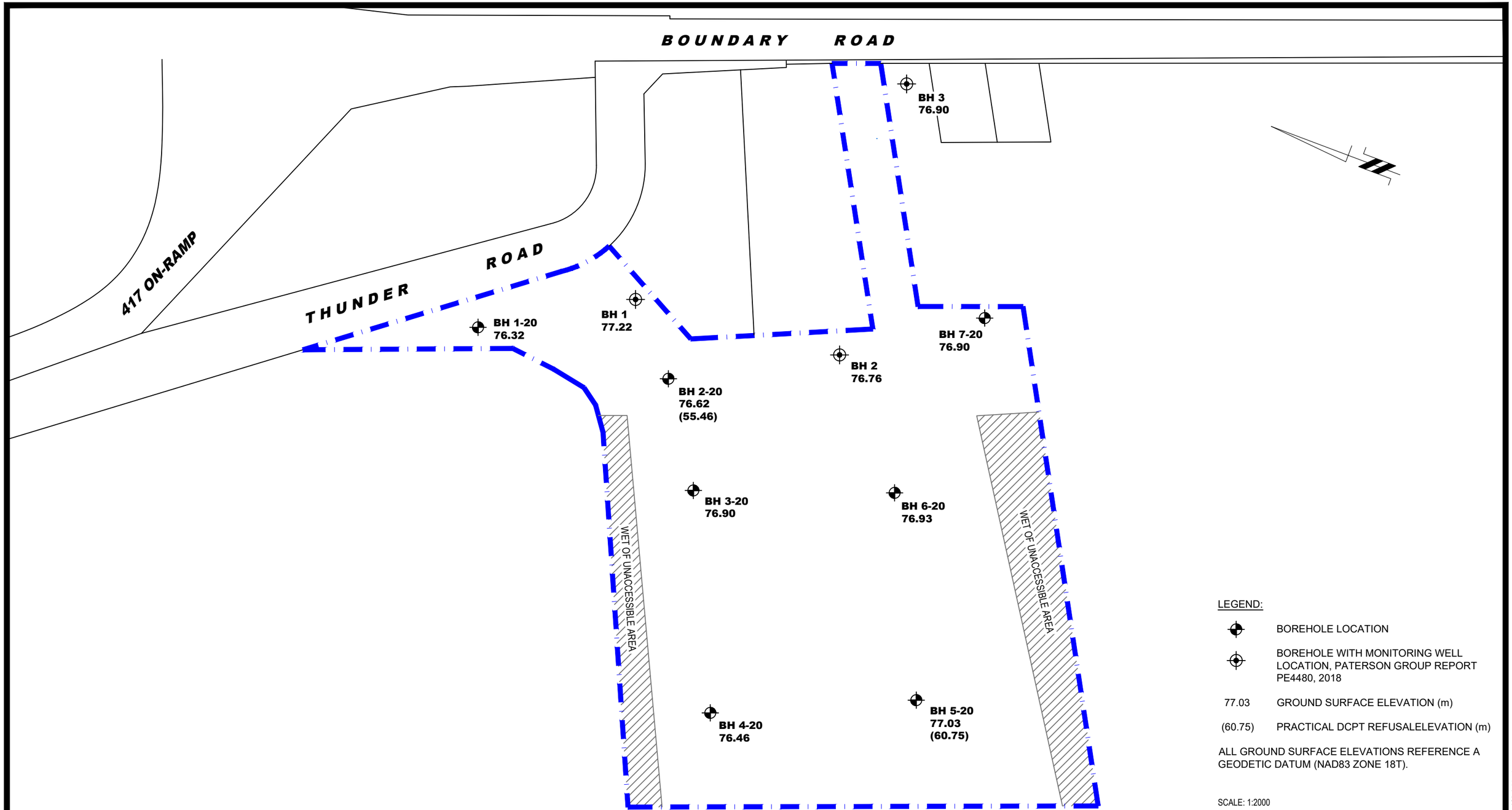
20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction



LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE4480, 2018
- 77.03 GROUND SURFACE ELEVATION (m)
- (60.75) PRACTICAL DCPT REFUSALELEVATION (m)

ALL GROUND SURFACE ELEVATIONS REFERENCE A GEODETIC DATUM (NAD83 ZONE 18T).

SCALE: 1:2000

0 25 50 75 100 125 150m

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL

EXIT 96 DEVELOPMENTS INC.

GEOTECHNICAL INVESTIGATION
6150 THUNDER ROAD AND 5368 BOUNDARY ROAD
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:2000	Date: 08/2020
Drawn by: NFRV	Report No.: PG5161-1
Checked by: JV	**PG5161-1**
Approved by: DJG	Revision No.:

p:\autocad drawings\geotechnical\pg51xx\pg5161\pg5161-1 thtp.dwg

APPENDIX 4

EUROFINS ANALYTICAL TEST RESULTS

ECA #2849-BCFKST

Certificate of Analysis

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 30756
Invoice to: Paterson Group

Report Number: 1942889
Date Submitted: 2020-11-11
Date Reported: 2020-11-17
Project: PH4319
COC #: 866674

Dear Erik Ardley:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: Addrine Thomas 2020.11.17 15:00:47 -05'00'

Addrine Thomas, Inorganics Supervisor

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: http://www.cala.ca/scopes/2602.pdf.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

eurofins | Environment Testing

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 30756
Invoice to: Paterson Group

Report Number: 1942889
Date Submitted: 2020-11-11
Date Reported: 2020-11-17
Project: PH4319
COC #: 866674

Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.		
					1528161 GW 2020-11-11 X1	1528162 GW 2020-11-11 X2	1528163 GW 2020-11-11 X3
Anions	N-NO2	0.10	mg/L		<0.10	<0.10	<0.10
	N-NO3	0.10	mg/L		<0.10	<0.10	<0.10
General Chemistry	pH	1.00			8.16	8.19	8.10
Nutrients	N-NH3	0.010	mg/L		<0.010	<0.010	<0.010
	Total Kjeldahl Nitrogen	0.100	mg/L		0.798	0.628	0.879

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 30756
Invoice to: Paterson Group

Report Number: 1942889
Date Submitted: 2020-11-11
Date Reported: 2020-11-17
Project: PH4319
COC #: 866674

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 392351 **Analysis/Extraction Date** 2020-11-14 **Analyst** SKH **Method** SM 4110			
N-NO2	<0.10 mg/L	102	90-110
N-NO3	<0.10 mg/L	105	90-110
Run No 392377 **Analysis/Extraction Date** 2020-11-13 **Analyst** QT **Method** SM2320,2510,4500H/F			
pH		102	90-110
Run No 392420 **Analysis/Extraction Date** 2020-11-16 **Analyst** SKH **Method** EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	96	70-130
Run No 392445 **Analysis/Extraction Date** 2020-11-17 **Analyst** AET **Method** EPA 350.1			
N-NH3	<0.010 mg/L	102	80-120

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

eurofins 866674

STANDARD CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

Eurofins Workorder #: 1942889

CLIENT INFORMATION

Company:	Paterson Group
Contact:	Erik Ardley
Address:	154 Colonnade Road South
Telephone:	613-808-9776
Cell:	
Email: #1:	eardley@patersongroup.ca
Email: #2:	mlaflamme@patersongroup.ca mkillam@patersongroup.ca
Project:	PH4319
Quote #:	

INVOICE INFORMATION (SAME AS CLIENT INFORMATION: YES ☐ NO ☐)

Company:	Fax:
Contact:	Email: #1:
Address:	Email: #2:
Telephone:	PO #: 30756

TURN-AROUND TIME (Business Days)

☐ 1 Day* (100%) ☐ 2 Day** (50%) ☐ 3-5 Days (25%) ☒ 5-7 Days (Standard)

Please contact Lab in advance to determine rush availability.

*For results reported after rush due date, surcharges will apply: before 12:00 - 100%, after 12:00 - 50%.

**For results reported after rush due date, surcharges will apply: before 12:00 - 50%, after 12:00 - 25%.

REGULATION/GUIDELINE REQUIRED

☐ Sanitary Sewer, City: Ottawa
☐ Storm Sewer, City: Ottawa
☐ ODWSOG
☐ PWQO
☐ O. Reg 347/558
☐ Other:
☒ None

☐ O. Reg 153

Table # ___, Course / Fine, Surface / subsurface.

Type: Com-Ind / Res-Park / Agri / GW / All Other / Sediment

☐ Excess Soil, Table: _____ Type: _____

The sample results from this submission will form part of a formal Record of Site Condition (RSC) under O.Reg. 153/04

☐ Yes ☐ No

The optimal temperature conditions during transport should be less than 10°C. Sample(s) cannot be frozen, unless otherwise indicated or agreed upon with the Laboratory. Note that this COC is not to be used for drinking water samples. The COC must be complete upon submission of the samples, there will be a $25 surcharge if required information is missing (required fields are shaded in grey).

Sample Details / Sample Analysis Required

Field Filtered -->

Sample ID	Date/Time Collected	Sample Matrix	# of Containers	O.Reg.153 parameters: PHC F1 - F4	BTEX	VOCs	PAHs	PCBs	Metals + Inorganics	Metals only	See attached paper	Subdivision Supply Bacti 2 (Ec/TC only)	15 NO3	pH	Total Metals*	15 Hg* NO3	20 N-NH3	20 TKN		RN# (Lab Use Only)
T1	Nov 11, 2020	GW	2										X	X		X	X	X		1528161
T2	↓	↓	↓										↓	↓		↓	↓	↓		62
T3	↓	↓	↓										↓	↓		↓	↓	↓		63

	PRINT	SIGN	DATE/TIME	TEMP (°C)
Sampled By:				
Relinquished By:	Erik Ardley		Nov 11, 2020	9.6
Received By:				

COMMENTS: * As per City Sewer Use By-law

CUSTODY SEAL: ☐ YES ☐ NO Ice packs submitted: ☐ Yes ☐ No

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 2849-BCFKST
Issue Date: May 29, 2019

Boundary Road Development Inc.
130 Slater St, No. 1300
Ottawa, Ontario
K1P 6E2

Site Location: Boundary Road Distribution Centre
5225 Boundary Road
City of Ottawa , Ontario
K4B 1P6

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

sewage works, for the treatment of sanitary sewage with a rated capacity of 113 cubic metres per day and maximum daily flow of 225 cubic metres per day to discharge Final Effluent to a ditch which outlet to the Regimbald Municipal Drain and eventually to South Nation River consisting of the following:

Sewage Lift Station/Equalization

- one (1) concrete lift station/equalization tank with inside dimensions of 2.5 x 2.5 x 7.0 metres (L x W x SWD), providing a total volume of 43.75 cubic metres capturing and equalizing sewage from the influent gravity sewer.

- two (2) duty/stand-by submersible flow through sewage pumps each having a pumping capacity of approximately 22.7 cubic metres per hour with a Total Dynamic Head (TDH) of 7.41 metres.

Primary Settling Tank:

- one (1) two-compartment 20 cubic metres precast concrete tank complete with an internal baffle wall.

- two (2) duty/stand-by submersible flow through sewage pumps located in the second compartment. Each pump have a pumping capacity of approximately 19.8 cubic metres per hour with a TDH of 33.8 metres.

Automatic Backwashing Filters

- two (2) automatic backwashing filters, each with a maximum screen size of 2000 microns capable to handle a maximum flow rate of approximately 19.8 cubic metres per hour, discharging to Aeration Tanks described below.

Aluminium Sulfate Addition

- one (1) chemical metering system, with two (2) chemical metering pump, each pump have a pumping capacity of approximately 5.97 litres per hour at 32 psi, to dose chemical to effluent from the filters.

Aeration Tank

- three (3) 57 m3 precast concrete tanks connected in series, each equipped with fine bubble air diffusers.
- dissolved oxygen probe installed in all aeration tanks.
- two (2) submersible MBR feed pumps, each pump have a rated capacity of approximately 23.54 cubic metres per hour at 9.8 metres TDH installed in the third aeration tank.
- Two (2) duplex aeration blowers, each blower capable of providing approximately 5.75 cubic metres per minute at 3.44 psi.

Membrane Bioreactor (MBR) System

A membrane bioreactor system receiving mixed liquor from the Aeration Tanks consisting of the following components:

- two (2) 4.6 cubic metre stainless steel MBR tanks each equipped with one (1) stainless steel diffuser plate and twelve (12) Fibreplate FPM500 membrane modules.
- two (2) reversing lobe rotary permeate pumps, each having a maximum pumping capacity of approximately 22.5 cubic metres per hour at 10.48 metres TDH.
- Two (2) air scouring blowers, each capable of providing approximately 4.16 cubic metres per minute at a discharge pressure of 3.1 psi.
- One (1) chemical metering system, with two (2) chemical metering pumps each having the capacity of approximately 12.7 litres per hour at 10 psi, to be used to perform a clean in place
- One (1) 1260 litre polyethylene backpulse tank or equivalent shall be installed to store permeate to be used for backpulsing the membranes.

UV Disinfection

- three (3) UV units, capable of handling a maximum flowrate 22.5 cubic metres per hour with partial duplicity, each unit to be capable of providing a minimum UV dosage of 30 mJ/cm^2 at a UV transmittance of 65% or equivalent, treating flow from the MBR system.

Sludge Holding Tanks

- one (1) 36 cubic metre precast concrete sludge storage tank with an effective working volume of 32.13 cubic metres receiving primary waste and waste activated sludge from automatic backwash filters and bioreactor respectively.

- one (1) 100 mm floating decanter with a capacity of 69 cubic metres per hour or equivalent to utilize the entire volume of the sludge tank to return supernatant to the lift station/ equalization for reprocessing.

Effluent Discharge

- Following UV disinfection, Final Effluent will drain through a 200 millimetre SDR35 gravity sewer with a 0.5% slope into the above described drainage ditch.

including all other mechanical system, electrical system, instrumentation and control system, standby power system, piping, pumps, valves and appurtenances essential for the proper, safe and reliable operation of the Works in accordance with this Approval;

all in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

2. "Annual Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar year divided by the number of days during which Final Effluent was discharged that year;

3. "Annual Average Daily Effluent Loading" means the value obtained by multiplying the Annual Average Effluent Concentration of a contaminant by the Annual Average Daily Effluent Flow over the same calendar year;

4. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;

5. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

6. "Bypass" means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities;

7. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

8. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

9. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;

10. "*E. coli* " refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

11. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;

12. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements and performance specifications of the piece(s) of equipment to be substituted;

13. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

14. "Final Effluent" means effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s);

15. "Influent" means flows to the Sewage Treatment Plant from the collection system;

16. "Limited Operational Flexibility" (LOF) means the conditions that the Owner shall follow in order to undertake any modification that is pre-authorized as part of this Approval;

17. "Maximum Daily Flow " means the largest volume of flow to be received during a one-day period for which the sewage treatment process unit or equipment is designed to handle;

18. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

19. "Monthly Average Effluent Concentration" is the mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, calculated and reported as per the methodology specified in Schedule F;

20. "Monthly Geometric Mean Density" is the mean of all Single Sample Results of *E.coli* measurement in

the samples taken during a calendar month, calculated and reported as per the methodology specified in Schedule F;

21. "Normal Operating Condition" means the condition when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity;

22. "Operating Agency" means the Owner or the entity that is authorized by the Owner for the management, operation, maintenance, or alteration of the Works in accordance with this Approval;

23. "Overflow" means a discharge to the environment from the Works at designed location(s) other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

24. "Owner" means Boundary Road Development Inc. and its successors and assignees;

25. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

26. "Preliminary Treatment System" means all facilities in the Sewage Treatment Plant associated with screening and grit removal;

27. "Primary Treatment System" means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;

28. "Professional Engineer" means a person entitled to practice as a Professional Engineer in the Province of Ontario under a licence issued under the Professional Engineers Act;

29. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

30. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;

31. "Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;

32. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;

33. "Works" means the sewage works described in the Owner's application, and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the terms and conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

3. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

2. CHANGE OF OWNER AND OPERATING AGENCY

1. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of Owner;

   b. change of Owner, including address of new owner;

   c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17* , as amended, shall be included in the notification;

   d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39* , as amended, shall be included in the notification.

2. The Owner shall notify the District Manager, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of Operating Agency;

   b. change of Operating Agency, including address of new Operating Agency.

3. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the District Manager.

4. The Owner shall ensure that all communications made pursuant to this condition refer to the environmental compliance approval number.

3. CONSTRUCTION

1. All Works in this Approval shall be constructed and installed and must commence operation within five (5) years of issuance of this Approval, after which time the Approval ceases to apply in respect of any

portions of the Works not in operation. In the event that the construction, installation and/or operation of any portion of the Works is anticipated to be delayed beyond the time period stipulated, the Owner shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment application shall include the reason(s) for the delay and whether there is any design change(s).

2. Within thirty (30) days of commencement of construction, the Owner shall prepare and submit to the District Manager a schedule for the completion of construction and commissioning operation of the Works. The Owner shall notify the District Manager within thirty (30) days of the commissioning operation of any Works. Upon completion of construction of the Works, the Owner shall prepare and submit a statement to the District Manager, certified by a Professional Engineer, that the Works is constructed in accordance with this Approval.

3. Within one (1) year of completion of construction of the Works, a set of as built drawings of the Works shall be prepared or updated. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be readily accessible for reference at the Works.

4. BYPASSES

1. Any Bypass is prohibited, except:

   a. an emergency Bypass when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed;

   b. a planned Bypass that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the District Manager has given written consent of the Bypass;

2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) prior to bypassing.

3. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the type of the Bypass as indicated in Paragraph 1 and the reason(s) for the Bypass;

   b. the date and time of the beginning of the Bypass;

   c. the treatment process(es) gone through prior to the Bypass and the treatment process(es) bypassed;

d. the effort(s) done to maximize the flow through the downstream treatment process(es) and the reason(s) why the Bypass was not avoided.

4. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Bypass;

   b. the estimated or measured volume of Bypass.

5. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition, except for *E. coli* , pH, temperature and unionized ammonia, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled monitoring day.

6. The Owner shall submit a summary report of the Bypass Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5) and either a statement of compliance or a summary of the non-compliance notifications submitted as required under Paragraph 1 of Condition 12. If there is no Bypass Event during a quarter, a statement of no occurrence of Bypass is deemed sufficient.

7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Bypass Event.

5. OVERFLOWS

1. Any Overflow is prohibited, except:

   a. an emergency Overflow in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

   b. a planned Overflow that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the District Manager has given written consent of the Overflow;

2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) and Bypass(es) prior to

overflowing.

3. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the type of the Overflow as indicated in Paragraph 1 and the reason(s) for the Overflow;

   b. the date and time of the beginning of the Overflow;

   c. the point of the Overflow from the Works, the treatment process(es) gone through prior to the Overflow, the disinfection status of the Overflow and whether the Overflow is discharged through the effluent disposal facilities or an alternate location;

   d. the effort(s) done to maximize the flow through the downstream treatment process(es) and Bypass(es) and the reason(s) why the Overflow was not avoided.

4. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Overflow;

   b. the estimated or measured volume of the Overflow.

5. For any Overflow Event

   a. in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD5, total suspended solids, total phosphorus, total ammonia nitrogen, *E. coli.* , except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD5, total suspended solids and total phosphorus only.

   b. at sewage lift station in the collection system, the Owner shall collect at least one (1) grab sample representative of the Overflow Event and have it analyzed for BOD5, total suspended solids, total phosphorus.

6. The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient.

7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Overflow

Event.

6. DESIGN OBJECTIVES

1. The Owner shall design and undertake everything practicable to operate the Sewage Treatment Plant in accordance with the following objectives:

   a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B.

   b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

   c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

7. COMPLIANCE LIMITS

1. The Owner shall operate and maintain the Sewage Treatment Plant such that compliance limits for the Final Effluent parameters listed in the table(s) included in Schedule C are met.

2. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent is disinfected continuously year-round.

8. OPERATION AND MAINTENANCE

1. The Owner shall ensure that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall prepare the operations manual for the Works within six (6) months of completion of construction of the Works, that includes, but not necessarily limited to, the following information:

   a. operating procedures for the Works under Normal Operating Conditions;

   b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

   c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

   d. procedures for the inspection and calibration of monitoring equipment;

   e. operating procedures for the Works to handle situations outside Normal Operating Conditions and emergency situations such as a structural, mechanical or electrical failure, or an unforeseen flow

condition, including procedures to minimize Bypasses and Overflows;

f. a spill prevention and contingency plan, consisting of procedures and contingency plans, including notification to the District Manager, to reduce the risk of spills of pollutants and prevent, eliminate or ameliorate any adverse effects that result or may result from spills of pollutants;

g. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and make the manual readily accessible for reference at the Works.

4. The Owner shall ensure that the Operating Agency fulfills the requirements under O. Reg. 129/04, as amended for the Works, including the classification of facilities, licensing of operators and operating standards.

9. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a scheduled monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

   a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.

2. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.

   a. definitions for frequency:

      i. Daily means once every day;

      ii. Weekly means once every week;

      iii. Monthly means once every month.

3. In addition to the scheduled monitoring program required in Paragraph 1, the Owner shall collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D, except for *E. coli* , temperature and unionized ammonia.

4. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents and all analysis shall be conducted

by a laboratory accredited to the ISO/IEC:17025 standard or as directed by the District Manager:

a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended;

c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

5. The Owner shall monitor and record the flow rate and daily quantity using flow measuring devices or other methods of measurement as approved below calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate of the following:

   a. Influent flow to the Sewage Treatment Plant by adopting the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

   b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations;

6. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

10. SPECIAL REQUIREMENT

1. The Owner shall enter into a Total Phosphorus Management (TPM) Plan with the South Nation River Conservation Authority (SNC) within 90 day of issuance of this Approval, and submit a copy of the signed Agreement to the District Manager. The Owner shall be responsible for paying to the SNC the required offset charges equivalent to 16.5 kg of phosphorus per year.

11. LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant in Works in accordance with the document “Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works” (Schedule E), as amended, subject to the following:

   a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids treatment trains as originally designed and approved.

   b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry’s publication “Design Guidelines for Sewage Works 2008”, as amended, Ministry’s regulations, policies, guidelines, and industry engineering standards;

   c. the modifications shall not negatively impact on the performance of any process or equipment in the

Works or result in deterioration in the Final Effluent quality;

d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (Schedule E), as amended shall be completed with declarations from a Professional Engineer and the Owner and retained on-site prior to the scheduled implementation date. All supporting information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF shall remain on-site for future inspection.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

   a. Modifications that involve addition or extension of process structures, tankages or channels;

   b. Modifications that involve relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

   c. Modifications that involve addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

   d. Modifications that require changes to be made to the emergency response, spill prevention and contingency plan; or

   e. Modifications that are required pursuant to an order issued by the Ministry.

12. REPORTING

1. The Owner shall report to the District Manager orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the EPA, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

   a. a summary and interpretation of all Influent, monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;

   b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow

rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

c. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;

d. a summary of all operating issues encountered and corrective actions taken;

e. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

f. a summary of any effluent quality assurance or control measures undertaken;

g. a summary of the calibration and maintenance carried out on all Influent and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;

h. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

    i. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;

    ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

i. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

j. a summary of any complaints received and any steps taken to address the complaints;

k. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

l. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 11, including a report on status of implementation of all modification.

m. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.

n. any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Works.

Schedule A

1. Application for Environmental Compliance Approval submitted by Kevin Hall of Clearford Koester received on August 17, 2018 for the proposed sewage works, including Environmental Study Report, design report, final plans and specifications.

Schedule B

Final Effluent Design Objectives

Concentration Objectives

Final Effluent Parameter	**Averaging Calculator**	**Objective** (milligrams per litre unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	5.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	1.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.05 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	0.5 mg/L
E. coli	Monthly Geometric Mean Density	*< 2.2 CFU/100 mL

*If the MPN method is utilized for *E.coli* analysis the objective shall be 2.2 MPN/100 mL

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	10.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	10.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.1 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	1.0 mg/L (May - October) 3.0 mg/L (November - April)
E. coli	Monthly Geometric Mean Density	*200 CFU/100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

*If the MPN method is utilized for *E.coli* analysis the limit shall be 200 MPN/100 mL

Loading Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Annual Average Daily Effluent Loading	1.13 kg/d
Total Suspended Solids	Annual Average Daily Effluent Loading	1.13 kg/d
Total Phosphorus	Annual Average Daily Effluent Loading	0.01 kg/d
Total Ammonia Nitrogen	Annual Average Daily Effluent Loading	0.11 kg/d (May - October) 0.34 kg/d (November - April)

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
CBOD5	Grab	Weekly
Total Suspended Solids	Grab	Weekly
Total Phosphorus	Grab	Weekly
Total Ammonia Nitrogen	Grab	Weekly
Total Kjeldahl Nitrogen	Grab	Weekly
Nitrate as Nitrogen	Grab	Weekly
Nitrite as Nitrogen	Grab	Weekly
E. coli	Grab	Weekly
pH*	Grab	Weekly
Temperature*	Grab	Weekly
Un-ionized Ammonia**	As Calculated	Weekly

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. General

1. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

2. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

3. The Owner shall consult the District Manager on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

4. The Owner shall ensure that any pre-authorized modifications will not:

    a. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

    b. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

    c. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

2. Modifications that do not require pre-authorization:

1. Sewage works that are exempt from Ministry approval requirements;

2. Modifications to the electrical system, instrumentation and control system.

3. Pre-authorized modifications that do not require preparation of "Notice of Modification to Sewage Works"

1. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

    a. Repairing a piece of equipment and putting it back into operation, including replacement of minor

components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

2. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

4. Pre-Authorized Modifications that require preparation of "Notice of Modification to Sewage Works"

1. Pumping Stations

a. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

b. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

c. Replacement or installation of inlet screens to the wetwell;

d. Replacement or installation of flowmeters, construction of station bypass;

e. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

f. Replacement, realignment of existing forcemain(s) including valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

2. Sewage Treatment Plant

1. Sewers and appurtenances

a. Replacement, realignment of existing sewers (including pipes and channels) or construction of new

sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the Works.

2. Flow Distribution Chambers/Splitters

    a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements or installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

3. Imported Sewage Receiving Facility

    a. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;

    b. Replacement, relocation or installation of screens, grit removal units and compactors;

    c. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;

    d. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;

    e. Replacement, relocation or installation of flow measurement and sampling equipment;

    f. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity and waste loading of each type of Imported Sewage already approved for co-treatment.

4. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement or upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.

    b. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

5. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;

    b. Replacement or installation of scum removal mechanism, including scum chamber;

    c. Replacement or installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

6. Secondary Treatment System

    1. Biological Treatment

        a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;

        b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;

        c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of submersible mixer(s);

        d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.

    2. Secondary Sedimentation

        a. Replacement of sludge removal mechanism, including sludge chamber;

        b. Replacement or installation of scum removal mechanism, including scum chamber;

        c. Replacement or installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

7. Post-Secondary Treatment System

    a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

8. Disinfection System

    1. UV Irradiation

        a. Replacement of UV irradiation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

    2. Chlorination/Dechlorination and Ozonation Systems

        a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

        b. Replacement or installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

9. Supplementary Treatment Systems

    1. Chemical systems

        a. Replacement, relocation or installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;

        b. Replacement or installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.

        c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;

        d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

10. Sludge Management System

    1. Sludge Holding and Thickening

        a. Replacement or installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

    2. Sludge Digestion

        a. Replacement or installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids

storage or handling capacities;

b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal

a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

4. Processed Organic Waste

a. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity already approved for co-processing.

11. Standby Power System

1. Replacement or installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

12. Pilot Study

1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:

a. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;

b. no proprietary treatment process or propriety chemical is involved in the pilot study;

c. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;

d. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;

e. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the District Manager within one month of completion of the pilot project.

13. Lagoons

a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;

b. raise top elevation of lagoon berms to increase free-board;

c. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;

d. replace or install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;

e. removal of accumulated sludge and disposal to an approved location offsite.

3. Final Effluent Disposal Facilities

a. Replacement or realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

This page contains an image of the form entitled "Notice of Modification to Sewage Works". A digital copy can be obtained from the District Manager.

Ontario

Ministry of the Environment, Conservation and Parks

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number

Signature	Date (mm/dd/yy)

Name of Employer

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)

Owner Representative's Signature	Date (mm/dd/yy)

Schedule F

Methodology for Calculating and Reporting Monthly Average Effluent Concentration, Annual Average Effluent Concentration and Monthly Geometric Mean Density

1. Monthly Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar month, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar month separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar month and record it as **Monthly Average NBPD Effluent Concentration**;

c. Obtain the "**Total Monthly NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar month;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar month and record it as **Monthly Average BPD Effluent Concentration**;

e. Obtain the "**Total Monthly BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar month;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Monthly Average NBPD Effluent Concentration × Total Monthly NBPD Flow) + (Monthly Average BPD Effluent Concentration × Total Monthly BPD Flow)] ÷ (Total Monthly NBPD Flow + Total Monthly BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the month, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval.

2. Annual Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar year, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar year separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar year

and record it as **Annual Average NBPD Effluent Concentration**;

c. Obtain the "**Total Annual NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar year;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar year and record it as **Annual Average BPD Effluent Concentration**;

e. Obtain the "**Total Annual BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar year;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Annual Average NBPD Effluent Concentration × Total Annual NBPD Flow) + (Annual Average BPD Effluent Concentration × Total Annual BPD Flow)] ÷ (Total Annual NBPD Flow + Total Annual BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the calendar year, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Annual Average Effluent Concentration for this parameter where applicable in this Approval.

3. Monthly Geometric Mean Density

Geometric mean is defined as the n^{th} root of the product of n numbers. In the context of calculating Monthly Geometric Mean Density for *E.coli*, the following formula shall be used:

$$\sqrt[n]{x_1 x_2 x_3 \cdots x_n}$$

in which,

"n" is the number of samples collected during the calendar month; and

"x" is the value of each Single Sample Result.

For example, four weekly grab samples were collected and tested for *E.coli* during the calendar month. The *E.coli* densities in the Final Effluent were found below:

Sample Number	*E.coli* Densities* (CFU/100 mL)
1	10
2	100
3	300
4	50

The Geometric Mean Density for these data:

$$\sqrt[4]{10 \times 100 \times 300 \times 50} = 62$$

*If a particular result is zero (0), then a value of one (1) will be substituted into the calculation of the Monthly Geometric Mean Density. If the MPN method is utilized for E.coli analysis, values in the table shall be MPN/100 mL.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of Owner and Operating Agency is included to ensure that the Ministry records are kept accurate and current with respect to ownership and Operating Agency of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding construction of Works/record drawings is included to ensure that the Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction to ensure the ongoing protection of the environment, and that prior to the commencement of construction of the portion of the Works that are approved in principle only, the Director will have the opportunity to review detailed design drawings, specifications and an engineer's report containing detailed design calculations for that portion of the Works, to determine capability to comply with the Ministry's requirements stipulated in the terms and conditions of the Approval, and also ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the

Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 is included to ensure that the existing sewage works will be discontinued from the operation and properly decommissioned and disposed off the site, and to ensure that the phosphorus annual load is used to calculate the final payment under the TPM program, which forms the basis for granting the Policy 2 deviation.

11. Condition 11 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

12. Condition 12 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6972-B5NK9K issued on November 19, 2018.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 29th day of May, 2019

Youssouf Kalogo, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

MA/
c: District Manager, MECP Ottawa District Office
Kevin Hall, Clearford Koester