



**St. Lawrence Testing
& Inspection Co. Ltd.**

P.O. Box 997, Cornwall, ON, Canada K6H 5V1
814 Second Street W., Phone (613) 938-2521
E-mail: slt@ontarioeast.net Fax (613) 938-7395

July 31, 2020

Mr. Jordan Bourdages, P. Eng.
HP Engineering Inc.
400-2039 Robertson Road
Nepean, ON
K2H 8R2

**RE: DuLac Rd. Culvert, Clarence Rockland, ON
Geotechnical Subsurface Investigation
Report No. 20C317**

Dear Mr. Bourdages:

In accordance with e-mail instructions received from you, this report is submitted outlining the results of a geotechnical subsurface investigation carried out on DuLac Rd., just North of Duquette Rd. in Clarence Rockland, ON.

A) DESCRIPTION OF FIELD WORK

Prior to starting, service locates were done.

Drilling and sampling were carried out on July 2, 2020 using a truck mounted CME 55 auger drill from Eastern Ontario Diamond Drilling of Hawkesbury, Ontario. Supervision was by the undersigned geotechnical engineer.

A total of 2 boreholes were put down on diagonal corners away from the existing culvert. The boreholes were advanced by a split spoon sampler. Standard Penetration tests were conducted along with the split spoon

sampling. The recovered samples were placed in glass jars for later detailed lab classification. Samples were set aside for chemical tests for corrosion potential. The results of the classification are found attached in the borehole logs.

A water sample was taken from the existing creek. All of the soil samples were kept. A selection of these samples was sent to Bureau Veritas of Mississauga, Ontario for environmental and corrosion potential tests.

At the conclusion of drilling each borehole it was filled and tamped. The locations are found on a sketch attached to the report.

B) STRATIGRAPHY

The stratigraphy at the boreholes is somewhat different below the surface fill.

The surface has 430 mm. of gravel fill underlain by a brown, moist sand fill to an average depth of 2.30 m. Thereafter, the stratigraphy differs.

Borehole 1 has a grey, moist, compact silty sand with gravel fill to 3.50 m. Below is a grey, moist, loose silt with sand, clay and wood pieces to 5.33 m. Below is a grey, wet, soft silty clay. This borehole was extended to the top of the silty sand till, which was noted at 13.92 m. below the surface.

Borehole 2 had the grey, moist, loose silt with sand and clay to 3.05 m. where wood from old wood trees was encountered. We kept on augering and sampling through wood or portions of wood to 4.11 m. Thereafter, the soil was the grey, moist, loose silt with sand and clay, but had pieces of wood

down to 6.1 m. Below was the start of the silty clay. The upper part of the silty clay was grey, very moist and firm.

For the specific stratigraphy at each borehole, the borehole logs should be referred to.

We estimated the depth to the creek since we couldn't take exact measurements. This was approximately 3.7 m. near Borehole 1 and 4.0 m. near Borehole 2.

C) GEOTECHNICAL DISCUSSION

1) General

It is our understanding that it is proposed to replace the existing culvert with a new culvert.

2) Culvert Design Data

The bearing capacity at 4 to 5 m. below the surface in the silt is on average 50 KPa S.L.S. and 75 KPa U.L.S. This may be possibly influenced by the presence of some wood branches.

The bedding for the culvert should consist of 300 mm. of Granular "B" Type 2 and 150 mm. of Granular "A", with each lift compacted to 95% Standard Proctor Density.

For scour protection, 300 mm. minus quarry rock should be placed at a slope of 1.5 to 1. Alternatively, stone filled gabion baskets can be placed where the slopes will be steeper than 1.5 to 1 such as adjacent to the culvert.

Backfill on the sides of the culvert should be Granular "B" Type 2 and compacted in maximum 300 mm. lifts to 95% Standard Proctor Density.

3) Corrosion Data

Samples were taken from 3.0 to 5.2 m. from Borehole 1 and Borehole 2 for chemical analyses for corrosion potential. A sample of the creek water was also taken. The test results from Bureau Veritas are attached.

The pH of the soil is 7.59 which is mildly alkaline. The pH of the creek water is 7.88 which is mildly alkaline.

The soil has a high resistivity of 2600 ohm-cm which is indicative of little to no potential for corrosiveness. The water has a resistivity of 740 ohm-cm. which is fair to good for resistivity.

The general chemistry of the soil and water from the chloride, sulphate and sulfide analyses indicates medium potential for corrosion.

4) Roadway

The granular beside and above the culvert should be Granular "B" Type 2 and compacted in maximum 300 mm. lifts to 95% Standard Proctor Density up to the subbase course.

The design should incorporate a frost taper. The frost taper should start at 1.5 m. below grade and continue to 6 m. away from the edge of the excavation on both sides.

The final road gravel thickness should match the existing thickness at the culvert which is 0.43 m.

Compaction of the road portion restoration should be to 100% Standard Proctor Density. Maximum lift thickness should be 300 mm. Granular "B" Type 2 should be used throughout except for the final 150 mm. The final 150 mm. should be Granular "A" compacted to 100% Standard Proctor Density.

D) CONSTRUCTION CONTROL

In order to ensure that the recommendations of our report for materials and compaction are adhered to, it is recommended that our firm be retained to inspect, test and report accordingly.

Respectfully submitted

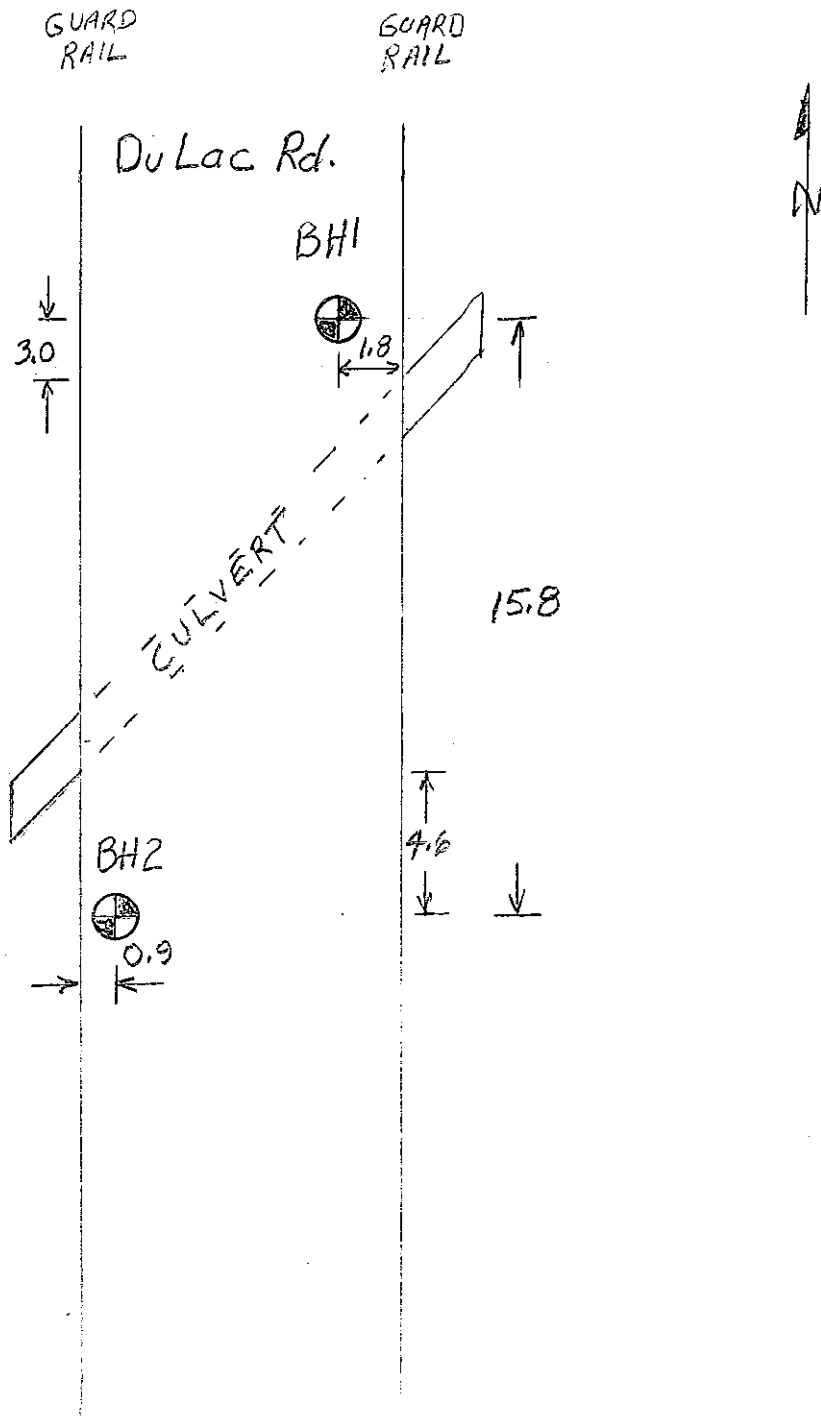
ST. LAWRENCE TESTING & INSPECTION CO. LTD.


G.G. McIntee, P. Eng.

GGM:njw



Attachments



St. Lawrence Testing
 Report No 20C317
 July 2020
 Scale 1:200

Untitled Map

Write a description for your map.

1528 Du Lac Rd

Legend

- 📍 1528 Du Lac Rd
- 🚧 culvert replacement



culvert replacement

Du Lac Rd

300 m

Google Earth

©2020 Google

CLIENT HP Engineering

REPORT NO. 20C317

LOCATION DuLac Rd., North of Duquette Rd., Clarence Rockland, ON

BOREHOLE NO. 1

DATE OF BORING July 2, 2020

CASING HF Auger

DATE OF WL READING

DATUM

| SOIL PROFILE | | | | SAMPLES | | | | LABORATORY TESTS PERFORMED | LAB | TEST | RESULTS | | | | |
|--------------|-----------|-------|---|-------------|------------------|-----------|------|----------------------------|--------|----------|--|--|----|----|----|
| DEPTH | ELEVATION | DEPTH | SOIL DESCRIPTION | STRAT. PLOT | WATER CONDITIONS | CONDITION | TYPE | | NUMBER | RECOVERY | N - VALUE | WATER CONTENT & ATTERBERG LIMITS. WP W WL | | | |
| 0 | | | <u>Gravel Fill</u> | | | | | | | | DYNAMIC PENETRATION TEST BLOWS PER FOOT. ... K ... | | | | |
| | | | | | | | | | | | 0 | 20 | 40 | 60 | 80 |
| .43 | | | <u>Sand Fill</u> Brown, moist, compact | | | | SS | 1 | 75 | 15 | | | | | |
| 2.40 | | | <u>Silty Sand Fill</u> Grey, moist, compact, with gravel | | | | SS | 2 | 60 | 12 | | | | | |
| 3.50 | | | <u>Silt</u> Grey, moist, loose with sand, clay and wood pieces | | | | SS | 3 | 60 | 8 | | | | | |
| 5.33 | | | <u>Silty Clay</u> Grey, wet, soft | | | | SS | 4 | 60 | 6 | | | | | |
| 5 | | | | | | | SS | 5 | 100 | 2 | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 45 | 13.92 | | Top of silty sand till | | | | | | | | | | | | |

CLIENT HP Engineering

REPORT NO. 20C317

LOCATION DuLac Rd., North of Duquette Rd., Clarence Rockland, ON

BOREHOLE NO. 2

DATE OF BORING July 2, 2020

CASING HF Auger

DATE OF WL READING _____

DATUM _____

| SOIL PROFILE | | | | SAMPLES | | | | LABORATORY TESTS PERFORMED | LAB | TEST | RESULTS | | | | |
|--------------|-----------|-------|--|-------------|------------------|-----------|------|----------------------------|--------|----------|---|-----------------------------------|----|----|----|
| DEPTH | ELEVATION | DEPTH | SOIL DESCRIPTION | STRAT. PLOT | WATER CONDITIONS | CONDITION | TYPE | | NUMBER | RECOVERY | N - VALUE | WATER CONTENT & ATTERBERG LIMITS. | | | |
| | | | | | | | | | | | | WP | W | WL | |
| 0 | | | <u>Gravel Fill</u> | | | | | | | | DYNAMIC PENETRATION TEST BLOWS PER FOOT. .K.... | | | | |
| | | .43 | <u>Sand Fill</u> | | | | | | | | 0 | 20 | 40 | 60 | 80 |
| 1 | | | | | | | | | | | | | | | |
| 2 | | 2.20 | <u>Silt</u> Grey, moist, compact, with sand and clay | | | X | SS | 1 | 75 | 14 | | | | | |
| 3 | | 3.05 | <u>Wood</u> | | | X | SS | 2 | 10 | 14 | | | | | |
| 4 | | 4.11 | <u>Silt</u> Grey, moist, loose, with sand, clay and wood pieces | | | X | SS | 3 | 15 | 11 | | | | | |
| 5 | | | | | | X | SS | 4 | 35 | 5 | | | | | |
| 6 | | | | | | X | SS | 5 | 10 | 7 | | | | | |
| 6 | | 6.10 | <u>Silty Clay</u> Grey, very moist, firm | | | X | SS | 6 | 100 | 4 | | | | | |
| 7 | | 6.70 | Termination of borehole | | | | | | | | | | | | |

APPENDIX



Your Project #: DULAC STREET
 Site Location: RUSSELL TWP
 Your C.O.C. #: n/a

Attention: Gib McIntee
 St Lawrence Testing & Inspection Co Ltd

814 Second St W
 PO Box 997
 Cornwall, ON
 CANADA K6H 5V1

Report Date: 2020/07/16
 Report #: R6248510
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: COG8937

Received: 2020/07/07, 09:53

Sample Matrix: Soil
 # Samples Received: 1

| Analyses | Quantity | Date | Date | Laboratory Method | Analytical Method |
|---------------------------------|----------|------------|------------|-----------------------------|----------------------|
| | | Extracted | Analyzed | | |
| Chloride (20:1 extract) (1) | 1 | 2020/07/10 | 2020/07/13 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity (1) | 1 | 2020/07/10 | 2020/07/10 | CAM SOP-00414 | OMOE E3530 v1 m |
| Moisture (Subcontracted) (2, 4) | 1 | N/A | 2020/07/15 | AB SOP-00002 | CCME PHC-CWS m |
| pH @ 25C (Soluble) (2) | 1 | 2020/07/15 | 2020/07/15 | AB SOP-00033 / AB SOP-00006 | SM 22 4500 H+B m |
| Sulphide in Soil (2) | 1 | N/A | 2020/07/15 | AB SOP-00080 | EPA9030B/SM4500S2-DF |
| Soluble Paste (2) | 1 | 2020/07/15 | 2020/07/15 | AB SOP-00003 | Carter 2nd ed 15.2 m |
| pH CaCl2 EXTRACT (1) | 1 | 2020/07/09 | 2020/07/09 | CAM SOP-00413 | EPA 9045 D m |
| Resistivity of Soil (1) | 1 | 2020/07/08 | 2020/07/10 | CAM SOP-00414 | SM 23 2510 m |
| Sulphate (20:1 Extract) (1) | 1 | 2020/07/10 | 2020/07/13 | CAM SOP-00464 | EPA 375.4 m |
| Redox Potential (3, 5) | 1 | N/A | N/A | | |

Sample Matrix: Water
 # Samples Received: 1

| Analyses | Quantity | Date | Date | Laboratory Method | Analytical Method |
|---|----------|------------|------------|---------------------------|----------------------|
| | | Extracted | Analyzed | | |
| Alkalinity (1) | 1 | N/A | 2020/07/10 | CAM SOP-00448 | SM 23 2320 B m |
| Carbonate, Bicarbonate and Hydroxide (1) | 1 | N/A | 2020/07/13 | CAM SOP-00102 | APHA 4500-CO2 D |
| Chloride by Automated Colourimetry (1) | 1 | N/A | 2020/07/10 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity (1) | 1 | N/A | 2020/07/10 | CAM SOP-00414 | SM 23 2510 m |
| Hardness (calculated as CaCO3) (1) | 1 | N/A | 2020/07/10 | CAM SOP-00102/00408/00447 | SM 2340 B |
| Lab Filtered Metals by ICPMS (1) | 1 | 2020/07/09 | 2020/07/10 | CAM SOP-00447 | EPA 6020B m |
| Ion Balance (% Difference) (1) | 1 | N/A | 2020/07/13 | | |
| Anion and Cation Sum (1) | 1 | N/A | 2020/07/13 | | |
| Nitrate (NO3) and Nitrite (NO2) in Water (1, 6) | 1 | N/A | 2020/07/09 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| pH (1) | 1 | 2020/07/09 | 2020/07/10 | CAM SOP-00413 | SM 4500H+ B m |
| Resistivity of Water (1) | 1 | 2020/07/08 | 2020/07/13 | CAM SOP-00414 | SM 23 2510 m |
| Sat. pH and Langelier Index (@ 20C) (1) | 1 | N/A | 2020/07/13 | | Auto Calc |
| Sat. pH and Langelier Index (@ 4C) (1) | 1 | N/A | 2020/07/13 | | Auto Calc |
| Sulphate by Automated Colourimetry (1) | 1 | N/A | 2020/07/10 | CAM SOP-00464 | EPA 375.4 m |



Your Project #: DULAC STREET
 Site Location: RUSSELL TWP
 Your C.O.C. #: n/a

Attention: Gib McIntee
 St Lawrence Testing & Inspection Co Ltd

814 Second St W
 PO Box 997
 Cornwall, ON
 CANADA K6H 5V1

Report Date: 2020/07/16
 Report #: R6248510
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0G8937
Received: 2020/07/07, 09:53

Sample Matrix: Water
 # Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---------------------------------------|----------|----------------|---------------|-------------------|-------------------|
| Total Dissolved Solids (TDS calc) {1} | 1 | N/A | 2020/07/13 | | Auto Calc |

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Laboratories Mississauga
- (2) This test was performed by BV Labs Calgary via Mississauga
- (3) This test was performed by Sub from Campo to Env. Testing Canada (Eurofins)
- (4) Offsite analysis requires that subcontracted moisture be reported.
- (5) Oxidation-Reduction Potential (ORP) values are determined using a Ag/AgCl reference electrode.
- (6) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.



Your Project #: DULAC STREET
Site Location: RUSSELL TWP
Your C.O.C. #: n/a

Attention: Gib McIntee
St Lawrence Testing & Inspection Co Ltd

814 Second St W
PO Box 997
Cornwall, ON
CANADA K6H 5V1

Report Date: 2020/07/16
Report #: R6248510
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: COG8937
Received: 2020/07/07, 09:53

Encryption Key

Hongmei Zhao (Grace)
Project Manager
16 Jul 2020 09:46:54

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Jolanta Goralczyk, Project Manager
Email: Jolanta.Goralczyk@bvlab.com
Phone# (905)817-5751

=====
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



**BUREAU
VERITAS**

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

SOIL CORROSIVITY PACKAGE (SOIL)

| | | | | | | | |
|--|--------------|---------------------|------------|-----------------|-----------------------|------------|-----------------|
| BV Labs ID | | NBC074 | | | NBC074 | | |
| Sampling Date | | 2020/07/02 11:00 | | | 2020/07/02 11:00 | | |
| COC Number | | n/a | | | n/a | | |
| | UNITS | S1 | RDL | QC Batch | S1 Lab-Dup | RDL | QC Batch |
| Calculated Parameters | | | | | | | |
| Resistivity | ohm-cm | 2600 | | 6825581 | | | |
| Inorganics | | | | | | | |
| Soluble (20:1) Chloride (Cl-) | ug/g | 72 | 20 | 6829193 | 68 | 20 | 6829193 |
| Conductivity | umho/cm | 384 | 2 | 6829159 | | | |
| Available (CaCl2) pH | pH | 7.13 | | 6827414 | | | |
| Soluble (20:1) Sulphate (SO4) | ug/g | ND | 20 | 6829183 | | | |
| Sulphide | mg/kg | 0.7 (1) | 0.5 | 6838019 | 1.0 | 0.5 | 6838019 |
| Physical Testing | | | | | | | |
| Moisture-Subcontracted | % | 25 | 0.30 | 6838018 | | | |
| RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected (1) Sample extracted past method-specified hold time. Matrix spike exceeds acceptance limits due to matrix interference. | | | | | | | |



**BUREAU
VERITAS**

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

RCAP - COMPREHENSIVE (LAB FILTERED)

| | | | | | | | |
|---|--------------|---------------------|------------|-----------------|-----------------------|------------|-----------------|
| BV Labs ID | | NBC073 | | | NBC073 | | |
| Sampling Date | | 2020/07/02 10:00 | | | 2020/07/02 10:00 | | |
| COC Number | | n/a | | | n/a | | |
| | UNITS | S1 | RDL | QC Batch | S1 Lab-Dup | RDL | QC Batch |
| Calculated Parameters | | | | | | | |
| Anion Sum | me/L | 12.9 | N/A | 6825015 | | | |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 340 | 1.0 | 6825019 | | | |
| Calculated TDS | mg/L | 720 | 1.0 | 6825018 | | | |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 2.4 | 1.0 | 6825019 | | | |
| Cation Sum | me/L | 13.5 | N/A | 6825015 | | | |
| Hardness (CaCO3) | mg/L | 280 | 1.0 | 6824622 | | | |
| Ion Balance (% Difference) | % | 2.29 | N/A | 6825014 | | | |
| Langelier Index (@ 20C) | N/A | 0.787 | | 6825016 | | | |
| Langelier Index (@ 4C) | N/A | 0.540 | | 6825017 | | | |
| Saturation pH (@ 20C) | N/A | 7.09 | | 6825016 | | | |
| Saturation pH (@ 4C) | N/A | 7.34 | | 6825017 | | | |
| Inorganics | | | | | | | |
| Conductivity | umho/cm | 1400 | 1.0 | 6827060 | 1400 | 1.0 | 6827060 |
| pH | pH | 7.88 | | 6827085 | 7.90 | | 6827085 |
| Dissolved Sulphate (SO4) | mg/L | ND | 1.0 | 6827106 | | | |
| Alkalinity (Total as CaCO3) | mg/L | 340 | 1.0 | 6827083 | 340 | 1.0 | 6827083 |
| Dissolved Chloride (Cl-) | mg/L | 220 | 3.0 | 6827091 | | | |
| Nitrite (N) | mg/L | ND | 0.010 | 6827137 | | | |
| Nitrate (N) | mg/L | ND | 0.10 | 6827137 | | | |
| Nitrate + Nitrite (N) | mg/L | ND | 0.10 | 6827137 | | | |
| Metals | | | | | | | |
| Dissolved Aluminum (Al) | ug/L | 16 | 4.9 | 6827396 | | | |
| Dissolved Antimony (Sb) | ug/L | ND | 0.50 | 6827396 | | | |
| Dissolved Arsenic (As) | ug/L | ND | 1.0 | 6827396 | | | |
| Dissolved Barium (Ba) | ug/L | 76 | 2.0 | 6827396 | | | |
| Dissolved Beryllium (Be) | ug/L | ND | 0.40 | 6827396 | | | |
| Dissolved Boron (B) | ug/L | 42 | 10 | 6827396 | | | |
| Dissolved Cadmium (Cd) | ug/L | ND | 0.090 | 6827396 | | | |
| Dissolved Calcium (Ca) | ug/L | 77000 | 200 | 6827396 | | | |
| Dissolved Chromium (Cr) | ug/L | ND | 5.0 | 6827396 | | | |
| Dissolved Cobalt (Co) | ug/L | 1.2 | 0.50 | 6827396 | | | |
| Dissolved Copper (Cu) | ug/L | 1.3 | 0.90 | 6827396 | | | |
| RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable ND = Not detected | | | | | | | |



BV Labs Job #: COG8937
 Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
 Client Project #: DULAC STREET
 Site Location: RUSSELL TWP

RCAP - COMPREHENSIVE (LAB FILTERED)

| | | | | | | | |
|---|--------------|---------------------|------------|-----------------|-----------------------|------------|-----------------|
| BV Labs ID | | NBC073 | | | NBC073 | | |
| Sampling Date | | 2020/07/02 10:00 | | | 2020/07/02 10:00 | | |
| COC Number | | n/a | | | n/a | | |
| | UNITS | S1 | RDL | QC Batch | S1 Lab-Dup | RDL | QC Batch |
| Dissolved Iron (Fe) | ug/L | ND | 100 | 6827396 | | | |
| Dissolved Lead (Pb) | ug/L | ND | 0.50 | 6827396 | | | |
| Dissolved Magnesium (Mg) | ug/L | 21000 | 50 | 6827396 | | | |
| Dissolved Manganese (Mn) | ug/L | 3800 | 2.0 | 6827396 | | | |
| Dissolved Molybdenum (Mo) | ug/L | 0.91 | 0.50 | 6827396 | | | |
| Dissolved Nickel (Ni) | ug/L | 1.8 | 1.0 | 6827396 | | | |
| Dissolved Phosphorus (P) | ug/L | 120 | 100 | 6827396 | | | |
| Dissolved Potassium (K) | ug/L | 2100 | 200 | 6827396 | | | |
| Dissolved Selenium (Se) | ug/L | ND | 2.0 | 6827396 | | | |
| Dissolved Silicon (Si) | ug/L | 6500 | 50 | 6827396 | | | |
| Dissolved Silver (Ag) | ug/L | ND | 0.090 | 6827396 | | | |
| Dissolved Sodium (Na) | ug/L | 180000 | 100 | 6827396 | | | |
| Dissolved Strontium (Sr) | ug/L | 330 | 1.0 | 6827396 | | | |
| Dissolved Thallium (Tl) | ug/L | ND | 0.050 | 6827396 | | | |
| Dissolved Titanium (Ti) | ug/L | ND | 5.0 | 6827396 | | | |
| Dissolved Uranium (U) | ug/L | 1.0 | 0.10 | 6827396 | | | |
| Dissolved Vanadium (V) | ug/L | 0.79 | 0.50 | 6827396 | | | |
| Dissolved Zinc (Zn) | ug/L | ND | 5.0 | 6827396 | | | |
| RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected | | | | | | | |



**BUREAU
VERITAS**

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

RESULTS OF ANALYSES OF SOIL

| | | | | |
|--|--------------|---------------------|-----------------------|-----------------|
| BV Labs ID | | NBC074 | NBC074 | |
| Sampling Date | | 2020/07/02 11:00 | 2020/07/02 11:00 | |
| COC Number | | n/a | n/a | |
| | UNITS | S1 | S1 Lab-Dup | QC Batch |
| Inorganics | | | | |
| Soluble pH | pH | 7.59 | 7.59 | 6838016 |
| Saturation % | % | 48 | 52 | 6838017 |
| QC Batch = Quality Control Batch | | | | |
| Lab-Dup = Laboratory Initiated Duplicate | | | | |



**BUREAU
VERITAS**

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

RESULTS OF ANALYSES OF WATER

| | | | |
|----------------------------------|--------------|---------------------|-----------------|
| BV Labs ID | | NBC073 | |
| Sampling Date | | 2020/07/02 10:00 | |
| COC Number | | n/a | |
| | UNITS | S1 | QC Batch |
| Calculated Parameters | | | |
| Resistivity | ohm-cm | 740 | 6825582 |
| QC Batch = Quality Control Batch | | | |



BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

TEST SUMMARY

BV Labs ID: NBC073
Sample ID: S1
Matrix: Water

Collected: 2020/07/02
Shipped:
Received: 2020/07/07

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|--|-----------------|---------|------------|---------------|---------------------|
| Alkalinity | AT | 6827083 | N/A | 2020/07/10 | Surinder Rai |
| Carbonate, Bicarbonate and Hydroxide | CALC | 6825019 | N/A | 2020/07/13 | Automated Statchk |
| Chloride by Automated Colourimetry | KONE | 6827091 | N/A | 2020/07/10 | Deonarine Ramnarine |
| Conductivity | AT | 6827060 | N/A | 2020/07/10 | Surinder Rai |
| Hardness (calculated as CaCO3) | | 6824622 | N/A | 2020/07/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 6827396 | 2020/07/09 | 2020/07/10 | Nan Raykha |
| Ion Balance (% Difference) | CALC | 6825014 | N/A | 2020/07/13 | Automated Statchk |
| Anion and Cation Sum | CALC | 6825015 | N/A | 2020/07/13 | Automated Statchk |
| Nitrate (NO3) and Nitrite (NO2) in Water | LACH | 6827137 | N/A | 2020/07/09 | Chandra Nandlal |
| pH | AT | 6827085 | 2020/07/09 | 2020/07/10 | Surinder Rai |
| Resistivity of Water | | 6825582 | 2020/07/13 | 2020/07/13 | Automated Statchk |
| Sat. pH and Langelier Index (@ 20C) | CALC | 6825016 | N/A | 2020/07/13 | Automated Statchk |
| Sat. pH and Langelier Index (@ 4C) | CALC | 6825017 | N/A | 2020/07/13 | Automated Statchk |
| Sulphate by Automated Colourimetry | KONE | 6827106 | N/A | 2020/07/10 | Deonarine Ramnarine |
| Total Dissolved Solids (TDS calc) | CALC | 6825018 | N/A | 2020/07/13 | Automated Statchk |

BV Labs ID: NBC073 Dup
Sample ID: S1
Matrix: Water

Collected: 2020/07/02
Shipped:
Received: 2020/07/07

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|------------------|-----------------|---------|------------|---------------|--------------|
| Alkalinity | AT | 6827083 | N/A | 2020/07/10 | Surinder Rai |
| Conductivity | AT | 6827060 | N/A | 2020/07/10 | Surinder Rai |
| pH | AT | 6827085 | 2020/07/09 | 2020/07/10 | Surinder Rai |

BV Labs ID: NBC074
Sample ID: S1
Matrix: Soil

Collected: 2020/07/02
Shipped:
Received: 2020/07/07

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|--------------------------|-----------------|---------|------------|---------------|----------------------|
| Chloride (20:1 extract) | KONE/EC | 6829193 | 2020/07/10 | 2020/07/13 | Deonarine Ramnarine |
| Conductivity | AT | 6829159 | 2020/07/10 | 2020/07/10 | Neil Dassanayake |
| Moisture (Subcontracted) | BAL | 6838018 | N/A | 2020/07/15 | Margarita Aguilera |
| pH @ 25C (Soluble) | PH | 6838016 | 2020/07/15 | 2020/07/15 | Jianying Huang |
| Sulphide in Soil | SPEC | 6838019 | N/A | 2020/07/15 | Preetleen Kathuria |
| Soluble Paste | BAL | 6838017 | 2020/07/15 | 2020/07/15 | Linda Zhang |
| pH CaCl2 EXTRACT | AT | 6827414 | 2020/07/09 | 2020/07/09 | Neil Dassanayake |
| Resistivity of Soil | | 6825581 | 2020/07/10 | 2020/07/10 | Automated Statchk |
| Sulphate (20:1 Extract) | KONE/EC | 6829183 | 2020/07/10 | 2020/07/13 | Deonarine Ramnarine |
| Redox Potential | COND | 6837703 | 2020/07/15 | | Nilushi Mahathantila |



BUREAU
VERITAS

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

| |
|-----------|
| Package 1 |
|-----------|

| |
|-------|
| 1.0°C |
|-------|

Sample NBC074 [S1] : Sample was analyzed past method specified hold time for Sulphide.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

QUALITY ASSURANCE REPORT

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|-------------|------|-----------------|-----------------------------|---------------|------------------|----------|---------|-----------|
| 6827060 | SAU | Spiked Blank | Conductivity | 2020/07/10 | | 102 | % | 85 - 115 |
| 6827060 | SAU | Method Blank | Conductivity | 2020/07/10 | ND, RDL=1.0 | | umho/cm | |
| 6827060 | SAU | RPD [NBC073-01] | Conductivity | 2020/07/10 | 0.22 | | % | 25 |
| 6827083 | SAU | Spiked Blank | Alkalinity (Total as CaCO3) | 2020/07/10 | | 98 | % | 85 - 115 |
| 6827083 | SAU | Method Blank | Alkalinity (Total as CaCO3) | 2020/07/10 | ND, RDL=1.0 | | mg/L | |
| 6827083 | SAU | RPD [NBC073-01] | Alkalinity (Total as CaCO3) | 2020/07/10 | 0.82 | | % | 20 |
| 6827085 | SAU | Spiked Blank | pH | 2020/07/10 | | 101 | % | 98 - 103 |
| 6827085 | SAU | RPD [NBC073-01] | pH | 2020/07/10 | 0.23 | | % | N/A |
| 6827091 | DRM | Matrix Spike | Dissolved Chloride (Cl-) | 2020/07/10 | | NC | % | 80 - 120 |
| 6827091 | DRM | Spiked Blank | Dissolved Chloride (Cl-) | 2020/07/10 | | 103 | % | 80 - 120 |
| 6827091 | DRM | Method Blank | Dissolved Chloride (Cl-) | 2020/07/10 | ND, RDL=1.0 | | mg/L | |
| 6827091 | DRM | RPD | Dissolved Chloride (Cl-) | 2020/07/10 | 0.066 | | % | 20 |
| 6827106 | DRM | Matrix Spike | Dissolved Sulphate (SO4) | 2020/07/10 | | NC | % | 75 - 125 |
| 6827106 | DRM | Spiked Blank | Dissolved Sulphate (SO4) | 2020/07/10 | | 104 | % | 80 - 120 |
| 6827106 | DRM | Method Blank | Dissolved Sulphate (SO4) | 2020/07/10 | ND, RDL=1.0 | | mg/L | |
| 6827106 | DRM | RPD | Dissolved Sulphate (SO4) | 2020/07/10 | 0.99 | | % | 20 |
| 6827137 | C_N | Matrix Spike | Nitrite (N) | 2020/07/09 | | 104 | % | 80 - 120 |
| | | | Nitrate (N) | 2020/07/09 | | 90 | % | 80 - 120 |
| 6827137 | C_N | Spiked Blank | Nitrite (N) | 2020/07/09 | | 107 | % | 80 - 120 |
| | | | Nitrate (N) | 2020/07/09 | | 101 | % | 80 - 120 |
| 6827137 | C_N | Method Blank | Nitrite (N) | 2020/07/09 | ND, RDL=0.010 | | mg/L | |
| | | | Nitrate (N) | 2020/07/09 | ND, RDL=0.10 | | mg/L | |
| 6827137 | C_N | RPD | Nitrate (N) | 2020/07/09 | 0.061 | | % | 20 |
| 6827396 | N_R | Matrix Spike | Dissolved Aluminum (Al) | 2020/07/10 | | 106 | % | 80 - 120 |
| | | | Dissolved Antimony (Sb) | 2020/07/10 | | 109 | % | 80 - 120 |
| | | | Dissolved Arsenic (As) | 2020/07/10 | | 106 | % | 80 - 120 |
| | | | Dissolved Barium (Ba) | 2020/07/10 | | 103 | % | 80 - 120 |
| | | | Dissolved Beryllium (Be) | 2020/07/10 | | 102 | % | 80 - 120 |
| | | | Dissolved Boron (B) | 2020/07/10 | | 104 | % | 80 - 120 |
| | | | Dissolved Cadmium (Cd) | 2020/07/10 | | 105 | % | 80 - 120 |
| | | | Dissolved Calcium (Ca) | 2020/07/10 | | NC | % | 80 - 120 |
| | | | Dissolved Chromium (Cr) | 2020/07/10 | | 102 | % | 80 - 120 |
| | | | Dissolved Cobalt (Co) | 2020/07/10 | | 104 | % | 80 - 120 |
| | | | Dissolved Copper (Cu) | 2020/07/10 | | 102 | % | 80 - 120 |
| | | | Dissolved Iron (Fe) | 2020/07/10 | | 104 | % | 80 - 120 |
| | | | Dissolved Lead (Pb) | 2020/07/10 | | 99 | % | 80 - 120 |
| | | | Dissolved Magnesium (Mg) | 2020/07/10 | | NC | % | 80 - 120 |
| | | | Dissolved Manganese (Mn) | 2020/07/10 | | 104 | % | 80 - 120 |
| | | | Dissolved Molybdenum (Mo) | 2020/07/10 | | 106 | % | 80 - 120 |
| | | | Dissolved Nickel (Ni) | 2020/07/10 | | 100 | % | 80 - 120 |
| | | | Dissolved Phosphorus (P) | 2020/07/10 | | 110 | % | 80 - 120 |
| | | | Dissolved Potassium (K) | 2020/07/10 | | 105 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2020/07/10 | | 102 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2020/07/10 | | 108 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2020/07/10 | | 102 | % | 80 - 120 |
| | | | Dissolved Sodium (Na) | 2020/07/10 | | NC | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2020/07/10 | | 106 | % | 80 - 120 |
| | | | Dissolved Thallium (Tl) | 2020/07/10 | | 98 | % | 80 - 120 |



BUREAU
VERITAS

BV Labs Job #: C0G8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits | | |
|-------------------------|------------|--------------|---------------------------|---------------|------------------|----------|----------|-----------|---|----------|
| 6827396 | N_R | Spiked Blank | Dissolved Titanium (Ti) | 2020/07/10 | | 102 | % | 80 - 120 | | |
| | | | Dissolved Uranium (U) | 2020/07/10 | | 100 | % | 80 - 120 | | |
| | | | Dissolved Vanadium (V) | 2020/07/10 | | 106 | % | 80 - 120 | | |
| | | | Dissolved Zinc (Zn) | 2020/07/10 | | 103 | % | 80 - 120 | | |
| | | | Dissolved Aluminum (Al) | 2020/07/10 | | 101 | % | 80 - 120 | | |
| | | | Dissolved Antimony (Sb) | 2020/07/10 | | 103 | % | 80 - 120 | | |
| | | | Dissolved Arsenic (As) | 2020/07/10 | | 102 | % | 80 - 120 | | |
| | | | Dissolved Barium (Ba) | 2020/07/10 | | 101 | % | 80 - 120 | | |
| | | | Dissolved Beryllium (Be) | 2020/07/10 | | 99 | % | 80 - 120 | | |
| | | | Dissolved Boron (B) | 2020/07/10 | | 101 | % | 80 - 120 | | |
| | | | Dissolved Cadmium (Cd) | 2020/07/10 | | 101 | % | 80 - 120 | | |
| | | | Dissolved Calcium (Ca) | 2020/07/10 | | 99 | % | 80 - 120 | | |
| | | | Dissolved Chromium (Cr) | 2020/07/10 | | 98 | % | 80 - 120 | | |
| | | | Dissolved Cobalt (Co) | 2020/07/10 | | 101 | % | 80 - 120 | | |
| | | | Dissolved Copper (Cu) | 2020/07/10 | | 100 | % | 80 - 120 | | |
| | | | Dissolved Iron (Fe) | 2020/07/10 | | 100 | % | 80 - 120 | | |
| | | | Dissolved Lead (Pb) | 2020/07/10 | | 100 | % | 80 - 120 | | |
| | | | Dissolved Magnesium (Mg) | 2020/07/10 | | 105 | % | 80 - 120 | | |
| | | | Dissolved Manganese (Mn) | 2020/07/10 | | 100 | % | 80 - 120 | | |
| | | | Dissolved Molybdenum (Mo) | 2020/07/10 | | 99 | % | 80 - 120 | | |
| | | | Dissolved Nickel (Ni) | 2020/07/10 | | 99 | % | 80 - 120 | | |
| | | | Dissolved Phosphorus (P) | 2020/07/10 | | | | 121 (1) | % | 80 - 120 |
| | | | Dissolved Potassium (K) | 2020/07/10 | | | | 100 | % | 80 - 120 |
| | | | Dissolved Selenium (Se) | 2020/07/10 | | | | 99 | % | 80 - 120 |
| | | | Dissolved Silicon (Si) | 2020/07/10 | | | | 103 | % | 80 - 120 |
| | | | Dissolved Silver (Ag) | 2020/07/10 | | | | 99 | % | 80 - 120 |
| | | | Dissolved Sodium (Na) | 2020/07/10 | | | | 103 | % | 80 - 120 |
| | | | Dissolved Strontium (Sr) | 2020/07/10 | | | | 100 | % | 80 - 120 |
| Dissolved Thallium (Tl) | 2020/07/10 | | | | 96 | % | 80 - 120 | | | |
| Dissolved Titanium (Ti) | 2020/07/10 | | | | 98 | % | 80 - 120 | | | |
| Dissolved Uranium (U) | 2020/07/10 | | | | 97 | % | 80 - 120 | | | |
| Dissolved Vanadium (V) | 2020/07/10 | | | | 101 | % | 80 - 120 | | | |
| Dissolved Zinc (Zn) | 2020/07/10 | | | | 101 | % | 80 - 120 | | | |
| 6827396 | N_R | Method Blank | Dissolved Aluminum (Al) | 2020/07/10 | ND, RDL=4.9 | | ug/L | | | |
| | | | Dissolved Antimony (Sb) | 2020/07/10 | ND, RDL=0.50 | | ug/L | | | |
| | | | Dissolved Arsenic (As) | 2020/07/10 | ND, RDL=1.0 | | ug/L | | | |
| | | | Dissolved Barium (Ba) | 2020/07/10 | ND, RDL=2.0 | | ug/L | | | |
| | | | Dissolved Beryllium (Be) | 2020/07/10 | ND, RDL=0.40 | | ug/L | | | |
| | | | Dissolved Boron (B) | 2020/07/10 | ND, RDL=10 | | ug/L | | | |
| | | | Dissolved Cadmium (Cd) | 2020/07/10 | ND, RDL=0.090 | | ug/L | | | |
| | | | Dissolved Calcium (Ca) | 2020/07/10 | ND, RDL=200 | | ug/L | | | |
| | | | Dissolved Chromium (Cr) | 2020/07/10 | ND, RDL=5.0 | | ug/L | | | |
| | | | Dissolved Cobalt (Co) | 2020/07/10 | ND, RDL=0.50 | | ug/L | | | |



BUREAU
VERITAS

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|-------------|------|--------------------------|-------------------------------|---------------|------------------|----------|---------|-----------|
| | | | Dissolved Copper (Cu) | 2020/07/10 | ND, RDL=0.90 | | ug/L | |
| | | | Dissolved Iron (Fe) | 2020/07/10 | ND, RDL=100 | | ug/L | |
| | | | Dissolved Lead (Pb) | 2020/07/10 | ND, RDL=0.50 | | ug/L | |
| | | | Dissolved Magnesium (Mg) | 2020/07/10 | ND, RDL=50 | | ug/L | |
| | | | Dissolved Manganese (Mn) | 2020/07/10 | ND, RDL=2.0 | | ug/L | |
| | | | Dissolved Molybdenum (Mo) | 2020/07/10 | ND, RDL=0.50 | | ug/L | |
| | | | Dissolved Nickel (Ni) | 2020/07/10 | ND, RDL=1.0 | | ug/L | |
| | | | Dissolved Phosphorus (P) | 2020/07/10 | ND, RDL=100 | | ug/L | |
| | | | Dissolved Potassium (K) | 2020/07/10 | ND, RDL=200 | | ug/L | |
| | | | Dissolved Selenium (Se) | 2020/07/10 | ND, RDL=2.0 | | ug/L | |
| | | | Dissolved Silicon (Si) | 2020/07/10 | ND, RDL=50 | | ug/L | |
| | | | Dissolved Silver (Ag) | 2020/07/10 | ND, RDL=0.090 | | ug/L | |
| | | | Dissolved Sodium (Na) | 2020/07/10 | ND, RDL=100 | | ug/L | |
| | | | Dissolved Strontium (Sr) | 2020/07/10 | ND, RDL=1.0 | | ug/L | |
| | | | Dissolved Thallium (Tl) | 2020/07/10 | ND, RDL=0.050 | | ug/L | |
| | | | Dissolved Titanium (Ti) | 2020/07/10 | ND, RDL=5.0 | | ug/L | |
| | | | Dissolved Uranium (U) | 2020/07/10 | ND, RDL=0.10 | | ug/L | |
| | | | Dissolved Vanadium (V) | 2020/07/10 | ND, RDL=0.50 | | ug/L | |
| | | | Dissolved Zinc (Zn) | 2020/07/10 | ND, RDL=5.0 | | ug/L | |
| 6827396 | N_R | RPD | Dissolved Cadmium (Cd) | 2020/07/10 | NC | | % | 20 |
| | | | Dissolved Chromium (Cr) | 2020/07/10 | NC | | % | 20 |
| | | | Dissolved Copper (Cu) | 2020/07/10 | 0.69 | | % | 20 |
| | | | Dissolved Lead (Pb) | 2020/07/10 | NC | | % | 20 |
| | | | Dissolved Nickel (Ni) | 2020/07/10 | NC | | % | 20 |
| | | | Dissolved Zinc (Zn) | 2020/07/10 | 0.83 | | % | 20 |
| 6827414 | NYS | Spiked Blank | Available (CaCl2) pH | 2020/07/09 | | 100 | % | 97 - 103 |
| 6827414 | NYS | RPD | Available (CaCl2) pH | 2020/07/09 | 0.15 | | % | N/A |
| 6829159 | NYS | Spiked Blank | Conductivity | 2020/07/10 | | 100 | % | 90 - 110 |
| 6829159 | NYS | Method Blank | Conductivity | 2020/07/10 | ND,RDL=2 | | umho/cm | |
| 6829159 | NYS | RPD | Conductivity | 2020/07/10 | 0.49 | | % | 10 |
| 6829183 | DRM | Matrix Spike | Soluble (20:1) Sulphate (SO4) | 2020/07/13 | | NC | % | 70 - 130 |
| 6829183 | DRM | Spiked Blank | Soluble (20:1) Sulphate (SO4) | 2020/07/13 | | 103 | % | 70 - 130 |
| 6829183 | DRM | Method Blank | Soluble (20:1) Sulphate (SO4) | 2020/07/13 | ND, RDL=20 | | ug/g | |
| 6829183 | DRM | RPD | Soluble (20:1) Sulphate (SO4) | 2020/07/13 | 15 | | % | 35 |
| 6829193 | DRM | Matrix Spike [NBC074-02] | Soluble (20:1) Chloride (Cl-) | 2020/07/13 | | NC | % | 70 - 130 |



BUREAU
VERITAS

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

QUALITY ASSURANCE REPORT(CONT'D)

| QA/QC Batch | Init | QC Type | Parameter | Date Analyzed | Value | Recovery | UNITS | QC Limits |
|-------------|------|--------------------------|-------------------------------|---------------|-----------------|----------|-------|-----------|
| 6829193 | DRM | Spiked Blank | Soluble (20:1) Chloride (Cl-) | 2020/07/13 | | 104 | % | 70 - 130 |
| 6829193 | DRM | Method Blank | Soluble (20:1) Chloride (Cl-) | 2020/07/13 | ND, RDL=20 | | ug/g | |
| 6829193 | DRM | RPD [NBC074-02] | Soluble (20:1) Chloride (Cl-) | 2020/07/13 | 6.0 | | % | 35 |
| 6838016 | JHC | QC Standard | Soluble pH | 2020/07/15 | | 101 | % | 98 - 102 |
| 6838016 | JHC | Spiked Blank | Soluble pH | 2020/07/15 | | 100 | % | 97 - 103 |
| 6838016 | JHC | RPD [NBC074-03] | Soluble pH | 2020/07/15 | 0 | | % | N/A |
| 6838017 | LZ0 | QC Standard | Saturation % | 2020/07/15 | | 100 | % | 75 - 125 |
| 6838017 | LZ0 | RPD [NBC074-03] | Saturation % | 2020/07/15 | 6.7 | | % | 12 |
| 6838018 | éHG | Method Blank | Moisture-Subcontracted | 2020/07/15 | ND, RDL=0.30 | | % | |
| 6838019 | éE2 | Matrix Spike [NBC074-03] | Sulphide | 2020/07/15 | | 72 (1) | % | 75 - 125 |
| 6838019 | éE2 | Spiked Blank | Sulphide | 2020/07/15 | | 84 | % | 75 - 125 |
| 6838019 | éE2 | Method Blank | Sulphide | 2020/07/15 | ND, RDL=0.5 | | mg/kg | |
| 6838019 | éE2 | RPD [NBC074-03] | Sulphide | 2020/07/15 | NC | | % | 30 |

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: COG8937
Report Date: 2020/07/16

St Lawrence Testing & Inspection Co Ltd
Client Project #: DULAC STREET
Site Location: RUSSELL TWP

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

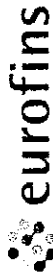
Brad Newman, Scientific Service Specialist

Harry (Peng) Liang, Senior Analyst

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Nilushi Mahathantila, Project Manager Assistant

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



Environment Testing

Certificate of Analysis

Client: Bureau Veritas Canada (2019) Inc.
6740 Campobello Road
Mississauga, ON
L5N 2L8
Attention: Ms. Jolanta Goralczyk
PO#:

Report Number: 1934124
Date Submitted: 2020-07-10
Date Reported: 2020-07-15
Project: C0G8937
COC #: 859907

Invoice to: Bureau Veritas Canada (2019) Inc.

Page 1 of 3

Dear Jolanta Goralczyk:

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:

Sarah
Horner
2020.07.1
5 15:22:50
-04'00'

APPROVAL: Sarah Horner, Inorganics Technician

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

Environment Testing

Client: Bureau Veritas Canada (2019) Inc.

6740 Campobello Road
Mississauga, ON

L5N 2L8

Attention: Ms. Jolanta Goralczyk

PO#:

Invoice to: Bureau Veritas Canada (2019) Inc.

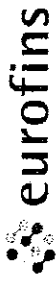
Report Number: 1934124
Date Submitted: 2020-07-10
Date Reported: 2020-07-15
Project: C0G8937
COC #: 859907

| Group | Analyte | MRL | Units | Guideline |
|-----------------|--|-----|-------|--|
| Redox Potential | REDOX Potential | | mV | |
| | Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. | | | 1503756 Water 2020-07-02 NB073-S1 |
| | | | | 211 |

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, PW/QO = Provincial Water Quality Guideline, IPW/QO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Environment Testing

Certificate of Analysis

Client: Bureau Veritas Canada (2019) Inc.
6740 Campbell Road
Mississauga, ON
L5N 2L8
Attention: Ms. Jolanta Goralczyk
PO#:

Report Number: 1934124
Date Submitted: 2020-07-10
Date Reported: 2020-07-15
Project: C0G8937
COC #: 859907

Invoice to: Bureau Veritas Canada (2019) Inc.

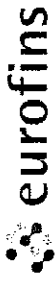
QC Summary

| Analyte | Blank | QC % Rec | QC Limits |
|--|--|----------|-----------|
| Run No: 386237 Method: C-SM2580B REDOX Potential | Analysis/Extraction Date: 2020-07-15 Analyst: SKH 266 mV | 102 | |

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, PW/QO = Provincial Water Quality Guideline, IPW/QO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Environment Testing

Certificate of Analysis

Client: Bureau Veritas Canada (2019) Inc.
6740 Campobello Road
Mississauga, ON
L5N 2L8

Report Number: 1934125
Date Submitted: 2020-07-10
Date Reported: 2020-07-15
Project: C0G8937
COC #: 859907

Attention: Ms. Jolanta Goralczyk
PO#:

Invoice to: Bureau Veritas Canada (2019) Inc.

Page 1 of 3

Dear Jolanta Goralczyk:

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:

Sarah
Horner
Sarah Horner 2020.07.1
5 15:23:16
-04'00'

APPROVAL: Sarah Horner, Inorganics Technician

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

Environment Testing

Client: Bureau Veritas Canada (2019) Inc.

6740 Campobello Road
Mississauga, ON
L5N 2L8

Attention: Ms. Jolanta Goralczyk

PO#:

Invoice to: Bureau Veritas Canada (2019) Inc.

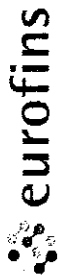
Report Number: 1934125
Date Submitted: 2020-07-10
Date Reported: 2020-07-15
Project: C0G8937
COC #: 859907

| Group | Analyte | MRL | Units | Guideline |
|-----------------|--|-----|-------|--|
| Redox Potential | REDOX Potential | | mV | |
| | Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. | | | 1503757 Soil 2020-07-02 NBC074-S1 |
| | | | | 64.2 |

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



Environment Testing

Certificate of Analysis

Client: Bureau Veritas Canada (2019) Inc.

6740 Campobello Road
Mississauga, ON

L5N 2L8

Attention: Ms. Jolanta Goralczyk

PO#:

Invoice to: Bureau Veritas Canada (2019) Inc.

Report Number: 1934125

Date Submitted: 2020-07-10

Date Reported: 2020-07-15

Project: C0G8937

COC #: 859907

QC Summary

| Analyte | Blank | QC % Rec | QC Limits |
|---|--------|----------|-----------|
| Run No 386237 Analysis/Extraction Date 2020-07-15 Analyst SKH | | | |
| Method C SM2580B | | | |
| REDOX Potential | 266 mV | 102 | |

Guideline = * = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
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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

GEORGE DOWNING ESTATE DRILLING LTD.

Date: July 9 2020

Driller: Scott

Helper: Jersey B

Client: ST LAWRENCE TESTING

Job Name: ROCKLAND EMBRUN

Drill: CME 20

Job No. Client: _____ Ours: _____

PRODUCTION

| Hole # | Augering: | | Cone Footage | Casing: | | | Coring: | | | Piezo/MW Inst./ Tag* |
|--------|-----------|----|--------------|---------|------|----|---------|------|----|----------------------|
| | From | To | | Size | From | To | Size | From | To | |
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*Record Ontario Well Tag # when applicable, with site plan and GPS coordinates of all wells on back of sheet

SUPPLIES CHARGEABLE TO CLIENT

| | | | |
|----------------------|---------------|---------------------|----------|
| PVC screen (Size/Ft) | ___ / ___ ft. | Asphalt Patch | ___ bags |
| PVC riser (Size/Ft) | ___ / ___ ft. | Casagrande Piez. | ___ No. |
| End Caps | ___ No. | 1" Standpipe | ___ ft. |
| J-Plugs | ___ No. | Shelby Tubes 2" | ___ No. |
| Protectors | ___ No. | Shelby Tubes 3" | ___ No. |
| Silica Sand | ___ bags | Penetration cones | ___ No. |
| Bentonite 3/8" | ___ bags | Auger Teeth | ___ No. |
| Cement | ___ bags | Wood coreboxes | ___ No. |
| Aqua Guard | ___ bags | Cardboard coreboxes | ___ No. |
| Bentonite Powder | ___ bags | 45 Gal. Drums | ___ No. |

| Rentals: | |
|------------|--------------------------|
| Grouter | <input type="checkbox"/> |
| Steamer | <input type="checkbox"/> |
| Tanker | <input type="checkbox"/> |
| Compressor | <input type="checkbox"/> |
| Piston | <input type="checkbox"/> |
| Packer | <input type="checkbox"/> |
| ATV | <input type="checkbox"/> |

Other: _____

| Name | Drilling | Installing | Testing | Water | Moving | St/By | Other | Travel | Total |
|---------------|----------|------------|---------|-------|--------|-------|-----------|------------|------------|
| <u>Scott</u> | <u>6</u> | | | | | | <u>.5</u> | <u>3BT</u> | <u>9.5</u> |
| <u>Jersey</u> | <u>6</u> | | | | | | <u>.5</u> | <u>3</u> | <u>9.5</u> |
| | | | | | | | | | |
| | | | | | | | | | |

Details: (St/By, Other): 5.00ft

George Downing Estate Drilling Ltd. will not be held responsible for any damages done to underground or overhead services. Succession Forage George Downing Ltee. n'est pas responsable pour aucun dommage encouru aux services publics en dessous ou au-dessus de la terre.

[Signature]
CLIENT

FOREMAN

Scott Pearson
DRILLER