Agenda

Regular Meeting of Council

Corporation of the Township of The North Shore
Wednesday, March 20th, 2024
6:00 PM

Township of the North Shore is inviting you to a scheduled Zoom meeting.

Join Zoom Meeting
https://us02web.zoom.us/j/81298288842?pwd=V3U5VHltL1JGVW8wc0dWWE5LdHpQZz09

Meeting ID: 812 9828 8842
Passcode: 881747

This meeting is being held in a Hybrid setting. Attendees may choose to attend via ZOOM or in person in the Municipal Office Council Chambers located at 1385 Highway 17, Algoma Mills.

1. CALL TO ORDER
2. APPROVAL OF AGENDA
3. DISCLOSURES OF PECUNIARY INTEREST
4. PRESENTATIONS/DELEGATION - Nil
5. ADOPTION OF MINUTES
   a) Minutes of the Regular meeting minutes of March 6th, 2024
6. COUNCIL MEMBERS REPORT - Nil
7. REPORTS AND MOTIONS OF MUNICIPAL STAFF, COMMITTEES, AND COMMUNICATIONS

   a) Riverview Road - Geotechnical Report
   b) 2023 Estimated Closure and Post Closure costs - Serpent River Waste Disposal Site
   c) Police Services Board - changes to Composition April 1st, 2024

   Consent Agenda
   a) Letter from Algoma Public Health regarding merger with Public Health Sudbury & Districts

8. OLD BUSINESS (INCLUDES THE FOLLOWING WRITTEN LETTERS/REPORTS) - Nil
9. INTRODUCTION, READING AND CONSIDERATION OF BY-LAWS
   a) By-Law 24-15 being a by-law to adopt the Recruitment and Termination of Volunteer Firefighters Policy for the Corporation of the Township of The North Shore
10. NOTICES OF MOTION Nil
11. CLOSED SESSION Nil
12. REPORT FROM CLOSED SESSION
13. CONFIRMATORY BY-LAW
    By-law 24-16 being a by-law to confirm the proceedings of Council at its meeting held March 20th, 2024, be read a first, second and third time enacted and passed.
14. ADJOURNMENT

5

Minutes

Regular Council Meeting

Township of the North Shore

Wednesday, March 6th, 2024
6:00 p.m.
Hybrid Meeting

ATTENDANCE

Council: Tony Moor - Mayor
Robin Green - Councillor at Large
Richard Welburn - Ward 1 - electronic
Len Menard - Ward 2
Tracey Simon - Ward 3 - ***left meeting at 7:53 PM***

Staff: Matt Simon, Public Works Manager/Fire Chief - ***left meeting at 7:39 PM***
Rachel Schneider, Municipal Clerk/Deputy Treasurer

CALL TO ORDER

The Mayor called the meeting to order at 6:00 p.m.

APPROVAL OF AGENDA

RESOLUTION #24-60
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED: That Council for the Corporation of the Township of The North Shore approves the agenda as circulated, with the additions of items:

- 7d - Next Budget meeting - March 18th, 2024
- 7e - MMAH FIT review and explanation
- 7f - MMAH Councillor Training

CARRIED

DISCLOSURES OF PECUNIARY INTEREST

T. Simon - Closed Session 3a, 3b, 4e Conflict of Interest, 4g Pecuniary Interest

PRESENTATIONS/DELEGATION

ADOPTION OF MINUTES

a) Regular meeting minutes of February 7th, 2024

RESOLUTION #24-61
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED: That Council of the Corporation of the Township of the North Shore adopts the Regular meeting minutes of February 7th, 2024.

CARRIED

b) Special meeting minutes of February 28th, 2024

RESOLUTION #24-62
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED: That Council of the Corporation of the Township of the North Shore adopts the Special meeting minutes of February 28th, 2024.

CARRIED

COUNCIL MEMBERS REPORT

Councillor Welburn spoke about the end of the Budget meeting dated Monday, March 4th, 2024 and spoke about Human Resource matters in open session.

REPORTS AND MOTIONS OF MUNICIPAL STAFF, COMMITTEES AND COMMUNICATION

a) 2023 Council Statement of Remuneration and Expenses

RESOLUTION #24-63
Moved by: L. Menard
Seconded by: T. Simon
BE IT RESOLVED: That Council for the Corporation of the Township of The North Shore receive the "2023 Council Statement of Remuneration & Expenses" report as required under Section 284 of the Municipal Act, 2001, for information purposes.

CARRIED

b) Appointment to Cemetery Committee

RESOLUTION #24-64
Moved by: R. Green
Seconded by: T. Simon
BE IT RESOLVED That Council for the Corporation of the Township of The North Shore receive the staff report for consideration, and that Council approve that Heather Pelky be appointed to the Cemetery Committee for the 2022-2026 Council term

CARRIED

c) Recruitment and Termination of Volunteer Firefighters Policy

RESOLUTION #24-65
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED That Council for the Corporation of the Township of The North Shore receive the staff report as presented for consideration, and that Council approve the Recruitment and Termination of Volunteer Firefighters Policy.

CARRIED

d) Next Budget meeting - March 18th, 2024

RESOLUTION # 24-66
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED THAT Council for the Corporation of the Township of the North Shore schedule the next Special Budget meeting for Monday, March 18th, 2024, at 6pm

CARRIED

e) MMAH 2022 FIT review and explanation

RESOLUTION # 24-67
Moved by: T. Simon
Seconded by: R. Green
BE IT RESOLVED THAT Council for the Corporation of the Township of the North Shore receive the staff report as presented, and that Council direct the Clerk to reach out to the Ministry of Municipal Affairs and Housing to provide a review and explanation of the 2022 Financial Indicator at a future meeting

CARRIED

f) MMAH Councillor training

RESOLUTION # 24-68
Moved by: R. Green
Seconded by: T. Simon
BE IT RESOLVED THAT Council for the Corporation of the Township of the North Shore receive the staff report as presented, and that Council direct the Clerk to reach out to the Ministry of Municipal Affairs and Housing to provide Councillor training at a future meeting

CARRIED

Consent Agenda

a) Memo from MTO regarding license plate renewals
b) AMO Workforce Development - Municipal Employee Survey
c) Letter from the Ministry of the Environment, Conservation and Parks regarding Environmental Assessment processes

RESOLUTION #24-69
Moved by: T. Simon
Seconded by: L. Menard
BE IT RESOLVED: That items a-c, as set out on the Consent Agenda of the January 17th, 2024, Regular meeting of Council, be received for information purposes.

CARRIED

OLD BUSINESS **Nil**

INTRODUCTION, READING, AND CONSIDERATION OF BY-LAWS

a) By-Law 24-12 being a by-law to adopt the Internal Control Policy for the Corporation of the Township of The North Shore

RESOLUTION #24-70
Moved by: L. Menard
Seconded by: T. Simon
BE IT RESOLVED: That Council for the Corporation of the Township of The North Shore approve By-Law 24-12 being a by-law to adopt the Internal Control Policy for the Corporation of the Township of The North Shore be read a first, second and third time enacted and passed.

CARRIED

NOTICES OF MOTION **Nil**

CLOSED SESSION
RESOLUTION #24-71
Moved by: L. Menard
Seconded by: T. Simon
BE IT RESOLVED: That Council for the Corporation of the Township of The North Shore move to Closed Session pursuant to Section 239 (2) of the Municipal Act, to consider items 1-11, specifically:

To move to Closed Session pursuant to Section 239 (3.1) of the Municipal Act, to consider:

ii. (b) personal matters about an identifiable individual, including municipal or local board employees
iii. (c) a proposed or pending acquisition or disposition of land by the municipality or local board
iv. (d) labour relations or employee negotiations
v. (e) litigation or potential litigation, including matters before administrative tribunals, affecting the municipality or local board
vi. (f) advice that is subject to solicitor-client privilege, including communications necessary for that purpose
viii. (h) information explicitly supplied in confidence to the municipality or local board by Canada, a province or territory or a Crown agency of any of them
xi. (k) a position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the municipality or local board

Closed session meeting attendance by: Township of The North Shore Municipal Council, Clerk, Public Works Manager

For the purpose of legal matters, human resource matters and the potential disposition of land.

CARRIED

T. Simon exited Council Chambers at 6:34 PM
L. Menard exited Council Chambers at 6:51 PM and returned at 6:52 PM

The Mayor called recess at 6:53 PM
L. Menard exited Council Chambers at 6:53 PM
R. Green exited Council Chambers at 6:53 PM
M. Simon exited Council Chambers at 6:53 PM
T. Simon returned to Council Chambers at 6:56 PM
T. Simon exited Council Chambers at 6:57 PM and returned at 7:00 PM
L. Menard returned to Council Chambers at 7:01 PM
R. Green returned to Council Chambers at 7:01 PM
M. Simon returned to Council Chambers at 7:01 PM
The meeting was resumed at 7:02 PM

M. Simon left the meeting at 7:39 PM

The Mayor called recess at 8:02 PM
T. Moor exited Council Chambers at 8:02 PM and returned at 8:06 PM
The meeting was resumed at 8:06 PM

REPORT FROM CLOSED SESSION
RESOLUTION #24-72
Moved by: L. Menard
Seconded by: R. Welburn
BE IT RESOLVED: That Council for the Corporation of the Township of The North Shore arise from Closed Session at 8:30 PM and report as follows: Council gave direction to the Mayor and Clerk regarding the legal and personnel matters and declare the property of Roll# 5740-040-000-07500-0000 as surplus land and to begin the tendering process.

CARRIED

CONFIRMATORY BY-LAW
RESOLUTION # 24-73
Moved By: L. Menard
Seconded By: R. Green
BE IT RESOLVED: That the Council of the Corporation of the Township of The North Shore hereby approve By-Law No. 24-13, Being a By-Law to Confirm the Proceedings of Council at its Regular meeting held March 6th, 2024, be read a first, second and third time, enacted and passed.

CARRIED

ADJOURNMENT

RESOLUTION # 24-74
Moved By: L. Menard
Seconded By: R. Green
BE IT RESOLVED: That the Corporation of the Township of The North Shore Regular Council meeting of March 6th, 2024, do now adjourn at 8:31 PM to meet again on the 20th day of March 2024 at 6:00 p.m., or at the call of the Chair.

CARRIED

_____
Tony Moor, Mayor

_____
Rachel Jean Schneider, Clerk/Deputy Treasurer

7a)

March 14, 2024 Meeting of March 20th, 2024

Council Report

SUBJECT: RIVERVIEW ROAD – GEOTECHNICAL REPORT

RECOMMENDATION: That Council receive the staff report as presented regarding the Geotechnical Report for Riverview Road from TULLOCH, and that Council approve the proposed Option 3 for pavement design.

At the September 20th, 2023, Regular Council meeting, Council accepted Tulloch Engineering's proposal for engineering services and design of the Riverview Road Rehabilitation Project.

The proposal from Tulloch included the following proposed timeline;

• Topographic Survey & Base plan	Nov 1st, 2023
• Geotechnical & Excess Soils Investigations – Field Work	Nov 1st, 2023
• Environmental Review – Field Work	Nov 1st, 2023
• Preliminary Design	Nov 30th, 2023
• Preliminary Design Review Meeting	Dec 1st, 2023
• Geotechnical & Ecess Soils Investigations – Reporting	Dec 15th, 2023
• Detailed Design	Dec 15th, 2023
• Detailed Design Review Meeting	Dec 20th, 2023
• Environmental Review – Permit Submissions	Dec 22nd, 2023
• Tender Preparation	Feb 23rd, 2024

Tulloch has forwarded their prepared Geotechnical Report to the Township and has provided Council with multiple options for pavement design (as found on pages 10, 11, and 12 of the attached Geotechnical Report).

Tulloch is recommending that the Township consider Option 3, as provided below:

*"**Option 3**: This option utilizes a biaxial geogrid on the existing road sub-base material. The geogrid would be placed between the existing fills used as a Granular B subgrade and the Granular A to help strengthen the road base from traffic loading as well as to help mitigate impacts of frost heave from the subgrade.*

- Advantages: Utilizes existing fill while also helping mitigate issues with respect to potential frost susceptibility, existing sub-base can be re-used utilizing a more economical approach to the road rehabilitation. Likely the most economical option.

- Disadvantages: Increased cost of geogrid (likely offset compared to importing new fill), the geogrid may not be able to fully mitigate impacts of fill re-use and as such the road may see a lower service life."

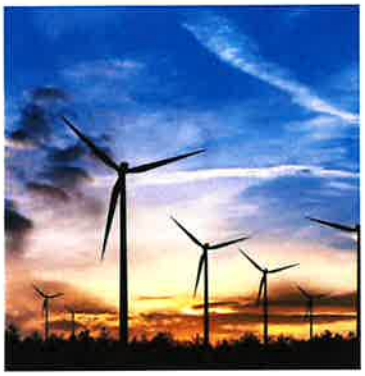
Prepared and Submitted by: Rachel Jean Schneider, Municipal Clerk/Deputy Treasurer
Matt Simon, Public Works Manager/Fire Chief

GEOTECHNICAL REPORT

Riverview Road Rehabilitation

Serpent River, Ontario





March 2024

TULLOCH Project # 23-1168

LICENSED PROFESSIONAL ENGINEER
E.K. GILES
100206670
MAR 5th/2024
PROVINCE OF ONTARIO

March 5, 2024	0	Issued for Use	L. Meneghetti	J. Mercer	E. Giles
Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**
TULLOCH					

TULLOCH

1100 South Service Rd. Suite 420
Stoney Creek, ON
L8E 0C5

T. 905.481.1678
TF. 800.797.2997
stoneycreek@tulloch.ca

www.TULLOCH.ca

23-1168
March 5, 2024

The Corporation of the Township of The North Shore
P.O. Box 108
1385 Highway 17
Algoma Mills, Ontario
P0R 1A0

Attention: Rachel Jean Schneider | Municipal Clerk/Deputy Treasurer

RE: Rehabilitation of Riverview Road in Serpent River, Ontario.

Dear Ms. Scheider,

Please find enclosed our Geotechnical Report for the proposed road rehabilitation for a section of Riverview Road, located between Highway 17 and Handi Sport Road in Serpent River, Ontario.

This report outlines the results of the geotechnical investigation and provides geotechnical design recommendations and construction considerations for the proposed rehabilitation of the paved road section.

We trust the enclosed is adequate for your current needs. If there is anything further that we can assist with, please contact us at your convenience.

Sincerely,

Jackson Mercer, P. Eng.
Project Engineer

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1. INTRODUCTION AND SCOPE

TULLOCH Engineering Inc. (TULLOCH) was retained by the Corporation of the Township of The North Shore (Client) to complete a geotechnical investigation for the proposed rehabilitation of approximately 2.0 km of pavement on Riverview Road. The investigated section lies between Highway 17 and Handi Spot Road near Serpent River, Ontario.

The purpose of the geotechnical investigation was to evaluate the subsurface conditions within the project site in order to provide pavement engineering recommendations for the proposed rehabilitation of the pavement structure. A site plan attached in Appendix A outlines the borehole locations completed for the drilling investigation associated with the project.

This report provides the factual geotechnical investigation data and geotechnical design recommendations, which are based on the site investigation data, our understanding of the project scope and engineering experience. Common terminology used in this report can be found in Appendix B and specific terminology is referenced in table notes or in the report body.

2. REGIONAL GEOLOGY AND SITE INFORMATION

The project site is located on Riverview Road, between Highway 17 and Handi Spot Road in the Township of The North Shore near Serpent River, Ontario.

Based on review of Bedrock Geology and Northern Ontario Engineering Geology Terrain Study (NOEGTS) (OGS 2005) and Bedrock Geology of Ontario (OGS 2011) mapping as published by the Ontario Geological Survey, the site surficial geology consists of a mix of bedrock and sand with a secondary gravel material. The bedrock comprised of siltstone, wacke and argillite, of the McKim Formation belonging to the Elliot Lake Group. The topography of the site is mixed jagged and plain, with low to moderate relief and exhibits dry drainage conditions with a suspected high water table.

Riverview Road is currently an active two-lane roadway, within the Township of The North Shore. The road consists of drainage ditching and a paved surface. The site is relatively flat with the road running parallel to the Serpent River along the investigated area. A detailed photo log of the site and investigation is attached in Appendix C.

3. SITE INVESTIGATION AND METHODOLOGY

The investigation consisted of advancing six (6) geotechnical boreholes referenced as BH-23-01 to BH-23-06, and twenty-nine (29) environmental boreholes referenced as BH-23-07 to BH-23-35. The geotechnical boreholes were advanced to approximately 3.7 m below ground

surface (mbgs), and the environmental boreholes were advanced to approximately 0.8 mbgs. Environmental boreholes were advanced for the purposes of soil characterization to support TULLOCH's. supplemental excess soils management investigation. Recommendations with respect to soil disposal and O.Reg. 406/19 Excess Soils Management are not included within the scope of this report and are provided in a separate report issued by TULLOCH.

All boreholes were positioned, and field fit to avoid underground utility conflicts determined through the underground utility locate process. Boreholes were completed under the direction of a TULLOCH geotechnical representative and as-drilled coordinates were taken via a handheld GPS during the investigation. The following table summarizes the borehole investigation.

Table 3-1: Summary of Borehole Information

Borehole No.	Easting (m)	Northing (m)	Depth of Borehole (mbgs)[1]	Comment
BH-23-01	380 787	5 118 351	3.66	Geotechnical Borehole
BH-23-02	380 555	5 118 346	3.66	Geotechnical Borehole
BH-23-03	380 219	5 118 406	3.66	Geotechnical Borehole
BH-23-04	379 910	5 118 481	3.66	Geotechnical Borehole
BH-23-05	379 555	5 118 524	3.66	Geotechnical Borehole
BH-23-06	379 122	5 118 698	3.66	Geotechnical Borehole
BH-23-07	378 954	5 118 726	0.76	Environmental Borehole
BH-23-08	379 038	5 118 707	0.76	Environmental Borehole
BH-23-09	379 138	5 118 690	0.76	Environmental Borehole
BH-23-10	379 195	5 118 674	0.76	Environmental Borehole
BH-23-11	379 270	5 118 612	0.76	Environmental Borehole
BH-23-12	379 339	5 118 584	0.76	Environmental Borehole
BH-23-13	379 386	5 118 571	0.76	Environmental Borehole
BH-23-14	379 466	5 118 556	0.76	Environmental Borehole
BH-23-15	379 596	5 118 515	0.76	Environmental Borehole
BH-23-16	379 665	5 118 500	0.76	Environmental Borehole
BH-23-17	379 736	5 118 504	0.76	Environmental Borehole
BH-23-18	379 804	5 118 501	0.76	Environmental Borehole
BH-23-19	379 877	5 118 488	0.76	Environmental Borehole
BH-23-20	379 975	5 118 465	0.76	Environmental Borehole
BH-23-21	380 037	5 118 451	0.76	Environmental Borehole

Borehole No.	Easting (m)	Northing (m)	Depth of Borehole (mbgs)[1]	Comment
BH-23-22	380 104	5 118 436	0.76	Environmental Borehole
BH-23-23	380 185	5 118 418	0.76	Environmental Borehole
BH-23-24	380 277	5 118 395	0.76	Environmental Borehole
BH-23-25	380 371	5 118 372	0.76	Environmental Borehole
BH-23-26	380 422	5 118 365	0.76	Environmental Borehole
BH-23-27	380 496	5 118 361	0.76	Environmental Borehole
BH-23-28	380 592	5 118 338	0.76	Environmental Borehole
BH-23-29	380 680	5 118 336	0.76	Environmental Borehole
BH-23-30	380 711	5 118 351	0.76	Environmental Borehole
BH-23-31	380 786	5 118 351	0.76	Environmental Borehole
BH-23-32	380 874	5 118 366	0.76	Environmental Borehole
BH-23-33	380 909	5 118 379	0.76	Environmental Borehole
BH-23-34	380 060	5 118 448	0.76	Environmental Borehole
BH-23-35	378 955	5 118 752	0.76	Environmental Borehole

Note(s): [1] meters below ground surface.

Boreholes were advanced using a CME 55 truck-mounted drill rig owned and operated by Landcore Drilling in Chelmsford, Ontario. The geotechnical boreholes were advanced using 200 mm OD (outside diameter) continuous flight hollow stem augers, and the environmental boreholes were advanced using continuous flight solid stem augers. The rig was equipped with standard soil sampling equipment including a full weight automatic hammer.

In the overburden, soil samples were obtained using standard split spoon equipment in conjunction with Standard Penetration Tests (SPT) performed in accordance with ASTM D1586. SPT sampling generally occurred at 0.76 m intervals in the upper approximately 1.5 m of the boreholes, and at 1.5 m intervals thereafter and was conducted using an automatic hammer.

Environmental boreholes were sampled via grab samples taken from the augers, soils were screened using an RKI Eagle 2 Gas Detector and then placed in labelled sealed jars for further testing.

The drilling and soil sampling program was directed by a TULLOCH representative, who logged the drilling operations and identified the soil samples as they were retrieved. Detailed borehole logs for the proposed site can be found in Appendix D.

The recovered soil samples were transported to TULLOCH's CCIL-Certified Laboratory in Sault Ste. Marie for detailed examination and testing. A select number of soil samples were also submitted to Testmark Laboratories in Garson, ON for soil corrosivity analysis. All samples will be stored at the laboratory for three (3) months and then disposed of unless directed otherwise.

4. LABORATORY TESTING PROGRAM

A geotechnical laboratory testing program was performed on representative samples in accordance with ASTM standards. Table 4-1 provides a list of the testing program. Detailed laboratory reports for particle size distribution curves, moisture content, and corrosivity testing can be found in Appendix E.

Table 4-1: Summary of Soil Laboratory Testing Program

Item No.	Test	Number of Tests	ASTM Standard
1	Sieve/Hydrometer Analysis	7	ASTM D422/ D7928
2	Moisture Content	21	ASTM D2216
3	Corrosivity Analysis	2	Various

5. SUBSURFACE CONDITIONS

5.1 General

Subsurface conditions encountered within the boreholes during the geotechnical investigation are summarized below. Detailed borehole and associated laboratory testing reports are provided in Appendix D and E, respectively. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The soil encountered on the project site consisted of the main deposits outlined below and are described as they were encountered from ground surface.

5.1.1 ASPHALT/Surface Treatment

A thin asphaltic surface treatment layer was encountered in all borehole locations. Examination at the borehole locations determined the surficial layer to be a double-layered bituminous surface treatment. The encountered wearing surface thickness was found to consistently be 25 mm across the site at all borehole locations. A visual inspection was conducted during the investigation and found the pavement structure to be in fair to poor condition with alligator, transverse, and longitudinal cracking observed along with past pavement patching throughout the project area.

5.1.2 *Existing Fill / (SW) Gravelly SAND*

An existing road base/subbase fill consisting of a gravelly sand was encountered underlying the asphalt in all borehole locations. The walls of each borehole were scratched, and auger cuttings were examined in the field to determine road base and sub-base material thicknesses below the asphalt. Distinction between the existing road sub-base and subgrade fills was not possible during the investigation as the fill was found to contain variably mixed materials including sands, gravels, and some fines. The material contained fine to coarse grained sand and gravel and trace amounts of non-plastic fines. The material was typically brown in color, non-cohesive, and field moisture observations on retrieved split spoon samples indicated the material was moist. The fill ranged in thickness between 0.6 and 1.4 m.

The SPT 'N' value in this deposit ranged from 10 to 31 blows per 30 cm of sampler advancement in all boreholes indicating a compact to dense material density, typically the material was observed to be compact.

Laboratory testing on representative samples yielded moisture contents ranging from 3% to 7% with an average of 5%.

Gradation testing was conducted on three (3) recovered samples of the existing fill. The laboratory sieve analysis yielded the grain size distributions shown in Table 5-1.

Table 5-1: Grain Size Distribution Summary – Fill

Borehole No.	Sample No.	Size Fraction (%)		
		Gravel	Sand	Silt/Clay
BH-23-01	SS01	21	68	11
BH-23-03	SS01	20	67	13
BH-23-05	SS01	27	62	11

5.1.3 *(SM) SILTY SAND*

A silty sand deposit was encountered in BH-23-02 through BH-23-05, below the existing fill and extended to approximately 1.1 to 2.0 mbgs. The silty sand was found to be non-plastic, dark brown to dark grey in colour with field moisture observations on retrieved split spoon samples indicating the material was moist.

The SPT 'N' value in this deposit ranged from 4 to 21 blows per 30 cm of sampler advancement indicating a material density ranging from loose to compact.

Laboratory testing on representative samples yielded moisture contents ranging from 16% to 19% with an average of 18%. Grain size distribution testing was not performed on samples from within this deposit.

5.1.4 (ML) SILT

A non-plastic silt deposit was encountered between approximately 0.7 and 1.4 mbgs in BH-23-06. The material was found to contain trace organics and exhibited non-cohesive behaviour. Field moisture observations on retrieved split spoon samples indicated the material was moist and grey in colour. An SPT 'N' within the silt material was 10 blows per 30 cm of sampler advancement indicating a compact material density.

Laboratory testing on one (1) representative sample yielded a moisture content of 16%. Gradation testing was not performed on this deposit.

5.1.5 (MH) CLAYEY SILT

A clayey silt deposit was encountered in all boreholes, the starting depth ranged between approximately 1.1 to 2.2 mbgs extending to the termination depth of the boreholes. A shallower deposit was found in BH-23-01, encountered between approximately 0.8 and 1.5 mbgs. The clayey silt was found to contain some to trace fine grained sand, with an increase in sand content in BH-23-01. The clayey silt was light brown to grey in colour and exhibited cohesive and highly plastic behaviour. The SPT 'N' values within the deposit ranged from the sampler being advanced by the weight of the sampling hammer alone to upwards of 26 blows per 30 cm of sampler advancement. The blow counts indicated a very soft to very stiff material consistency. However, it should be noted that the majority of the material was observed to be soft to very soft and often saturated with the free-standing water observed in retrieves samples.

Laboratory testing yielded moisture contents in the deposit ranging from 12% to 43% with an average of 27%.

The grain size distribution testing of four (4) representative samples from this deposit was determined by laboratory sieve analysis which yielded the grain size distribution shown in Table 5-3.

Table 5-2: Grain Size Distribution Summary – Clayey Silt

Borehole No.	Sample No.	Size Fraction (%)			
		Gravel	Sand	Silt	Clay
BH-23-01	SS02	1	9	49	41
BH-23-02	SS02B	0	19	53	28
BH-23-04	SS03B	0	7	56	37
BH-23-06	SS05	0	1	60	39

5.1.6 (SP) SAND

A poorly graded sand deposit was encountered between approximately 1.5 and 2.2 mbgs in BH-23-01. The material was found to be fine to medium grained and exhibited non-cohesive behaviour. Field moisture observations on retrieved split spoon samples indicated the material was moist and brown in colour. An SPT 'N' value of 7 blows per 30 cm of sampler advancement was recorded in the sand indicating a loose material density.

Laboratory testing on a representative sample yielded a moisture content of 12%. Gradation testing was not performed on the sand.

5.2 Groundwater Conditions

Groundwater level measurements were taken down open boreholes upon completion of the drilling. Groundwater was encountered at BH-23-03, BH-23-04, BH-23-05 and BH-23-06 at the conclusion of drilling. Water level readings ranged from 1.83 m to 2.90 mbgs.

It should be noted that groundwater level is subject to seasonal fluctuations with high levels occurring during wet weather conditions in the spring and fall and lower levels during dry weather conditions. As such additional precautions should be taken for groundwater management if necessary. A summary of measured water levels is shown in Table 5-4.

Table 5-3: Water Level Readings Summary

Borehole Location	Water Depth (mbgs)	Soil Type
BH-23-01	N/E[1]	-
BH-23-02	N/E[1]	-
BH-23-03	1.83	Sand
BH-23-04	2.56	Clayey Silt
BH-23-05	2.29	Clayey Silt
BH-23-06	2.90	Clayey Silt

[1]N/E = Not Encountered

6. GEOTECHNICAL RECOMMENDATIONS

6.1 General

The following section will discuss pavement recommendations and construction considerations for the rehabilitation of the investigated section of Riverview Road. This section will provide our interpretation of the available geotechnical data and geotechnical recommendations and it is intended for the guidance of the design engineer. Where comments are made regarding construction, they are provided only to highlight any aspects that could affect the design of the project. Contractors bidding on or undertaking the construction should make their own interpretation of the provided subsurface information with respect to their planned construction methods, equipment selection, scheduling, and the like. A series of proposed rehabilitation options will be provided in the following sections for consideration of the Township of The North Shore.

6.2 Existing Pavement Condition

Existing asphalt/surface treatment was found to be approximately 25 mm thick across all borehole locations. The subgrade conditions consisted of an existing sand fill overlaying native silty sand. During the investigation, granular base and subbase measurement attempts were made, however, due to the variability of existing fill, the distinguishment between base and subbase was not possible at the time of investigation and may not exist beneath the asphalt.

Photographs of the asphalt surface of the road were taken during the investigation on November 2 & 3, 2023, at the borehole locations. Selected representative photos can be found in Appendix C. Visual inspection of the pavement surface noted that it was in poor condition, moderate heaving was observed across the majority of the roadway. Most stretches of paved surfaces were visibly distressed, with frequent raveling, longitudinal and transverse cracking noted throughout. Depressions, cracking and historic patching were also noted throughout the site area. The high level of cracking indicates that the road is nearing the end of its serviceable life and may also indicate poor quality fills below the asphalt surface. The low permeability clayey silt material may also be contributing to poor drainage of the road as ditching was also observed to be poorly defined along the investigated area. The subgrade material was also found to be generally quite soft and fine-grained which would be considered frost susceptible and of poor quality which may also be contributing to the heaves and ruts noticed in the roadway.

Table 6-1 summarizes the road conditions including asphalt, granular road base and groundwater depth encountered at the geotechnical borehole advanced across the site.

Table 6-1: Existing Road Condition Summary Based on Borehole Data

Borehole	Asphalt Thickness (mm)	Existing Road Fill Thickness (mm)	Groundwater Depth (m)[1]
BH-23-01	25	695	N/E[2]
BH-23-02	25	585	N/E[2]
BH-23-03	25	695	1.83
BH-23-04	25	695	2.56
BH-23-05	25	695	2.29
BH-23-06	25	695	2.90

Note(s): [1] Field observation taken upon completion of borehole. Groundwater level from this observation may not be stabilized [2] N/E = Not Encountered.

Gradation testing was performed on representative samples of the existing fill and measured against the OPSS 1010 Granular B Type I gradation envelope. Generally, all samples met the standard with the exception of the fines content which was typically observed to be greater than the 8% allowed per the specification. The tested samples yielded a range of 10.7% to 13.5% which may make the existing fill more frost-susceptible and of reduced quality than newly imported fills. Further comment on the re-use of existing fills is provided in the following sections.

6.3 Pavement Design

The following section will discuss pavement recommendations for the stretch of roadway. Table 6-2 presented below shows the minimum recommended specifications for a flexible asphaltic concrete pavement structure constructed on the native silty sand. Deeper excavations into the clayey silt are not recommended as this layer could easily become disturbed and is considered to be of poor quality.

The Client has not provided TULLOCH with the expected daily traffic volume and TULLOCH understands that there is no available traffic data or any published traffic studies for the project site. As such, pavement design has been conducted with an assumed daily traffic rate in accordance with the Routine (Empirical) Method – Experience-Based Standard Section design method as presented in the Pavement Design and Rehabilitation Manual (PDRM) (MTO 2013) for a pavement structure located in the northeastern region of Ontario with granular fill depths not less than those given for an Annual Average Daily Traffic (AADT) volume ranging from 1000 to 1500. The pavement structure design has been conducted to provide a Granular Base Equivalency (GBE) in accordance with the PDRM and previous experience for similar roadway structures.

A series of options have been provided with respect to potential rehabilitation options for Client consideration. The implementation of geosynthetic reinforcement could be used to reduce the granular fill requirements for the site. In addition, the reuse of the existing granular fill material has been deemed acceptable based on the gradation results of the existing fill as a road sub-base as it generally met the OPSS 1010 Granular B Type 1 Standard. However, the Client should be aware that re-use of the existing road base/sub-base fill may reduce the service life of the road due to a high fines content with respect to the typical gradation windows (>8%). Further discussion on fill re-use can be found in Section 6.3.2.

Given the above, TULLOCH has proposed four (4) potential options for consideration which are summarized below along with key considerations for each option. Each option is also highlighted in Table 6-2 shown below:

Option 1 is the base option which would constitute full road reconstruction, this would involve stripping the road down to the existing silty sand material and reinstating the road with imported granular fill.

- *Advantages:* New fill meeting OPSS standards will provide the most longevity and serviceable life, less concern for existing fills and quality assurance of the material.
- *Disadvantages:* Least economical option, no re-use of existing fill. Deeper excavations may lead to softer subgrade conditions which would necessitate the use of geosynthetic reinforcement.

Option 2 Involves partial reinstatement of the road, with the excavation extending approximately 300 mm into the existing road fill, recompacting the fill subbase and then importing new granular fill above the existing fill.

- *Advantages:* Able to use some of the existing fill, offsetting some negative effects of the existing fill by importing new fill. Reduced cost to full replacement option.
- *Disadvantages:* Still requires imported fill placement, potential increased cost to geosynthetic alternatives, use of existing fill as the majority of road sub-base may shorten the service life of road compared to full reconstruction.

Option 3: This option utilizes a biaxial geogrid on the existing road sub-base material. The geogrid would be placed between the existing fills used as a Granular B subgrade and the Granular A to help strengthen the road base from traffic loading as well as to help mitigate impacts of frost heave from the subgrade.

- *Advantages:* Utilizes existing fill while also helping mitigate issues with respect to potential frost susceptibility, existing sub-base can be re-used utilizing a more economical approach to the road rehabilitation. Likely the most economical option.
- *Disadvantages:* Increased cost of geogrid (likely offset compared to importing new fill), the geogrid may not be able to fully mitigate impacts of fill re-use and as such the road may see a lower service life.

Option 4 includes a geo-grid mixed with a combination of re-used granular sub-base and imported fill. This option allows for less imported material with geosynthetic reinforcement.

- *Advantages:* Geosynthetic reinforcement is used to minimize the amount of imported fill and help reduce the cost of the project. Imported fill can help mitigate the need for reliance on a historic fill with lower quality. Less excavation will also result in less cost.
- *Disadvantages:* Potentially higher cost and disposal requirements for the existing fill.

Table 6-2: Pavement Design Parameters

Pavement Layer	Compaction Requirements	Option 1: New Imported Granular Fill (mm)	Option 2: Partial Reuse of Existing Fill (mm)	Option 3: Partial Reuse of Existing Fill with Geogrid (mm)	Option 4: New Imported Granular Fill with Geogrid (mm)
Double Course Surface Treated (OPSS 304)	Double Course Surface Treated per OPSS 305	Yes	Yes	Yes	Yes
Base Course: Granular "A" (OPSS 1010)	100% Standard Proctor Maximum Dry Density (ASTM-D698)	150	150	150	150
Geogrid[1]	-	-	-	Yes	Yes
Sub-base Course: Granular "B" Type I (OPSS 1010)[1]	100% Standard Proctor Maximum Dry Density (ASTM D698)	450	150	-	250
Sub-Base Course: Reused Existing Granular Fill[2]	100% Standard Proctor Maximum Dry Density (ASTM D698)	-	450	Recompacted	Recompacted
Non-woven Geotextile[3]	-	Yes	Yes	Yes	Yes
Min Total Thickness		650	800	450	350

Note(s): [1] The geogrid should be TBX2500 from Terrafix Geosynthetics Inc. or approved equivalent. [2] It is assumed that the existing sand fill material will be reused as granular subbase. [3] Geotextile should be non-woven LP 8 from Layfield or approved equivalent with the grab tensile strength not less than 800 N and AOS (Apparent Opening Size) not larger than 0.3 mm.

Pavement design cases have been based on an estimated design life of 15 years prior to major rehab or reinstatement assuming adequate maintenance is conducted throughout its design life. Higher maintenance costs may be associated with partial rehab, however, given the loose to very soft nature of the native clayey materials below the silty sand subgrade.

6.3.1 Subgrade Preparation

All topsoil, organics, soft soil, asphalt, and construction debris (if any) must be sub-excavated within the proposed subgrade areas below the pavement structure. The site should be graded to the target subgrade profile as per the final pavement profile and the total pavement thickness. Unless the Client elects to proceed with an option that includes the reuse of existing fills, all road base and sub-base material should be comprised of imported and approved engineered fill materials for this site. Re-use of fill will be discussed further in Section 6.3.2. Given the fine-grained nature of the encountered subgrade, a non-woven geotextile (Layfield LP8 or approved equivalent) should be placed between the native subsoil material (or re-used fill) and any imported fill material to act as a separation medium and to promote drainage.

The exposed subgrade should be inspected and approved by the geotechnical engineer, or their representative during construction to ensure the encountered subgrade conditions are consistent with the design assumptions used to prepare this report. Proof rolling should be carried out as directed by the geotechnical engineer or their representative to spot and delineate soft areas and may not be required where the subgrade soil is deemed very sensitive. If a soft spot/area is identified, it should be sub-excavated and subsequently replaced with compacted engineered fill such as Granular B or as approved by the geotechnical engineer. If deemed necessary by the engineer, the density of the subgrade should be tested and recorded during backfill inspection. The native fine grained silty sand and clayey silt subgrades may easily become disturbed or degraded when exposed to weather or heavy vibration, as such caution should be taken when compacting the initial lift of fill not to leave the subgrade exposed and should be backfilled immediately upon exposure and inspection.

Should the subgrade soils become disturbed during construction or pockets of unstable or unsuitable areas be encountered, TULLOCH can provide recommendations at the time, which may include but not be limited to the following:

- Compaction of the subgrade soil
- Removal of subgrade material and subsequent replacement with engineered fill
- Stabilization with a non-woven geotextile or geogrid

Post compaction settlement of fine-grained soils can be expected, even when placed to compaction specifications. As such, fill material should be installed as far in advance as possible before finishing the parking lot and roadway for best grade integrity.

Imported granular fill material is to be placed in maximum 200 mm thick lifts compacted to minimum 100% SPMDD within ±2% of optimum moisture content.

Where existing fill is to be re-used it should be recompacted in situ to 100% of the materials SPMDD and proof-rolled and certified by a geotechnical engineer prior to placement of imported fills.

Quality control will be of utmost importance when selecting the material. The selection of the material should be done as early in the contract as possible to allow sufficient time for gradation and proctor testing on representative samples to ensure it meets project specifications. This material may also be used for general landscaping purposes where compaction is not critical.

The final subgrade crossfall should be at least 2% to drain and be free of depressions. Grading should be completed to promote positive drainage to existing ditches and as required.

If partial excavation is determined the existing fill should be recompacted to 100% of the material's SPMDD prior to placement of additional fills. Furthermore, the existing fill should be treated as a subgrade, and be inspected, proof-rolled and certified prior to placement of backfill.

6.3.2 Reuse of Existing Granular Fill

Excavated existing granular fills may be re-used assuming sufficient testing and inspection have been conducted to confirm their general conformance with OPSS 1010 standards. It should be mentioned that the existing fill may have a low to moderate frost susceptibility, as the tested samples of existing fill contained higher silt content than would typically be acceptable for an OPSS 1010 Granular B Type I material. While still usable the material will contain greater than 10% fines content causing increased frost susceptibility and decreased strength over time, however, the largely granular fill will likely still be suitable for general re-use given the above understanding and risk associated with the fill. Accordingly, suitable fills may be re-used based on inspection and certification by a qualified geotechnical engineer, or their representative.

Re-used material should be placed in a similar fashion to imported material in lifts not exceeding 200 mm and compacted to 100% of the materials' SPMDD within ± 2% of the material's OMC.

The native silty sand and clayey silt soils on site may be re-used as general landscaping fills but given high fines contents are frost susceptible and should not be used within the pavement structure rehabilitation areas where settlement and/or movement are a concern. The clayey silt material was also noted to have a high water content and will likely require stockpiling prior to re-use.

It should be noted that all excess soils should be disposed of per the appropriate environmental regulations including but not limited to O.Reg. 406/19. It should be noted that comments with respect to excess soils management are excluded from this report and are discussed in a separate document issued by TULLOCH.

6.3.3 Pavement Materials, Placement and Compaction

The asphalt, base and subbase granular fill should be placed and compacted as per the requirement in this section.

6.3.3.1 Double Course Surface Treatment

The binder for the surface treatment should be reviewed and approved by the engineer and should be in accordance with OPSS 304. Two (2) successive treatment passes and rolling shall be completed in accordance with OPSS 304. Testing of the Binder shall be completed in conformance with OPSS 304 and 1103.

6.3.3.2 Base and Sub-base Fill

Table 6-3 below summarizes the specifications regarding base and sub-base fills.

Table 6-3: Requirement for Asphalt, Base and Sub-base Materials

Materials	Notes
Double Course Surface Treatment	- Binder to be selected, and approved by engineer, binder to meet OPSS 1103 standards - Surface treatment to be placed and rolled in accordance with OPSS 304
Base Course: Granular "A" (OPSS 1010)	- 100% Standard Proctor Maximum Dry Density (ASTMD698) at ± 2% of Optimum Moist Content (OMC) - Placement in maximum 200 mm lifts, or as accepted by the engineer in writing
Sub-base Course: Granular "B" Type I, Type II or Approved Fill (OPSS 1010)	- 100% Standard Proctor Maximum Dry Density (ASTMD698) at ± 2% of Optimum Moist Content (OMC) - Placement in maximum 200 mm lifts, or as accepted by the engineer in writing - Granular B Type II may be placed by an approved method spec

6.3.3.3 *Inspection and Testing*

During construction, subgrade inspection and in-situ density tests should be conducted, by the field geotechnical engineer, or their representative, to confirm that the conditions exposed are consistent with those encountered in boreholes and to verify the conformance to the design specifications.

6.3.4 *Horizontal Transition*

Horizontal transition treatment is required where pavement structure changes occur. The following recommendations should be considered:

- The frost tapers for the transition zone between fine-grained native soil and granular fill should be designed at least 10H:1V to mitigate abrupt differential frost heave.
- Horizontal transition from backfill and native soil should follow OPSD 803.010, OPSD 803.030, and OPSD 803.031.
- To ensure a good tie-in from new to old asphalt, the joints along both longitudinal and transverse direction should be designed as per Section 310.07.11 in OPSS 310.

6.3.5 *Pavement Over Underground Utilities*

After installation of underground service, the pavement should be constructed as per the recommended pavement structure. Appropriate frost tapers should be implemented in the backfill geometry for the underground service utilities such as culverts as per the OPSD 803 series (e.g., 803.030 and 803.031).

The backfill should be placed in a maximum 200 mm loose lifts and compacted to minimum 95% SPMDD, except the top 1 m of the pavement subgrade which should be compacted to at least 100%.

6.3.6 *Pavement Drainage*

The surface of the subgrade, subbase and base should be graded with a suitable slope to ensure satisfactory drainage performance.

6.4 Frost Protection

The estimated frost penetration depth at the site is 1.8 m, as such, all servicing shall be situated at least 1.8 m below ground surface to provide adequate soil cover against frost heaving. Alternatively, insulation equivalent to a soil cover can be used to raise the frost line. If shallower embedment is needed, Expanded Polystyrene (EPS) insulation or equivalent can be designed to prevent frost action. A demonstration of a typical methodology can be seen in OPSD 1109.030. Installing insulation does not alter conventional utility line construction practices to an appreciable extent. It should be noted that a wider trench may be required to accommodate frost tapering if backfill soils differ from the surrounding native soils to prevent differential frost heaving and subsequent thaw settlement. A preliminary estimate for cost evaluation can be made assuming that 25 mm of rigid insulation designed for below grade installation is equivalent to approximately 0.3 m soil cover. It should also be noted that as per OPSD 1109.030, the minimum recommended insulation thickness is 50 mm.

If construction is undertaken during the winter months, road subgrade must be protected from freezing.

6.5 Excavation and Groundwater Control

All excavation should be carried out in accordance with Occupational Health and Safety Act (OHSA), Ontario Regulation 213/9, Construction Projects, January 1, 2010, and OPSS 902. Based on the OHSA, the soils are classified as Type 3 soils above the groundwater table and Type 4 soils below the groundwater table. Temporary excavation side slopes in Type 3 soils should remain stable at a slope of 1H:1V. Temporary excavation side slopes in Type 4 soils should remain stable at a slope of 3H:1V. The soft clayey silt material if encountered within the excavation should be treated as a Type 4 material.

As the native materials are of a glacial origin, there is the possibility of encountering boulders and cobbles during excavation that were not identified in the geotechnical investigation for the proposed road rehabilitation. Therefore, the contractor undertaking the work should supply equipment capable of removing such material. Excavation safety and the stability of temporary construction slopes and lateral support systems are the contractor's responsibility.

Groundwater control may be required during construction to maintain dry excavations. The contractor should direct any surface water and runoff generated from the excavation area. The groundwater level was lower than the expected pavement structure of the boreholes during the investigation. However, seasonal variations in the water table should be expected. Pumping from

filtered sumps will likely be sufficient to control groundwater unless deeper excavations are required for such things as servicing where excavation depth extends 0.5 m below the groundwater table, in which case active de-watering may be required. The temporary groundwater control measures for excavation are the contractor's responsibility.

An application under the Environmental Activity Sector Registry (EASR) of the Ministry of the Environmental and Climate Change should be submitted in the event that the dewatering pumping volumes exceed 50,000 L/day.

6.6 Excavated Soil and Trench Backfill

Typical practice in Northern Ontario is to reuse a portion of the in-situ excavated material as fill within utility service trenches, especially where these trenches interrupt travelled sections of a roadway. This is to ensure compatibility with adjacent subgrade soils to minimize differential frost heaving. Maintaining compatibility with adjacent subgrade conditions is crucial to minimize the annual differential frost heaving. This is usually accomplished by backfilling the service trenches with excavated materials. If dissimilar materials are used for trench backfilling, frost tapers should be incorporated in the backfill trench geometry as discussed in Section 6.3.5

The non-organic material from the service trench excavation may be re-used as backfill above the top of the pipe cover material to the underside of the pavement structure subbase materials. Prior to re-use, all fill materials should be inspected and certified by a qualified geotechnical engineer. All re-used materials must be placed in lifts not exceeding 200 mm and be compacted to 95% of the SPMDD within 2% of the optimum moisture content. Subgrade materials within 1.0m of the road base should be compacted to 100% SPMDD.

TULLOCH cautions that any native material below the groundwater level may not meet the above compaction requirements without reworking (drying) prior to placement. If stockpiling of trench excavated material for re-use is required, it is recommended that it be covered to prevent exposure to rain, and it cannot be allowed to freeze. Furthermore, stockpiles should be kept at a safe distance (distance at least equal to the depth of the excavation) away from open excavations. All unsuitable materials (construction rubble, organics, etc.) from the trench excavation must be disposed of off-site in an environmentally compliant method. Any excavated material contaminated with organics must not be re-used as backfill material. It is recommended that the excavated native soils be inspected and certified by a geotechnical engineer prior to re-use.

6.7 Soil Corrosivity

Testing was completed for soil corrosivity and sulphate concentrations on recovered samples from the borehole investigation. The results of the testing are shown below in Table 6-4. Samples were tested at TESTMARK Laboratories based in Garson, Ontario. The detailed results can be found in Appendix E.

Table 6-4: Soil Corrosivity Results

Borehole No. / Sample No.	Depth (m)	Resistivity (Ω cm)	pH	Redox Potential (mV)	Chloride (µg/g)	Sulfide (µg/g)	Sulphate (µg/g)
BH-23-01 SS03	1.83	22900	6.31	320	4.7	<0.3[1]	7.7
BH-23-06 SS04	2.59	12900	6.59	316	9.3	<0.3[1]	17.3

Note(s): [1] Sulfide testing detection limit 0.3 µg/g

The results of the chemical testing were assessed in reference to the AWWA C-105 Standard from ANSI/AWWA Corrosivity Rating System. A score greater than 10 indicates the requirement of corrosion protective measures for buried cast iron alloys. The tested samples analyzed for the boreholes referenced in Table 6-4 above scored a ranking of 1 and 2, respectively, which is below the threshold.

In addition, chloride ions can lead to corrosion of steel. Typically, soils with chloride concentrations greater than 500 µg/g are considered corrosive. As noted in the table, chloride concentrations are less than 500 µg/g in the tested samples. Corrosion protection measures shouldn't be utilized in this area of the site to protect subsurface infrastructure.

The concentration of sulphate indicates the degree of sulphate attack for concrete buried at the site. As shown in the table, the sulphate concentrations are less than 1000 µg/g indicating a low degree of sulphate attack. Type GU Portland Cement should be suitable for use at this site.

7. CLOSURE

This geotechnical report has been prepared by TULLOCH for The Corporation of the Township of The North Shore and their authorized agents for the Riverview Road Rehabilitation Project. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering, for the above-noted location. Classification and identification of soils, and geologic units have been based upon commonly accepted methods employed in professional geotechnical practice. No

warranty or other conditions, expressed or implied, should be understood. Please refer to Appendix F, Notice to Reader, which pertains to this report.

We trust that the information in this report will be sufficient to the project. Should further elaboration be required for any portion of this project, we would be pleased to assist.

Laura Meneghetti
Engineering Technologist

Reviewed By:
Erik Giles, P.Eng.
Geotechnical Engineer/Project Manager

Jackson Mercer, P. Eng
Project Engineer

REFERENCES

Ministry of Transportation, Pavement Design and Rehabilitation Manual – Second Edition, Queen's Printer, 2013

Ministry of Northern Development and Mines, Surficial Geology of Northern Ontario.

Ontario Geological Survey 1991, Quaternary Geology of Ontario, southern sheet. scale 1:1 000 000.

Occupational Health and Safety Act (OHSA), Ontario Regulation 213/9, Construction Projects, January 1, 2010, Part III - Excavations, Section 226.

Canadian Geotechnical Foundation Engineering Design Manual 4th Edition, 2006.

APPENDIX A

SITE LOCATION PLAN

BOREHOLE LOCATION PLAN

NOTES:

1. CO-ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH-23-01 BOREHOLE LOCATION

COORDINATES					
NAME	EASTING	NORTHING	NAME	EASTING	NORTHING
BH-23-35	378 955	5 118 752	BH-23-10	379 195	5 118 674
BH-23-07	378 954	5 118 726	BH-23-11	379 270	5 118 612
BH-23-08	379 038	5 118 707	BH-23-12	379 339	5 118 584
BH-23-06	379 122	5 118 698	BH-23-13	379 386	5 118 571
BH-23-09	379 138	5 118 690	BH-23-14	379 466	5 118 556

PROJECT LOCATION

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-22	LM	ISSUED FOR USE

TULLOCH

DRAWING: BOREHOLE LOCATION PLAN

PROJECT: **RIVERVIEW ROAD REHABILITATION GEOTECHNICAL INVESTIGATION**

DRAWN BY: L. MENEGHETTI	CHECKED BY: E. GILES	PROJECT No.: 23-1168	
DESIGNED BY: L. MENEGHETTI	APPROVED BY: E. GILES	DRAWING No.: 23-1168-001	REVISION No.: 0
SCALE: AS NOTED	DATE: 2024-01-22		

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BOREHOLE LOCATION PLAN

NOTES:

1. CO-ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH-23-01 BOREHOLE LOCATION

COORDINATES

NAME	EASTING	NORTHING
BH-23-05	379 555	5 118 524
BH-23-15	379 596	5 118 515
BH-23-16	379 665	5 118 500
BH-23-17	379 736	5 118 504
BH-23-18	379 804	5 118 501
BH-23-19	379 877	5 118 488

NAME	EASTING	NORTHING
BH-23-04	379 910	5 118 481
BH-23-20	379 975	5 118 465
BH-23-21	380 037	5 118 451
BH-23-34	380 060	5 118 448
BH-23-22	380 104	5 118 436
BH-23-23	380 185	5 118 418
BH-23-03	380 219	5 118 406

PROJECT LOCATION

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-22	LM	ISSUED FOR USE

TULLOCH

DRAWING: BOREHOLE LOCATION PLAN

PROJECT: **RIVERVIEW ROAD REHABILITATION GEOTECHNICAL INVESTIGATION**

DRAWN BY: L. MENEGHETTI	CHECKED BY: E. GILES	PROJECT No.: 23-1168	
DESIGNED BY: L. MENEGHETTI	APPROVED BY: E. GILES	DRAWING No.: 23-1168-002	REVISION No.: 0
SCALE: AS NOTED	DATE: 2024-01-22		

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BOREHOLE LOCATION PLAN

NOTES:

1. CO-ORDINATES ARE IN UTM ZONE 17T (NAD83 CSRS).

LEGEND:

BH-23-01 BOREHOLE LOCATION

COORDINATES					
NAME	EASTING	NORTHING	NAME	EASTING	NORTHING
BH-23-24	380 277	5 118 395	BH-23-29	380 680	5 118 335
BH-23-25	380 371	5 118 372	BH-23-30	380 711	5 118 351
BH-23-26	380 422	5 118 365	BH-23-31	380 786	5 118 351
BH-23-27	380 496	5 118 361	BH-23-01	380 787	5 118 351
BH-23-02	380 555	5 118 346	BH-23-32	380 874	5 118 366
BH-23-28	380 592	5 118 338	BH-23-33	380 909	5 118 379

PROJECT LOCATION

No.	DATE	BY	ISSUES / REVISIONS
0	2024-01-22	LM	ISSUED FOR USE

TULLOCH

DRAWING: BOREHOLE LOCATION PLAN

PROJECT: **RIVERVIEW ROAD REHABILITATION GEOTECHNICAL INVESTIGATION**

DRAWN BY: L. MENEGHETTI	CHECKED BY: E. GILES	PROJECT No.: 23-1168	
DESIGNED BY: L. MENEGHETTI	APPROVED BY: E. GILES	DRAWING No.: 23-1168-003	REVISION No: 0
SCALE: AS NOTED	DATE: 2024-01-22		

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APPENDIX B

TERMINOLOGY

ABBREVIATIONS, TERMINOLOGY AND PRINCIPAL SYMBOLS USED IN REPORT AND BOREHOLE LOGS

BOREHOLES AND TEST PIT LOGS

Soils

AA	Auger Sample	w	Water Content
SS	Split Spoon	wP	Plastic Limit
TO	Tin-walled Tube	wL	Liquid Limit
TP	Thin-walled Piston	V(FV)	Field Vane
WS	Washed Sample	OR	Organic Content
SC	Soil Core	GR	Gravel
BS	Block Sample	SA	Sand
WH	Weight of rods & hammer	SI	Silt
WR	Weight of rods	CL	Clay

Bedrock

TCR	Total Core Recover	VN	Vein
SCR	Solid Core Recovery	CO	Contact
FI	Fracture frequency index	KV	Karstic void
HQ	Rock Core (63.5 mm dia.)	MB	Mechanical Break
NQ	Rock Core (47.6 mm dia.)	PL	Planar
BQ	Rock Core (36.5 mm dia.)	CU	Curved
JN	Joint	UN	Undulating
FLT	Fault	IR	Irregular
SH	Shear	SM	Smooth
K	Slikensided	SR	Slightly Rough
BD	Bedding	R	Rough
FO	Foliation	VR	Very rough

IN SITU SOIL TESTING

Standard Penetration Test (SPT) "N" value. The number of blows required to drive a 51 mm OD split barrel sampler into the soil a distance of 300 mm with a 63.5kg weight free falling a distance of 760 mm after an initial penetration of 150 mm has been achieved.

Dynamic Cone Penetration Test (DCPT) is the number of blows required to drive a cone with a 60 degree apex attached to "A" size drill rods continuously into the soil for each 300 mm penetration with a 63.5 kg weight free falling a distance of 760 mm.

Cone Penetration Test (CPT) is an electronic cone point with a 10 cm base area with a 60 degree apex pushed through the soil at a penetration rate of 2cm/s.

Field Vane Test (FVT) consists of a vane blade, a set of rods and torque measuring apparatus used to determine the undrained shear strength of cohesive soils.

SOIL DESCRIPTIONS

The soil descriptions and classifications are based on an expanded Unified Soil Classification System (USCS). The USCS classifies soils on the basis of engineering properties. The system divides soils into three major categories; coarse grained, fine grained and highly organic soils. The soil is then subdivided based on either gradation or plasticity characteristics. The classification excludes particles larger than 75 mm. To aid in quantifying material amounts by weight within the respective grain size fractions the following terms have been included to expand the USCS:

Soil Classification	
Clay	<0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.075 to 4.75 mm
Gravel	4.751o 75 mm
Cobbles	75 to 200 mm
Boulders	>200 mm

Terminology	Proportion
"trace", sand, etc.	1%to 10%
"some"	10% to 20%
Sandy, Gravelly, etc.	20% to 35%
"and"	>35%
Ex., SAND, SILT, etc.	>35%

Notes:

1. Soil properties, such as strength, gradation, plasticity, structure, etc., dictate the soils engineering behaviour over the grain size fractions;
2. With the exception of soil samples tested for grain size distribution or plasticity, all soil samples have been classified based on visual and tactile observations and is therefore an approximate description.

The following table outlines the qualitative terms used to describe the relative density condition of cohesionless soil:

Cohesionless Soils

Compactness	SPT "N" Value (blows/30cm)
Very Loose	0 to 4
Loose	5 to 10
Compact	11 to 30
Dense	31 to 50
Very Dense	>50

The following table outlines the qualitative terms used to describe the consistency of cohesive soils related to undrained shear strength and SPT, N-Index:

Cohesive Soils

Consistency	Undrained Shear Strength (kPa)	SPT "N" Value (blows/30 cm)
Very Soft	<12.5	< 2
Soft	12.5 to 25	2 to 4
Firm	25 to 50	5 to 8
Stiff	50 to 100	9 to 15
Very Stiff	100 to 200	16 to 30
Hard	> 200	>30

Note: Utilizing the SPT, "N" value to correlate the consistency and undrained shear strength of cohesive soils is very approximate and needs to be used with caution.

Particle Sizes

Constituent	Description	Size (mm)	Size (in)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	< 0.075	< (200)

ROCK CORING

Rock Quality Designation (RQD) is an indirect measure of the number of fractures within a rock mass, Deere et al. (1967). It is the sum of sound pieces of rock core equal to or greater than 100 mm recovered from the core run, divided by the total length of the core run, expressed as a percentage. If the core section is broken due to mechanical or handling, the pieces are fitted together and if 100 mm or greater included in the total sum.

Intact Rock Strength

Intact Strength (Mpa)	Description
< 1	Extremely low strength
1-5	Very low strength
5-25	Low strength
25-50	Medium strength
50-100	High strength
100-250	Very high strength
>250	Extremely high strength

Rock Mass Quality

RQD Classification	RQD Value (%)
Very Poor Quality	<25
Poor Quality	25 to 50
Fair Qualty	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

Rock Mass Weathering

Term	Description
Unweathered (Fresh)	No visible sign of material weathering to discoloration on major discontinuity surfaces.
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity of surfaces. All the rock material may be discolored by weathering and may be somewhat weaker than its fresh condition.
Moderatly Weathered	Less than half the rock material is decomposed and/or disintegrates to soil. Fresh or discolored rock is present either as a continuous frame work of as core stones.
Highly Weathered	More than half the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous frame work or as core stones.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Joint and Foliation Spacing

Description	Spacing
Very Wide	Greater than 3 m
Wide	1 m to 3 m
Moderately Close	0.3 m to 1 m
Close	50 mm to 300 mm
Very Close	Less than 50 mm

Bedding Thickness

Description	Spacing
Very thick	Greater than 2 m
Thick	0.6 m to 2 m
Medium	0.2 m to 0.6 m
Thin	60 mm to 0.2 m
Very thin	20 mm to 60 mm
Laminated	6 to 20 mm
Thinly Laminated	Less than 6 mm

SYMBOLS

General

w_N Natural water content within the soil sample
γ Unit weight
γ' Effective unit weight
γ_D Dry unit weight
γ_{SAT} Saturated unit weight
ρ Density
ρ_s Density of solid particles
ρ_w Density of water
ρ_D Dry density
ρ_{SAT} Saturated density
e Void ratio
n Porosity
S Degree of saturation
E_{50} Fifty percent secant modulus

Consistency

w_L Liquid Limit
w_P Plastric Limit
I_P Plasticity Index
w_S Shrinkage limit
I_L Liquidity index
I_C Consistency index
e_{max} Void ratio in loosest state
e_{min} Void ratio in densest state
I_D Density index (formerly relative density)

Shear Strength

S_u Undrained shear strength parameter (total stress)
c' Effective cohesion intercept
ϕ' Effective friction angle
τ_R Peak shear strength
τ_R Residual shear strength
δ Angle of interface friction
μ Coefficient of friction = tan ϕ'

Consolidation

C_c Compression index (normally consolidated range)
C_r Recompression index (over consolidated range)
m_v Coefficient of volume change
c_v Coefficient of consolidation
T_v Time factor (vertical direction)
U Degree of consolidation
σ'_v Effictive overburden pressure
OCR Overconsolidation ratio

APPENDIX C

SITE PHOTOGRAPH LOG

Photo 1: BH-23-01 during advancement. Photo taken facing east.

Photo 2: BH-23-01 following completion of backfill. Photo taken facing southwest.

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Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

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TITLE
Geotechnical Investigation of BH-23-01 Site Photographs

PROJECT NO	PHASE/TASK	REV	FIGURE
23-1168	**101**		**1**

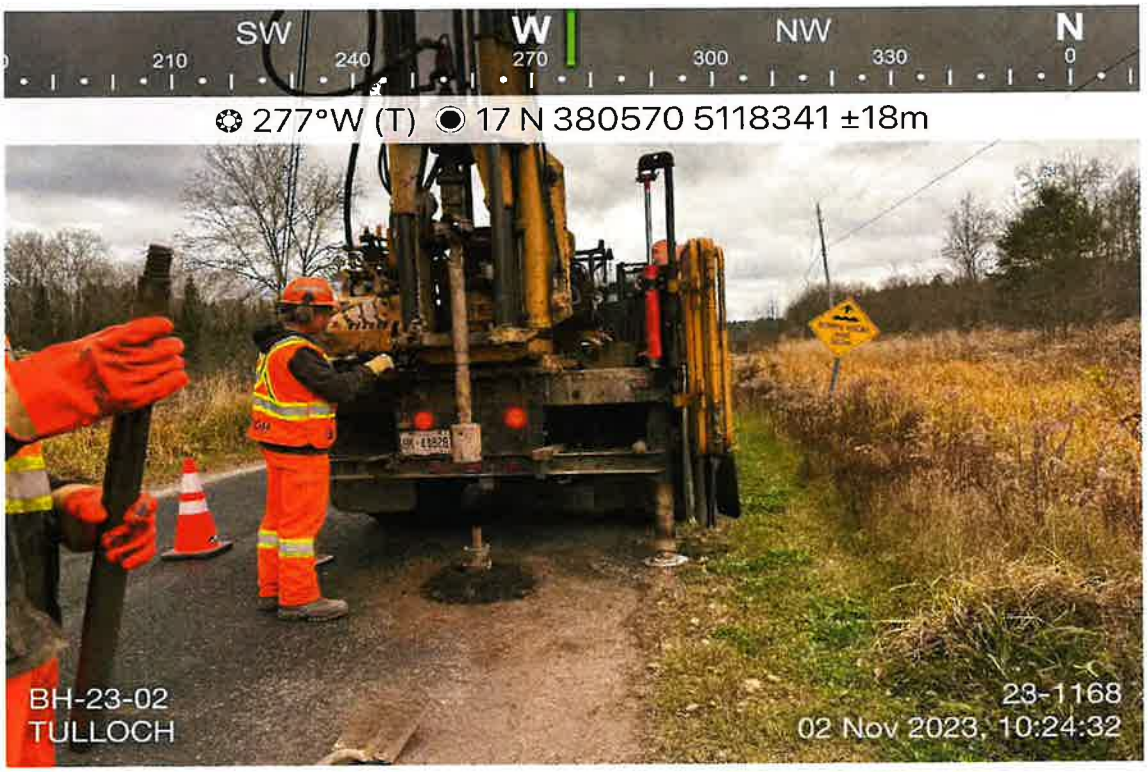

Photo 3: BH-23-02 during advancement. Photo taken facing west.

Photo 4: BH-23-02 following completion of backfill. Photo taken facing southwest.

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TITLE	**Geotechnical Investigation of BH-23-02 Site Photographs**
PROJECT NO	**23-1168**
Phase/Task	**101**
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FIGURE	**2**

Photo 5: BH-23-03 during advancement. Photo taken facing west.

Photo 6: BH-23-03 following completion of backfill. Photo taken facing south.

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TITLE	**Geotechnical Investigation of BH-23-03 Site Photographs**
PROJECT NO	**23-1168**
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FIGURE	**3**

25 mm

Photo 7: BH-23-04 during advancement. Photo taken facing west.

Photo 8: BH-23-04 following completion of backfill. Photo taken facing southeast.

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		TITLE	**Geotechnical Investigation of BH-23-04 Site Photographs**
		PROJECT NO	**23-1168**
		Phase/Task	**101**
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		FIGURE	**4**

Photo 9: BH-23-05 during advancement. Photo taken facing west.

Photo 10: BH-23-05 following completion of backfill. Photo taken facing southeast.

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TITLE	**Geotechnical Investigation of BH-23-05 Site Photographs**
PROJECT NO	**23-1168**
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FIGURE	**5**

Photo 11: BH-23-06 during advancement. Photo taken facing west.

Photo 12: BH-23-06 following completion of backfill. Photo taken facing west.

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PROJECT NO	**23-1168**
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PAGE	**6**

Photo 13: BH-23-07 during advancement. Photo taken facing southeast.

Photo 14: BH-23-07 following completion of backfill. Photo taken facing northwest.

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		APPROVED	EG
		TITLE	**Geotechnical Investigation of BH-23-07 Site Photographs**
		PROJECT NO	**23-1168**
		Phase/Task	**101**
		Rev	
		FIGURE	**7**

Photo 15: BH-23-08 during advancement. Photo taken facing east.

Photo 16: BH-23-08 following completion of backfill. Photo taken facing east.

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TITLE	**Geotechnical Investigation of BH-23-08 Site Photographs**
PROJECT NO	**23-1168**
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Rev	
FIGURE	**8**

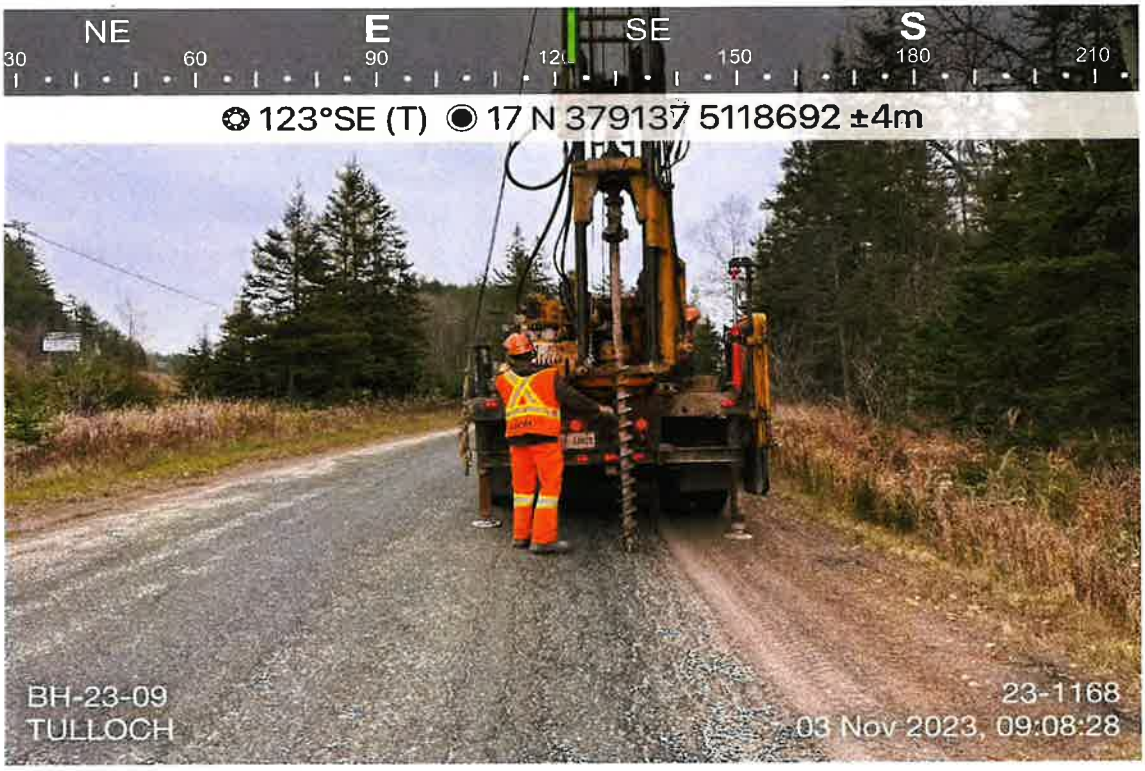

Photo 17: BH-23-09 during advancement. Photo taken facing southeast.

Photo 18: BH-23-09 following completion of backfill. Photo taken facing east.

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Geotechnical Investigation of BH-23-09 Site Photographs

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	**101**		**9**

Photo 19: BH-23-10 during advancement. Photo taken facing southeast.

Photo 20: BH-23-10 following completion of backfill. Photo taken facing southeast.

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PROJECT NO	**23-1168**
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FIGURE	**10**

Photo 21: BH-23-11 during advancement. Photo taken facing east.

Photo 22: BH-23-11 following completion of backfill. Photo taken facing southwest.

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TITLE
Geotechnical Investigation of BH-23-11 Site Photographs

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	**101**		**11**

25 mm

Photo 23: BH-23-12 during advancement. Photo taken facing east.

Photo 24: BH-23-12 following completion of backfill. Photo taken facing southwest.

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		REVIEWED	JM
		APPROVED	EG
		TITLE	**Geotechnical Investigation of BH-23-12 Site Photographs**
		PROJECT NO	**23-1168**
		Phase/Task	**101**
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		FIGURE	**12**

Photo 25: BH-23-13 during advancement. Photo taken facing southeast.

Photo 26: BH-23-13 following completion of backfill. Photo taken facing southwest.

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TITLE	**Geotechnical Investigation of BH-23-13 Site Photographs**
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FIGURE	**13**

Photo 27: BH-23-14 during advancement. Photo taken facing east.

Photo 28: BH-23-14 following completion of backfill. Photo taken facing southwest.

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CONSULTANT: TULLOCH ENGINEERING	YYYY-MM-DD: 2024-01-19	TITLE: **Geotechnical Investigation of BH-23-14 Site Photographs**	
	PREPARED: AU		
	DESIGNED: LM		
	REVIEWED: JM		
	APPROVED: EG	PROJECT NO: **23-1168**	PHASE/TASK: **101**
		REV:	FIGURE: **14**

Photo 29: BH-23-15 during advancement. Photo taken facing southeast.

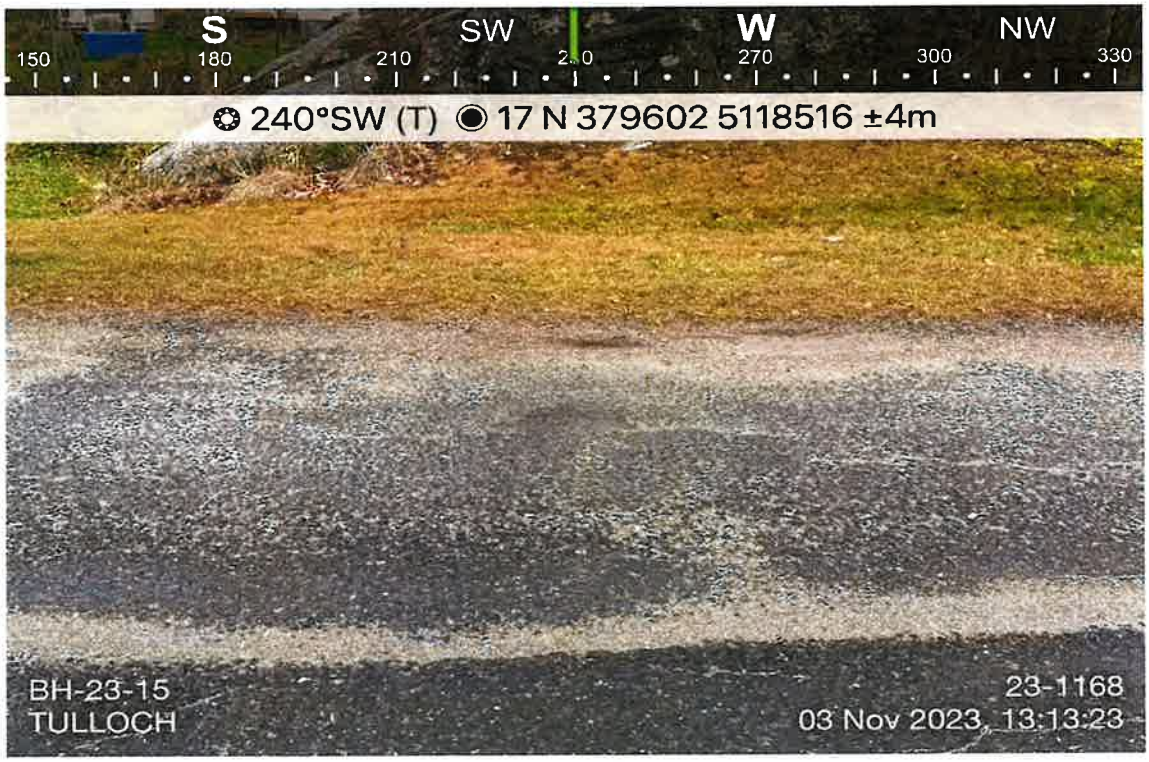

Photo 30: BH-23-15 following completion of backfill. Photo taken facing southwest.

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CONSULTANT	TULLOCH ENGINEERING
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TITLE	**Geotechnical Investigation of BH-23-15 Site Photographs**
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FIGURE	**15**

25 mm

Photo 31: BH-23-16 during advancement. Photo taken facing southeast.

Photo 32: BH-23-16 following completion of backfill. Photo taken facing southwest.

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CONSULTANT: TULLOCH ENGINEERING	YYYY-MM-DD: 2024-01-19	TITLE: **Geotechnical Investigation of BH-23-16 Site Photographs**	
	PREPARED: AU		
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	REVIEWED: JM		
	APPROVED: EG		
		PROJECT NO: **23-1168**	PHASE/TASK: **101**
		REV:	FIGURE: **16**

Photo 33: BH-23-17 during advancement. Photo taken facing east.

Photo 34: BH-23-17 following completion of backfill. Photo taken facing southwest.

CLIENT	PROJECT
Township of The North Shore	Riverview Road Rehabilitation

CONSULTANT			TITLE
TULLOCH ENGINEERING	YYYY-MM-DD	2024-01-19	Geotechnical Investigation of BH-23-17 Site Photographs
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	DESIGNED	LM	
	REVIEWED	JM	
	APPROVED	EG	

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	101		17

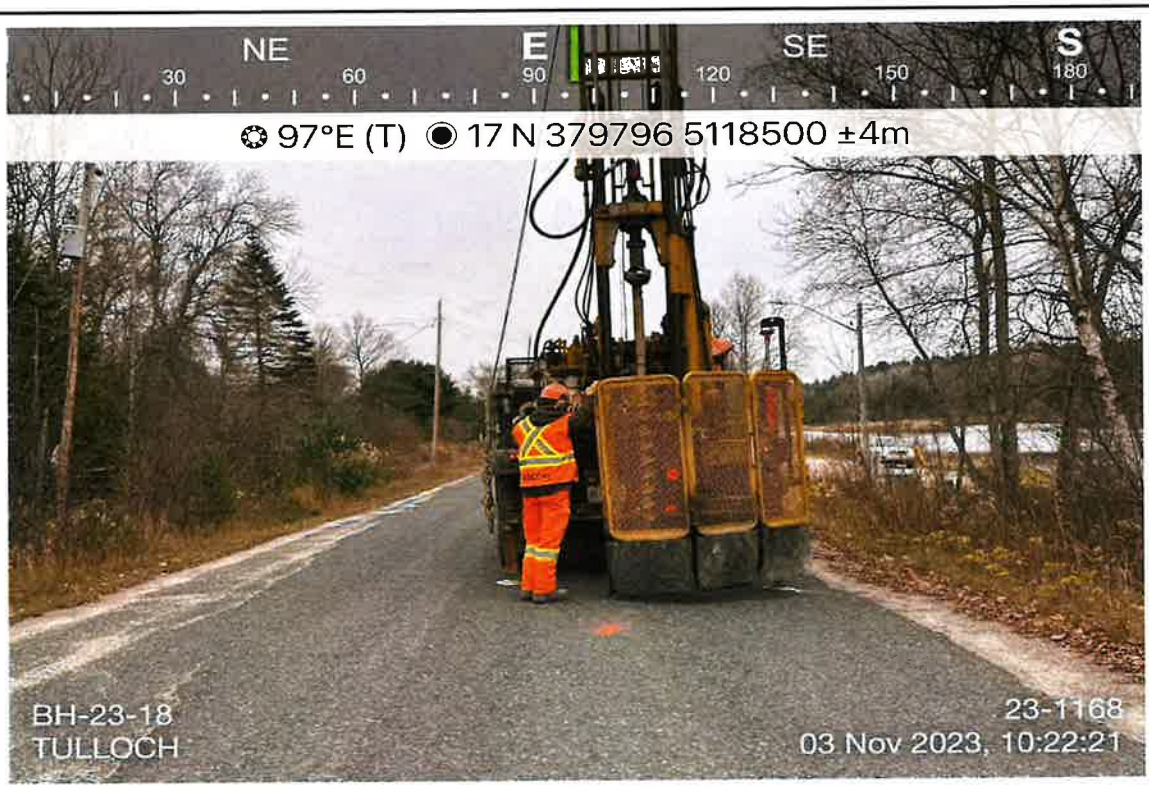

Photo 35: BH-23-18 during advancement. Photo taken facing east.

Photo 36: BH-23-18 following completion of backfill. Photo taken facing southwest.

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TITLE
Geotechnical Investigation of BH-23-18 Site Photographs

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23-1168	**101**		**18**

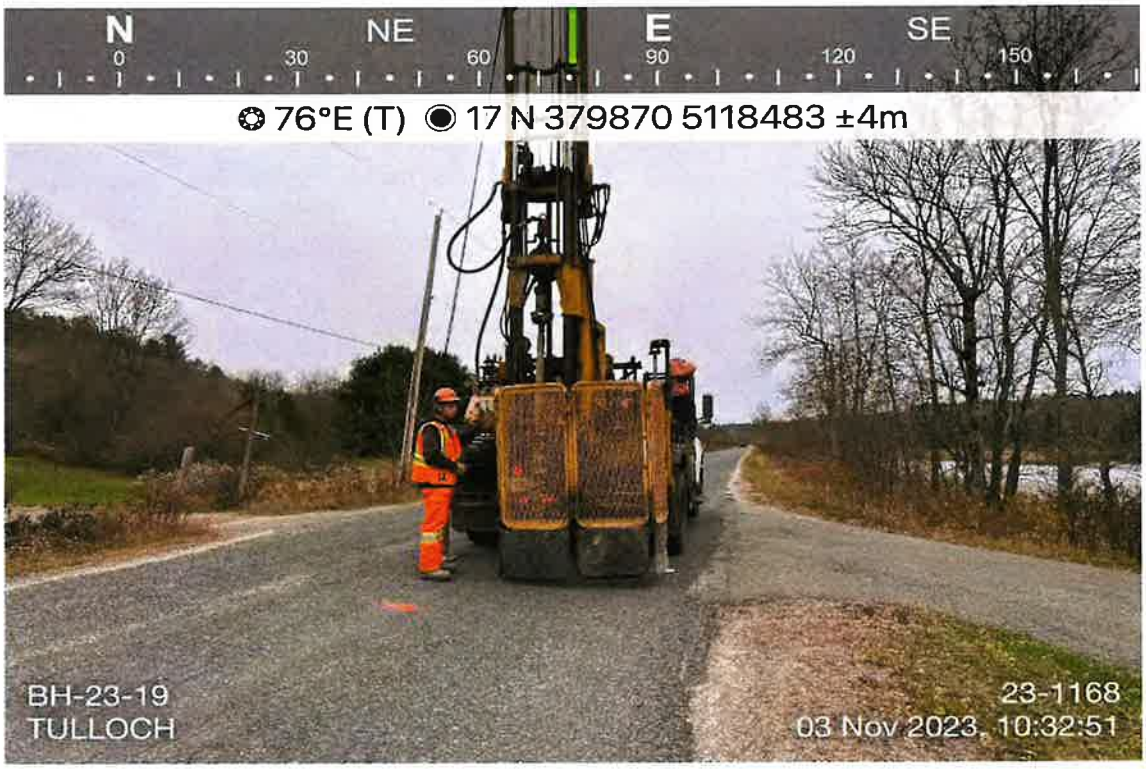

Photo 37: BH-23-19 during advancement. Photo taken facing east.

Photo 38: BH-23-19 following completion of backfill. Photo taken facing south.

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TITLE
Geotechnical Investigation of BH-23-19 Site Photographs

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Photo 39: BH-23-20 during advancement. Photo taken facing southwest.

Photo 40: BH-23-20 following completion of backfill. Photo taken facing southwest.

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TITLE
Geotechnical Investigation of BH-23-20 Site Photographs

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25 mm

Photo 41: BH-23-21 during advancement. Photo taken facing southwest.

Photo 42: BH-23-21 following completion of backfill. Photo taken facing southwest.

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TITLE
Geotechnical Investigation of BH-23-21 Site Photographs

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Photo 43: BH-23-22 during advancement. Photo taken facing east.

Photo 44: BH-23-22 following completion of backfill. Photo taken facing south.

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TITLE
Geotechnical Investigation of BH-23-22 Site Photographs

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Photo 45: BH-23-23 during advancement. Photo taken facing southeast.

Photo 46: BH-23-23 following completion of backfill. Photo taken facing south.

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TITLE	**Geotechnical Investigation of BH-23-23 Site Photographs**
PROJECT NO	**23-1168**
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Rev	
FIGURE	**23**

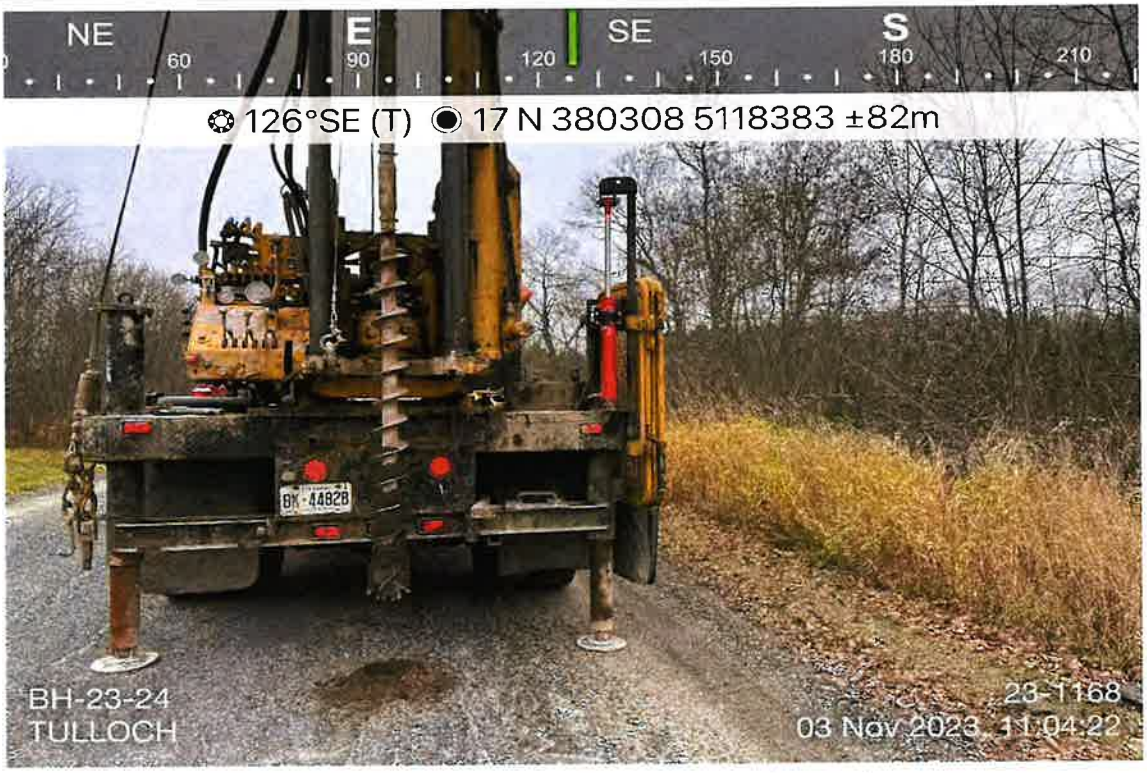

Photo 47: BH-23-24 during advancement. Photo taken facing southeast.

Photo 48: BH-23-24 following completion of backfill. Photo taken facing southwest.

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TITLE	**Geotechnical Investigation of BH-23-24 Site Photographs**
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FIGURE	**24**

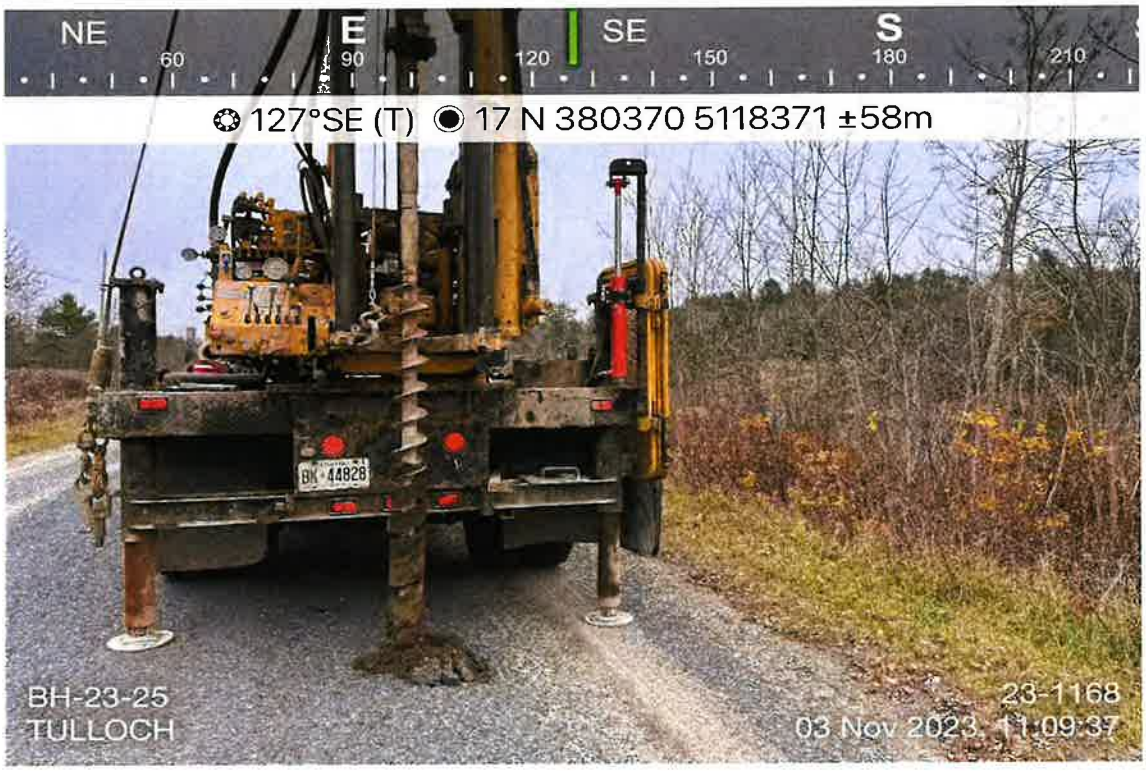

Photo 49: BH-23-25 during advancement. Photo taken facing southeast.

Photo 50: BH-23-25 following completion of backfill. Photo taken facing south.

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CONSULTANT: TULLOCH ENGINEERING	YYYY-MM-DD: 2024-01-19	TITLE: **Geotechnical Investigation of BH-23-25 Site Photographs**	
	PREPARED: AU		
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	REVIEWED: JM		
	APPROVED: EG	PROJECT NO: **23-1168**	Phase/Task: **101**
		Rev:	FIGURE: **25**

Photo 51: BH-23-26 during advancement. Photo taken facing southeast.

Photo 52: BH-23-26 following completion of backfill. Photo taken facing northwest.

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TITLE	**Geotechnical Investigation of BH-23-26 Site Photographs**
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Rev	
FIGURE	**26**

25 mm

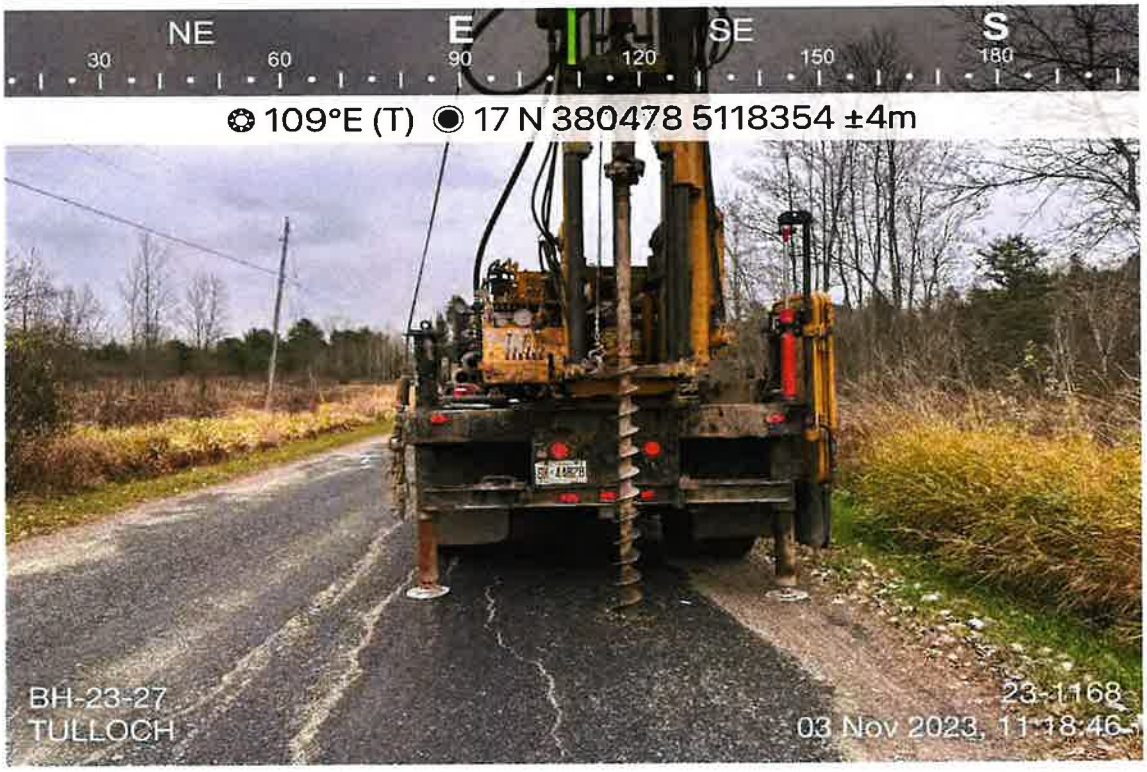

Photo 53: BH-23-27 during advancement. Photo taken facing southeast.

Photo 54: BH-23-27 following completion of backfill. Photo taken facing southwest.

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	PREPARED: AU		
	DESIGNED: LM		
	REVIEWED: JM		
	APPROVED: EG	PROJECT NO: **23-1168**	Phase,Task: **101**
		Rev:	FIGURE: **27**

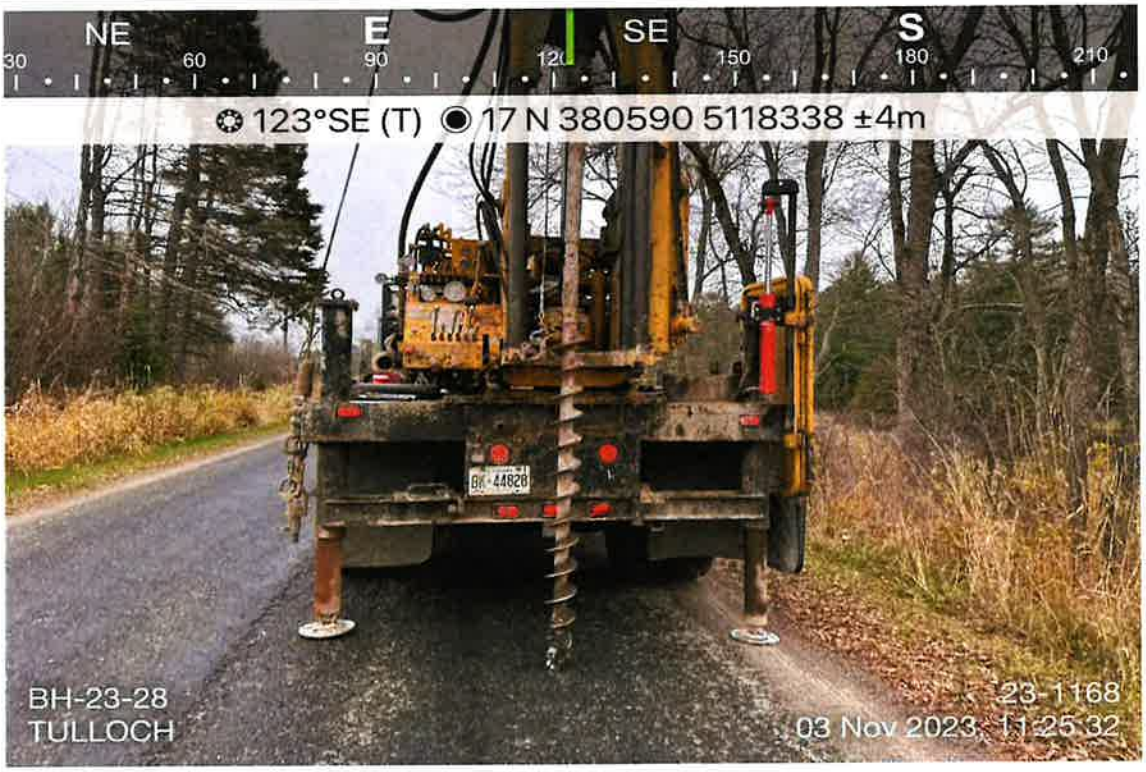

Photo 55: BH-23-28 during advancement. Photo taken facing southeast.

Photo 56: BH-23-28 following completion of backfill. Photo taken facing southwest.

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Township of The North Shore

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Riverview Road Rehabilitation

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TITLE
Geotechnical Investigation of BH-23-28 Site Photographs

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23-1168	101		28

25 mm

Photo 57: BH-23-29 following completion of backfill. Photo taken facing southwest.

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Township of The North Shore

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Riverview Road Rehabilitation

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TITLE
Geotechnical Investigation of BH-23-29 Site Photographs

PROJECT NO	Phase Task	Rev	FIGURE
23-1168	**101**		**29**

Photo 58: BH-23-30 following completion of backfill. Photo taken facing southwest.

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Riverview Road Rehabilitation

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TITLE
Geotechnical Investigation of BH-23-30 Site Photographs

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	**101**		**30**

Photo 59: BH-23-31 following completion of backfill. Photo taken facing southeast.

CLIENT
Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-19
PREPARED	AU
DESIGNED	LM
REVIEWED	JM
APPROVED	EG

TITLE
Geotechnical Investigation of BH-23-31 Site Photographs

PROJECT NO	Phase|Task	Rev	FIGURE
23-1168	**101**		**31**

Photo 60: BH-23-32 following completion of backfill. Photo taken facing east.

CLIENT
Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-19
PREPARED	AU
DESIGNED	LM
REVIEWED	JM
APPROVED	EG

TITLE
Geotechnical Investigation of BH-23-32 Site Photographs

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	**101**		**32**

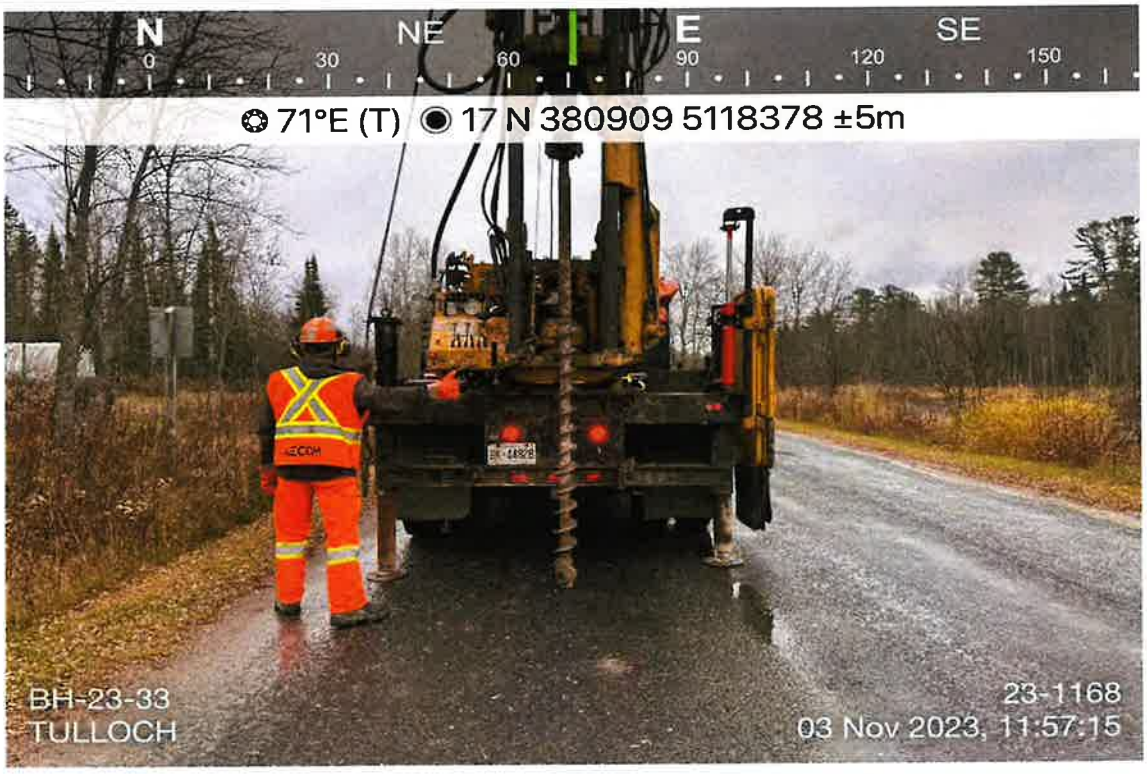

Photo 61: BH-23-33 during advancement. Photo taken facing northeast.

Photo 62: BH-23-33 following completion of backfill. Photo taken facing southwest.

CLIENT
Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-19
PREPARED	AU
DESIGNED	LM
REVIEWED	JM
APPROVED	EG

TITLE
Geotechnical Investigation of BH-23-33 Site Photographs

PROJECT NO.	Phase/Task	Rev	FIGURE
23-1168	**101**		**33**

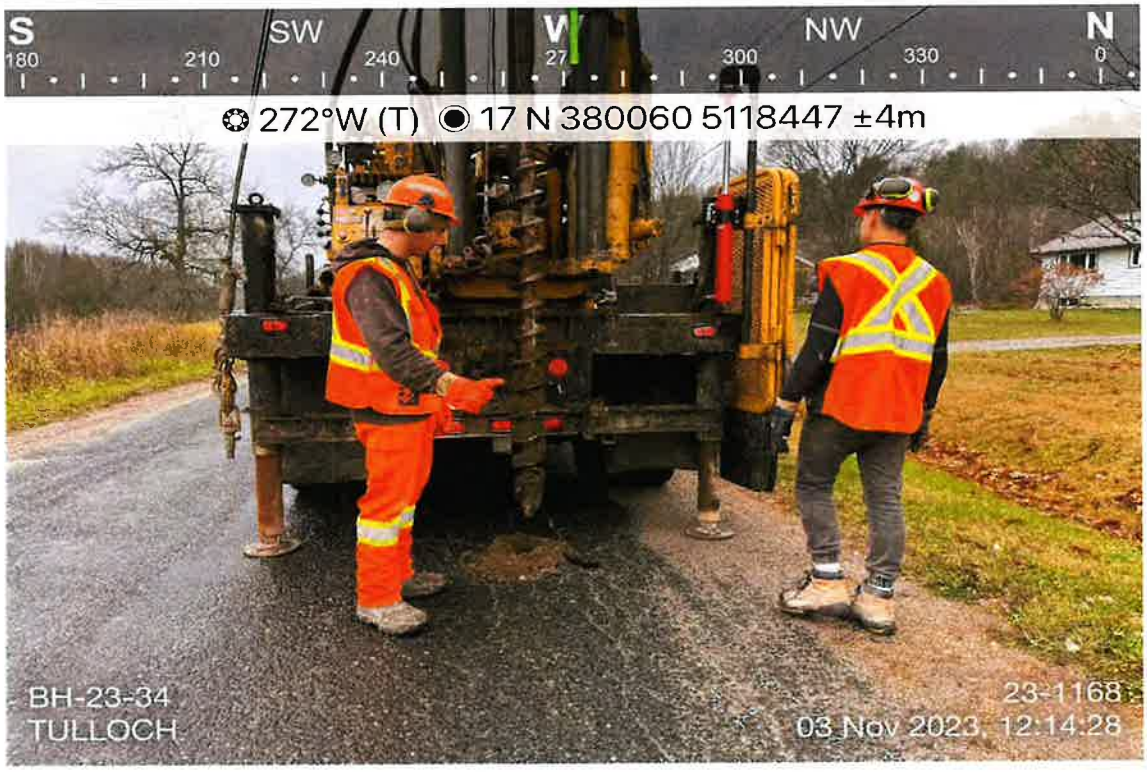

Photo 63: BH-23-34 during advancement. Photo taken facing west.

Photo 64: BH-23-34 following completion of backfill. Photo taken facing northeast.

CLIENT
Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-19
PREPARED	AU
DESIGNED	LM
REVIEWED	JM
APPROVED	EG

TITLE
Geotechnical Investigation of BH-23-34 Site Photographs

PROJECT NO	Phase/Task	Rev	FIGURE
23-1168	101		34

Photo 65: BH-23-35 during advancement. Photo taken facing southeast.

Photo 66 BH-23-35 following completion of backfill. Photo taken facing southeast.

CLIENT
Township of The North Shore

PROJECT
Riverview Road Rehabilitation

CONSULTANT
TULLOCH ENGINEERING

YYYY-MM-DD	2024-01-19
PREPARED	AU
DESIGNED	LM
REVIEWED	JM
APPROVED	EG

TITLE
Geotechnical Investigation of BH-23-35Site Photographs

PROJECT NO	Phase Task	Rev	FIGURE
23-1168	**101**		**35**

APPENDIX D

BOREHOLE LOGS

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-01

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118351 EASTING 380787 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, compact		1	SS	18	29		1		o	HEX = 10 ppm IBL = 0 ppm 21 68 (11)
0.76	(MH) CLAYEY SILT, trace fine grained sand, high plasticity, mottled brown to reddis brown, cohesive, W~PL, firm		2 1	SS AS	5	75				o	HEX = 15 ppm IBL = 0 ppm 1 9 49 41
1.45	(SP) SAND, fine to medium grained, brown, non-cohesive, moist, loose - 50 mm clayey silt seam at approx. 2.06 mbgs		3	SS	7	46		2		o	HEX = 15 ppm IBL = 0 ppm
2.21	(MH) Sandy CLAYEY SILT, fine grained, high plasticity, grey, cohesive, W>PL, very soft		4	SS	WH	50				o	HEX = 0 ppm IBL = 1 ppm
			5	SS	1	71		3			HEX = 10 ppm IBL = 0 ppm
3.66	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 3.43 mbgs upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3 , × 3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-02

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118346 EASTING 380555 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, compact		1A/1B 1	SS AS	21	63					HEX = 0 ppm IBL = 0 ppm
0.61	(SM) SILTY SAND, fine grained, dark grey, non-cohesive, moist, compact		2A/2B	SS	4	71		1			HEX = 0 ppm IBL = 0 ppm HEX = 0 ppm IBL = 0 ppm
1.07	(MH) CLAYEY SILT, some fine grained sand, high plasticity, dark grey, cohesive, W~PL to W> PL, very soft - Color change to grey below approx. 2.3 mbgs - W>PL below approx 2.3 mbgs, free standing water in retrieved sample.		3	SS	1	92		2			HEX = 0 ppm IBL = 0 ppm 0 19 53 28 HEX = 0 ppm IBL = 0 ppm
			4	SS	1	25		3			HEX = 0 ppm IBL = 0 ppm
3.66	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 2.85 mbgs upon removal of augers.		5	SS	1	58					HEX = 0 ppm IBL = 0 ppm

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$ $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-03

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118406 EASTING 380219 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	'N' VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm										
	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, loose		1 1	SS AS	10	54				o	HEX = 0 ppm IBL = 0 ppm 20 67 (13)
0.76	(SM) SILTY SAND, fine grained, non-plastic, light brown, non-cohesive, moist, loose		2	SS	8	50		1		o	HEX = 0 ppm IBL = 0 ppm
1.83	(SP) SAND, fine to medium grained, non-plastic, reddish brown, non-cohesive, moist, loose		3A/3B	SS	9	54	▽	2			HEX = 0 ppm IBL = 0 ppm
2.21	(MH) CLAYEY SILT, some fine grained sand, high plasticity, grey, cohesive, W~PL, firm		4	SS	5	54				o	HEX = 0 ppm IBL = 0 ppm
	- Very soft below approx. 3.1 mbgs		5	SS	1	100		3			HEX = 0 ppm IBL = 0 ppm
3.66	END OF BOREHOLE Note(s): - Groundwater measured at 1.83 mbgs upon completion of drilling with cave-in. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 1.87 mbgs upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3 : × 3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-04

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118481 EASTING 379910 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, compact		1 1	SS AS	27	50			HEX = 0 ppm IBL = 0 ppm
			2	SS	30	63		1	HEX = 0 ppm IBL = 0 ppm
1.45	(SM) SILTY SAND, fine grained, non-plastic, dark grey, non-cohesive, moist, loose		3A/3B	SS	5	58			HEX = 0 ppm IBL = 0 ppm
1.98	(MH) CLAYEY SILT, trace fine grained sand, high plasticity, grey, cohesive, W>PL, firm		4	SS	4	25	▽	2	0 7 56 37 HEX = 0 ppm IBL = 0 ppm
			5	SS	4	75		3	HEX = 0 ppm IBL = 0 ppm
3.66	END OF BOREHOLE Note(s): - Groundwater measured at 2.56 mbgs upon completion of drilling with cave-in. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 2.62 mbgs upon removal of augers.								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 20 40 60

200 + : Numbers refer to Field Vane Over Limit + 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-05

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118524 EASTING 379555 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, compact		1 1	SS AS	31	54				o o	HEX = 0 ppm IBL = 0 ppm 27 62 (11) HEX = 0 ppm IBL = 0 ppm
0.76	(SM) SILTY SAND, fine to coarse grained, trace fine grained gravel, non-plastic, dark brown, non-cohesive, moist, compact		2A/2B	SS	10	63		1			HEX = 0 ppm IBL = 0 ppm
1.07	(MH) CLAYEY SILT, some to trace fine grained sand, high plasticity, light brown, cohesive, W<PL to W >PL, stiff to soft		3	SS	26	38				o	HEX = 0 ppm IBL = 0 ppm
			4	SS	5	8	▽	2			HEX = 0 ppm IBL = 0 ppm
	- Soft below approx. 3.1 mbgs		5 2	SS AS	4	8		3		o	HEX = 0 ppm IBL = 0 ppm HEX = 0 ppm IBL = 0 ppm
3.66	END OF BOREHOLE Note(s): - Groundwater measured at 2.29 mbgs upon completion of drilling with cave-in. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole cave-in at 2.39 mbgs upon removal of augers.										

SHEAR STRENGTH kPa: o POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$ $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-06

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Hollow Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.02 NORTHING 5118698 EASTING 379122 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist, compact		1 1	SS AS	28	58			HEX = 0 ppm IBL = 0 ppm HEX = 0 ppm IBL = 0 ppm
0.76	(ML) SILT, trace organics, non-plastic, grey, non-cohesive, moist, compact		2	SS	10	50		1	HEX = 0 ppm IBL = 0 ppm
1.45	(MH) CLAYEY SILT, trace fine grained sand, high plasticity, light brown, cohesive, W~PL to W>PL, firm - Color change to reddish brown below approx. 2.0 mbgs - W>PL below approx. 2.3 mbgs		3A/3B	SS	4	100		2	HEX = 0 ppm IBL = 0 ppm HEX = 0 ppm IBL = 0 ppm
			4	SS	5	96	▽		
			5	SS	2	100		3	HEX = 0 ppm IBL = 0 ppm 0 1 60 39
3.66	END OF BOREHOLE Note(s): - Groundwater measured at 2.90 mbgs upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.								

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH kPa (20 40 60 80 100)
- ○ POCKET PEN
- + FIELD VANE
- ● QUICK TRIAXIAL
- × LAB VANE

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%) (20 40 60)

200 + : Numbers refer to Field Vane Over Limit

+3 , ×3 : Numbers refer to Sensitivity

○3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-07

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118726 EASTING 378954 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-08

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118707 EASTING 379038 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 50 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-09

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118690 EASTING 379138 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3 , × 3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-10

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118674 EASTING 379195 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 50 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3 , × 3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-11

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118612 EASTING 379270 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm										
	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-12

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118584 EASTING 379339 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-13

1 OF 1 **METRIC**

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118571 EASTING 379386 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit +3 ×3: Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-14

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118556 EASTING 379466 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit $+^3, \times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-15

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118515 EASTING 379596 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3, × 3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-16

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118500 EASTING 379665 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-17

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118504 EASTING 379736 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200_{+}: Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-18

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118501 EASTING 379804 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm										
	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 1 ppm
0.76	END OF BOREHOLE										
	Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH kPa (20 40 60 80 100)

O POCKET PEN + FIELD VANE

● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L

WATER CONTENT (%) (20 40 60)

REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

200^{+} Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$ Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-19

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118488 EASTING 379877 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)			20 40 60 80 100	w_P w w_L	GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

WATER CONTENT (%): 20 40 60

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-20

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118465 EASTING 379975 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200^{+} : Numbers refer to Field Vane Over Limit $+^{3}, \times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-21

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118451 EASTING 380037 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 65 ppm IBL = 5 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

200 + : Numbers refer to Field Vane Over Limit + 3 , × 3 : Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-22

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118436 EASTING 380104 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SM) SILTY SAND, fine to medium grained, non-plastic, dark brown, non-cohesive, moist		1	AS							HEX = 60 ppm IBL = 2 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$ Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-23

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118418 EASTING 380185 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm										
	FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 2 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-24

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118395 EASTING 380277 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 1 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit +3, ×3: Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-25

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118372 EASTING 380371 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SM) SILTY SAND, fine to medium grained, non-plastic, dark brown, non-cohesive, moist		1	AS							HEX = 70 ppm IBL = 2 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}_{\times}{}^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-26

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118365 EASTING 380422 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 0.03	ASPHALT - 25mm										
	FILL - (SM) SILTY SAND, fine to medium grained, non-plastic, dark brown, non-cohesive, moist		1	AS							HEX = 60 ppm IBL = 0 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200 + : Numbers refer to Field Vane Over Limit + 3, × 3: Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-27

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118361 EASTING 380496 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 55 ppm IBL = 1 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3 : × 3 : Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-28

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118338 EASTING 380592 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L) / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SM) SILTY SAND, fine to medium grained, non-plastic, dark brown, non-cohesive, moist		1	AS							HEX = 60 ppm IBL = 1 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200 + : Numbers refer to Field Vane Over Limit +3, ×3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-29

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118335 EASTING 380680 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit +3 ×3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-30

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118351 EASTING 380711 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 2 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200^{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-31

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118351 EASTING 380786 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ POCKET PEN + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwaler may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit +3, ×3 : Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-32

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118366 EASTING 380874 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 65 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

DYNAMIC CONE PENETRATION RESISTANCE PLOT

SHEAR STRENGTH kPa
O POCKET PEN + FIELD VANE
● QUICK TRIAXIAL × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-33

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118379 EASTING 380909 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 1 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit

+ 3, × 3 : Numbers refer to Sensitivity

O 3% STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-34

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118448 EASTING 380060 CHECKED BY JM

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	SAMPLES: RECOVERY RATIO (%)	GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00 / 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 60 ppm IBL = 3 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE

200_{+} : Numbers refer to Field Vane Over Limit $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity $O^{3\%}$ STRAIN AT FAILURE

TULLOCH ENGINEERING

RECORD OF BOREHOLE No BH-23-35

1 OF 1

METRIC

JOB NUMBER 23-1168 LOCATION Riverview Road, Serpent River, Ontario ORIGINATED BY LM

CLIENT Township of The North Shore DATUM Ground Surface BOREHOLE TYPE Solid Stem Auger COMPILED BY LM

DRILLER Landcore DATE 2023.11.03 NORTHING 5118752 EASTING 378955 CHECKED BY JM

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	DEPTH (M)	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O POCKET PEN, + FIELD VANE, ● QUICK TRIAXIAL, X LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	RECOVERY RATIO (%)					GR SA SI CL
~~0.00~~ 0.03	ASPHALT - 25mm FILL - (SW) Gravelly SAND, fine to coarse grained, trace non-plastic fines, brown, non-cohesive, moist,		1	AS							HEX = 50 ppm IBL = 1 ppm
0.76	END OF BOREHOLE Note(s): - Groundwater was not encountered upon completion of drilling. - It should be noted that groundwater may not have stabilized upon completion of the borehole. - Borehole did not cave in upon removal of augers.										

200 + : Numbers refer to Field Vane Over Limit + 3, X 3: Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

APPENDIX E

LABORATORY RESULTS

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CCIL Certified Laboratory for Aggregates and Asphalt Testing
CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories
Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168
DATE SAMPLED: Nov 2/23
PROJECT: Riverview Road Rehabilitation
SOURCE: Borehole
DATE TESTED: Nov 23/23
TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-01 SS01	0.2 to 0.8	433.02	418.79	215.43	14.23	7.0%
	BH-23-01 SS02	0.8 to 1.4	1001.41	834.14	203.60	167.27	26.5%
	BH-23-01 SS03	1.5 to 2.1	129.94	117.76	13.68	12.18	11.7%
	BH-23-01 SS04	2.3 to 2.9	106.38	90.45	13.90	15.93	20.8%

REMARKS:

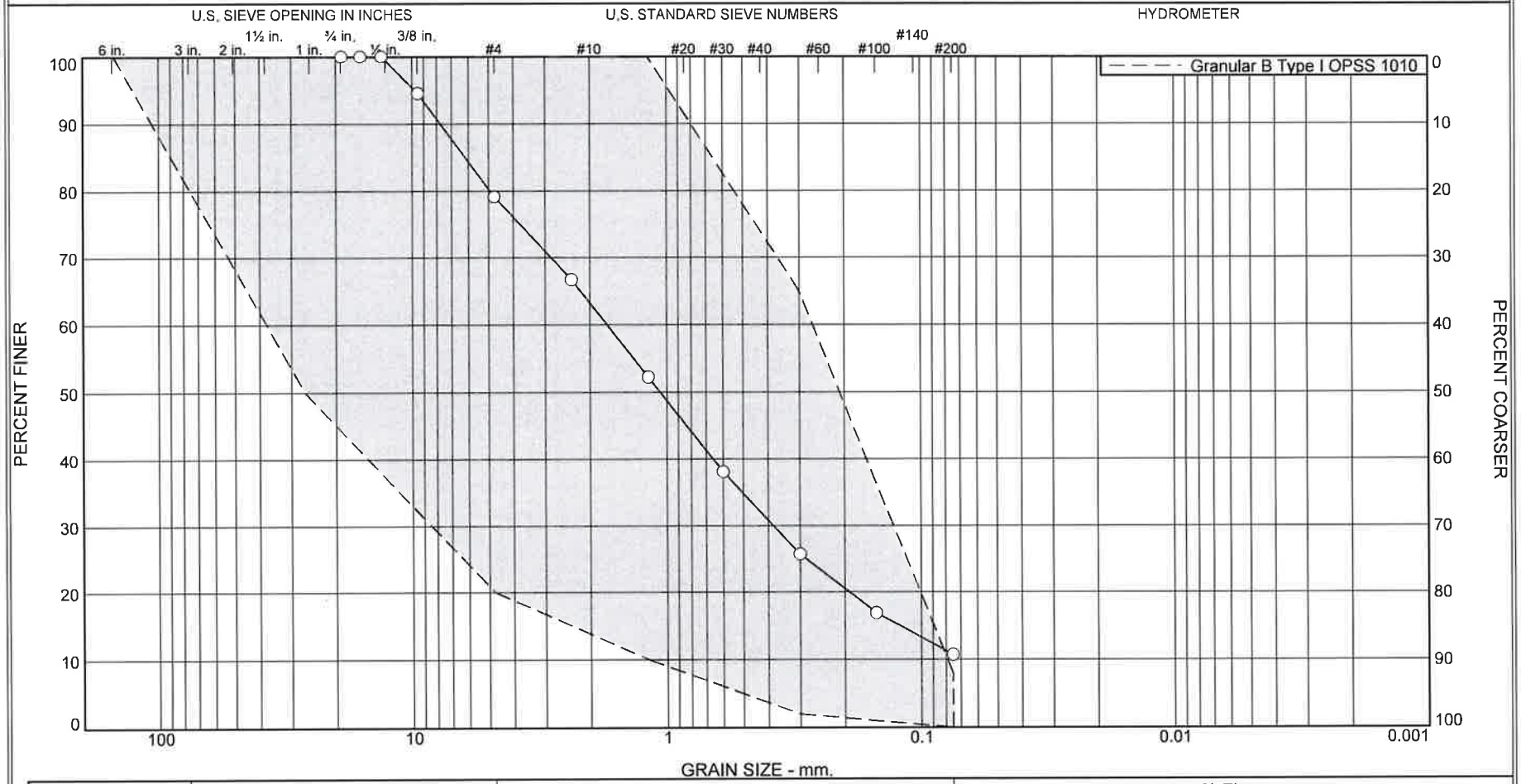
CLIENT: Township of North Shore

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.8	16.0	31.3	21.2	10.7	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-01 Depth: 0.2 - 0.8 m Sample Number: SS01	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-01
Depth: 0.2 - 0.8 m **Sample Number:** SS01
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: S. Campbell **Checked by:** D. Stadnisky
Material specification: Granular B Type I OPSS 1010

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 403.00
Tare Wt. = 215.43
Minus #200 from wash = 7.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
418.79	215.43	19mm	0.00	0.00	100.0	0.0			
		16mm	0.00	0.00	100.0	0.0			
		13.2mm	0.00	0.00	100.0	0.0			
		9.5mm.	11.00	0.00	94.6	5.4			
		#4	31.40	0.00	79.2	20.8	20.0	100.0	
		#8	25.40	0.00	66.7	33.3			
		#16	29.40	0.00	52.2	47.8	10.0	100.0	
		#30	28.70	0.00	38.1	61.9			
		#50	25.20	0.00	25.7	74.3	2.0	65.0	
		#100	18.00	0.00	16.8	83.2			
		#200	12.50	0.00	10.7	89.3	0.0	8.0	+2.7

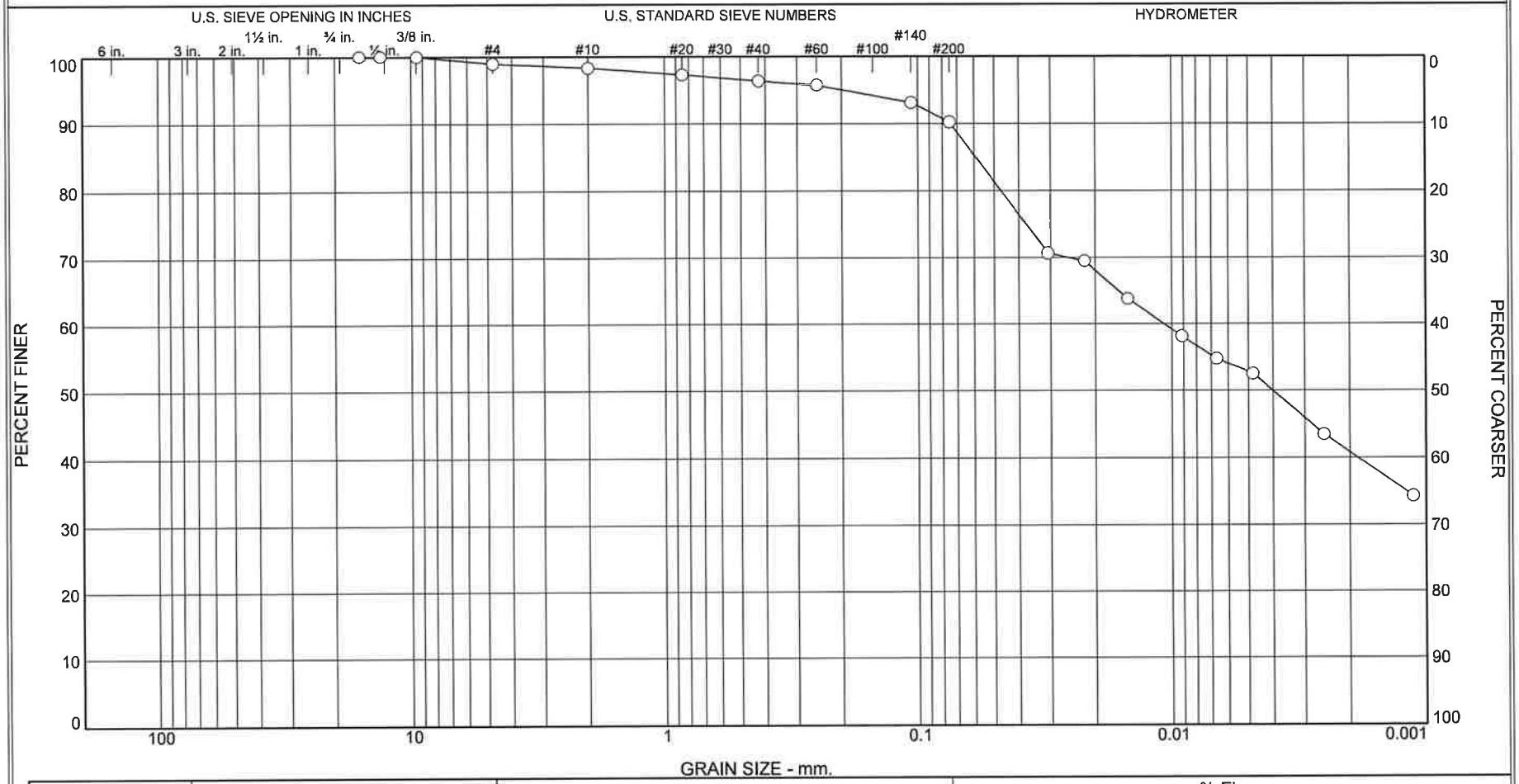
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	20.8	20.8	16.0	31.3	21.2	68.5			10.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1218	0.1920	0.3816	0.6575	1.0618	1.7149	4.9347	6.1765	7.7307	9.7393

Fineness Modulus
3.27

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.0	0.7	1.9	6.2	49.4	40.8

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-01 Depth: 0.8 - 1.4 m Sample Number: SS02	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-01
Depth: 0.8 - 1.4 m **Sample Number:** SS02
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: S. Campbell **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
834.14	203.60	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	0.00	0.00	100.0	0.0
		#4	6.60	0.00	99.0	1.0
		#10	4.00	0.00	98.3	1.7
85.16	0.00	#20	0.90	0.00	97.3	2.7
		#40	0.80	0.00	96.4	3.6
		#60	0.60	0.00	95.7	4.3
		#140	2.20	0.00	93.1	6.9
		#200	2.50	0.00	90.2	9.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 98.3
Weight of hydrometer sample =85.16
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -3.5
Meniscus correction only = 1.0
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	65.0	61.9	0.0131	66.0	5.5	0.0307	70.7	29.3
2.00	21.9	64.0	60.9	0.0131	65.0	5.6	0.0220	69.5	30.5
5.00	21.9	59.0	55.9	0.0131	60.0	6.5	0.0149	63.8	36.2
15.00	22.0	54.0	50.9	0.0131	55.0	7.3	0.0091	58.1	41.9
30.00	22.1	51.0	47.9	0.0131	52.0	7.8	0.0067	54.7	45.3
60.00	22.3	49.0	46.0	0.0131	50.0	8.1	0.0048	52.5	47.5
250.00	22.6	41.0	38.1	0.0130	42.0	9.4	0.0025	43.5	56.5
1440.00	22.6	33.0	30.1	0.0130	34.0	10.7	0.0011	34.3	65.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	0.7	1.9	6.2	8.8	49.4	40.8	90.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0019	0.0040	0.0107	0.0470	0.0591	0.0742	0.1998

Fineness Modulus
0.18

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WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168

DATE SAMPLED: Nov 2/23

PROJECT: Riverview Road Rehabilitation

SOURCE: Borehole

DATE TESTED: Nov 23/23

TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-02 SS01B	0.6 to 0.8	73.79	65.34	13.82	8.45	16.4%
	BH-23-02 SS02A	0.8 to 1.1	105.13	90.44	13.73	14.69	19.2%
	BH-23-02 SS02B	1.1 to 1.4	495.95	412.22	158.81	83.73	33.0%

REMARKS:

CLIENT: Township of North Shore

COPIES TO:

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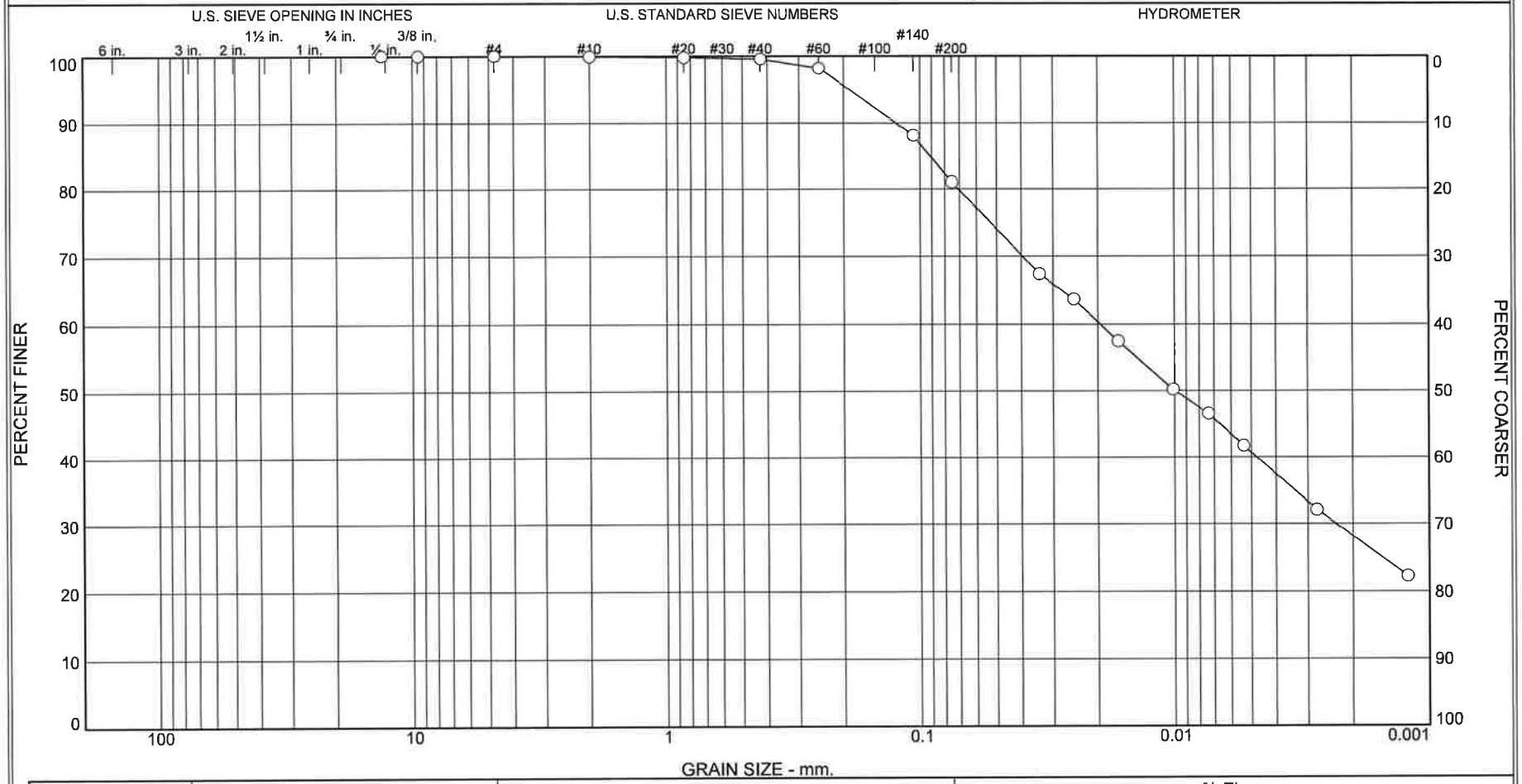
Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.4	18.5	52.8	28.2

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-02 Depth: 1.1 - 1.4 m Sample Number: SS02B	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-02
Depth: 1.1 - 1.4 m **Sample Number:** SS02B
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: S. Campbell **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
412.22	158.81	13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	0.00	0.00	100.0	0.0
		#4	0.00	0.00	100.0	0.0
		#10	0.20	0.00	99.9	0.1
80.39	0.00	#20	0.10	0.00	99.8	0.2
		#40	0.20	0.00	99.5	0.5
		#60	1.10	0.00	98.2	1.8
		#140	8.10	0.00	88.1	11.9
		#200	5.70	0.00	81.0	19.0

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.9
Weight of hydrometer sample =80.39
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -3.5
Meniscus correction only = 1.0
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **- .164 x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.5	58.0	54.8	0.0132	59.0	6.6	0.0340	67.3	32.7
2.00	21.5	55.0	51.8	0.0132	56.0	7.1	0.0249	63.7	36.3
5.00	21.5	50.0	46.8	0.0132	51.0	7.9	0.0166	57.5	42.5
15.00	21.8	44.0	40.9	0.0131	45.0	8.9	0.0101	50.2	49.8
30.00	21.8	41.0	37.9	0.0131	42.0	9.4	0.0074	46.5	53.5
60.00	22.1	37.0	33.9	0.0131	38.0	10.1	0.0054	41.7	58.3
250.00	22.7	29.0	26.1	0.0130	30.0	11.4	0.0028	32.1	67.9
1440.00	22.8	21.0	18.1	0.0130	22.0	12.7	0.0012	22.3	77.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.4	18.5	19.0	52.8	28.2	81.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0023	0.0048	0.0099	0.0196	0.0707	0.0911	0.1245	0.1906

Fineness Modulus
0.10

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CSA/CCIL Certified Technicians

Canadian Council of Independent Laboratories
Conseil canadien des laboratoires indépendants

WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168
DATE SAMPLED: Nov 2/23
PROJECT: Riverview Road Rehabilitation
SOURCE: Borehole
DATE TESTED: Nov 23/23
TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-03 SS01	0.2 to 0.8	710.26	681.72	166.80	28.54	5.5%
	BH-23-03 SS02	0.8 to 1.4	88.91	77.51	16.21	11.4	18.6%
	BH-23-03 SS04	2.3 to 2.9	80.45	68.66	13.77	11.79	21.5%

REMARKS:

CLIENT: Township of North Shore

COPIES TO:

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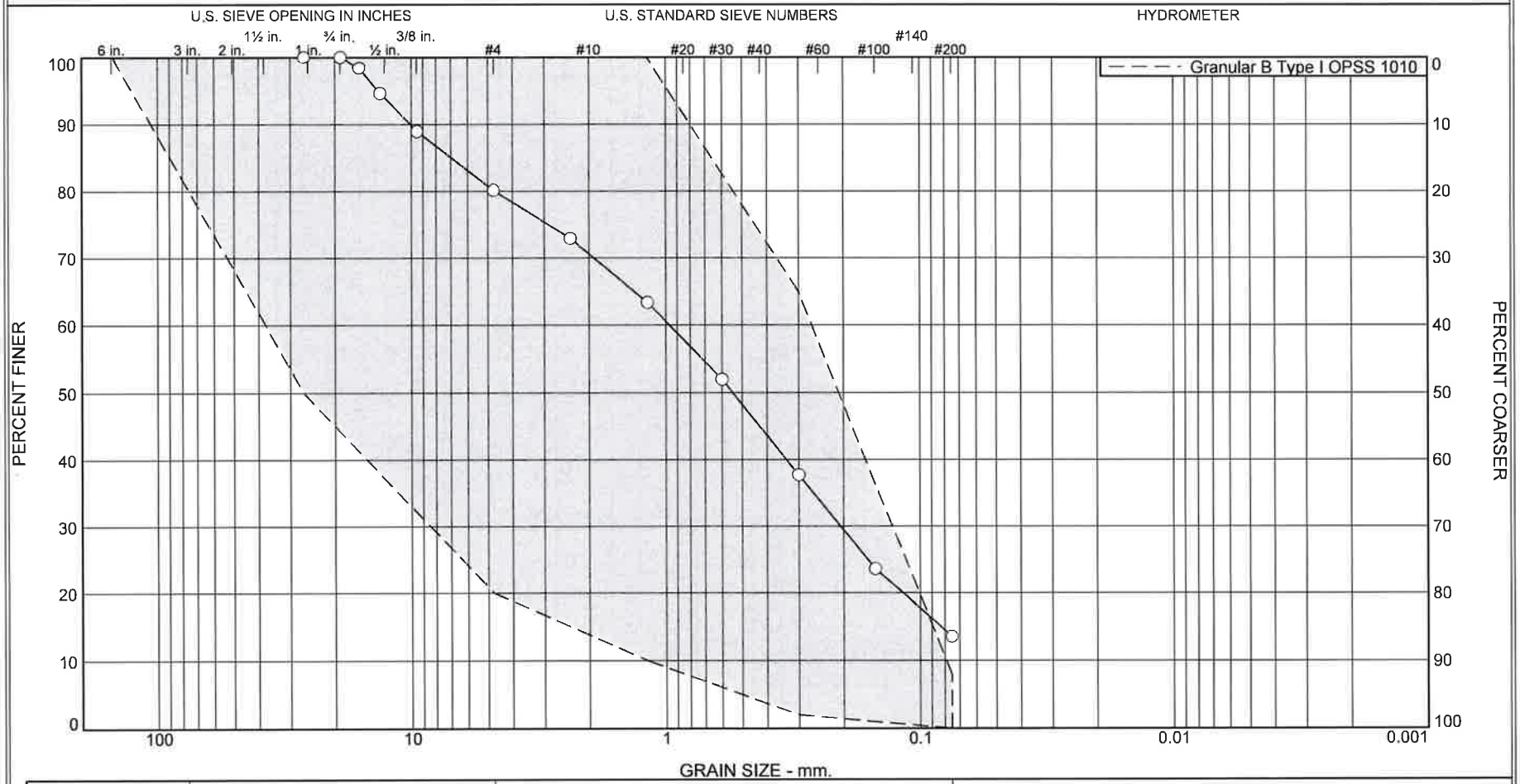
Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.8	9.6	25.7	31.4	13.5	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-03 Depth: 0.2 - 0.8 m Sample Number: SS01	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: H. Logan **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-03
Depth: 0.2 - 0.8 m **Sample Number:** SS01
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: H. Logan **Checked by:** D. Stadnisky
Material specification: Granular B Type I OPSS 1010

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 633.03
Tare Wt. = 166.80
Minus #200 from wash = 9.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
681.72	166.80	26.5mm	0.00	0.00	100.0	0.0	50.0	100.0	
		19mm	0.00	0.00	100.0	0.0			
		16mm	8.30	0.00	98.4	1.6			
		13.2mm	19.50	0.00	94.6	5.4			
		9.5mm.	28.80	0.00	89.0	11.0			
		#4	45.60	0.00	80.2	19.8	20.0	100.0	
		#8	37.50	0.00	72.9	27.1			
		#16	49.00	0.00	63.4	36.6	10.0	100.0	
		#30	58.50	0.00	52.0	48.0			
		#50	73.50	0.00	37.7	62.3	2.0	65.0	
		#100	72.70	0.00	23.6	76.4			
		#200	51.90	0.00	13.5	86.5	0.0	8.0	*+5.5*

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	19.8	19.8	9.6	25.7	31.4	66.7			13.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0830	0.1171	0.2054	0.3351	0.5447	0.9664	4.6810	6.9419	10.0707	13.4702

Fineness Modulus
2.81

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WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168
DATE SAMPLED: Nov 2/23
PROJECT: Riverview Road Rehabilitation
SOURCE: Borehole
DATE TESTED: Nov 23/23
TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-04 AS01	0.2 to 0.8	97.46	94.83	13.78	2.63	3.2%
	BH-23-04 SS03B	2.0 to 2.1	396.21	352.03	218.26	44.18	33.0%
	BH-23-04 SS04	2.3 to 2.9	111.64	95.33	13.92	16.31	20.0%

REMARKS:

CLIENT: Township of North Shore

COPIES TO:

Tulloch Engineering, Materials Testing Laboratory, 71 Black Road - Unit 3, Sault Ste. Marie, ON. Canada P6B 0A3

Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.7	5.1	56.1	37.1

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-04 Depth: 2.0 - 2.1 m Sample Number: SS03B	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-04
Depth: 2.0 - 2.1 m **Sample Number:** SS03B
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: S. Campbell **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
352.03	218.26	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	0.00	0.00	100.0	0.0
		#4	0.00	0.00	100.0	0.0
		#10	0.00	0.00	100.0	0.0
92.03	0.00	#20	0.60	0.00	99.3	0.7
		#40	1.00	0.00	98.3	1.7
		#60	1.00	0.00	97.2	2.8
		#140	2.80	0.00	94.1	5.9
		#200	0.90	0.00	93.2	6.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =92.03
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -3.5
Meniscus correction only = 1.0
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.5	70.0	66.8	0.0132	71.0	4.7	0.0285	71.8	28.2
2.00	21.5	68.0	64.8	0.0132	69.0	5.0	0.0208	69.6	30.4
5.00	21.5	65.0	61.8	0.0132	66.0	5.5	0.0138	66.4	33.6
15.00	21.5	62.0	58.8	0.0132	63.0	6.0	0.0083	63.2	36.8
30.00	21.7	57.0	53.8	0.0132	58.0	6.8	0.0063	57.8	42.2
60.00	22.0	52.0	48.9	0.0131	53.0	7.6	0.0047	52.6	47.4
250.00	22.8	41.0	38.1	0.0130	42.0	9.4	0.0025	41.0	59.0
1440.00	22.7	29.0	26.1	0.0130	30.0	11.4	0.0012	28.0	72.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.7	5.1	6.8	56.1	37.1	93.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0013	0.0024	0.0041	0.0070	0.0413	0.0518	0.0650	0.1354

Fineness Modulus
0.09

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WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168

DATE SAMPLED: Nov 2/23

PROJECT: Riverview Road Rehabilitation

SOURCE: Borehole

DATE TESTED: Nov 23/23

TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-05 SS01	0.2 to 0.8	1111.88	1068.82	221.23	43.06	5.1%
	BH-23-05 AS01	0.2 to 0.8	123.05	117.75	19.55	5.3	5.4%
	BH-23-05 SS02B	1.1 to 1.4	109.36	99.48	18.87	9.88	12.3%
	BH-23-05 SS05	3.0 to 3.7	100.05	87.56	24.22	12.49	19.7%

REMARKS:

CLIENT: Township of North Shore

COPIES TO:

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Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.2	17.4	10.8	26.2	25.1	11.3	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-05 Depth: 0.2 - 0.8 m Sample Number: SS01	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: H. Logan **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-05
Depth: 0.2 - 0.8 m **Sample Number:** SS01
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: H. Logan **Checked by:** D. Stadnisky
Material specification: Granular B Type I OPSS 1010

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 997.80
Tare Wt. = 221.23
Minus #200 from wash = 8.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
1068.82	221.23	37.5mm	0.00	0.00	100.0	0.0			
		26.5mm	33.10	0.00	96.1	3.9	50.0	100.0	
		19mm	45.00	0.00	90.8	9.2			
		16mm	16.50	0.00	88.8	11.2			
		13.2mm	13.00	0.00	87.3	12.7			
		9.5mm.	36.00	0.00	83.1	16.9			
		#4	81.90	0.00	73.4	26.6	20.0	100.0	
		#8	71.20	0.00	65.0	35.0			
		#16	84.50	0.00	55.0	45.0	10.0	100.0	
		#30	101.80	0.00	43.0	57.0			
		#50	113.20	0.00	29.7	70.3	2.0	65.0	
		#100	91.10	0.00	18.9	81.1			
		#200	64.50	0.00	11.3	88.7	0.0	8.0	*+3.3*

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.2	17.4	26.6	10.8	26.2	25.1	62.1			11.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1050	0.1609	0.3054	0.5131	0.8892	1.6676	7.6289	11.0419	17.7269	24.7429

Fineness Modulus
3.41

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WATER CONTENT TEST

TEST METHOD: LS 701 / ASTM C 566 / D 2216

CONTRACT NO: 23-1168
DATE SAMPLED: Nov 2/23
PROJECT: Riverview Road Rehabilitation
SOURCE: Borehole
DATE TESTED: Nov 23/23
TESTED BY: S.Campbell

			Gross (inc. Tare) (g)				
Tare ID	Sample ID	Depth (m)	Wet Weight	Dry Weight	TARE	Mass Lost	Water %
	BH-23-06 SS02	0.8 to 1.4	122.26	108.51	20.08	13.75	15.5%
	BH-23-06 SS03B	2.0 to 2.1	91.79	72.81	28.10	18.98	42.5%
	BH-23-06 SS04	2.3 to 2.9	86.43	68.07	19.73	18.36	38.0%
	BH-23-06 SS05	3.0 to 3.7	1605.12	1323.05	215.78	282.07	25.5%

REMARKS:

CLIENT: Township of North Shore

COPIES TO:

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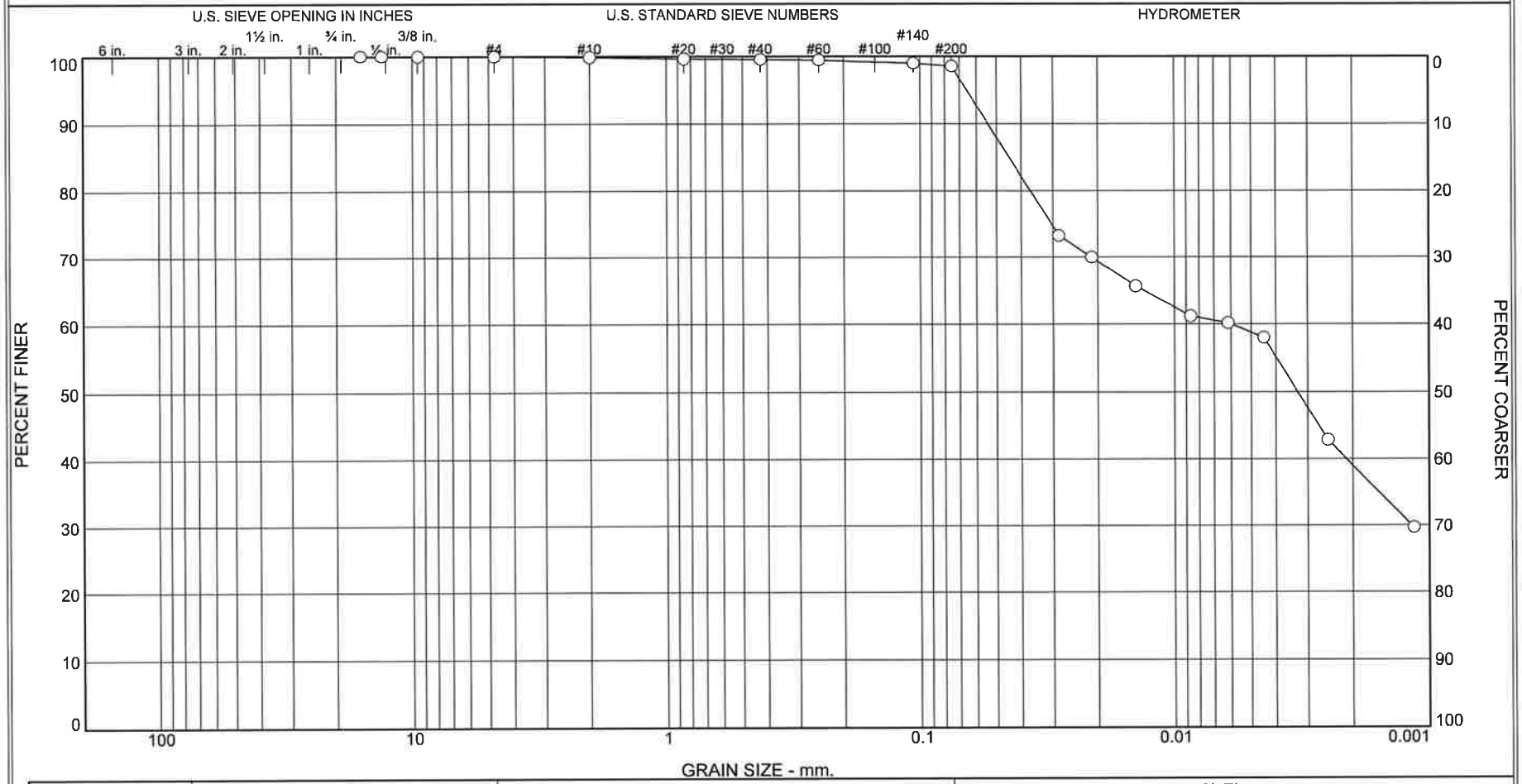
Tel: (705) 949-1457 email: daren.stadnisky@tulloch.ca

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	0.0	0.4	1.0	59.5	39.0

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: BH-23-06 Depth: 3.0 - 3.7 m Sample Number: SS05	Nov 2/23		Nov 23/23

Client Township of North Shore

Project Riverview Road Rehabilitation

Project No. 23-1168 Figure

TULLOCH ENGINEERING
71 Black Road
Unit 8
Sault Ste. Marie, ON
P6B 0A3
T. 705 949.1457
F. 705 949.9606
TF. 866 806.6602
Daren.Stadnisky@TULLOCH.ca

Tested By: S. Campbell **Checked By:** D. Stadnisky

GRAIN SIZE DISTRIBUTION TEST DATA

2023-11-27

Client: Township of North Shore
Project: Riverview Road Rehabilitation
Project Number: 23-1168
Location: BH-23-06
Depth: 3.0 - 3.7 m **Sample Number:** SS05
Date Sampled: Nov 2/23 **Date Tested:** Nov 23/23
Tested by: S. Campbell **Checked by:** D. Stadnisky

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer	Percent Retained
1323.05	215.78	16mm	0.00	0.00	100.0	0.0
		13.2mm	0.00	0.00	100.0	0.0
		9.5mm.	0.00	0.00	100.0	0.0
		#4	0.60	0.00	99.9	0.1
		#10	1.00	0.00	99.9	0.1
90.06	0.00	#20	0.20	0.00	99.6	0.4
		#40	0.10	0.00	99.5	0.5
		#60	0.10	0.00	99.4	0.6
		#140	0.40	0.00	99.0	1.0
		#200	0.40	0.00	98.5	1.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.9
Weight of hydrometer sample =90.06
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -3.5
Meniscus correction only = 1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.6	70.0	66.8	0.0132	71.0	4.7	0.0284	73.3	26.7
2.00	21.6	67.0	63.8	0.0132	68.0	5.1	0.0211	70.0	30.0
5.00	21.6	63.0	59.8	0.0132	64.0	5.8	0.0142	65.6	34.4
15.00	21.6	59.0	55.8	0.0132	60.0	6.5	0.0086	61.2	38.8
30.00	21.9	58.0	54.9	0.0131	59.0	6.6	0.0062	60.2	39.8
60.00	22.0	56.0	52.9	0.0131	57.0	6.9	0.0045	58.0	42.0
250.00	22.6	42.0	39.1	0.0130	43.0	9.2	0.0025	42.8	57.2
1440.00	22.7	30.0	27.1	0.0130	31.0	11.2	0.0011	29.7	70.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.0	0.4	1.0	1.4	59.5	39.0	98.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0012	0.0021	0.0033	0.0060	0.0368	0.0446	0.0541	0.0655

Fineness Modulus
0.02

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CERTIFICATE OF ANALYSIS

Client:	Laura Meneghetti	Work Order Number:	520078
Company:	Tulloch Engineering - Sault Ste. Marie	PO #:	
Address:	71 Black Road Unit 8 Sault Ste. Marie, ON, P6B 0A3	Regulation:	Information not provided
		Project #:	23-1168
Phone/Fax:	(705) 949-1457 / (705) 949-9606	DWS #:	
Email:	Laura.Meneghetti@tulloch.ca	Sampled By:	Laura Meneghetti
Date Order Received:	11/24/2023	Analysis Started:	11/25/2023
Arrival Temperature:	9 C	Analysis Completed:	12/1/2023

WORK ORDER SUMMARY

ANALYSES WERE PERFORMED ON THE FOLLOWING SAMPLES. THE RESULTS RELATE ONLY TO THE ITEMS TESTED.

Sample Description	Lab ID	Matrix	Type	Comments	Date Collected	Time Collected
BH-23-01 SS03	1955615	Soil	None		11/2/2023	
BH-23-06 SS04	1955616	Soil	None		11/2/2023	

METHODS AND INSTRUMENTATION

THE FOLLOWING METHODS WERE USED FOR YOUR SAMPLE(S):

Method	Lab	Description	Reference
Anions Soil (A5)	Garson	Determination of Anions in Soil	Modified from SW846-9056A
Cond Soil (R12)	Garson	Determination of conductivity in soil (1:2)	Modified from EPA SW846-9050A
Moisture (A99)	Garson	Determination of Percent Moisture	In-House
pH Soil (A2.0)	Garson	Determination of soil pH by Ion Selective Electrode	Modified from EPA SW-846 9045D
RedOx - Soil (T06)	Mississauga	Determination of RedOx Potential of Soil	Modified from APHA-2580B
Resistivity Soil (R12)	Garson	Determination of Resistivity in Soil (1:2)	Modified from Carter 18.3
Sulphide/S (R98)	Garson	Determination of Sulphide in Soil	In-House

REPORT COMMENTS

RedOx - Soil (A6): Hold time exceeded for methods BEFORE receipt date/time.

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

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CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

This report has been approved by:

Brad Halvorson, B.Sc.
Laboratory Director

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

WORK ORDER RESULTS

Sample Description	BH - 23 - 01 SS03		BH - 23 - 06 SS04		
Sample Date	11/2/2023 12:00 AM		11/2/2023 12:00 AM		
Lab ID	1955615		1955616		
Anions (Soil)	**Result**	**MDL**	**Result**	**MDL**	**Units**
Bromide	<0.2	0.2	<0.2	0.2	µg/g
Chloride	4.7	0.4	9.3	0.4	µg/g
Fluoride	0.42	0.02	0.21	0.02	µg/g
Nitrate (as N)	0.21	0.06	0.14	0.06	µg/g
Nitrite (as N)	<0.04	0.04	<0.04	0.04	µg/g
Sulphate	7.7	0.4	17.3	0.4	µg/g

Sample Description	BH - 23 - 01 SS03		BH - 23 - 06 SS04		
Sample Date	11/2/2023 12:00 AM		11/2/2023 12:00 AM		
Lab ID	1955615		1955616		
General Chemistry	**Result**	**MDL**	**Result**	**MDL**	**Units**
% Moisture	10.1	0.1	29.4	0.1	%
Conductivity	44	1	77	1	µS/cm
pH	6.31	N/A	6.59	N/A	pH
RedOx (vs. S.H.E.)	320	N/A	316	N/A	mV
Resistivity	22900	N/A	12900	N/A	ohm-cm
Sulphide	<0.3 [<0.3]	0.3	<0.3	0.3	µg/g

7 Margaret Street, Garson, ON, P3L 1E1
Phone: (705) 693-1121 Fax: (705) 693-1124 Web: www.testmark.ca

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

LEGEND

Dates: Dates are formatted as mm/dd/year throughout this report.

MDL: Method detection limit or minimum reporting limit.

[ ]: Results for laboratory replicates are shown in square brackets immediately below the associated sample result for ease of comparison.

Organic Soil Analysis: Data reported for organic analysis in soils samples are corrected for moisture content.

Quality Control: All associated Quality Control data is available on request.

LCL: Lower Control Limit.

UCL: Upper Control Limit.

QAQCID: This is a unique reference to the quality control data set used to generate the reported value. Contact our lab for this information, as it is traceable through our LIMS.

Field Data: Reports containing Field Parameters represent data that has been collected and provided by the client. Testmark is not responsible for the validity of this data which may be used in subsequent calculations.

Sample Condition Deviations: A noted sample condition deviation may affect the validity of the result. Results apply to the sample(s) as received.

ICPMS Dustfall Insoluble: The ICPMS Dustfall Insoluble Portion method analyzes only the particulate matter from the Dustfall Sampler which is retained on the analysis filter during the Dustfall method.

Regulation Comparisons: Disclaimer: Please note that regulation criteria are provided for comparative purposes, however the onus on ensuring the validity of this comparison rests with the client.

CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

QUALITY CONTROL DATA

THIS SECTION REPORTS QC RESULTS ASSOCIATED WITH THE TEST BATCH; THESE ARE NOT YOUR SAMPLE RESULTS.
QAQC details include only values where sufficient sample data allowed measurement.

Anions (Soil)

Blank: LRB-6 (Blank) (6)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	0.2	µg/g	0	<0.2	0.6	20231128.A5C
Chloride	0.4	µg/g	0	<0.4	1.2	20231128.A5C
Fluoride	0.02	µg/g	0	<0.02	0.6	20231128.A5C
Nitrate (as N)	0.2	µg/g	0	<0.2	0.6	20231128.A5C
Nitrite (as N)	0.1	µg/g	0	<0.1	0.18	20231128.A5C
Sulphate	0.4	µg/g	0	<0.4	6	20231128.A5C

Positive Control: LFB-5 (0.1/0.02/0.002 mg/g equiv) (5)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	N/A	%	80	115	120	20231128.A5C
Chloride	N/A	%	80	107	120	20231128.A5C
Fluoride	N/A	%	80	111	120	20231128.A5C
Nitrate (as N)	N/A	%	80	111	120	20231128.A5C
Nitrite (as N)	N/A	%	80	118	120	20231128.A5C
Sulphate	N/A	%	80	102	120	20231128.A5C

Positive Control: LFB-7 (0.2/0.1/0.02 mg/g equiv) (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Bromide	N/A	%	80	91.1	120	20231128.A5C
Chloride	N/A	%	80	102	120	20231128.A5C
Fluoride	N/A	%	80	99.9	120	20231128.A5C
Nitrate (as N)	N/A	%	80	101	120	20231128.A5C
Nitrite (as N)	N/A	%	80	86.6	120	20231128.A5C
Sulphate	N/A	%	80	98.1	120	20231128.A5C

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CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

Sample Replicate: % RPD (8)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Fluoride	N/A	%	0	14.3	35	20231128.A5C
Sulphate	N/A	%	0	4.5	35	20231128.A5C

General Chemistry

Calibration Check: Lab Control Sample (2)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	N/A	%	475	519	525	20231127.TM-G.R12B

Method Blank: Method Blank (1)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	1	µS/cm	0	<1	5	20231127.TM-G.R12B

Positive Control: LCS (pH 8) (2)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
pH	N/A	pH	7.8	7.93	8.2	20231127.TM-G.R2B

Positive Control: LFB-7 (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Sulphide	0.05	µg/g	0.24	0.288	0.36	20231201.R98B

Positive Control: LRB-6 (Blank) (6)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Sulphide	0.02	µg/g	0	<0.02	0.06	20231201.R98B

Positive Control: ORP Control 240 (7)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
RedOx (vs. S.H.E.)	N/A	mV	220	243	260	20231130.TM-M.A6B

Sample Replicate: % RPD (3)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
pH	N/A	pH	0	0.05	0.3	20231127.TM-G.R2B

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CERTIFICATE OF ANALYSIS

Tulloch Engineering - Sault Ste. Marie

Work Order Number: 520078

Sample Replicate: % RPD (8)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
Conductivity	N/A	%	0	12.3	10	20231127.TM-G.R12B

Sample Replicate: % RPD (9)

Parameter	MDL	Units	LCL	Result	UCL	QAQCID
RedOx (vs. S.H.E.)	N/A	%	0	0	10	20231130.TM-M.A6B

THIS INDEX SHOWS HOW YOUR SAMPLES ARE ASSOCIATED TO THE CONTROLS INCLUDED IN THE IDENTIFIED BATCHES.

Sample Description	Lab ID	Method	QAQCID	Prep QAQCID
BH - 23 - 01 SS03	1955615	Anions Soil (A5)	20231128.A5C	
BH - 23 - 01 SS03	1955615	Cond Soil (R12)	20231127.TM-G.R12B	
BH - 23 - 01 SS03	1955615	Moisture (A99)	20231125.TM-G.A99B	
BH - 23 - 01 SS03	1955615	pH Soil (A2.0)	20231127.TM-G.R2B	
BH - 23 - 01 SS03	1955615	RedOx - Soil (T06)	20231130.TM-M.A6B	
BH - 23 - 01 SS03	1955615	Resistivity Soil (R12)	20231129.TM-G.R12B	
BH - 23 - 01 SS03	1955615	Sulphide/S (R98)	20231201.R98B	
BH - 23 - 01 SS03	1955615r	Sulphide/S (R98)	20231201.R98B	
BH - 23 - 06 SS04	1955616	Anions Soil (A5)	20231128.A5C	
BH - 23 - 06 SS04	1955616	Cond Soil (R12)	20231127.TM-G.R12B	
BH - 23 - 06 SS04	1955616	Moisture (A99)	20231125.TM-G.A99B	
BH - 23 - 06 SS04	1955616	pH Soil (A2.0)	20231127.TM-G.R2B	
BH - 23 - 06 SS04	1955616	RedOx - Soil (T06)	20231130.TM-M.A6B	
BH - 23 - 06 SS04	1955616	Resistivity Soil (R12)	20231129.TM-G.R12B	
BH - 23 - 06 SS04	1955616	Sulphide/S (R98)	20231201.R98B	

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APPENDIX F

NOTICE TO READER

NOTICE TO READER

This Report has been prepared by TULLOCH Engineering Inc. ('TULLOCH') for the sole and exclusive use of Township of The North Shore (the 'Client') to support proposed rehabilitation of Riverview Road, between Highway 17 and Handi Spot Road in Blind River, Ontario. (the 'Site'). The Report shall not be used for any other purpose, or provided to, relied upon, or used by any third party without the express written consent of TULLOCH.

A limited number of boreholes were advanced at the Site; and as such, the information collected and presented herein applies to the borehole locations only. The subsurface conditions between boreholes can change and accordingly, any use of the data contained in this Report should take into consideration the nature of the materials and potential variation between boreholes.

This Report contains opinions, conclusions and recommendations made by TULLOCH using professional judgment and reasonable care for the purpose of foundation design for the Development. Use of or reliance on this report by the Client is subject to the following conditions:

a) the report being read in the context of and subject to the terms of the Engineering Services Agreement for the Work, including any methodologies, procedures, techniques, assumptions and other relevant terms or conditions specified or agreed therein.
b) the report being read in its entirety. TULLOCH is not responsible for the use of portions of the report without reference to the entire report.
c) the conditions of the site may change over time or may have already changed due to natural forces or human intervention, and TULLOCH takes no responsibility for the impact that such changes may have on the accuracy or validity of the observations, conclusions and recommendations set out in this report.
d) the classification of soils and rocks in this report is based on commonly accepted methods. However, the classification of geologic materials and the boundaries between subsurface layers involves judgment. Boundaries between different soils layers may also be transitional rather than abrupt. TULLOCH does not warrant or guarantee the exactness of these descriptions and boundaries.
e) the subsurface conditions must be verified by a qualified geotechnical engineer during construction to ensure that the borehole data presented herein is representative of the actual site conditions so that the design recommendations contained herein remain valid; and
f) the report is based on information made available to TULLOCH by the Client or by certain third parties; and unless stated otherwise in the Agreement, TULLOCH has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith.

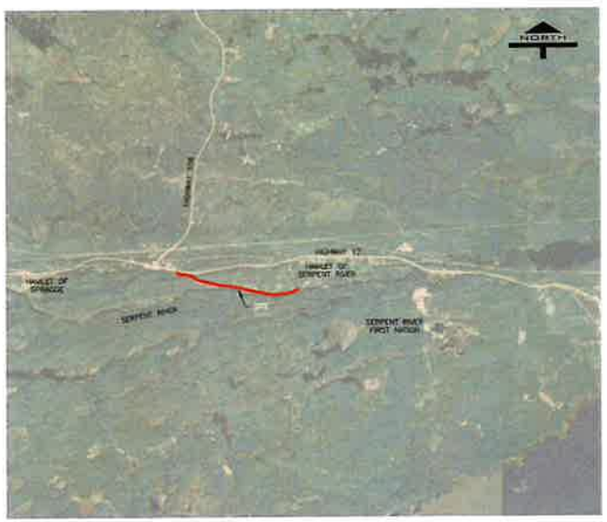
This report has been prepared with the degree of care, skill and diligence normally provided by engineers in the performance of comparable services for projects of similar nature. The scope of this report includes foundation engineering design only and it specifically excludes investigation, detection, prevention and assessment of the presence of subsurface contaminants. No conclusions or inferences should be drawn regarding contamination at the site including but not limited to molds, fungi, spores, bacteria, viruses, soil gases such as Radon, PCBs, petroleum hydrocarbons, inorganic and volatile organic compounds, polycyclic aromatic hydrocarbons and or any by-products thereof.

PRELIMINARY
NOT FOR CONSTRUCTION
MARCH 4, 2024

TOWNSHIP OF THE NORTH SHORE

RIVERVIEW ROAD REHABILITATION

CONTRACT NO. XXXXX



KEY PLAN

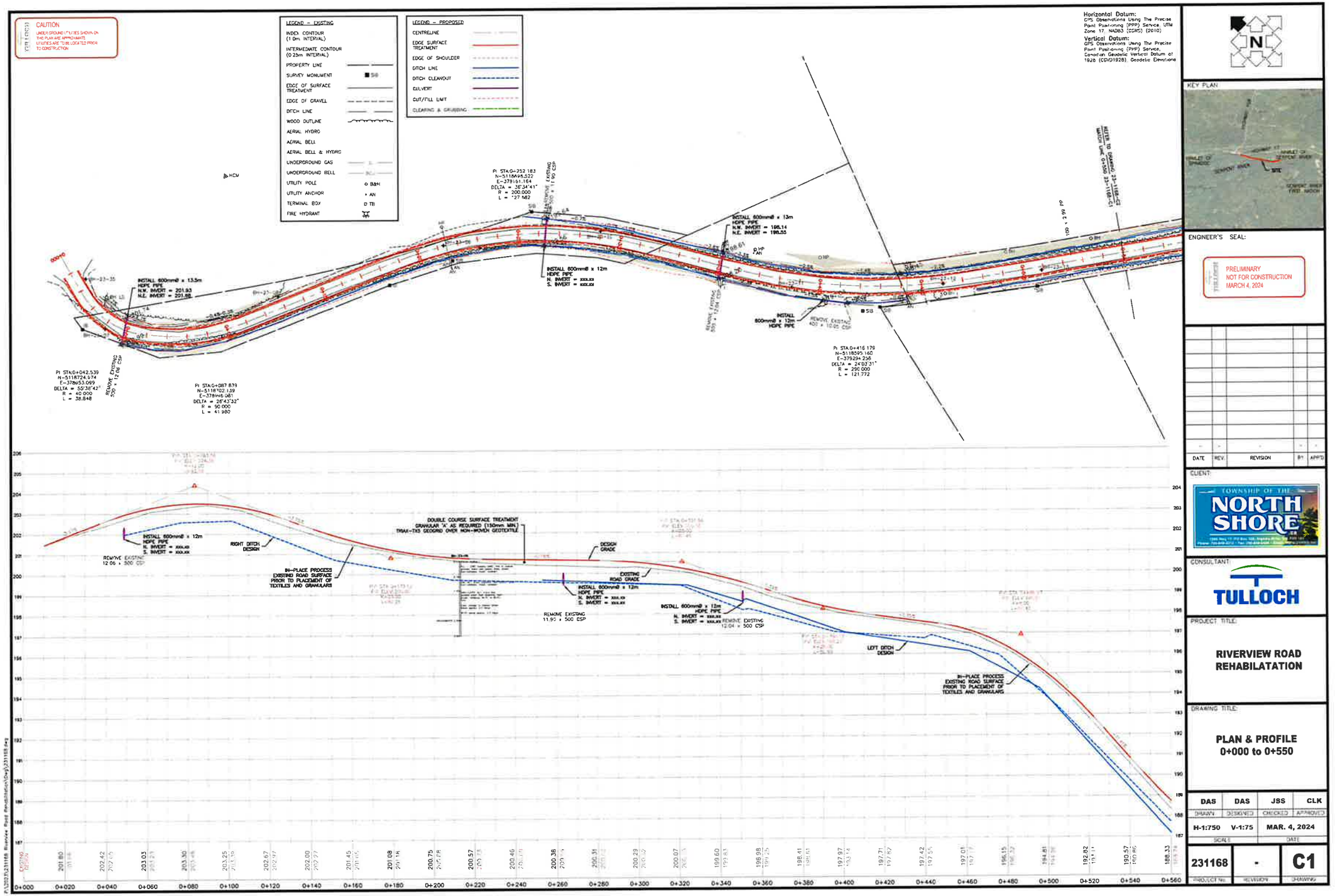
LIST OF DRAWINGS

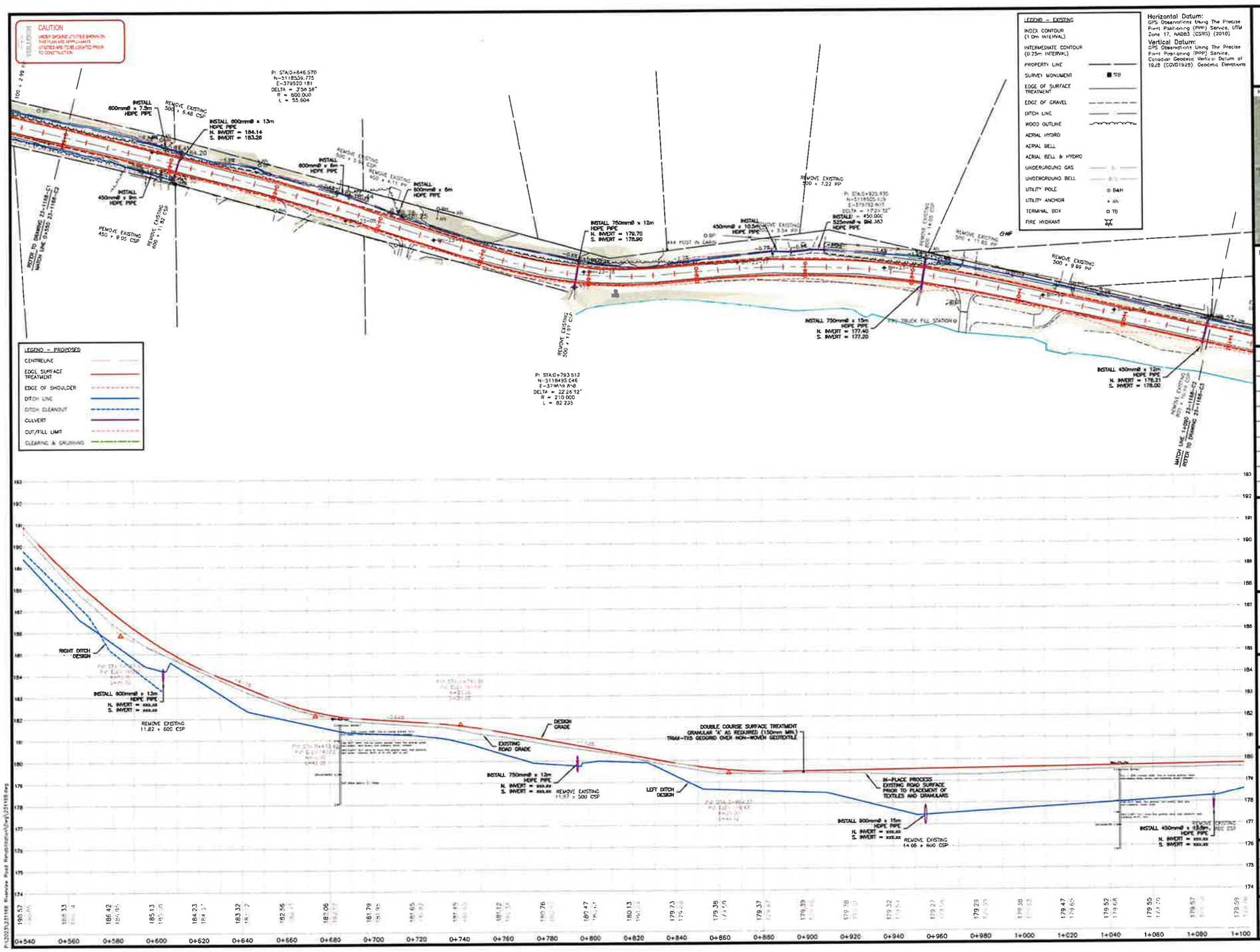
No.	Rev.	DRAWING DESCRIPTION
C1	0	PLAN & PROFILE 0+000 to 0+550
C2	0	PLAN & PROFILE 0+550 to 1+090
C3	0	PLAN & PROFILE 1+090 to 1+630
C4	0	PLAN & PROFILE 1+630 to 2+040
C5	0	TYPICAL SECTIONS, DETAILS & NOTES

TOWNSHIP OF THE NORTH SHORE

TULLOCH

PROJECT No. 23-1168


CAUTION
UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION
LEGEND - EXISTING
INDEX CONTOUR (1.0m INTERVAL)
INTERMEDIATE CONTOUR (0.25m INTERVAL)
PROPERTY LINE
SURVEY MONUMENT
EDGE OF SURFACE TREATMENT
EDGE OF GRAVEL
DITCH LINE
WOOD OUTLINE
AERIAL HYDRO
AERIAL BELL
AERIAL BELL & HYDRO
UNDERGROUND GAS
UNDERGROUND BELL
UTILITY POLE
UTILITY ANCHOR
TERMINAL BOX
FIRE HYDRANT
LEGEND - PROPOSED
CENTRELINE
EDGE SURFACE TREATMENT
EDGE OF SHOULDER
DITCH LINE
DITCH CLEANOUT
CULVERT
CUT/FILL LIMIT
CLEARING & GRUBBING
Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)
Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928). Geodetic Elevations
PI STA 0+252.183
N-5118496.522
E-379161.164
DELTA = 36°34'41"
R = 200.000
L = 127.662
INSTALL 600mmØ x 13.5m HDPE PIPE
N.W. INVERT = 201.93
N.E. INVERT = 201.82
INSTALL 600mmØ x 12m HDPE PIPE
N. INVERT = XXX.XX
S. INVERT = XXX.XX
INSTALL 600mmØ x 13m HDPE PIPE
N.W. INVERT = 195.14
N.E. INVERT = 195.05
REMOVE EXISTING 505 x 12.06 CSP
REMOVE EXISTING 405 x 10.05 CSP
PI STA 0+042.539
N-5118724.974
E-378953.069
DELTA = 59°38'42"
R = 40.000
L = 38.848
PI STA 0+087.839
N-5118702.139
E-378946.081
DELTA = 26°43'32"
R = 90.000
L = 41.980
PI STA 0+416.179
N-5118595.160
E-379294.256
DELTA = 24°03'31"
R = 290.000
L = 121.772
REFER TO DRAWING 22-118-C2 FOR MORE DETAILS
DOUBLE COURSE SURFACE TREATMENT GRANULAR 'A' AS REQUIRED (150mm MIN.) TRIAX-TX5 GEOGRID OVER NON-WOVEN GEOTEXTILE
RIGHT DITCH DESIGN
IN-PLACE PROCESS EXISTING ROAD SURFACE PRIOR TO PLACEMENT OF TEXTILES AND GRANULARS
DESIGN GRADE
EXISTING ROAD GRADE
REMOVE EXISTING 11.95 x 500 ESP
REMOVE EXISTING 12.04 x 500 CSP
LEFT DITCH DESIGN
EXISTING
201.80
202.42
203.03
203.30
203.25
202.67
202.00
201.45
201.08
200.75
200.57
200.46
200.36
200.31
200.23
200.07
199.60
198.98
198.41
197.97
197.71
197.42
197.01
196.15
194.81
192.82
190.57
188.33
0+000
0+020
0+040
0+060
0+080
0+100
0+120
0+140
0+160
0+180
0+200
0+220
0+240
0+260
0+280
0+300
0+320
0+340
0+360
0+380
0+400
0+420
0+440
0+460
0+480
0+500
0+520
0+540
0+560
KEY PLAN
SITE
ENGINEER'S SEAL:
PRELIMINARY
NOT FOR CONSTRUCTION
MARCH 4, 2024
DATE
REV.
REVISION
BY
APP'D
CLIENT:
TOWNSHIP OF THE NORTH SHORE
CONSULTANT:
TULLOCH
PROJECT TITLE:
RIVERVIEW ROAD REHABILATATION
DRAWING TITLE:
PLAN & PROFILE 0+000 to 0+550
DAS
DRAWN
DAS
DESIGNED
JSS
CHECKED
CLK
APPROVED
H-1:750
V-1:75
SCALE
MAR. 4, 2024
DATE
231168
PROJECT No.
-
REVISION
C1
DRAWING



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KEY PLAN

ENGINEER'S SEAL:

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MARCH 4, 2024

DATE	REV.	REVISION	BY	APP'D
-	-	-	-	-

CLIENT:

TOWNSHIP OF THE NORTH SHORE

CONSULTANT:

TULLOCH

PROJECT TITLE:

RIVERVIEW ROAD REHABILATATION

DRAWING TITLE:

PLAN & PROFILE 0+500 to 1+090

DAS	DAS	JSS	CLK
DRAWN	DESIGNED	CHECKED	APPROVED

H-1:750 V-1:75 — SCALE

MAR. 4, 2024 — DATE

231168	-	C2
PROJECT No.	REVISION	DRAWING

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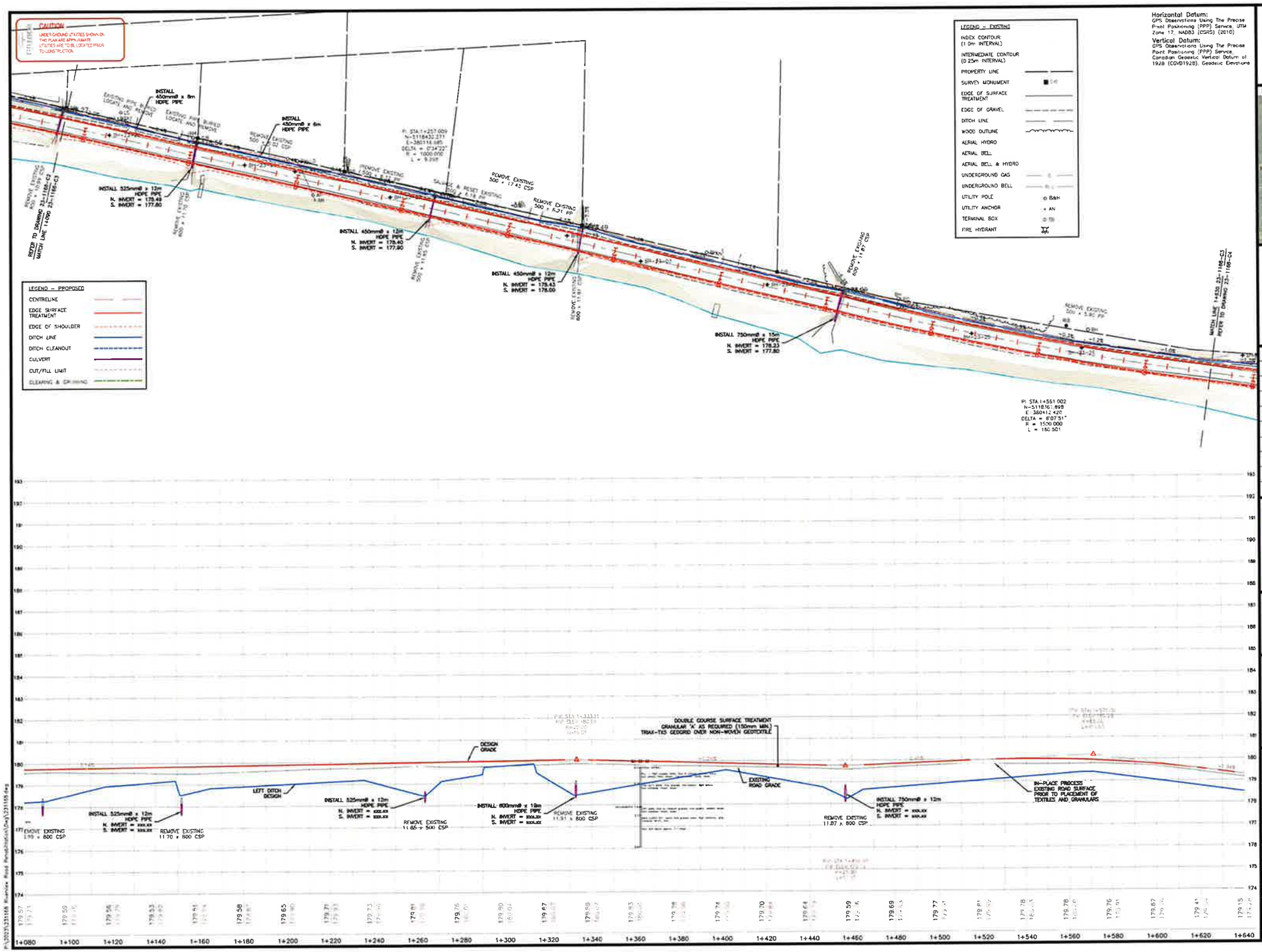

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GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations

KEY PLAN

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MARCH 4, 2024

DATE	REV.	REVISION	BY	APP'D

CLIENT: TOWNSHIP OF THE NORTH SHORE

CONSULTANT: TULLOCH

PROJECT TITLE:
RIVERVIEW ROAD REHABILITATION

DRAWING TITLE:
PLAN & PROFILE 1+090 to 1+630

DAS	DAS	JSS	CLK
DRAWN	DESIGNED	CHECKED	APPROVED

H-1:750 V-1:75 — SCALE

MAR. 4, 2024 — DATE

231168	-	C3
PROJECT No.	REVISION	DRAWING

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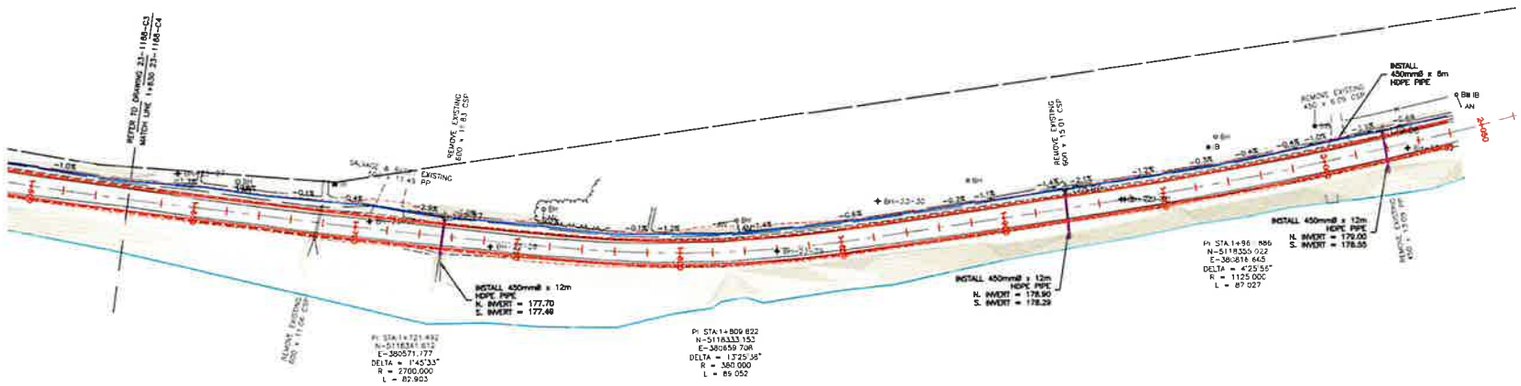
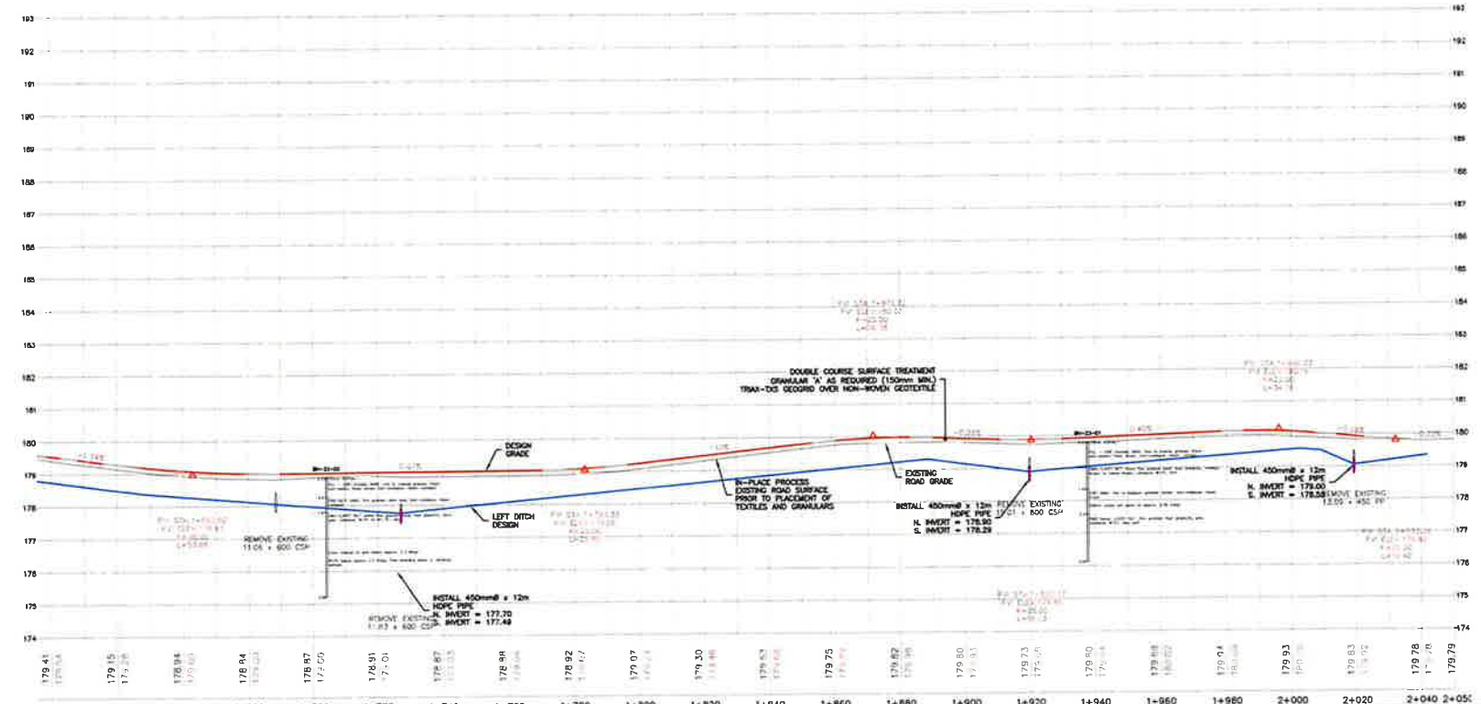
CAUTION

UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928). Geodetic Elevations





LEGEND – EXISTING

- INDEX CONTOUR (1.0m INTERVAL)
- INTERMEDIATE CONTOUR (0.25m INTERVAL)
- PROPERTY LINE
- SURVEY MONUMENT (SIB)
- EDGE OF SURFACE TREATMENT
- EDGE OF GRAVEL
- DITCH LINE
- WOOD OUTLINE
- AERIAL HYDRO
- AERIAL BELL
- AERIAL BELL & HYDRO
- UNDERGROUND GAS
- UNDERGROUND BELL
- UTILITY POLE (BAH)
- UTILITY ANCHOR (AN)
- TERMINAL BOX (TB)
- FIRE HYDRANT

LEGEND – PROPOSED

- CENTRELINE
- EDGE SURFACE TREATMENT
- EDGE OF SHOULDER
- DITCH LINE
- DITCH CLEANOUT
- CULVERT
- CUT/FILL LIMIT
- CLEARING & GRUBBING

KEY PLAN

ENGINEER'S SEAL:

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MARCH 4, 2024

DATE	REV.	REVISION	BY	APP'D
-	-	-	-	-

CLIENT:

TOWNSHIP OF THE NORTH SHORE

CONSULTANT:

TULLOCH

PROJECT TITLE:

RIVERVIEW ROAD REHABILATATION

DRAWING TITLE:

PLAN & PROFILE 1+630 to 2+060

DAS	DAS	JSS	CLK
DRAWN	DESIGNED	CHECKED	APPROVED

H-1:750 V-1:75 — SCALE

MAR. 4, 2024 — DATE

231168	-	C4
PROJECT No.	REVISION	DRAWING

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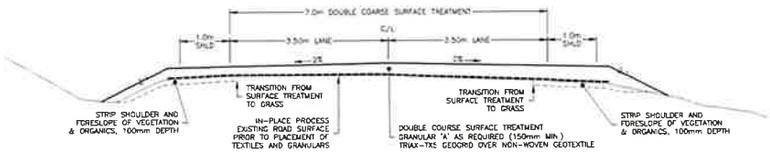

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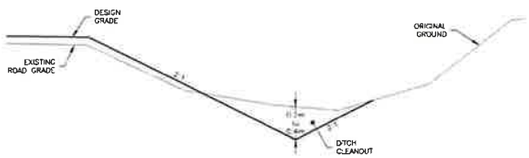
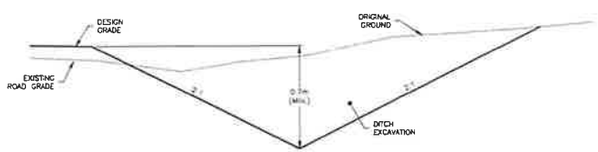
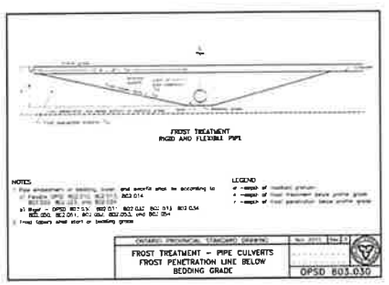


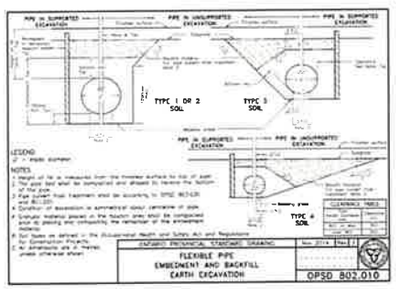
TYPICAL DITCH CLEANOUT
N.T.S

TYPICAL DITCH IMPROVEMENT
N.T.S



TYPICAL NEW DITCH
N.T.S





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MARCH 4, 2024

DATE	REV.	REVISION	BY	APP'D

CLIENT:

TOWNSHIP OF THE NORTH SHORE

CONSULTANT:

TULLOCH

PROJECT TITLE:

RIVERVIEW ROAD REHABILATATION

DRAWING TITLE:

TYPICAL SECTIONS, DETAILS & NOTES

DAS	DAS	JSS	CLK
DRAWN	DESIGNED	CHECKED	APPROVED

AS NOTED	MAR. 4, 2024
SCALE	DATE

231168	-	C5
PROJECT No.	REVISION	DRAWING

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7b)

March 11th, 2024 Meeting of March 20th, 2024

Council Report

SUBJECT: 2023 Estimated Closure/Post Closure Costs – Serpent River Waste Disposal Site

RECOMMENDATION: That Council receive the 2023 Estimated Closure/Post Closure Costs staff report for the Serpent River Waste Disposal Site for information purposes.

Please find attached the 2023 Estimated Closure and Post Closure Costs for the Serpent River Waste Disposal Site that the Township received from AECOM on March 11th, 2024.

This annual report is required every year in order to properly report and record the landfill liability of the Township, and to include this information in the Township's annual Financial Statements.

As indicated in the report, the Township is proceeding with an application to expand the site to accept an additional 39,990m^3 of waste; therefore, the application to the Ministry of Environment, Conservation and Parks (MECP) and their approval processes may impact the timeline for the closure of the existing site.

As it stands (with the assumed closure date of December 2024), the total estimated closure cost in 2023 dollars is $490,666.93, which includes the amount of $41,660.19 that has already been purchased in 2020 for part of the covering material. The required closure report, the annual post closure monitoring, and the annual site maintenance costs are in addition to this total. Please see Tables 1 and 2 for more information.

Prepared and Submitted by: Rachel Jean Schneider, Municipal Clerk/Deputy Treasurer

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AECOM Canada Ltd.
523 Wellington Street East
Sault Ste. Marie, ON P6A 2M4
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T: 705 942 2612
F: 705 942 3642
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Rachel Schneider
Municipal Clerk/Deputy Treasurer
Township of the North Shore
1385 Highway 17
Algoma Mills, ON P0R 1A0

March 11, 2024

Project # ***Revision #***
60526314

Dear Ms. Schneider:

Subject: 2023 Estimated Closure and Post-Closure Costs – Serpent River Waste Disposal Site

1. Introduction

The Serpent River Waste Disposal Site (WDS) is a naturally attenuating landfill located at 5931 Highway 17 in Serpent River. The site is owned and operated by the Township of the North Shore and Amended Environmental Compliance Approval (ECA) No. A562303 dated December 7, 2021 issued by the Ministry of the Environment, Conservation and Parks (MECP) provides the legal framework by which the site must be operated.

It is our understanding that municipalities are required to disclose, in their financial statements, the estimated closure and post-closure liabilities for landfill sites. All costs presented in this letter are in 2023 dollars.

Closure activities at the WDS are expected to include the following:

- Preparation of a Closure Plan;
- Final cover and vegetation; and
- Drainage control features.

Post-closure activities relate to those activities which occur after final closure has been completed and the site no longer accepts waste, and include:

- Monitoring groundwater and surface water quality; and
- Ongoing site maintenance including monitoring wells, drainage systems, final cover and security.

Based on the above requirements, we have developed the estimated closure and post-closure costs for the Serpent River WDS in the following subsections.

Within the context of this report, final closure is assumed to occur in December 2024 as per the current amended ECA for the WDS. However, the Township is proceeding with an application to expand the site to accept an additional 39,990 m^3 of waste. The MECP application and approval process, may impact the timeline for closure of the existing site. The approach taken herein generally reflects a worst-case scenario from the perspective of the Township's finances (i.e. remaining closure activities assumed to be undertaken in 2025).

The assumptions and approach used in developing the relevant closure and post-closure cost estimates are described in the following paragraphs.

2. Closure Requirements

A closure report, MECP application and MECP review fee is required prior to beginning closure activities. Condition 9(1) of the current amended ECA requires the closure plan to be submitted to the Ministry at least one year prior to closure – allow $14,266 for preparation of a report and associated application and review by the Ministry.

Condition 7(11)(c) of the current amended ECA addresses final cover for the site and prescribes a total of 750 mm of final cover consisting of 600 mm of medium permeability soil overlain with 150 mm of topsoil to support vegetative growth.

Given that there is no further trenching activity planned for this site (i.e., all future disposal activities will consist of waste filling with placement of waste in horizontal layers and compacted and covered) all soil material required for final cover will need to be imported to the site. As a component to site upgrades completed in 2020, 7,219 m^3 of final cover material was purchased and stockpiled on site for use as final cover. Costs will still be required to grade the pre-purchased material as it is deployed over time.

We suggest the following unit prices be used for the closure and post closure cost estimates based on recent final cover activities at the WDS:

- Imported medium permeability soil - $24.24/$m^3$
- Grade pre-purchased medium permeability soil - $5.77/$m^3$
- Imported topsoil - $103.88/$m^3$ (Note: During the most recent capital improvements undertaken at the WDS the 2018 tendered price for topsoil was approximately $90/$m^3$. During the procurement of the capital improvements the Contractor was able to source a lower quality, unscreened, organic soil that was suitable for the intended purpose (i.e., to support vegetative growth). The alternate organic soil was supplied and placed for approximately one quarter of the tendered price for topsoil. For the purposes of this report, we have conservatively used the tendered price as the future availability of a suitable lower cost alternative is unknown.)
- Seed and cover application - $1.62/$m^2$

The total estimated area that will require final cover is approximately 22,500 m^2. Approximately 3,750 m^2 has received final cover to-date, therefore there is approximately 18,750 m^2 remaining to be covered. In addition, as previously noted 7,219 m^3 of final cover material was pre-purchased and stockpiled on-site. We have taken the cover material placed to-date and the pre-purchased final cover material into consideration when estimating future financial obligations.

Based on the foregoing, the total residual quantities of cover material required at the WDS are as follows:

- Imported medium permeability soil – 4,031 m^3
- Imported topsoil – 2,813 m^3
- Seed and cover application – 18,750 m^2

Based on the forgoing, the estimated cost to apply the remainder of final cover is $461,812.38. In addition to the final cover, we also suggest including a $28,854.55 allowance to address any specific site drainage activities. Therefore, the total estimated closure cost in 2023 dollars is $490,666.93 not including the closure report cost of $14,266.

3. Post-Closure Requirements

Once the site has been closed, post-closure maintenance and monitoring will have to be initiated. The post-closure costs are based on having to monitor the site for a period of 25 years after closure. The post-closure period could be longer or shorter than 25 years and is dependent on the contaminating lifespan of the site. A more detailed assessment of the contaminating lifespan would have to be undertaken to determine a more definitive timeframe. 25 years is assumed to be reasonable for the purpose of this assessment.

The following post-closure activities have been incorporated in the financial template (Note: values shown reflect 2023 $'s):

1. Annual monitoring and reporting – allow $17,313 per year for site surface and groundwater quality monitoring and reporting.

2. Monitoring well network maintenance and upgrading – allow $2,308 annually. Over time monitoring wells may require repairs or may no longer yield adequate quantities of water or may become damaged beyond repair. In addition, new wells may become necessary to better assess groundwater impacts and compliance. It is anticipated that these costs will be incurred periodically. For example, the cost of a new well may be in the range of $5,000 to $10,000 but may only be required once during the post closure monitoring period for key wells.

3. General site maintenance allowance – allow $2,308 annually. This allowance is intended to address maintenance of final cover, drainage features, access, security, etc.

As previously noted, the costs presented above are based on 2023 dollars. The 2023 costs were derived from the 2019 prices converted to 2023 dollars. This was performed by applying the conversion factor based on the Ontario Consumer Price Index according to Statistics Canada of 15.42% to the 2019 base costs. We are committed to updating our base cost estimates at five-year intervals with the next update to be incorporated in the 2024 closure/post-closure costs. An inflation rate of 3% per annum has been applied to establish the estimated costs to be incurred in future years.

The estimated closure and post closure costs are summarized in the attached tables. The costs presented herein should be reviewed periodically to ensure suitability particularly related to the longevity of the site and the final cover design. It is recommended that closure and post-closure costs be updated upon MECP approval of additional site capacity.

We trust this meets your requirements. Should you have any questions please contact the undersigned.

Sincerely,
AECOM Canada Ltd.

Rick Talvitie, P.Eng.
rick.talvitie@aecom.com

RT:ta
Encl. Table 1 and Table 2
cc: Spencer Bootsma, Marie Wardman, AECOM

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

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This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

AECOM Imagine it. Delivered.

Tables

Township of the North Shore
Closure and Post Closure Cost Summary
Base Information (2019 $'s) - Table 1

AECOM Imagine it. Delivered.

Updated: Feb-24

Description		
Annual Monitoring and Reporting (AMR)	$ 15,000.00	(Assumes sampling twice annually and reporting once every year)
Closure Report and Approvals (CR)	$ 12,000.00	
Final Cover Cost (CC)	$ 425,121.00	Includes stormwater management
Forward Inflation Rate (2024 and beyond) (IR)	3.00%	Note: BoC target = 2%
Conversion factor for 2019 $s to 2023 $s	15.42%	Conversion factor of (ONCPI (2023)- ONCPI (2019)) / (ONCPI (2019)) source: Statistics Canada website
Discount Rate	2.20%	MECP Discount Rate
Current Year (CY) (i.e., year base costs were updated)	2019	
Annual Site Maintenance (SM)	$ 4,000.00	

Estimated Final Cover Cost

Layer Material	Units	Quantity	Unit Cost (2019 $'s)	Amount (2019 $'s)	Unit Cost (2023 $'s)	Amount (2023 $'s)
Supply and place imported medium permeability soil (600 mm)	m^3	4031	$ 21.00	$ 84,651.00	$ 24.24	$ 97,702.65
Grade pre-purchased medium permeability soil	m^3	7219	$ 5.00	$ 36,095.00	$ 5.77	$ 41,660.19
Supply and place imported organic soil (150 mm)	m^3	2812.5	$ 90.00	$ 253,125.00	$ 103.88	$ 292,152.27
Seed and cover	m^2	18750	$ 1.40	$ 26,250.00	$ 1.62	$ 30,297.27
Subtotal				**$ 400,121.00**		**$ 461,812.38**
Allowance for Drainage Improvements	LS	1	$ 25,000.00	$ 25,000.00	$ 28,854.55	$ 28,854.55
TOTAL				**$ 425,121.00**		**$ 490,666.93**

Total Area for final closure	22500	m^2
Current area with final cover	3750	m^2
Area remaining for final cover	18750	m^2
Current stockpiled final cover	7219	m^3

Township of the North Shore
Closure and Post Closure Cost Summary
Projected Expenditures - Table 2

AECOM Imagine it. Delivered.

Remaining Final Closure Area (ha): **18750** m^2 Updated: Feb-24

Year	Notes	Item Description					
		Post Closure Monitoring	Annual Site Maintenance	Closure Cover Placement & Drainage	Closure Report & Approvals	TOTAL (Current $s)	TOTAL (2025 $s)
2023						$0	
2024	Undertake closure reporting activities				$14,266	$14,266	
2025	Undertake final closure activities and initiate post closure monitoring and maintenance	$18,367	$4,898	$520,549		$543,814	$543,814
2026		$18,918	$5,045			$23,963	$23,447
2027		$19,486	$5,196			$24,682	$23,631
2028		$20,070	$5,352			$25,422	$23,816
2029		$20,672	$5,513			$26,185	$24,002
2030		$21,292	$5,678			$26,970	$24,190
2031		$21,931	$5,848			$27,780	$24,379
2032		$22,589	$6,024			$28,613	$24,570
2033		$23,267	$6,204			$29,471	$24,762
2034		$23,965	$6,391			$30,355	$24,956
2035		$24,684	$6,582			$31,266	$25,152
2036		$25,424	$6,780			$32,204	$25,348
2037		$26,187	$6,983			$33,170	$25,547
2038		$26,973	$7,193			$34,165	$25,747
2039		$27,782	$7,408			$35,190	$25,948
2040		$28,615	$7,631			$36,246	$26,152
2041		$29,474	$7,860			$37,333	$26,356
2042		$30,358	$8,095			$38,453	$26,563
2043		$31,269	$8,338			$39,607	$26,770
2044		$32,207	$8,588			$40,795	$26,980
2045		$33,173	$8,846			$42,019	$27,191
2046		$34,168	$9,112			$43,280	$27,404
2047		$35,193	$9,385			$44,578	$27,619
2048		$36,249	$9,666			$45,915	$27,835
2049	Assumed end of post closure requirements	$37,336	$9,956			$47,293	$28,053
						$1,383,037	$1,160,231

Notes:

Conversion factor applied for 2019 to 2023 $s and future inflation rate is assumed to be 3% for the remainder of the analysis period.
Excludes allowances for contingencies (additional property, leachate management, etc.)
Annual site maintenance provides for maintenace of final cover layer, drainage features, monitoring wells and site security ($4,616.80 in 2023 $'s).

7c)

March 14, 2024 Meeting of March 20th, 2024

Council Report

SUBJECT: Police Service Board – Changes to Composition April 1st, 2024

RECOMMENDATION: That Council accept the adjustment of composition to Board 2 – North Shore East – Blind River Detachment Police Services Board, which consists of one Community Representative and one member of Council from Mississauga First Nation, the Town of Blind River, the Township of The North Shore, Serpent River First Nation, and the Town of Spanish, and that Board 2 – North Shore East – Blind River Detachment Police Services Board have two appointed Provincial representatives.

The Township of The North Shore, the Town of Spanish, the Town of Blind River, Serpent River First Nation, and Mississauga First Nation are members of the Board 2 – North Shore East – Blind River Detachment Police Services Board.

Previously, the proposed composition of Board 2 included all mentioned communities above but did not allow for the two First Nations to appoint a member of Council or a Community Representative.

The proposed composition is now being amended to include x5 Council members, x5 Community Representatives, and x2 Appointed Provincial representatives.

Council is required to accept the proposed new composition and the approved Resolution will be forwarded to the other communities in our catchment area, as well as to the Ministry of the Solicitor General.

Prepared/Submitted by: Rachel Jean Schneider, Municipal Clerk/Deputy Treasurer

East Algoma Proposed Composition

East Algoma	Board 1 of 3	Catchment Area: Township of Tarbutt, Township of Johnson, Township of Jocelyn, Township of Hilton, Township of St. Joseph, Village of Hilton Beach, Township of Plummer Additional, Town of Bruce Mines, Municipality of Huron Shores, Town of Thessalon, Thessalon First Nation Council Member Seats: 10 • The following communities in the detachment are responsible for the appointment of 1 council member each: Township of Tarbutt, Township of Johnson, Township of Jocelyn, Township of Hilton, Township of St. Joseph, Village of Hilton Beach, Township of Plummer Additional, Town of Bruce Mines, Municipality of Huron Shores and the Town of Thessalon. Community Representative Seats: 3 • All communities in the detachment are jointly responsible for the appointment of the 3 community representatives. Provincial Appointees: 3 Total Board Member Seats: 16
	Board 2 of 3	Catchment Area: Town of Blind River, Township of The North Shore, Town of Spanish, Mississauga First Nation, Serpent River First Nation Council Member Seats: 3 • The following communities in the detachment are responsible for the appointment of 1 council member each: Town of Blind River, Township of The North Shore and the Town of Spanish. Community Representative Seats: 3 • The following communities in the detachment are responsible for the appointment of 1 community representative each: Town of Blind River, Township of The North Shore and the Town of Spanish. Provincial Appointees: 1 Total Board Member Seats: 7
	Board 3 of 3	Catchment Area: The City of Elliot Lake Council Member Seats: 2 • The City of Elliot Lake is responsible for the appointment of the 2 council members. Community Representative Seats: 2 • The City of Elliot Lake is responsible for the appointment of the 2 community representatives. Provincial Appointees: 1 Total Board Member Seats: 5

From: Sukhdeo, Devendra (SOLGEN) <Devendra.Sukhdeo@ontario.ca>
Sent: Tuesday, February 27, 2024 9:48 AM
To: Katie Scott <Katie.Scott@blindriver.ca>
Subject: RE: East Algoma OPP Board Composition Blind River

Good morning Katie,

Thank you for reaching out. The composition of the OPP detachment board, which includes Mississauga First Nation and Serpent River, can be adjusted to ensure that they have representation on that board.

Please be aware that there is an implication regarding the increase in both council member seats and community representative seats. OPP detachment boards are required to have a mandatory 20% provincial appointee representation. As such, with the inclusion of 4 new seats, an additional provincial appointee will also be required on the board.

Old Composition:

Council Seats	Community Representative Seats	Provincial Appointee Seats	Total
3	3	1	7

New Composition:

Council Seats	Community Representative Seats	Provincial Appointee Seats	Total
5	5	2	12

If you are in agreement with this adjustment, kindly inform me at your earliest convenience, and I will proceed to implement the change internally on our end. We will need to be informed fairly soon.

Thank you,

Dev

Devendra Sukhdeo (He/Him) | **Senior Policy Advisor (A), Public Safety and Policing Policy Unit**
Community Safety and Intergovernmental Policy Branch | Strategic Policy Division
Ministry of the Solicitor General
Mobile: 437-991-2947 | **Email:** devendra.sukhdeo@ontario.ca

Algoma
PUBLIC HEALTH
Santé publique Algoma

www.algomapublichealth.com

March 5, 2024

Dear community partners:

I'm reaching out to provide an update following our previous letter dated January 18, 2024, regarding the feasibility study of a potential voluntary merger between Algoma Public Health (APH) and Public Health Sudbury & Districts (PHSD).

After careful consideration, on February 20, Algoma Public Health's Board of Health unanimously voted not to proceed with merger. Although Public Health Sudbury & Districts' Board of Health voted in favor of a merger, the lack of agreement from both boards means that a voluntary merger will not proceed at this time.

The Algoma Board of Health's decision not to proceed with the merger was informed by a comprehensive evaluation of potential impacts. This assessment covered areas such as service delivery, finance, workforce, and the broader health system.

Although a merger offered certain benefits, such as a potentially larger and more diverse workforce capacity, our Board members concluded that the benefits did not outweigh the significant transition and opportunity costs, along with the anticipated ongoing increased costs over the longer term.

We deeply value the input of our partners and remain dedicated to collaborative efforts aimed at enhancing public health outcomes in our region. We will continue to keep you informed, should there be any future developments regarding this matter.

For more information about Algoma Public Health's Board of Health and local public health programs and services in Algoma, please visit www.algomapublichealth.com.

Best regards,

Jennifer Loo, MD MSc CCFP FRCPC
Medical Officer of Health/CEO

Blind River
P.O. Box 194
9B Lawton Street
Blind River, ON P0R 1B0
Tel: 705-356-2551
TF: 1 (888) 356-2551
Fax: 705-356-2494

Elliot Lake
ELNOS Building
302-31 Nova Scotia Walk
Elliot Lake, ON P5A 1Y9
Tel: 705-848-2314
TF: 1 (877) 748-2314
Fax: 705-848-1911

Sault Ste. Marie
294 Willow Avenue
Sault Ste. Marie, ON P6B 0A9
Tel: 705-942-4646
TF: 1 (866) 892-0172
Fax: 705-759-1534

Wawa
18 Ganley Street
Wawa, ON P0S 1K0
Tel: 705-856-7208
TF: 1 (888) 211-8074
Fax: 705-856-1752

9a)

BY-LAW NO: 24-15

Being a bylaw to adopt the Recruitment and Termination of Volunteer Firefighters Policy for The Corporation of the Township of The North Shore

WHEREAS Section 5(1) of the Municipal Act S.O. 2001, c.25, as amended, grants that the powers of a municipality shall be exercised by its Council;

AND WHEREAS Section 5(3) of the Municipal Act 2001 S.O. 2001, c.25, as amended, provides that a municipal power, including a municipality's capacity, rights, powers and privileges under section 9, shall be exercised by by-law unless the municipality is specifically authorized to do otherwise;

AND WHEREAS Section 5(4) subsections (1) to (3) of the Municipal Act S.O. 2001, c.25, as amended, apply to all municipal powers, whether conferred by this Act or otherwise;

AND WHEREAS the Council of the Corporation of the Township of the North Shore deems it appropriate to adopt a Recruitment and Termination of Volunteer Firefighters Policy;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF THE NORTH SHORE HEREBY ENACTS AS FOLLOWS:

1. That the Recruitment and Termination of Volunteer Firefighters Policy attached hereto as Schedule "A" be adopted.

2. That Schedule "A" be declared to form part of this by-law.

3. This By-Law shall come into force and take effect on the date of passing thereof and its short title is "Recruitment and Termination of Volunteer Firefighters Policy By-Law".

READ A FIRST, SECOND AND THIRD TIME, ENACTED AND FINALLY PASSED THIS 20th DAY OF MARCH 2024.

_____
Tony Moor, Mayor

_____
Rachel Jean Schneider, Clerk/Deputy Treasurer

Schedule "A"

THE CORPORATION OF THE TOWNSHIP OF THE NORTH SHORE

POLICY MANUAL

POLICY TITLE:	SUBJECT:
Recruitment and Termination of Volunteer Fire Fighters	Operational Guideline
POLICY SECTION:	POLICY NO:
F	1
EFFECTIVE DATE: February 18, 2008 AMENDED DATE: March 6, 2024	ENACTED BY: By-law 08-12 Schedule A Resolution, By-Law 24-15

1.00 Purpose

The purpose is to establish a guideline for the recruitment and termination of fire fighters of the Township of the North Shore Fire Department.

2.00 Scope

This guideline outlines the recruitment of volunteer fire fighters of the Fire Department mandated by the Corporation of the Township of the North Shore by-laws. Hiring and termination of volunteer fire fighters from their responsibilities with the Fire Department is outline.

3.00 Recruitment for the Fire Department

3.01 The Township of The North Shore Fire Department must maintain a minimum staffing to respond to emergencies within the Township municipal boundaries. The minimum staffing required for this purpose is ten (10) and a maximum number of twenty (20) members.

3.02 The Fire Department participates in the *District of Algoma Mutual Aid Plan*. Participation in the district mutual aid plan allows additional resources of labour or equipment to be obtained during a large emergency from the neighbouring communities on a mutual basis without compensation between the municipalities.

3.03 Members of the Fire Department, Township of The North Shore Council, public notices in the community newsletter and official bulletins shall be used to recruit prospective members. The prospective member shall be invited to observe fire department training prior to deciding to apply for membership as a fire fighter.

3.04 The minimum requirements for a new recruit are within the range of 18 to 65 years of age (over 65 at the discretion of the Fire Chief), willing to participate in the training and respond to emergencies within the municipality or the neighbouring municipalities as required in the *District of Algoma Mutual Aid Plan*.

3.05 New fire department recruits would preferably reside in the municipality on a permanent or semi-permanent basis such as work outside the community on alternate weeks. Fire fighters may be retained on the active membership list while living outside the municipality, in order to maintain the required staffing with the approval of the council.

3.06 New recruits or current fire fighters may be employed by the Township of the North Shore or serve term(s) with the Township of The North Shore Council. The fire fighter shall be required to complete the same attendance at training and emergency response as other fire fighters without prejudice to their other work assignments with the Township of The North Shore.

3.07 The new recruit will complete *Fire Department Application for Employment* to join the fire department for submission to the Fire Chief for comment and approval. The Fire Chief shall forward all applications to the Township of The North Shore Council for approval or rejection based on the information within the application and knowledge of the applicant. The Fire Chief shall be notified of the approval of a new recruit pending a medical examination.

3.08 The new recruit will be requested to complete a medical examination by a qualified medical professional to ensure the applicant meets the physical demands for a fire fighter OR join the fire department with medical restrictions. The Fire Chief in consultation with the Township of The North Shore Council shall determine the medical restrictions applicable to the new recruit. The Township of The North Shore shall compensate the applicant for the medical examination, whether successful or not, for joining the Fire Department. The new recruit will also be requested to provide a current drivers abstract and a vulnerable sector check of which the cost will be reimbursed.

3.09 The successful recruit shall be required to sign a confidentiality agreement and will be required to complete a six (6) month probationary period to ensure the person meets the minimum requirements for training and adherence to the Fire Department operating guidelines. The recruit will be expected to attend a minimum of 50% of the fire department meetings.

3.10 The inclusion of a new recruit in the emergency scene operations will be minimized and at the discretion of the Officer-in-Charge based on any medical restrictions and the completion of the necessary training during the routine training sessions which are held twice a month in the evening, with the dates to be decided at the discretion of the Fire Chief.

4.00 Termination from the Fire Department

4.01 Termination of a fire fighter from the fire department will be initiated by the Fire Chief based on performance issues or at the request of the fire fighter.

4.02 The fire fighter resignation process will preferably be a written notice to the Fire Chief. The reason for leaving the Fire Department (personal reasons or issues within the Fire Department) should be discussed with the Fire Chief to improve retention of future recruits.

4.03 Termination or temporary suspension of a fire fighter from the Fire Department shall be a multi-step process dependent on the circumstances.

4.03.1 A serious offence that may compromise safety for the fire fighter, other members of the Fire Department or members of the public may result in immediate suspension. Termination from the Fire Department will be made with approval of the Township of The North Shore Council as recommended by the Fire Chief.

4.03.2 Less serious infractions of Fire Department safety guidelines, lack of attendance at fire department training, personal conflict with Fire Department officers or other

fire fighters may result in a verbal or written reprimand followed by a temporary suspension.

4.03.3 Termination of a fire fighter as a culmination of a series of minor offences shall be done only with the approval of the Township of The North Shore Council.

4.04 A temporary leave of absence for a fire fighter shall be granted for absence from the area due to work, education or personal reasons. The temporary leave of absence will be honoured for a period of time not to exceed two (2) years. A longer absence will require a new application to the Fire Department.

5.00 Responsibility

It is the responsibility of all fire fighters to recruit new fire fighters to the Fire Department. The Fire Chief and Township of The North Shore shall be responsible to approve new recruits. The Fire Chief and other department officers are responsible for safety and good management at the scene of an emergency and while carrying out the duties of the Township of The North Shore Fire Department. Actions that would compromise safety or cause unnecessary damage to public or private property shall not be condoned and may result in demotion of responsibilities or dismissal from Fire Department active duty.

THE TOWNSHIP OF THE NORTH SHORE
NORTH SHORE FIRE DEPARTMENT
POINT SYSTEM DISTRIBUTION

The North Shore Fire Department will adhere to the following rules for the distribution of points.

1. FALSE ALARMS, FIRES AND EMERGENCY RESPONSES

a. Points will start when the member reports for duty.
b. Points will stop when the member is dismissed or excused from duty.
c. 1 point will be allotted to all members reporting for duty when a general alarm has been sounded and it is a false alarm.
d. No member is entitled to any points unless he reports to the officer in charge.
e. Each member reporting for duty is entitled to: 3 points for the first 2 hours, or any portion thereof, plus 1 point for each hour after the first 2 hours, or any portion of an hour.

2. MEETING/PRACTICE

a. Fire practice unless otherwise stated will be 2 hours.
b. All members are required to report to the officer in charge when ready for duty.
c. Each member who attends practice for the full 2 hours is entitled to 2 points.
d. Each member who attends less than 2 hours will be entitled to 1/2 point for each full 1/2 hour during the practice period.
e. Any member who attends more than 2 hours shall be entitled 1/2 point each full 1/2 hour.
f. Any member who desires to leave practice shall request permission from the officer in charge.

3. EXTRA DUTY

a. Each member will be entitled to 1/2 point for each 1/2 hour or portion thereof for authorized duties which are necessary for the proper operation of the Fire Department.

4. OFFICERS

a. Fire Chief and Deputy Fire Chief do not earn or participate in the point system.
b. Captains and Assistant Captains earn points, at the same distribution as members, for false alarms, fires and emergency call outs only.
c. Training Officers earn points, at the same distribution as members, for meetings/practices in which they are the training officer in charge.
d. Other Officers earn points, at the same distribution as members, for authorized duties under extra duty (i.e. - Equipment Officers, Health and Safety Officer, Fire Prevention Officer).

5. SUMMARY

RESPONSE	**DESCRIPTION**	**POINTS**
False Alarm	Reporting for duty	1 point
Fire, Emergency	First 2 hours or part thereof	3 points
	Each hour or part thereafter	1 point
Meeting/Practice	Full practice attendance of 2 hours	2 points
	For each 1/2 hour if not full attendance	1/2 point
	For each 1/2 hour over full attendance	1/2 point
Extra Duty	For each 1/2 hour	1/2 point

Council Approval - Resolution No. 92-24-303

Revised: 06/10/90

TOWNSHIP OF THE NORTH SHORE

COPY

Resolution # 65

PO Box 108, Algoma Mills, ON P0R 1A0
(705) 849-2213 (705) 461-1821

REGULAR COUNCIL MEETING

MEETING DATE: March 6th, 2024

AGENDA ITEM(S): 7 c)

MOVED BY: T. Simon

SECONDED BY: L. Menard

BE IT RESOLVED That Council for the Corporation of the Township of The North Shore receive the staff report as presented for consideration, and that Council approve the Recruitment and Termination of Volunteer Firefighters Policy.

Conflict of Interest disclosed by :	**Ward 1**	**Ward 2**	**Ward 3**	**At Large**	**Mayor**
Seat Vacated : Y	**N**	**Recorded Vote Requested by :**			
Recorded Vote : (Y) ea,	**(N) ay,**	**Ward 1**	**Ward 2**	**Ward 3**	**At Large**	**Mayor**
DEFEATED	**DEFERRED**	**CARRIED**		✓		

MAYOR or CHAIR or (Acting)

BY-LAW 24-16

THE CORPORATION OF THE TOWNSHIP OF THE NORTH SHORE

Being a bylaw to confirm the proceedings of Council at its Regular Council Meeting of March 20th, 2024.

The Council of the Corporation of the Township of The North Shore hereby enacts as follows:

WHEREAS Section 5(3) of the *Municipal Act, 2001, S. O. 2001, c.25,* as amended requires municipal Council to exercise a municipal power including a municipality's capacity, rights, powers and privileges under Section 9, by by-law unless the municipality is specifically authorized to do otherwise;

AND WHEREAS the Corporation of the Township of the North Shore deems it desirable to confirm the proceedings of Council at its Regular Council Meeting of March 20th, 2024.

NOW THEREFORE the Council of the Corporation of the Township of the North Shore hereby enacts as follows:

1. That each motion, resolution, and other action passed and taken by the Council at its Regular Council meeting of March 20th, 2024, is hereby adopted, and ratified and confirmed.

2. The Head of Council and the proper officers of the Corporation of the Township of the North Shore are hereby authorized and directed to do all things necessary to give effect to the said action or to obtain approval where required and except where otherwise provided, the Mayor and the Clerk, or if absent, the designate, are hereby directed to affix the Corporate Seal of the Municipality to all such documents.

READ A FIRST, SECOND AND THIRD TIME ENACTED AND FINALLY PASSED THIS 20th DAY OF MARCH 2024.

_____
Tony Moor, Mayor

_____
Rachel Jean Schneider, Clerk/Deputy Treasurer