



Foundation Investigation Report

Culvert 68

~30.3 km North of the Corner of HWY 17 and 72

Township of Echo

Station 11+537, Lat: 49.896129, Lon: -92.297128

District of Kenora

Highway 72

6021-E-0045 & 0046

Geocres No. 52F16-005

Prepared for:

Ontario Ministry of Transportation NWR

615 James Street South

Thunder Bay, ON

P7E 6P6

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Part A - FOUNDATION INVESTIGATION REPORT

1 Introduction

TBT Engineering Limited (TBTE) has been retained by the Ontario Ministry of Transportation Northwest Region (MTO) to provide foundation investigation services under the Northwest Region (NWR) Geotechnical Retainer Assignment. The site is located on Highway 72, approximately 30.3 north of the intersection of Highway 17 and Highway 72. The site coordinates are as follows:

- Station 11+537, Latitude: 49.896129°, Longitude: -92.297128°

A Google Earth image illustrating the site location can be seen in Figure 1.1.

The investigation consisted of two boreholes; one borehole was advanced at each of the invert and outlet of the culvert. The boreholes were advanced to depths of 6.7 and 8.2 m. Planned borehole locations were provided by the MTO in the Terms of Reference, however, final borehole locations were adjusted to suit field conditions. This report (Part A) describes the subsurface conditions encountered during the investigation.

The MTO Foundations Section has assigned Geocres No. 52F16-005 to this site.



Figure 1.1: A Google Earth Image Illustrating the Site Location.

2 Site Description

The existing embankments are within the MTO Right-of-Way but are near the tree line. The photos below were taken by TBTE during site reconnaissance. The area is generally flat, with embankment side slope of approximately 2.5H:1V. The embankment is approximately 4 m high at the culvert location. The culvert at the site has an inlet obvert elevation of 378.1 m and invert elevation of 376.6 m and an outlet obvert elevation of 377.7 m and invert elevation of 376.2 m.



**Figure 2.1: Left Embankment
Looking North June 28, 2023.**



**Figure 2.2: Right Embankment
Looking South, June 28, 2023.**

2.1 Surficial Geology

As defined by the Ontario Ministry of Natural Resources' Northern Ontario Engineering Geology Terrain Study (NOEGTS), Map No. 52KSE, the site is in an area which primarily consists of a clay/clayey glaciolacustrine delta. The area has low local relief and is generally dry.

Glaciolacustrine deltas are described in the NOEGTS as deposits with glaciolacustrine clay and silt at depths.

The presence of the above soils were confirmed from the field investigation.

3 Investigation Procedures

A geotechnical site investigation was undertaken on September 10, 2023 to September 11, 2023. The field investigation consisted of advancing a total of two boreholes. Borehole locations are illustrated on the Borehole Location and Soil Strata Drawings (Appendix C). The boreholes were advanced to depths of 6.7 and 8.2 m.

The borehole locations were identified in the field by TBTE personnel and service clearances were completed prior to mobilizing the drill rig to site. The boreholes were advanced using a drill rig mounted on an all-terrain carrier equipped with hollow stem augers, a casing advancement system and apparatus used to carry out Standard Penetration Testing as per ASTM D1586.

During the drilling operations for the boreholes, soil samples were obtained from the auger flights and using the techniques of the Standard Penetration Test (SPT). The SPT involves driving a 51 mm O.D. thick walled split barrel sampler into the soils under a standardized energy (63.5 kg, falling 760 mm). The number of blows required to drive the sampler 0.3 m is known as the SPT blow count (N). Following completion of the test, a representative soil sample is obtained from within the sampler. SPTs are typically taken at a frequency of every 0.75 m for the first 3 m of the borehole, and every 1.5 m afterwards, to the termination depth of the borehole. Sample frequency may vary due to circumstances experienced in the field.

In addition, thin-walled tube samples were taken within the cohesive materials, alternating with SPT samples. In-situ field vane testing was completed at select depths within the cohesive materials to obtain an indication of the material's undrained shear strength. In-situ field vane testing was completed as per ASTM D2573 with a tapered vane.

Test hole locations were surveyed by TBTE with a level and rod and referenced to a temporary benchmark at the centreline of the highway. The benchmark has an elevation of 379.4 m from the B&C-633-664-8 surface as provided by the client. A hand-held Garmin GPS device was used in the field to record coordinates of the borehole locations, based on North American Data 1983 NAD83 (CSRS) v6 (2010 epoch).

A summary of the borehole location data is provided below and on the Borehole Location and Soil Strata Drawings (Appendix C).

Table 3.1: Summary of Borehole Information.

| Borehole Number | Co-ordinates | Surface Elevation (m) | Depth of Exploration (m) |
|-----------------|-----------------------------------|-----------------------|--------------------------|
| 1 | Lat 49.8961861 Lon -92.2972601 | 377.3 | 6.7 |
| 2 | Lat 49.8960568 Lon -92.2969603 | 377.1 | 8.2 |

A temporary standpipe piezometer was installed to a depth of 2.9 m within Borehole 2.

All boreholes and temporary standpipe piezometers have been backfilled and/or decommissioned with auger cuttings and bentonite in accordance with the Ontario Ministry of the Environment's Regulation 903, as amended by Regulation 128/03 (water well regulation under the Ontario Water Resource Act).

4 Laboratory Testing

Soil samples obtained during the field investigation were subjected to routine laboratory testing. The routine testing included moisture content, Atterberg limits tests, and grain size analysis. Typically, 100% of the recovered soil samples are tested for natural moisture content determination, and 25% of the recovered soil samples are chosen for grain size analysis and/or Atterberg limits testing, as applicable. The following test methods/standards are followed for the above testing: LS 602 (sieve analysis for aggregates), LS 701 (moisture content of soils), ASTM C136 (standard test method for sieve analysis of fine and coarse aggregates), ASTM D4318 (standard test for liquid, plastic, and plasticity index of soils), ASTM D2216 (standard test method for laboratory determination of water (moisture) content of soil and rock by mass). The results of this testing are shown on the borehole logs (Appendix A) and on the laboratory data reports (Appendix B).

5 Subsurface Conditions

Details of the subsurface conditions are provided on the borehole logs (Appendix A), and on the Borehole Location and Soil Strata Drawings (Appendix C).

The subsurface soils at this site generally consist of clay or topsoil overlying fill fills overlying organics, which overlie sands or clay and sand to the termination of the boreholes.

5.1 Topsoil

100 mm of topsoil was present at the surface of Borehole 2.

5.2 Fill

Sand and gravel with some silt and some organics was encountered underling the topsoil at Borehole 2 and extended to a depth of 1.0 m (elev. 376.1 m). Thickness of the fill is 0.9 m. The condition of this material is very loose to compact with an SPT N-value of 3 blows per 0.3 m.

5.3 Organics

An organic layer was identified underlying the fill at a depth of 1.0 m (elev. 376.1 m) at Borehole 2 and extended to a depth of 1.4 m (elev. 375.7 m). Moisture contents varied from 62 to 71 %.

5.4 Sand

Silty sand with some organics was present underlying the organics at Borehole 2 at a depth of 1.4 m (elev. 375.7 m) and extended to a depth of 2.3 m (elev. 374.8 m). The results of a grain size analysis indicates that this material can consist of 0% gravel, 68% sand, 32% silt/clay sized particles. The condition of this material is very loose with an SPT N-value of 1 blow per 0.3 m.

5.5 Clay and Sand

Clay with trace sand and trace gravel to clay and sand was encountered at the surface of Borehole 1 (elev. 377.3 m) and underlying the sand at Borehole 2 at a depth of 2.3 m (elev. 374.8 m). The clay has a varved structure starting at depths of 1.7 to 2.3 m (elev. 375.6 to 374.8 m). The varved clay has a layered structure with layers of varying colour, plasticity and silt content. This material extended to the termination of the boreholes at a depth of 6.7 to 8.2 m (elev. 368.9 to 370.6 m). Atterberg limits testing indicates that this material is clay of low to medium plasticity, with the natural moisture content at or above the liquid limit. The results of three grain size analyses indicate that this material can consist of 0-2 % gravel, 29-44 % sand, 56-69 % silt/clay sized particles. This material generally has a very soft consistency based on SPT N-values of 1 blow per 0.3 m with one SPT N-value of 9 indicating this material has a stiff consistency at a depth of 8.0 m (elev. 369.1 m) and a firm to stiff consistency based on field vane tests ranging from 45 to 67 kPa, however, it is expected that presence of varves overestimated the test results.

5.6 Groundwater

Casing advancement with water was utilized at the boreholes during drilling operations. Elevated water levels may have been recorded due to this drilling method and water levels may not have stabilized. A temporary standpipe piezometer was installed to a depth of 2.9 m at

Borehole 2. Water level readings were taken upon completion and afterwards, as shown below. Observed groundwater levels have been provided in the table below. Groundwater levels may vary from season to season and from the effects of heavy precipitation events. Based on the B&C-633-664-8 surface as provided by the client, water level within the downstream culvert was 377.4 m on June 2021.

Table 5.1: Observed Groundwater Levels.

| Location | Surface Elevation (m) | Groundwater Level on Completion of Drilling | | Groundwater Level After Completion | | |
|------------|-----------------------|---|-----------|------------------------------------|-----------|------------------------|
| | | Depth (m) | Elev. (m) | Depth (m) | Elev. (m) | Time After Comp. (hrs) |
| Borehole 1 | 377.3 | 3.7 | 373.6 | - | - | - |
| Borehole 2 | 377.1 | 0.0 | 377.1 | - | - | - |

6 Miscellaneous

Laboratory testing was carried out at the TBT Engineering laboratory in Thunder Bay. The drill equipment for this investigation was operated by TBT Engineering Limited. The field operations were supervised by Ian Baumann and Allan Finke. Laboratory testing was supervised by Forch Valela, C.Tech. This report was prepared and reviewed by Dean Vale, P.Eng., and Steven Seller, P.Eng. (TBTE's designated principal contact identified for MTO Foundation Engineering).

7 Limitations

Conclusions and recommendations presented in this report are based on the information determined at a limited number of borehole locations. Subsurface and groundwater conditions between and beyond these locations may differ from those encountered. Conditions may become apparent during construction that were not detected and could not be anticipated at the time of the site investigation.

The design recommendations provided in this report are based on the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments given in this report on potential construction problems and possible methods of construction are intended only for the guidance of the designer.

Groundwater levels indicated are based on the information described within the report. The presence of all conditions that could affect the type and scope of the dewatering procedures which may be considered during construction cannot readily be determined from site investigation or boreholes. These conditions include local and seasonal fluctuations of the groundwater level, changes in soil conditions between borehole locations, thin and/or discontinuous layers of highly permeable soils, etc.

In no way does the information contained within this report reflect any environmental aspect of the site or soil.

8 Closure

We trust the above addresses your project requirements at this time. Should you have any questions or comments, please do not hesitate to contact us at your convenience.

Yours truly,

For TBT ENGINEERING



Dean Vale, P.Eng.
Geotechnical Engineer



Steve Steller, P.Eng.
Senior Engineer
Principal Contact for MTO Foundations

9 References

Braja M. Das, *Fundamentals of Geotechnical Engineering*, 4th ed. Stamford, CT, USA: Cengage Learning, 2013.

D.E. Becker *et al.*, *Canadian Foundation Engineering Manual*, 4th ed. Richmond, BC, Canada: The Canadian Geotechnical Society, 2006.

Ontario Ministry of Northern Development and Mines; Digital Northern Ontario Engineering Geology Terrain Study (NOEGTS), 2005

APPENDIX A

Borehole Logs

EXPLANATION OF TERMS

N Value: The Standard Penetration Test (SPT) N value is the number of blows required to cause a standard 51mm O.D. split barrel sampler to penetrate 0.3m into undisturbed ground in a borehole when driven by a hammer with a mass of 63.5 kg, falling freely a distance of 0.76m. For penetrations of less than 0.3m N values are indicated as the number of blows for the penetration achieved. Average N value is denoted thus \bar{N} .

Dynamic Cone Penetration Test: Continuous penetration of a conical steel point (51mm O.D. 60° cone angle) driven by 475 J impact energy on 'A' size drill rods. The resistance to cone penetration is measured as the number of blows for each 0.3m advance of the conical point into the undisturbed ground.

Soils are described by their composition and consistency/condition.

Consistency: Cohesive soils are described on the basis of their undrained shear strength (c_u) as follows:

| C_u (kPa) | 0-12 | 12-25 | 25-50 | 50-100 | 100-200 | >200 |
|-------------|-----------|-------|-------|--------|------------|------|
| | Very Soft | Soft | Firm | Stiff | Very Stiff | Hard |

Condition: Cohesionless soils are described on the basis of denseness as indicated by SPT N values as follows:

| N (Blows/0.3m) | 0-4 | 4-10 | 10-30 | 30-50 | >50 |
|----------------|------------|-------|---------|-------|------------|
| | Very Loose | Loose | Compact | Dense | Very Dense |

Minor Soil Components: Terminology used to represent the amount of minor components based on their percent of the sample by weight as follows:

| % by weight | 0-10 | 10-20 | 20-35 | 35-50 |
|-------------|-------|-------|-------------|-------|
| | Trace | Some | "ey" or "y" | And |

ABBREVIATIONS AND SYMBOLS

Field Sampling, Insitu Testing, Laboratory Testing

| | | | |
|-----|-----------------------|-----|---|
| S S | Split Spoon | T P | Thin Wall Piston |
| A S | Auger | O S | Osterberg |
| W S | Wash | R C | Rock Core |
| S T | Slotted Tube | P H | T W Advanced Hydraulically |
| B S | Block | P M | T W Advanced Manually |
| C S | Chunk | F S | Foil |
| V T | Vane Test (kPa) | P P | Pocket Penetrometer (kg/cm ²) |
| T W | Thin Wall Shelby Tube | | |

EXPLANATION OF TERMS Cont'd.

Stress and Strain

| | | |
|--------------------------------------|-----|------------------------------|
| u_w | kPa | Pore Water Pressure |
| u | | Pore Pressure Ratio |
| σ | kPa | Total Normal Stress |
| σ' | kPa | Effective Normal Stress |
| τ | kPa | Shear Stress |
| $\sigma_1, \sigma_2, \sigma_3$ | kPa | Principal Stress |
| ϵ | % | Linear Strain |
| $\epsilon_1, \epsilon_2, \epsilon_3$ | % | Principal Strains |
| E | MPa | Young's Modulus |
| G | kPa | Modulus of Shear Deformation |
| m | MPa | Constrained Modulus |
| μ | | Coefficient of Friction |

Mechanical Properties of Soil

| | | |
|----------|-------------------|--------------------------------------|
| m_v | kPa ⁻¹ | Coefficient of Volume Change |
| C_c | | Compression Index |
| C_s | | Swelling Index |
| C_a | | Rate of Secondary Consolidation |
| c_v | m ² /s | Coefficient of Consolidation |
| H | m | Drainage Path |
| T_v | | Time Factor |
| U | % | Degree of Consolidation |
| P'_o | kPa | Effective Overburden Pressure |
| P'_c | kPa | Preconsolidation Pressure |
| τ_f | kPa | Shear Strength |
| c' | kPa | Effective Cohesion Intercept |
| ϕ' | ° | Effective Angle of Internal Friction |
| c_u | kPa | Undrained Shear Strength |
| s | | Sensitivity |

Physical Properties of Soil

| | | | | | | | | |
|----------------|-------------------|--------------------------------|-----------|---|---|-----------|-------------------|--|
| ρ_s | kg/m ³ | Density of Solid Particles | e | % | Void Ratio | e_{min} | % | Void Ratio in Densest State |
| γ_s | kN/m ³ | Unit Weight of Solid Particles | n | % | Porosity | I_D | | Density Index $= \frac{e_{max}-e}{e_{max}-e_{min}}$ |
| ρ_w | kg/m ³ | Density of Water | w | % | Water Content | D | mm | Grain Diameter |
| γ_w | kN/m ³ | Unit Weight of Water | s_r | % | Degree of Saturation | D_n | mm | n Percent Diameter |
| ρ | kg/m ³ | Density of Soil | w_L | % | Liquid Limit | C_u | | Uniformity Coefficient |
| γ | kN/m ³ | Unit Weight of Soil | w_p | % | Plastic Limit | h | m | Hydraulic Head or Potential |
| ρ_d | kg/m ³ | Density of Dry Soil | w_s | % | Shrinkage Limit | q | m ³ /s | Rate of Discharge |
| γ_d | kN/m ³ | Unit Weight of Dry Soil | I_p | % | Plasticity Index = $w_L - w_p$ | v | m/s | Discharge Velocity |
| ρ_{sat} | kg/m ³ | Density of Saturated Soil | I_L | | Liquidity Index = $\frac{w-w_p}{I_p}$ | i | | Hydraulic Gradient |
| γ_{sat} | kN/m ³ | Unit Weight of Saturated Soil | I_c | | Consistency Index = $\frac{w_L-w}{I_p}$ | k | m/s | Hydraulic Conductivity |
| ρ' | kg/m ³ | Density of Submerged Soil | e_{max} | % | Void Ratio in Loosest State | j | kN/m ³ | Seepage Force |
| γ' | kN/m ³ | Unit Weight of Submerged Soil | | | | | | |

RECORD OF BOREHOLE No 1

1 OF 1

METRIC

W.P. 6033-19-00 LOCATION Station 11+533 o/s 11.0m Lt of C/L N:5528983.916; E:355286.613 MTM Zone: ORIGINATED BY AF
 DIST NWR HWY 72 BOREHOLE TYPE Hollow Stem Auger COMPILED BY ZA/TG
 DATUM Geodetic DATE 2023.09.10 - 2023.09.10 LATITUDE 49.8961861 LONGITUDE -92.2972601 CHECKED BY DV

| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT | | | UNIT WEIGHT γ kN/m³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) | | | | |
|---------------|--|------------|---------|------|------------|----------------------------|-----------------|--|--|---|--|--|--------------------------------------|---|--|---------------|--|--|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | SHEAR STRENGTH kPa | | | | | | | W _p W W _L | | | |
| | | | | | | | | ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE | | | | | | | WATER CONTENT (%) | | | |
| 377.3 0.0 | CLAY - trace sand to Sandy, trace gravel, trace organics, wood fibers, grey, very soft | | | | | | 377 | | | | | | | | Water level @ 3.7 m on completion. | | | |
| | | | 1 | SS | 1 | | 376 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 375.6 1.7 | CLAY & SAND to Sandy - varved, grey, very soft to firm | | 2 | SS | 1 | | | | | | | | | | | 2 29 (69) | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 375 | | | | | | | | | | |
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| | | | 4 | SS | 1 | | | | | | | | | | | | | |
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| | | | 5 | SS | 1 | | | | | | | | | | | | | |
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| | | | | | | | 372 | | | | | | | | | | | |
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RECORD OF BOREHOLE No 2

1 OF 1

METRIC

W.P. 6033-19-00 LOCATION Station 11+541 o/s 13.9m Rt of C/L N:5528969.74; E:355308.284 MTM Zone: ORIGINATED BY AF
 DIST NWR HWY 72 BOREHOLE TYPE Hollow Stem Auger COMPILED BY ZA/TG
 DATUM Geodetic DATE 2023.09.11 - 2023.09.11 LATITUDE 49.8960568 LONGITUDE -92.2969603 CHECKED BY DV

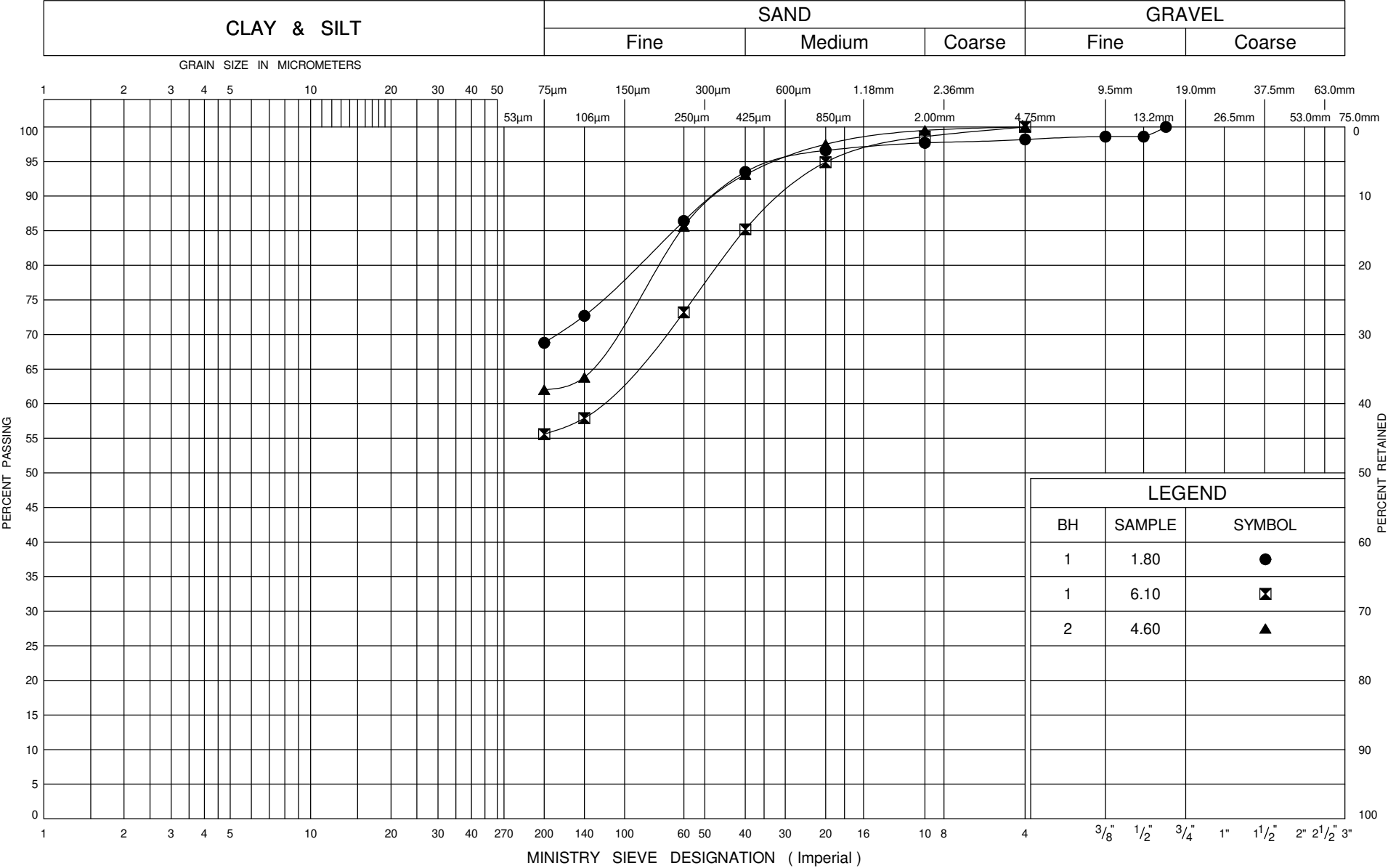
| SOIL PROFILE | | | SAMPLES | | | GROUND WATER CONDITIONS | ELEVATION SCALE | DYNAMIC CONE PENETRATION RESISTANCE PLOT | | PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT | | | UNIT WEIGHT γ kN/m³ | REMARKS & GRAIN SIZE DISTRIBUTION (%) |
|-----------------------|---|------------|---------|------|------------|----------------------------|-----------------|--|-------------------|---|--|--|--------------------------------------|---|
| ELEV DEPTH | DESCRIPTION | STRAT PLOT | NUMBER | TYPE | "N" VALUES | | | SHEAR STRENGTH kPa | | W _p W W _L | | | | |
| | | | | | | | | ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE | WATER CONTENT (%) | | | | | |
| 377.1 377.0 0.1 | TOPSOIL - 100 mm FILL - SAND & GRAVEL - some organics, some silt, brown, very loose | | | | | | 377 | | | | | | | Water @ surface. |
| 376.1 1.0 | ORGANICS - brown | | 1 | SS | 3 | | 376 | | | | | | | |
| 375.7 1.4 | SAND - Silty, some organics, grey, very loose | | 2 | SS | 1 | | 375 | | | | | | | 0 68 (32) Non Plastic. |
| 374.8 2.3 | CLAY to CLAY & SAND - varved, grey, very soft to stiff | | 3 | SS | 1 | | 374 | | | | | | | Temporary standpipe installed to 2.8 m. |
| | | | 4 | TW | | | | | | | | | | |
| | | | | | | | 373 | | | | | | | |
| | | | 5 | SS | 1 | | 372 | | | | | | | 0 38 (62) |
| | | | | | | | | | | | | | | |
| | | | 6 | SS | 1 | | 371 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 370 | | | | | | | Cave @ 7.2 m. |
| | | | 7 | SS | 9 | | | | | | | | | |
| 368.9 8.2 | End of Borehole @ 8.2 m. | | | | | | 369 | | | | | | | |

ONTARIO MTO MOD. CULVERT 68 HWY 72 11+537 ECHO.GPJ ONTARIO MTO.GDT 4-17-24

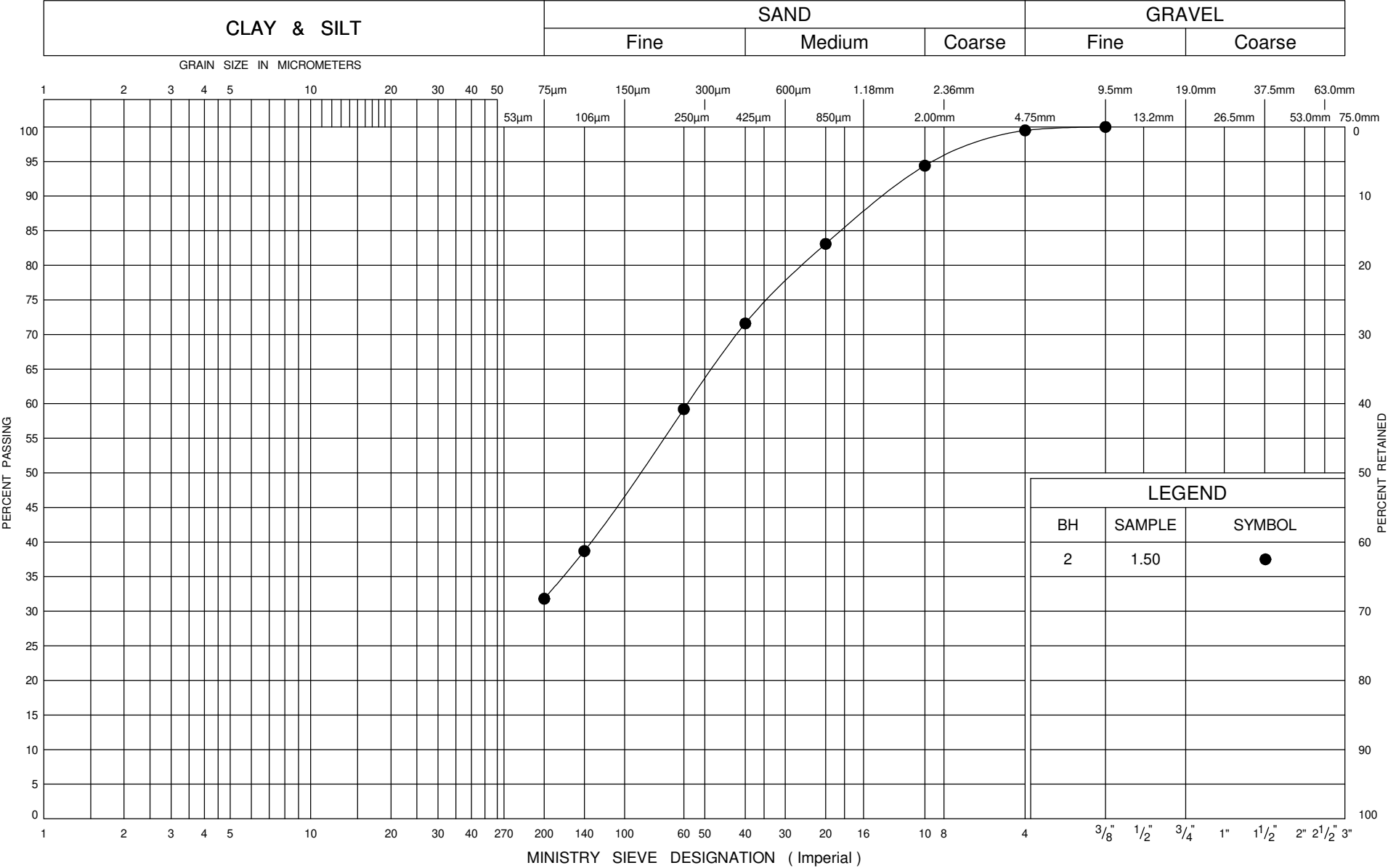
APPENDIX B

Laboratory Test Data

UNIFIED SOIL CLASSIFICATION SYSTEM

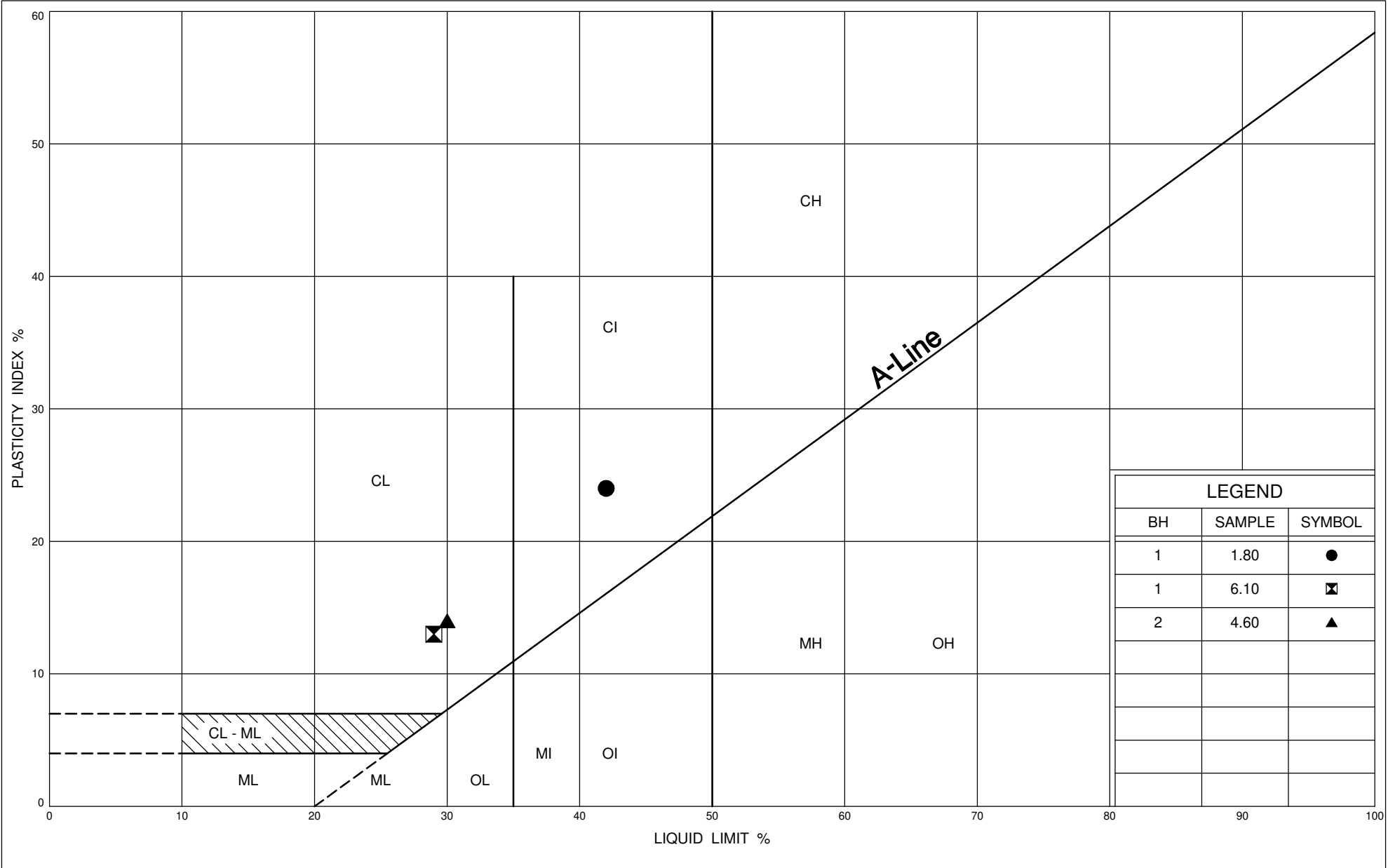


UNIFIED SOIL CLASSIFICATION SYSTEM



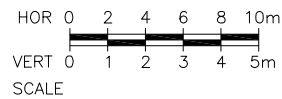
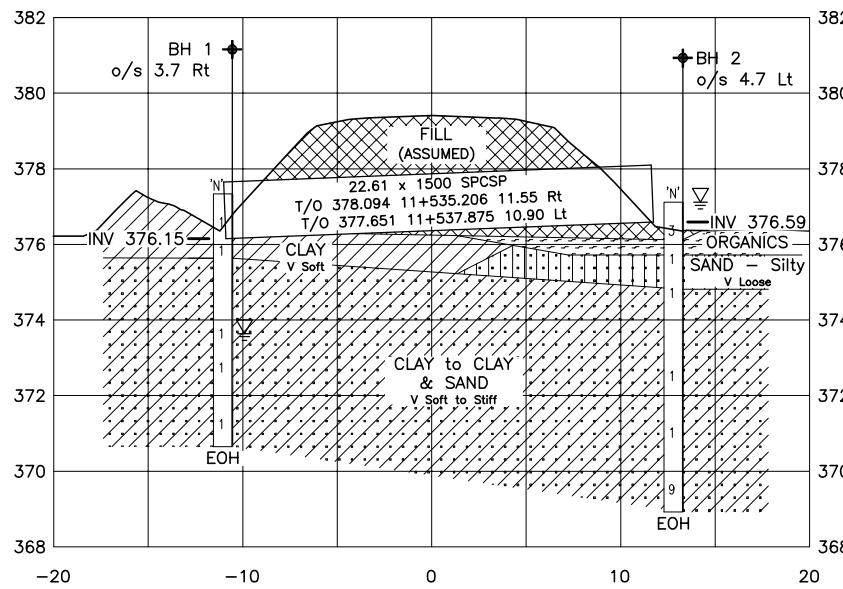
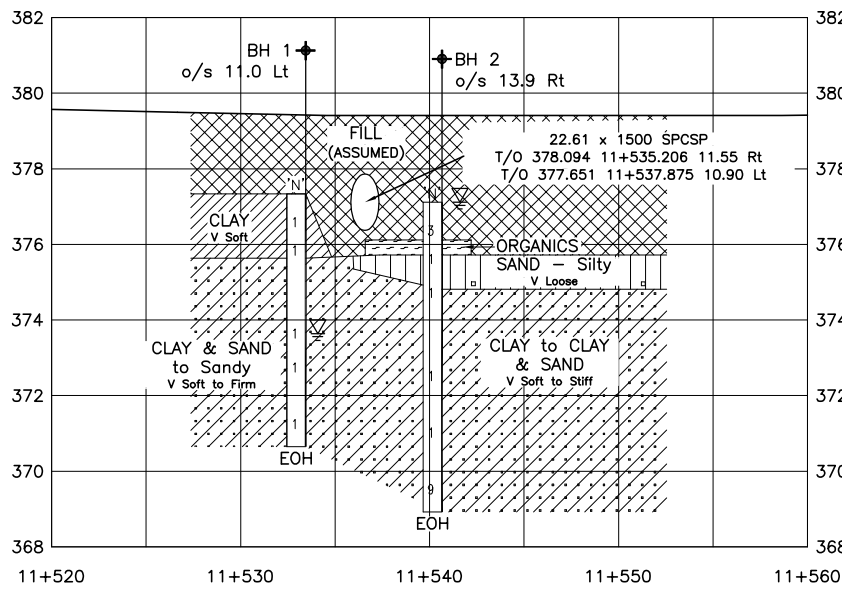
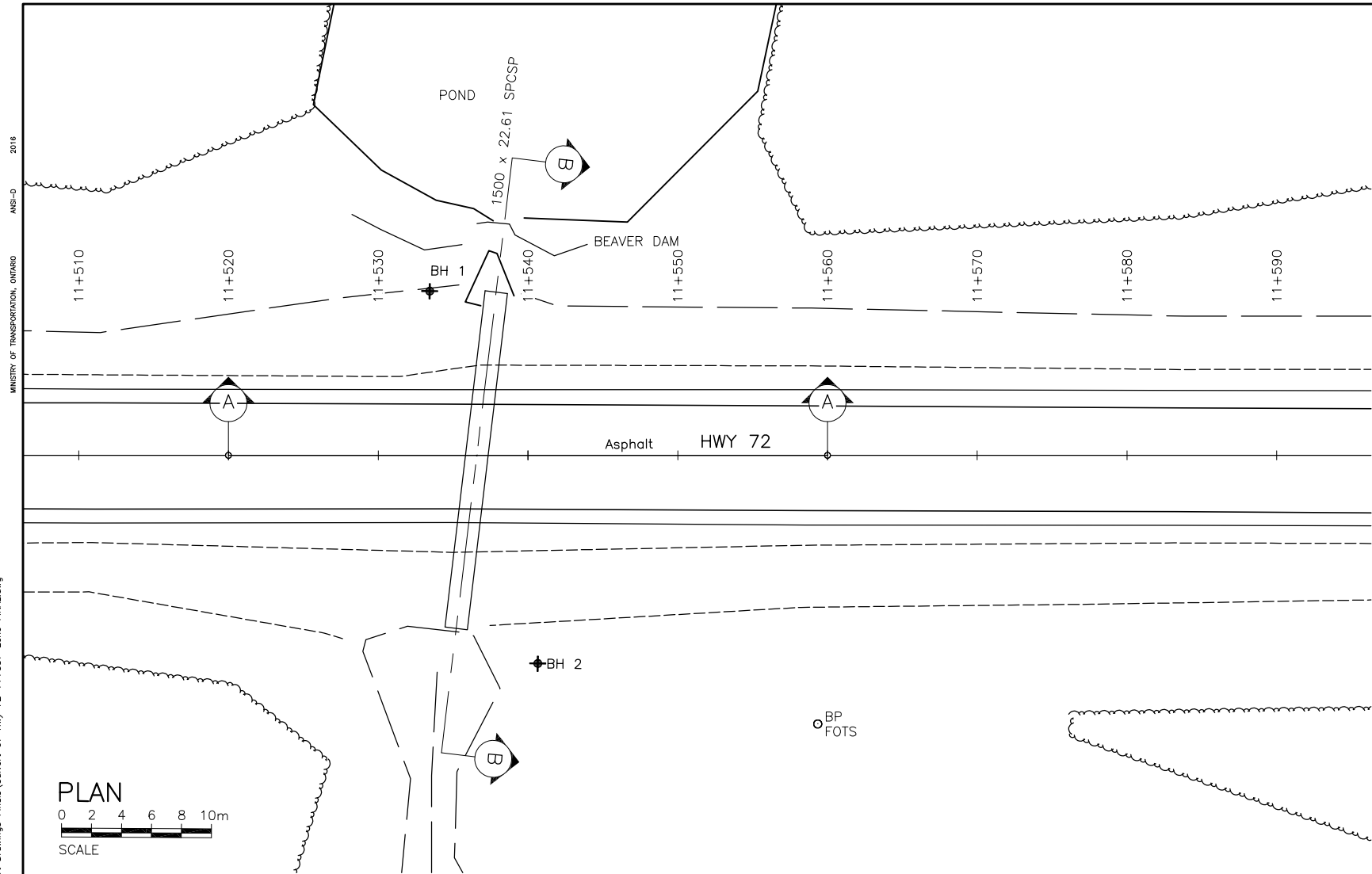
ONTARIO MOT PLASTICITY CHART CULVERT 68 HWY 72 11+537 ECHO GPJ ONTARIO MOT.GDT 4-17-24

Oct 75, FF - S - 21



APPENDIX C
Borehole Location and Soil Strata Drawings

FILE NAME: Y:\Projects\2022\22-146 MTO, NMR Geotechnical Retainer\22-146-10 - Hwy 72 & 664 FND\Drawings\Culvert Drawings\Culvert Drawings\Final\Culvert 67 Hwy 72 11+537 Echo FINAL.dwg
MODIFIED: 2024-04-17 10:42



DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES UNLESS
OTHERWISE SHOWN

Ontario Ministry of Transportation

GEOCRES 52F16-005

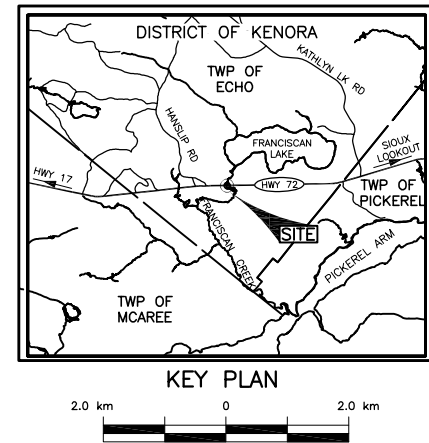
CONT -

GWP 6033-19-00

SOIL STRATA
STA 11+537 CULVERT #68
HIGHWAY 72, TOWNSHIP OF ECHO

SHEET -

TBT ENGINEERING
CONSULTING GROUP



| SOIL STRATA SYMBOLS | | | |
|---------------------|----------|--|--------------|
| | ORGANICS | | SAND - Silty |
| | FILL | | SAND & CLAY |
| | CLAY | | |

| LEGEND | | | |
|--------|---------------------------|-----------------------|---------|
| | Borehole | | |
| 'N' | Std Pen Test (Blows/0.3m) | | |
| | Water Level on Completion | | |
| EOH | End of Borehole | | |
| No | ELEVATION | CO-ORDINATES (MTM 16) | |
| | | NORTH | EAST |
| BH 1 | 377.3 | 16 5 528 984 | 355 287 |
| BH 2 | 377.1 | 16 5 528 970 | 355 308 |

NOTE

The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

DRAWING REFERENCED FROM B&C 5-22-72-3 PROVIDED BY CLIENT.

| REVISIONS | | ISSUED IN FINAL 26/03/24 | | | |
|-----------|----|--------------------------|----|------|----------|
| 2 | SS | ISSUED FOR REVIEW | | | |
| 1 | SS | | | | |
| DESIGN | XX | CHK | XX | CODE | XXXXXX |
| DRAWN | TG | CHK | SS | SITE | XXXXXX |
| | | LOAD | | DATE | 12/01/24 |
| | | | | DWG | 1 |

APPENDIX D
Site Photographs



**Left Embankment
Looking North, June 28, 2023.**



**Right Embankment
Looking South, June 28, 2023.**