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September 12, 2005

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Ministry of Transportation
Northeastern Region
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P1B 9S9

Via courier

Dear Mr. Pilon:

**Foundation Investigations
Highway 69 Route Selection Study
GWP 5377-02-00**

Attached please find three hard copies of the final Preliminary Foundation Investigation & Design Report, Swamp Crossings, and an electronic copy of the same in the enclosed cd.

We have incorporated into the final report the results of the additional drilling after the presentation of the draft report, and amended the report as per MTO's comments. The amendments are as follows:

A. Comments by Roch Pilon, P.Eng. of the Planning and Environment Section, Northeastern Region:

1. Page 4, Section 4.3 of the report has been revised as per comment.
2. Page 15, Section 5.8 of the report has been revised as per comment.
3. Page 19, Section 6.1.7 has been revised.
4. The drawings have been reviewed and changes made to the Key Plans as necessary.
5. The connection line on Sheet 7 has been corrected.
6. A note has been added to Drawing Sheets 21, 22 and 23 identifying the numbered alignment as the alignment at the beginning of the assignment.

7. The revised alignment station numbers have been rotated so that they are no longer upside down.
8. The missing station number on Drawing Sheet 25 has been added.
9. The table for the further investigation has been revised.

B. Comments by K. Ahmad, P.Eng. of Pavements and Foundations Section

1. Section 6.1 of report has been revised as per comment.
2. The reference in Section 6.4 has been changed from Appendix 'E' to Appendix 'F'.
3. The table in Appendix 'F' has been revised to add station limits and estimated depths of boreholes.
4. In Table 3 (previously Table 2) the comments "Not encountered" have been replaced by "Clay not encountered" and "Bedrock not encountered" as appropriate.
5. In Table 3 (previously Table 2), "Firm Bottom" has been defined.
6. On all borehole logs, "WP" has been changed to "GWP" and District Number 54 has been added.
7. The dates on the borehole logs are now in Metric format.
8. The symbols for the various deposits have been made consistent.
9. The font size of the moisture content values has been increased.
10. In some test holes, the cone test were terminated at depths where the blow counts exceeded 15 blows per 0.3 m, as agreed in the first project meeting.
11. The soil types in all dynamic cone test holes have been labeled as per comment.
12. The scale bar on all drawings has been enlarged.
13. "WP" has been changed to "GWP" on all drawings.
14. On Page 1 of the report, the words "Request for Proposal" have been changed to "Request for Quotation".
15. The Geocres Number has been added to the cover page of the report.

Yours truly,

Trow Associates Inc.



James Ng, M.Eng., P.Eng., MICE
Senior Engineer
Geotechnical Division

Enclosures: Three copies of final Preliminary Foundation Investigation & Design Report,
Swamp Crossings, and one cd

Distribution: Tom Crilly, Trow Associates, Sudbury, + 1 copy of final report
Tae Kim, MTO Pavement and Foundation Section, + 1 copy of final report
Stan Gonsalves, Trow Associates
Stan Gonsalves, Trow Associates Inc., + 1 copy of draft report

**Preliminary
Foundation Investigation & Design Report
Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

Prepared for:

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1. Introduction

A preliminary foundation investigation and design study was authorized by the Ministry of Transportation (MTO) for some of the structures and swamp crossings for the proposed four-laning of Highway 69. Within the study area, MTO selected twenty one (21) structures and seventy four (74) swamps for this investigation. This Preliminary Foundation Investigation and Design Report presents the factual data and preliminary design recommendations for the swamp crossings. A separate report has been issued for the structures.

The Terms of Reference for this study were outlined in the MTO Request for Quotation (Agreement No. 5004-E-0028, Highway 69), and in our proposal dated December 2004. The scope of work was subsequently modified by MTO to include additional works in the Grundy Straight Lake Area.

The work carried out for this study should be considered preliminary in nature. A limited number of boreholes were put down to provide general subsurface information at selected structures and swamp crossings to confirm the feasibility of the preferred alignment. Minor revisions were under consideration at the time of this investigation, and profile and structural layout drawings were not yet available. Detailed foundation investigations will be required at a later stage to provide detailed recommendations for the design of the structures and highway embankments, once the alignment has been finalized.

2. Site Description

The study area extends from 3.5 km north of Highway 559 (Town of Nobel) to 3.8 km north of Highway 522 (Grundy Lake Provincial Park), with a total length of approximately 68 km. Figure 1 attached in Appendix 'A' of this report shows the study area, which includes the Townships of Carling, Shawanaga, The Archipelago, Wallbridge, and Henvey. Within this area are lands belonging to the Shawanaga First Nation, the Magnetawan First Nation, and the Henvey Inlet First Nation, and a few private properties.

Within the study area, the existing Highway 69 is generally a two lane undivided roadway. The preferred alignment for the proposed four lane highway generally follows the existing highway but could deviate from it by 0.5 to 1 km at certain locations. The preliminary preferred alignment was determined in a route planning study currently underway.

The topography of the study area can be described as generally rolling, with heavily wooded areas, separated by rivers, lakes and low-lying swamp areas. Most of the lands along the preferred alignment are undeveloped, with a few open farms within the north half of the study area.

There are no major population center along the preferred alignment. The alignment by passes the communities of Pointe Au Baril, Britt, Still River and Key River by up to 1 km.

3. Physiography and Geology

The study area is located in the physiographic region known as the Georgian Bay Fringe, which occupies much of Parry Sound and Muskoka. This region is characterized by shallow bedrock, often exposed in many areas, and intermittent swamps that were filled in when glacial lake Algonquin inundated the area. The shallow overburden materials, where they exist, are mostly sand, silt and clay.

3.1 Bedrock Geology

According to OGS Maps, the area is underlain by strongly foliated and highly deformed gneissic and migmatic and felsic to intermediate intrusive rocks of Precambrian age. These rocks form part of the Central Gneiss Belt of the Grenville Province, a subdivision of the Canadian Shield.

Bedrock outcroppings and ridges are visible along much of the existing Highway 69 corridor. In the region between the Magnetawan River and Key River, many geological fault lines are highlighted by the shape of the linear lakes, elongated bays of Georgian Bay and the straight rivers that follow these lines. Where these faults occur the topography is typically characterized by steep sloping and smooth faced, or weathered outcrops.

3.2 Quaternary Geology

OGS Maps indicate that the area is dominated by bare bedrock terrain with less than 50 % of the area having shallow drift or sediment cover. The shallow drift depth reflects not only a lack of significant deposition by the last glacial advance, but also the wave-washing of the bedrock surfaces by the waters of the glacial lakes Algonquin and Nipissing. As such, glacial till, glaciofluvial outwash and glaciolustrine deposits are sparsely dispersed in this area. These deposits are found primarily in bedrock hollows and depressions.

Significant alluvial deposits are not found in this area. Minor amounts can be found in all creek and river valleys. Recent organic deposits of peat, muck and marl occur in abundance in the bedrock hollows and valleys.

Quality aggregate deposits are scarce throughout the area. Most existing pits exploit the glaciolustrine deposits. These are generally too fine grained and small in size to be of economic significance.

4. Investigation Procedures

The investigation procedures of this study consisted of a review of available subsurface information for the existing structures, a review of available water well records, and a field investigation program.

4.1 Available Subsurface Information for the Existing Structures

A review of the foundation drawings / information for the structures along the existing Highway 69 was carried out. No relevant information for the swamp crossings were found.

4.2 Water Well Records

The available water well records along the preferred alignment were obtained from the Ministry of Natural Resources and Ministry of Environment. Only one water well was found within the preferred alignment Right of Way (ROW). The location of this well, No. 48-08997, is shown on Drawing No. Sheet 4. The well record shows that bedrock was encountered at ground surface.

4.3 Field Investigation

In accordance with the Terms of Reference for this study, a number of boreholes/dynamic cone tests were put down at the various swamp areas. The locations of the swamp crossings boreholes and dynamic cone penetration tests are listed in Table 2 in Appendix 'B' of this report.

A few test holes in the Woods Road area were inaccessible due to the very soft ground condition. A number of the boreholes and cone penetration tests in the Grundy Lake area are located within the Henvey Inlet First Nation. Permission to enter the First Nation properties was not given, therefore no investigation was completed within these areas.

The boreholes and dynamic cone tests included in this report were put down between January 22 and April 2, 2005. Bombardier mounted power auger drill rigs equipped with hollow stem augers, and a tripod rig were used to drill the boreholes to depths ranging from 0 to 31.7 m below existing ground surface. The tripod rig was used for areas that were too soft to support the bombardier mounted drill. Most of these locations were submerged under 0.3 to 0.6 m of water at the time of the investigation, and considerable difficulties were experienced in drilling these holes. In order to minimize the delay, only one or two samples were taken in the tripod holes, supplemented with dynamic cone test below the depth of sampling. The tripod rig used a hammer that is half the weight of the one used in Standard Penetration Tests, and the height of the drop was also reduced. The 'N' values shown on the records of

boreholes for the tripod boreholes have been corrected for the lower energy used in sampling. Most boreholes were terminated at auger refusal on probable bedrock. The dynamic cone tests were driven to either refusal or where a blow count of 25 blows per 0.3 m was obtained. The boreholes and dynamic cone tests were put down under the full time supervision of field technicians from our Sudbury office.

Del Bosco Surveying Ltd. of Sudbury, Ontario, was engaged to lay out the boreholes, and to establish the borehole co-ordinates and elevations. The co-ordinates shown on the records of borehole and on the borehole location plans were referred to the MTM Zone 10 NAD 83 co-ordinate system. The borehole elevations were referenced to benchmarks along the existing Highway 69 as published by MNR. Drawing Nos. Sheet 1 to 25 in Appendix 'E' of this report shows the borehole and dynamic cone test locations.

For many of the boreholes and dynamic cone tests, access to the hole locations was established by clearing the vegetation using a backhoe, and packing snow on the ground to form an access road and a working platform.

In the boreholes, samples of the sub-soil were obtained at 1.5 m intervals of depth using the standard penetration test method. Where soft cohesive materials were encountered, relatively undisturbed Shelby tube samples were obtained, and insitu vane shear tests were preformed to assess the undrained shear strength of the soils. The samples were visually identified in the field and transported to our laboratory in Sudbury for testing. The groundwater levels in the boreholes were closely monitored during drilling. After drilling, all boreholes were backfilled according to MTO and MOE guidelines for borehole abandonment using bentonite mixed with soil cuttings.

4.4 Laboratory Tests

The samples were selectively tested in our laboratory for their index properties and engineering properties. The following tests were performed:

Natural water content (102)

Natural unit weight (1)

Grain size distribution (45)

Consistency (Atterberg) limits (15)

Specific gravity (1)

Consolidation test (1)

The results of the index tests and grain size analyses are summarized on the Records of Boreholes in Appendix 'C' of this report. The grain size distribution curves, Atterberg limits test results, and consolidation test results are shown plotted on Figures 2 to 10 attached in Appendix 'A' of this report.

5. Sub-surface Conditions

The sub-surface conditions encountered in the boreholes for each of the areas are summarized in Table 3 in Appendix 'C' of this report. Heavy snow cover at the time of the fieldwork precluded confirmation of the swamp locations on site. Therefore although the boreholes and cone tests were located in areas thought to be swamps, some of the boreholes and cone tests encountered refusal (probable bedrock) at or very close to existing ground surface. In the other boreholes, the general stratigraphy is composed of topsoil, peat and other organics overlying silty sand, sand, and silt (probably alluvial deposit), underlain by clay in some boreholes. A brief description of the relevant properties of the various soil strata encountered in the boreholes is presented in the following sections of this report. For details of the subsurface conditions at the test hole locations, reference should be made to the Records of Boreholes and Dynamic Cone Tests attached in Appendix 'D' of this report.

5.1 Woods Road Area (Drawing Nos. Sheet 1 – sheet 4)

In the Woods Road area, thirty one (31) boreholes and seventeen (17) dynamic cone tests were put down. Two boreholes and two cone test were not carried out due to the very soft ground conditions. Twenty boreholes / dynamic cone tests encountered probable bedrock at or just below ground surface. These test holes were located outside the confirmed swamp areas.

The other boreholes found organic and/or alluvial deposits to varying depths, as indicated below:

Station 12+000 to 12+200	0.9 to 4.8 m
Station 12+900 to 13+300	1.6 to 5.8 m
Station 16+600 to 16+800	1.9 to 4.6 m
Station 18+200 to 18+350	0.6 to 1.5 m
Station 18+800 to 10+100	0.7 to 1.9 m

One borehole encountered 2.3 m of sand **fill** overlying probable bedrock. SPT 'N' values of 12 to 14 blows per 0.3 m were recorded in the fill.

0.3 to 3.7 m of **peat** were found in fourteen of the boreholes, mostly at ground surface or under a thin layer of sand. The peat is fibrous, dark brown to black in colour, and wet. Moisture contents of the peat range from 418 to 1260%, and the SPT 'N' values are between 0 and 3 blows per 0.3m, suggesting very soft to soft consistency.

Silty sand or **sand** were encountered in eight boreholes. The thickness of the sand layer is between 0.3 and 4.4 m. In most boreholes the sand was found under the peat deposit. A wide range of SPT blow counts were recorded in the silty sand, from 0 to 60 blows per 0.3 m,

which indicate that the sand is very loose to very dense. The sand found in the boreholes located at the edge of the swamps is denser. Some of the sand layers contain some organics. The moisture contents of the sand range from 8 to 34%. Figure 3 in Appendix 'A' of this report shows four grading curves of the sand deposits in this area. The tested samples contain 3 to 4 % gravel, 47 to 88% sand, 9 to 35% silt, and about 2 to 15% clay. Figure 3 also shows a sample of gravelly sand taken from one of the boreholes.

An approximately 2.0 m thick layer of **clay** was found underlying the peat in one Borehole WR-3. Figure 6 in Appendix 'A' shows a grading curve of the clay. The tested sample is composed of 4% sand, 69% silt and 27% clay. The liquid limit, plastic limit, and plasticity of the clay are 29%, 14%, and 15, respectively. An 'N' value of 0 (i.e. weight of hammer) was obtained in the clay. The natural moisture content of the clay is between 42 and 52%. Undrained shear strength of the clay, as measured by insitu vane shear test, is 17 kPa. No correction factor for plasticity or organic content has been applied to the field vane test results. The sensitivity (ratio of undisturbed to remoulded shear strength) is 2. The above results indicate a very soft to soft clay of low plasticity and low sensitivity. Figure 10 in Appendix 'A' shows the results of a consolidation test performed on the clay. The compression index (C_c) of the tested sample is 0.459, and the coefficient of consolidation (C_v) is about 6×10^{-4} to 2.5×10^{-3} cm^2/sec .

All boreholes encountered auger refusal, probably on rock. The depth to the inferred bedrock ranged from 0 to 6.4 m.

Of the boreholes / cone tests that did not encounter refusal at or near ground surface, six were dry at the completion of drilling. However, these short term observations may not represent the true groundwater conditions at those locations. The remaining boreholes were located in low lying areas, and groundwater was at 0.8 m below to 0.3 m above ground surface (i.e., these boreholes were submerged) shortly after drilling.

5.2 Shawanaga (Drawing No. Sheet 5 to 8)

Sixteen (16) boreholes and three dynamic cone tests have been put down in this area (two cone tests were not performed due to access problems). The boreholes encountered alluvial deposits of mostly sand and silt deposits. Clay was also encountered in a few boreholes and relatively thin. The depths to refusal (inferred bedrock) in the boreholes and cone tests are as follows:

Station 11+700	1.5 m
Station 13+400	7.3 m
Station 14+300 to 14+450	1.1 to 3.1 m
Station 14+775 to 14+850	0.8 to 9.0 m
Station 15+000	10.0 m
Station 15+725 to 15+750	7.3 to 10.8 m

Station 16+425 to 16+500	10.7 to 11.1 m
Station 17+225 to 17+ 350	6.6 to 7.7 m
Station 17+700 to 17+950	8.5 to 8.8 m
Station 18+500 to 18+750	1.7 to 4.0 m

Peat, from 0.3 to 2.5 m thick, was encountered at ground surface in twelve boreholes. The peat is fibrous and very soft to stiff. A blow count of 0 was obtained in one borehole, and about 11 blows per 0.3 m (after adjusting for hammer weight and drop) was obtained in another borehole.

The majority of the soil profile of the boreholes in this area is either **sand or silty sand**, which were found in all but one borehole. In two boreholes there were two sand layers separated by a clay layer. The thickness of the sand layer varies from 0.8 to 10.8 m. SPT 'N' values of 2 to 21 blows per 0.3 m were recorded in the sand and silty sand, indicating very loose to compact conditions. The moisture contents of the sands are about 19 to 20% (i.e. full saturation). Figure 3 shows two grading curves of the sand deposits from this area. The samples are composed of 56 to 92 % sand, and 8 to 42% silt, and about 2% clay.

Two of the boreholes encountered **silt and sandy silt**, which could be a sub-unit of the sand deposits but with slightly different composition. Figure 4 shows a grading curve of the sandy silt, which is composed of 47% sand, 50% silt and 3% clay. The moisture content of this sample is 19%. SPT blow counts of 3 to 22 blows per 0.3 m indicate very loose to compact conditions.

A layer of **clay** was found in three boreholes in this area, either underlying the sand, or is interbedded with the sand and the silt deposits. The thickness of the clay layer is about 1.7 to 2.4 m. The liquid limit, plastic limit, and plasticity index of a sample of the clay was found to be 53%, 21%, and 32, respectively. The moisture content of this sample is 72% (i.e., above its liquid limit). This samples is composed of 8% sand, 55% silt, and 37% clay (Figure 6). SPT 'N' values of 0 to 2 blows per 0.3 m were obtained in the clay. The above results indicate a clay of high plasticity, and very soft to soft consistency.

Shortly after drilling, the water level in the boreholes were from 0.4 m below to 1.4 m above ground surface (five of the boreholes were submerged).

5.3 South Pointe Au Baril (Drawing Nos. Sheet 9 to 11)

Sixteen (16) boreholes and five (5) dynamic cone penetration tests were put down in this area. Most of the boreholes / cone tests encountered refusal at shallow depth. The overburden materials are mostly peat or sand. The depths to refusal (inferred bedrock) are as follows:

Station 20+450	0.8 m
Station 21+ 125 to 21+300	0.2 to 0.9 m

Station 21+500 to 21+ 700	0.5 to 2.3 m
Station 10+050 to 10+600	0.1 to 9.9 m
Station 11+800 to 11+950	0.3 to 3.6 m
Station 12+775	0.2 m

At the ground surface of nine of the boreholes is a layer of fibrous **peat** that extended to between 0.2 and 8.9 m depths (mostly less than 3.7 m). SPT blow counts of 0 to 1 blow per 0.3 m suggest very soft consistency. The moisture contents of the peat range from 81 to 891%.

Organic silt underlies the peat in two of the boreholes. Figure 4 shows the grading curve of a sample of the organic silt, which is composed of 5% gravel, 33% sand, 53% silt, and 9% clay. This sample has a moisture content of 127% (407% for another sample) and an 'N' value of 1 blow per 0.3 m.

The majority of the overburden materials in this area are either **sand or silty sand**. Where they are encountered, the sand layers are about 0.5 to 1.8 m thick. The grading curve of a sample of the sand is shown in Figure 3. This sample is composed of 7% gravel, 73% sand, and 20% silt and clay. This sample has a moisture content of 15%. Standard penetration blow counts of 2 to 13 blows recorded in the sand deposits indicate very loose to compact conditions.

An approximately 1.5 m thick **clay** layer was encountered in one of the boreholes at 4 m depth. This clay has a liquid limit of 56%, a plastic limit of 20%, and plasticity index of 36. Its moisture content is 84%, which is above its liquid limit. Figure 7 shows a grading curve of the clay, which is composed of 6% sand, 37% silt and 57% clay. With an 'N' value of 0, the clay is very soft.

At the time of the fieldwork, groundwater was at or just below ground surface in most of the boreholes.

5.4 North Pointe Au Baril (Drawing Nos. Sheet 12, 13)

Ten (10) boreholes and four (4) dynamic cone tests were put down in this area. Seven of the boreholes / dynamic cone tests encountered probable bedrock at or just below ground surface. These test holes are located in areas not marked as swamps in the preliminary Route Planning Study report. The depths of the boreholes or the depths to refusal (inferred bedrock) are as follows:

Station 16+250	3.5 m (refusal not encountered)
Station 16+750 to 16+ 900	0 to 1.8 m
Station 18+200 to 18+375	0 to 6.0 m
Station 19+200 to 19+ 250	9.3 to 9.9 m (refusal not encountered)
Station 19+675 to 19+750	0.2 to 4.0 m

A layer of **peat** was found at ground surface (or the submerged ground surface) in Boreholes NPB-4 to NPB-9. The thickness of this layer varies from 0.3 m to 6.3 m. The peat is dark brown in colour, fibrous to amorphous, and wet. The moisture contents of the peat range from 278 to 2125%, i.e., the peat contains 26 to less than 5% (by weight) of solid. The SPT 'N' values of the peat are from 0 to 3 blows per 0.3 m, suggesting very soft to soft consistency.

Sand was found in Borehole NPB-1 extending from ground surface to about 2.2 m depth. This material is brown in colour, fine grained and poorly graded. It has an SPT 'N' value of 11 blows per 0.3 m, indicating compact condition. A 0.2 m thick layer of dense sand containing cobbles was also found at the bottom of Borehole NPB-9. This layer could be weathered rock.

A relatively thin (about 0.4 m) layer of **silt** was found in Borehole NPB-1, where it underlies the sand layer, and contains some sand and cobbles. It has a blow count of 21 blows per 0.3 m, indicating compact condition.

Clay and Silty Clay were encountered in five boreholes, and possibly also exist in one other borehole (NPB-7). The clays generally underlies the peat, and has a thickness varying from 0.2 to 3.7 m. The clays are found to have natural moisture contents of 27 to 62%, and liquid limit, plastic limit, and plasticity index of 42 to 52%, 20 to 26%, and 16 to 30, respectively. The undrained shear strength of the clay, as measured by insitu vane shear tests, varies from 40 to 45 kPa, with sensitivities of 2.0 to 7.6. The SPT 'N' values recorded in the clay range from 0 to 10 blows per 0.3 m. The above results indicate a soft to stiff clay of medium to high plasticity and low to high sensitivity. Figures 6 and 7 in Appendix 'A' show four grain size curves of the clay in this area. It is composed of 8 to 34% sand, 35 to 66% silt, and 25 to 53% clay size particles.

Other than the boreholes that found (probable) rock near ground surface, the other test holes were located in low lying areas. Groundwater at completion of drilling was found at between 0.3 m below to 1.5 m above ground surface.

5.5 Harris Lake South Area (Drawing Nos. Sheet 14, 15)

One borehole (HLS-7) in this area encountered probable bedrock at ground surface. The other boreholes encountered peat overlying sand, silty sand, or sandy silt, which in turn overlies clay. The sandy soils were absent in two boreholes. The depths of the boreholes or the depths to refusal (inferred bedrock) are as follows:

Station 23+100	5.3 m (refusal)
Station 23+825	2.6 m (refusal)
Station 24+450	2.2 m (refusal)
Station 24+800 to 24+ 900	4.3 to 9.5 m (refusal)

Station 25+225 2.9 m (refusal)
Station 10+350 to 10+400 0 to 4.3 m (refusal); 3.3, 5.8 m (not refusal)

Peat was found at ground surface (sometimes submerged) of five borehole. The thickness of the peat vary from 0.2 to 0.3 m in four holes, and about 2.0 to over 2.4 m in the other boreholes. SPT 'N' values of 1 blow per 0.3 m, and a moisture content of 139% were obtained in the peat.

An approximately 1.2 to 2.3 m thick layer of **sand** was found in three boreholes. The sand is brown in colour, fine grained, and poorly graded. Figure 3 in Appendix 'A' shows a grading curve of the sand, which is composed of 91% sand, and 8% silt and clay size particles. The sand has 'N' values of 2 to 12 blows per 0.3 m, which indicate very loose to compact conditions.

In Borehole HLS-1, the sand is underlain by **silty sand**. This stratum is about 1.5 m thick at the borehole location. It is composed of 50% sand, 46% silt, and 4% clay (Figure 2). The silty sand is compact, based on the penetration blow count of 16 blows per 0.3 m recorded in this stratum.

In Borehole HLS-9, the peat is underlain by **sandy silt**, which extended from about 2.0 m depth to about 4.3 m. This is a poorly graded soil containing 28% sand, 61% silt and 11% clay (Figure 4). It has 22% moisture, and a blow count of 7 blows per 0.3 m, which indicates loose condition.

A layer of **silty clay** was found in Boreholes HLS-1, HLS-2, HLS-6 and HLS-8, underlying either the sand or the peat. It is about 0.6 to 1.7 m thick. Three samples of the clay were tested and found to contain 10 to 22% sand, 42 to 68% silt and 22 to 36% clay. These grading curves are shown in Figure 6 in Appendix 'A' of this report. The natural moisture content of the silty clay varies from 26 to 54%. An Atterberg limits test yielded a liquid limit of 39%, a plastic limit of 16%, and a plasticity index of 24, indicating medium plasticity. Penetration blow counts of 7 and 12 blows per 0.3 m were recorded in the silty clay. An insitu vane shear test obtained an undrained shear strength of 35 kPa, with a sensitivity of 5.1. These results show a clay of firm to stiff consistency and low sensitivity.

As in the other areas, the boreholes / dynamic cone tests were located in low lying areas. The groundwater levels observed at the borehole locations shortly after drilling was completed ranged from 0.6 m below to 0.9 m above ground.

5.6 Harris Lake North (Drawing Nos. Sheet 16, 17, 18)

In this area, nine (9) boreholes and one dynamic cone penetration test were completed in the largely isolated swamp areas. Four of the boreholes encountered refusal at or just below ground surface. The other boreholes found as much as 9.5 m of overburden soils consisting

of sand in some places, and peat overlying very soft clay in others. The depths to refusal (inferred bedrock) are as follows:

Station 13+925	0
Station 17+750 to 17+850	0.4 to 8.3 m
Station 18+225	0.4 m
Station 18+600	2.9 m
Station 18+800	6.8 m
Station 18+925	1.8 m
Station 19+000	0
Station 19+875	8.7 m

It should be noted that, due to the submerged condition in this area, the boreholes were drilled using a tripod drill, which could only sample to a certain depth. In many boreholes, a dynamic cone test was performed below the last sample to estimate the depth to bedrock.

Peat was encountered at the ground surface of eight boreholes, and extended to depths ranging from 0.3 to 2.6 m. The peat is fibrous and very soft, with blow counts of 0 to 1 blow per 0.3 m. A sample of the peat was found to have a moisture content of 125%.

Sand was found in two boreholes. In Borehole HLN-9, it is only 0.3 m thick. In Borehole HLN-3, it is at least 0.7 m thick, and could be as thick as 7.7 m. The sand is poorly graded and very loose to compact. Its SPT 'N' values are between 2 and 10 blows per 0.3 m.

In three of the boreholes, a layer of **clay** was found underlying the peat. In two of the boreholes it is 0.9 to 1.2 m thick, and is underlain by inferred bedrock. In Borehole HLN-9, it is at least 0.3 thick. It is possible that the clay extends to considerable depth (8.7 m) in this borehole. The liquid limit, plastic limit, and plasticity index of the clay are 25 to 31%, 17 to 18%, and 8 to 13, respectively, which are typical of a low plasticity clay. Its moisture contents are 30 to 44%. Two grading curves of the clay are shown in Figure 6 in Appendix 'A' of this report. The samples are composed of 0 to 1% gravel, 10 to 24% sand, 50 to 67% silt, and 15 to 23% clay. The 'N' values of the clay are between 1 and 10 blows per 0.3 m, which suggest very soft to stiff consistency.

At the time of the fieldwork, the areas where the boreholes were located were submerged under 0.4 to 0.8 m of water.

5.7 Magnetawan (Drawing Nos. Sheet 18 to 22)

Thirty two (32) boreholes and thirteen (13) dynamic cone penetration tests were completed in this area. Of these, twenty four (24) test holes encountered refusal (inferred bedrock) at less than 1 m depths. In the other boreholes, the predominant soil profile consists of peat overlying sand and silty sand. Silt was found in four boreholes, and a deep deposit of clay was found in Borehole M-25. The depths to inferred bedrock are as follows:

Station 20+100	7.9 m
Station 20+925 to 21+000	1.6 to 2.8 m
Station 22+000 to 22+250	0 to 0.8 m
Station 22+400 to 22+650	0 to 0.5 m
Station 22+800 to 23+000	0 to 0.6 m
Station 23+100 to 23+200	0.1 to 1.5 m
Station 10+250 to 10+425	0.2 to 0.5 m
Station 10+550 to 10+700	0.6 to 2.1 m
Station 11+050 to 11+100	3.4 to 3.7 m
Station 12+300 to 12+350	0
Station 12+500 to 12+650	9.1 to 13.4 m
Station 13+300	3.4 to 5.2 m
Station 13+600 to 13+700	5.0 to 11.1 m
Station 13+900	0.8 to 2.1 m
Station 14+200	8.2 to 9.8 m
Station 14+500	7.4 to 7.9 m

A layer of **peat**, varying from 0.2 to 1.3 m in thickness, was contacted in eighteen (18) boreholes where refusal was encountered not at shallow depths. The peat is very soft and fibrous.

Sand or silty sand form the majority of the soil profile in fourteen (14) boreholes in this area, where they usually underlie the peat, and in many cases, also extend to the bottom of the boreholes. The thickness of the sand deposits varies from 0.4 to 7.8 m. the sands are poorly graded, and saturated. Their moisture contents vary from 21 to 52%. Two samples of the sands were tested and found to contain 92 to 95% sand, and 5 to 9% soil fines (silt and clay). These grading curves are shown in Figure 2 in Appendix 'A' of this report. The SPT 'N' values of the sands range from 2 to 20 blows per 0.3m, indicating very loose to compact, but mostly very loose to loose, conditions.

In Boreholes M-22 and M-31, the majority of the soil profile consists of silt and sandy silt. Silt was also contacted in Boreholes M-25 and M-27. Figure 4 in Appendix 'A' shows three grading curves of the silts from this area. The samples are composed of 0 to 4% gravel, 2 to 44% sand, 50 to 86% silt, and 2 to 12% clay. The silts are saturated (moisture contents of 13 to 42%) and dilatant. Their 'N' values of 1 to 11 blows per 0.3 m indicate very loose to compact conditions.

In Borehole M-25, the soil profile is quite different from the other boreholes in this area. Here, the dominant soil types are clayey silt, silty clay and clay.

Clayey silt extends from 1.5 m to 2.7 m. It has a moisture content of 52%, and an 'N' value of 0, which suggests very soft consistency. It is composed of 15% sand, 70% silt, and 15% clay (Figure 5).

Underlying the clayey silt is a 1.4 m thick layer of **silty clay**, which has a moisture content of 33%. Its 'N' value is 0, and its undrained shear strength, as evaluated by insitu vane shear test, is 12 kPa with a sensitivity (ratio of undisturbed to remolded strengths) of 3.0. A grading curve of the clayey silt is shown in Figure 7. The tested sample is composed of 2% sand, 70% silt, and 28% clay.

The silty clay is underlain by **clay** that extends to 11.7 depth. The properties of the clay are as follows:

Moisture content – 63 to 90%
Liquid limit – 47%
Plastic limit – 20%
Plasticity index – 27
'N' value – 0 to 1 blows per 0.3 m
Undrained shear strength – 16 to 32 kPa
Sensitivity – 2.0 to 4.0
Grading – 2% sand, 31 to 49% silt, 49 to 67% clay

These results indicate a medium plastic clay of very soft to firm consistency and low sensitivity.

5.8 Grundy Lake 3A-Rev (Drawing Nos. 21, 23 to 25)

Seventeen (17) boreholes and eight (8) dynamic cone penetration tests have been completed for this area for the original preferred alignment. Five boreholes and two cone tests within the Henvey Inlet First Nation lands will not be drilled because permission to enter was not obtained. Due to the anticipated difficult ground conditions around the Portage Lake CNR area, the highway alignment has been re-located to the west, and five additional boreholes (PL-1 to PL-4, PL-6, PL-7) were put down for the revised alignment. Of the completed boreholes, only one encountered refusal at less than 1 m depth. The sub-surface conditions are highly variable within this area. South of Bekanon Interchange, the boreholes found sand overlying bedrock (inferred from refusal) at 5.3 to 14.2 m. Around the Portage Lake revised alignment area, one of the boreholes (PL-6) found deep deposits of sand and soft clay were extending to 32.9 m depth found. The depths of the test holes and the depth to inferred bedrock are as follows:

Station 15+650 to 15+850	4.6 (no refusal) to 14.2 m (refusal)	
Station 16+850 to 17+000	1.8 m (refusal), 5.4 m (no refusal)	
Station 12+200	0 to 3.7 m (refusal)	revised alignment
Station 12+600 to 12+800	8.4 m (refusal), 37.5 m (no refusal)	revised alignment
Station 13+800 to 13+850	1.5 to 5.5 m (refusal)	
Station 15+300 to 15+300	0.8 to 7.0 m (refusal)	
Station 16+200 to 16+500	1.8, 4.6 m (refusal), 3.4 to 12.7 m (no refusal)	

Station 16+650 to 16+750 4.7 m (refusal)

Station 16+975 to 17+050 8.2 m (refusal)

Peat, varying from 0.2 to 2.1 m thick, was encountered at ground surface in nine of the boreholes. The peat has moisture contents of 97 to 210%, and 'N' values of 0 to 2 blows per 0.3 m, which suggest very soft to soft consistency.

Sand or silty sand was found in ten boreholes, either underlying the peat, or was found at ground surface. The thicknesses of the sand layers are quite variable, from 0.6 to 14.2 m. The sands are poorly graded, as can be seen from the grading curves shown in Figure 2, which show that these soil units are composed of 70 to 98% sand, and 3 to 30% soil fines (silt and clay). SPT blow counts of 0 to 28 blows recorded in the sands indicated very loose to compact conditions.

A layer of **silt**, varying in thickness from 1.5 to 6.1 m, was found in four boreholes. The silt has moisture contents of 23 to 30% (i.e., saturated) and are dilatant. Figure 4 shows three grain size curves of the silts from this area. They are composed of 3 to 13% sand, 83 to 87% silt, and 4 to 14% clay. The 'N' values of 1 to 10 blows per 0.3 m recorded in the silt indicate that it is very loose to compact.

In two of the boreholes, a 0.8 m thick layer of **clayey silt** was found at 0 to 1.5 m depths. This soil is composed of 1% sand, 82% silt, and 17% clay (Figure 5). An 'N' value of 2 blows per 0.3 m suggests soft consistency.

In the northern half of this area, **clay** was found in nine boreholes. In one of the boreholes, two clay layers were encountered. The thicknesses of the clay layers range from 1.0 to 9.9 m. The other properties of the clay are as follows:

Moisture content – 29 to 93%

Liquid limit – 29 to 92%

Plastic limit – 16 to 33%

Plasticity index – 13 to 59

'N' value – 0 to 5 blows per 0.3 m

Undrained shear strength – 20 to 64 kPa

Sensitivity – 4.0 to 13.3

Grading – 1 to 18% sand, 40 to 74% silt, 18 to 58% clay

These results indicate a low to high plasticity clay of very soft to firm consistency and medium to high sensitivity.

6. Discussion and Preliminary Recommendations

For ease of reference, the subsurface conditions encountered in the different swamp areas are summarized in Table 3 in Appendix 'C' of this report, which also shows the depth to "firm bottom" (defined as non cohesive soils with SPT blow counts of 8 or higher, or cohesive soils with undrained shear strength of 50 kPa or higher). In many areas, probable bedrock (as inferred from auger or cone test refusal) was encountered at or just below ground surface. In the other boreholes, the general stratigraphy can be described as peat, mostly fibrous, (and other organics) overlying alluvial deposits of silty sand, sand, and silt, which in turn overlie clay or silty clay and finally bedrock. The peat and organic deposits are very soft to soft, while the alluvial deposits are very loose to compact. The clay and silty clay are generally very soft to soft. Groundwater was in most areas close to or above existing ground surface. Some of the borehole locations were submerged.

The peat and other organic deposits are very soft and highly compressible. They are not considered suitable to support the highway embankment, and should therefore be completely removed from the foot print of the embankments wherever practical.

The very soft clay and silty clay are also considered unsuitable to support the highway embankment because they could cause large settlements and/or stability problems. The soft to firm clay and silt clay may or may not be suitable for embankment support depending on the thickness of the cohesive soil layer and the height of the embankment. More detailed analysis should be carried out when the highway alignment has been finalized and the road profile becomes available. At that time the best strategy for embankment construction can be adopted.

In general, the sand, silty sand, and silt deposits are considered capable of supporting the highway embankments. Most of these deposits are very loose to loose, and some embankment settlements are expected; however, most of the settlements should occur during construction.

6.1 Embankment Design

All embankments should have finished slope gradients of 2H:1V or flatter for earth or aggregate fills, and 1.25H:1V for rock fills. A 2 m wide berm should be provided for rockfill embankments higher than 10 m, and for earth fill embankment higher than 8 m sitting on competent soil or rock. Earth and granular fills above water table should be compacted to minimum 95% standard Proctor maximum dry density. Berms may also be required for lower embankments in poor soil condition areas.

For the swamp crossings, all peat and organic deposits, and soft cohesive soils should be excavated or displaced from the footprint of the embankments. For embankment heights of

4.5 m or less above present grades, and depth to firm bottom of 6 m or less, swamp treatment in accordance with OPSD 203.01 is applicable. In some areas where the depth of the soft deposits exceed 6 m, the soft soils could be completely removed, or they may be excavated to the depth to firm bottom as indicated in Table 3 in Appendix 'C'. For embankments higher than 4.5 m founded on firm cohesive soils, the stability of the embankments should be assessed at detailed design stage. It may be necessary to apply non standard slope gradient, toe berms, or other means to ensure that stability is satisfactory.

The swamp areas where the depths of the soft/loose soils conditions sub-excavation is expected to exceed 6 m are listed below.

6.1.1 Shawanaga Area Station 14+775 to 14+850 (Drawing No. Sheet 6)

Very loose silty sand was found in Borehole S-6 to 0.8 m depth. Cone test below the sample depth indicates that loose sand extends to about 7 m below ground surface. Stability of the highway embankment should not be a problem. Some settlements can be expected, but the settlement should occur fairly rapidly. For preliminary design of embankments higher than 4.5 m, a sub-excavation depth of about 5 m may be assumed.

6.1.2 Shawanaga Area Station 14+900 to 14+975 (Drawing No. Sheet 6)

In this area, peat extends to 1.3 m depth, underlain by very loose silty sand. After removing the peat, the stability of the highway embankment should not be a problem. However, to minimize long term settlement, some sub-excavation could be required. For preliminary design of embankments higher than 4.5 m, the sub-excavation depth may be assumed to be 6 m.

6.1.3 Shawanaga Area Station 15+750 to 15+775 (Drawing No. Sheet 6)

The boreholes in this area found about 1.2 m of peat, overlying compact to very loose silty sand, which in turn overlies very soft clay. For stability of embankment higher than 5 m, and to minimize long term settlement, the peat and the clay should be sub-excavated.

6.1.4 Shawanaga Area Station 16+400 to 16+525 and 17+225 to 17+330 (Drawing No. Sheet 7)

About 1.0 to 1.2 m of peat was found overlying compact to very loose silty sand or sandy silt. The peat should be completely removed. The sand/silt need not be sub-excavated for embankments not exceeding 5 m high. For higher embankments, further analysis should be carried out at detailed design stage.

6.1.5 Shawanaga Area Station 17+700 to 17+95, SBL (Drawing No. Sheet 7)

This is the area adjacent to the Shawanaga River. The borehole on the north side of the river found bedrock at 8.5 m depth, overlain by peat and very soft clay. Preliminary analysis shows that the stability of 5 m high embankments should be satisfactory. For higher embankments and/or to minimize settlement, the very soft clay should be removed by sub-excavation. Additional boreholes will be put down on the south side of the river, and the results will be reported in an Addendum to this report.

6.1.6 South Pointe Au Baril Station 10+100 (Drawing No. Sheet 9)

Borehole SPB-8 encountered 9.9 m of peat and organic sandy silt. All the organic deposits under the highway should be excavated. However, it appears that the swamp area may be outside the highway embankment.

6.1.7 South Pointe Au Baril Station 10+250 to 10+550 (Drawing Nos. Sheet 9 and 10)

Borehole SPB-10 located at the south end of this swamp encountered 2.4 m of peat, overlying 1.6 m of loose sand, and 1.5 m of very soft clay. The peat should be completely removed. The sand and the clay need not be removed for embankments less than 4.5 m in height, but surcharge should be applied to shorten the period of the settlements. For higher embankments, further analysis should be carried out to determine whether the sand and the clay needs to be removed.

6.1.8 North Pointe Au Baril Station 19+175 to 19+225 (Drawing No. Sheet 13)

About 6.3 m of peat was found overlying very soft clay. The depth of the very soft clay is estimated to be about 2.5 m below the bottom of the peat. For stability and settlement reasons, the peat should be completely removed. The clay may or may not have to be removed depending on the height of the highway embankment in this area. If necessary, light weight fill could be used to minimize long term settlements.

6.1.9 Harris Lake North Station 17+725 to 17+825 (Drawing No. Sheet 17)

Borehole HLN-3 encountered 0.6 m of peat, and very loose condition (probably sand) to about 6 m below the peat. Stability of the embankment should not be a problem after removing the peat, but to minimize settlement problem, some sub-excavation may be necessary for embankments higher than 4.5 m. The depth of sub-excavation will depend on the actual height of embankment.

6.1.10 Harris Lake North Station 18+750 to 18+825 (Drawing No. Sheet 17)

The soil profile in this area comprises 2.6 m of peat overlying very soft clay to about 6.8 m depth. The peat should be completely excavated, and the clay likely will have to be excavated for embankments higher than 5 m, in order that the embankments remain stable. For embankments less than 5 m high, settlement consideration may require that the clay be partially removed. Further analysis should be conducted at detailed design stage.

6.1.11 Harris Lake North Station 19+850 to 19+875 (Drawing No. Sheet 18)

Borehole HLN-9 encountered 0.7 m of peat, underlain by very soft clay to about 6 m below the peat. The comments in the preceding section of this report also apply to this area.

6.1.12 Magnetawan Area Station 20+080 to 20+123 (Drawing No. Sheet 18)

Borehole M-1 encountered peat to 0.5 m, underlain by loose sand to 1.2 m. Cone test below sample depth indicates loose condition (probably sand) extending to 7.9 m depth. The peat should be completely excavated. The sand need not be removed for embankments less than 4.5 m high.

6.1.13 Magnetawan Area Station 12+500 to 12+ 650 (Drawing No. Sheet 21)

Borehole M-25 indicates very soft clay extends to about 11.2 m depth. For stability and settlement considerations, the clay should be removed as much as possible for embankments higher than 5 m. Alternatively, light weight fill materials may be used for the construction of the embankments. A more detailed investigation and analyses should be carried out for this area.

6.1.14 Magnetawan Area Station 13+650 to 13+750 (Drawing No. Sheet 21)

The boreholes indicate that loose to very loose sand and silt extend to the surface of the bedrock at about 9.9 to 11.1 m depth. Embankment stability should not be a problem, however, some sub-excavation may be necessary to minimize settlements depending on the height of the highway embankment in this area.

6.1.15 Magnetawan Area Station 14+200 to 14+500 (Drawing No. Sheet 22)

The conditions in this area are similar to those described in the preceding section of this report. Some sub-excavation may be necessary for high embankments to minimize settlements.

6.1.16 Grundy Lake 3A-Rev Area Station 15+650 to 15+900 (Drawing No. Sheet 23)

Very loose to loose silty sand extends to between 8.1 and 14.2 m depths. Some sub-excavation may be necessary for high embankments to minimize settlements.

6.1.17 Grundy Lake 3A-Rev Station 12+450 to 12+650, revised alignment (Drawing No. Sheet 24)

This is the area where the revised alignment of the highway will cross the CN rail. The two boreholes put down in this area (PL-3 and PL-6) encountered very different conditions. On the south side of the railway, Borehole PL-3 encountered about 8.4 m of sand overlying bedrock. On the north side of the railway, Borehole PL-6 found two layers of clay interbedded with sand and silt strata. The borehole ended in a deposit of very dense cobbly till.

On the north side of the railway, the embankment design will have to address stability and settlement issues. Preliminary calculations indicate that a 5 m high embankment may be constructed as usual. For a 10 m high embankment, the long term factor of safety should be satisfactory, but staged construction and/or flatter slope would be necessary to avoid instability during construction. Partial sub-excavation to remove the very soft clay deposits at ground surface could also be considered.

Another design issue that should be considered is the effect of the embankment construction on the stability of the existing railway embankment. If the new highway embankment is located close to the railway embankment, it could potentially cause the tilting or sliding of the railway embankment. For preliminary design purposes, the minimum distance between the two embankments should be three times the height of the higher embankment.

6.1.18 Grundy Lake 3A-Rev Station 16+200 to 16+500 (Drawing No. Sheet 25)

Borehole GL3A-19 found 4.4 m of peat, overlying sand and very soft clay. The clay extends to at least 9.2 m depth. The peat should be completely removed from the footprint of the highway embankment. The cone test below the depth of sampling indicates that the clay could extend to 12.7 m or more below ground surface. It may not be feasible to remove all the soft clay, and other alternatives such as light weight fills may have to be considered. A more detailed investigation should be carried out for this area at detailed design stage.

6.1.19 Grundy Lake 3A-Rev Station 16+975 to 17+300 (Drawing No. Sheet 25)

The borehole found firm to soft clay extending to bedrock at about 8.8 m depth. The clay has a firm crust and it should be able to support 5 to 8 m high embankments without stability problems. However, the embankment could experience substantial settlements. It may be necessary to install wick drains to shorten the consolidation time, and/or partial sub-excavation to reduce the magnitude of the settlement.

A summary of the anticipated sub-excavation at the various swamp sites is presented in Table 1 below.

Table 1

Anticipated Swamps Sub-Excavation

Area	Station		Length	Depth to Rock	Material	Depth	Sub-excavation
Shawanaga	17+700	17+950	250	8.5	Peat	3.3	√
					Sand	4	√
					Clay	7.9	√
					Sand	8.5	X
South Pointe Au Baril	10+050	10+325	275	9.9	Peat	8.6	√
					Org sand	9.9	√
North Pointe Au Baril	19+200	19+250	50	9.9	Peat	6.3	√
					Clay	6.6	?
					Prob. Clay	8.5	?
Harris Lake South	24+825	24+900	75	9.5	Peat	2.4	√
					Prob. Peat	9.5	√
Harris Lake North	18+750	18+800	50	6.8	Peat	2.6	√
					Clayey Silt	3.2	√
					Prob. Clay	6.8	√
Harris Lake North	19+850	19+900	50	8.7	Peat	0.7	√
					Clay	1.3	√
					Prob. Clay	8.3	√
Magnetawan	12+500	12+650	150	13.4	Sand	0.9	√
					Clayey Silt	2.1	√
					Clay	11.1	?
					Silt	13.4	X
Grundy Lake 3A-Rev	12+400	12+600	200	>37.5	Clay	2.9	√
					Sand	10.1	?
					Clay	20	?
					Silt	26.1	X
					Sand	32.9	X
					Cobbly till	37.5	X
Grundy Lake 3A-Rev	16+175	16+475	300	12.7	Peat	4.4	√
					Sand	6.8	?
					Clay	9.3	?
					Prob. Clay	12.7	?

6.2 Embankment Settlement

All organic deposits, soft cohesive soils and very loose non-cohesive soils to the depth of firm bottom should be removed from under the embankments to minimize road settlements. For embankments less than 3 m high, post construction highway settlements should not be a problem. For embankments 3 to 6 m high and founded on non-cohesive soils, a 2 m surcharge applied for a period of 3 months in accordance to MTO practice should reduce post construction settlements to acceptable levels. For embankments higher than 3 m founded on firm cohesive soils, the highway settlement will depend on the thickness of the remaining

compressible clay layer and the height of the embankment. Within the study area, most of the soft clay deposits that could cause long term settlement are less than 10 m deep. The clay could be partially or completely excavated to reduce post construction settlements to within tolerable limits. Wick drains could be installed to reduce consolidation time. In certain areas where the thickness of the clay strata is too large for complete removal, it may be necessary to use light weight fill materials for the construction of the embankments. Once the highway profile has been finalized, settlement analyses could be carried out to determine the extent of the sub-excavation.

Within the Grundy Lake area are two locations where the clay layer may be too thick to be completely removed. One area is where the revised alignment of the highway crosses the CN rail. The entire area is a swamp with soft clay deposit extending to 20 m or deeper. Preliminary calculations indicate that a 5 m high embankment constructed with regular earth or rock fill could settle by as much as 750 mm in five years, even removing the top 3 m of clay at ground surface. For a 13 m high embankment, the settlement could exceed 1.5 m. The settlement process could be shortened by installing wick drains into the deeper clay layers, but it is likely that light weight fill materials will have to be used for the construction of the embankments to reduce the magnitude of the settlements. For preliminary design purposes, it is recommended that the pressure at the base of the embankment at its highest point should not exceed 60 kPa, to be accomplished by a combination of limiting the height of the embankment and using light weight fill materials.

Another area is around Station 16+300 where peat overlying very loose sand and very soft clay extending to about 13 m depth. The peat should be completely excavated. A settlement analysis should be carried out at detailed design stage to determine how much of the soft clay should be sub-excavated.

For rock fills placed under water without compaction, the settlement of the fill materials alone could be as much as 2% of the thickness of the fills.

6.3 Construction Consideration

For embankments founded on rock and where the sub-excavation is 3 m or less, it is expected that conventional construction equipment may be used. For deeper excavations a bigger backhoe or dragline may be necessary. In some swamp areas, under water excavation operation would likely be necessary. It may be possible to displace some of the very soft organic deposits by end dumping rock fills into the swamps.

In areas of deep cohesive soils and high embankment, staged construction and/or other techniques such as preloading, wick drains, etc. can be used.

Where the new alignment is close to existing highway or railway, the construction procedures must be given careful consideration so that the sub-excavations needed to remove

the organic and/or soft soils under the new embankment do not cause instability of the existing embankments. This could involve staged construction, excavate and backfill in sections, or temporary shoring support.


6.4 Further Investigation

A list of the swamp areas that will require further foundation investigations during detailed design stage is provided in Appendix 'F' of this report. Some of the swamp areas identified were not possible to be investigated at this time due to access or other reasons. Other swamps (that have been investigated) require a more detailed investigation because of the difficult ground conditions indicated by the initial boreholes.

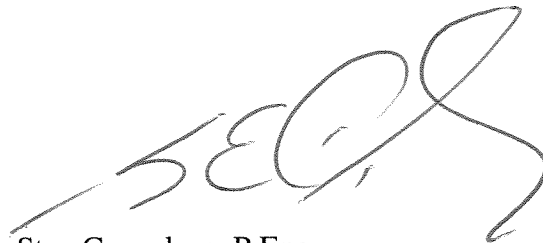
7. Closure

The field work for this study was carried out under the supervision of Haresh Gharegrat, P.E. This report was prepared by James Ng, P. Eng., Senior Project Engineer and project manager for this study, and was reviewed by Stan Gonsalves, P. Eng., Senior Geotechnical Specialist and designated MTO contact.

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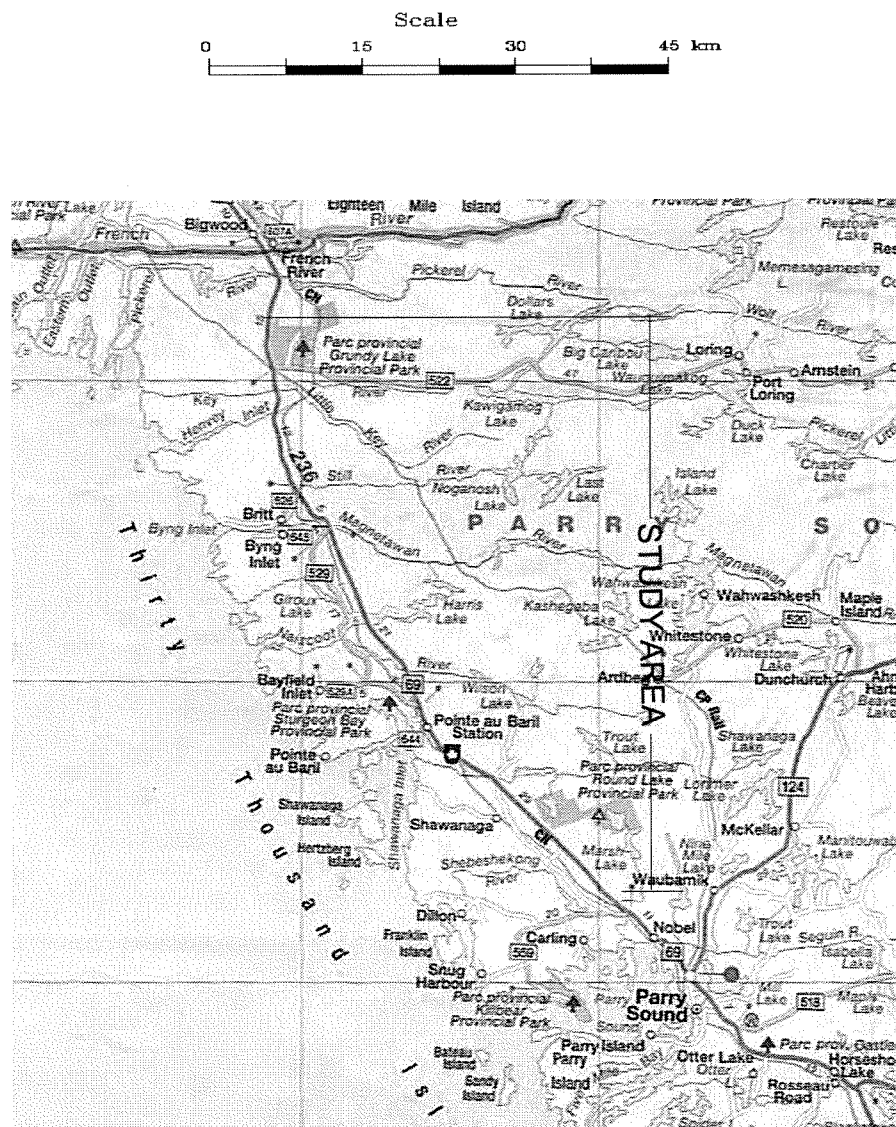


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Designated MTO Contact



Appendix A: Figures

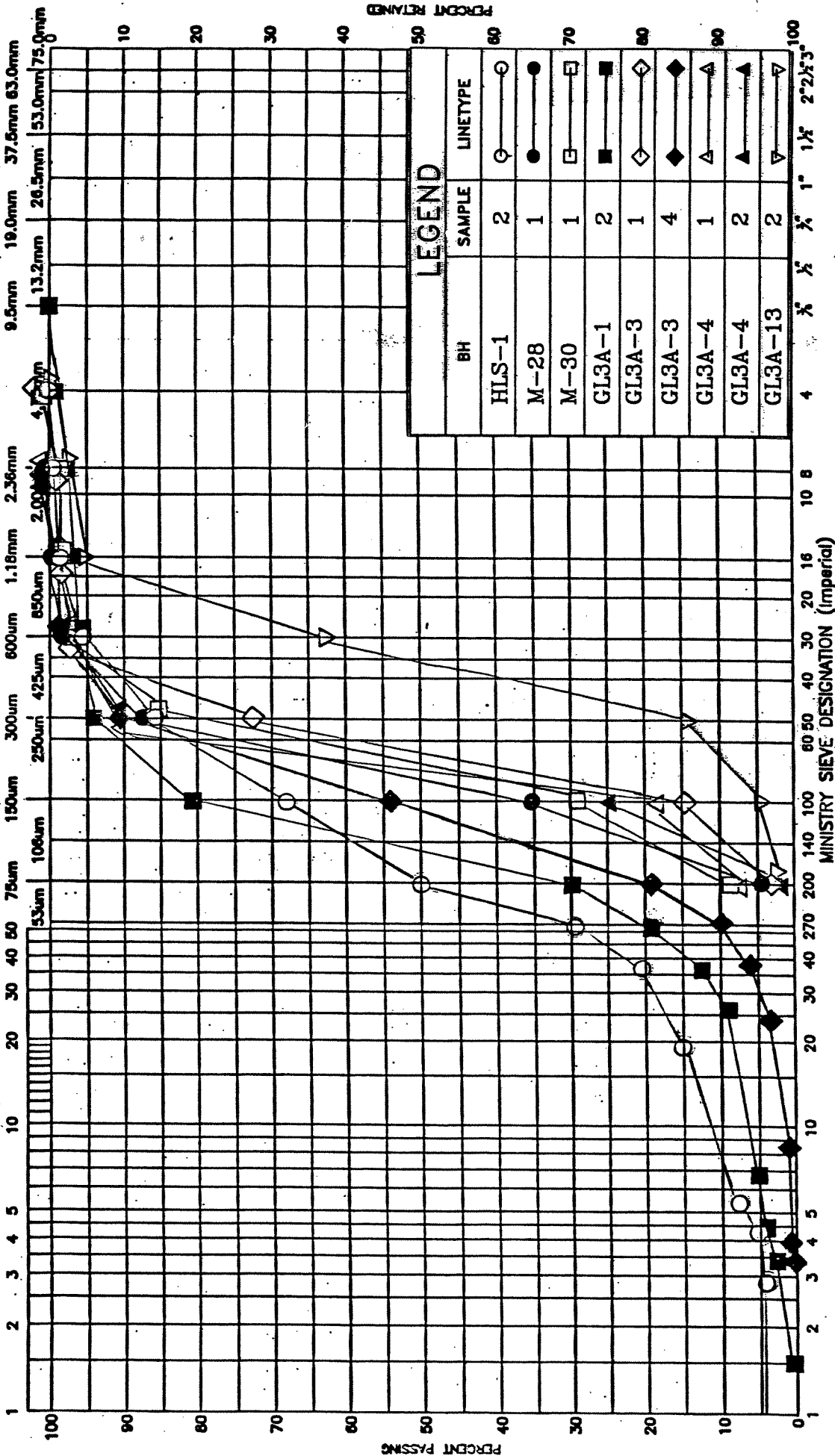
Figure 1 – Site Map



UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT			SAND			GRAVEL		
			Fine	Medium	Coarse	Fine	Coarse	

MINISTRY SIEVE DESIGNATION (Metric)



GRAIN SIZE DISTRIBUTION

SAND, SILTY SAND

FIG No. 2

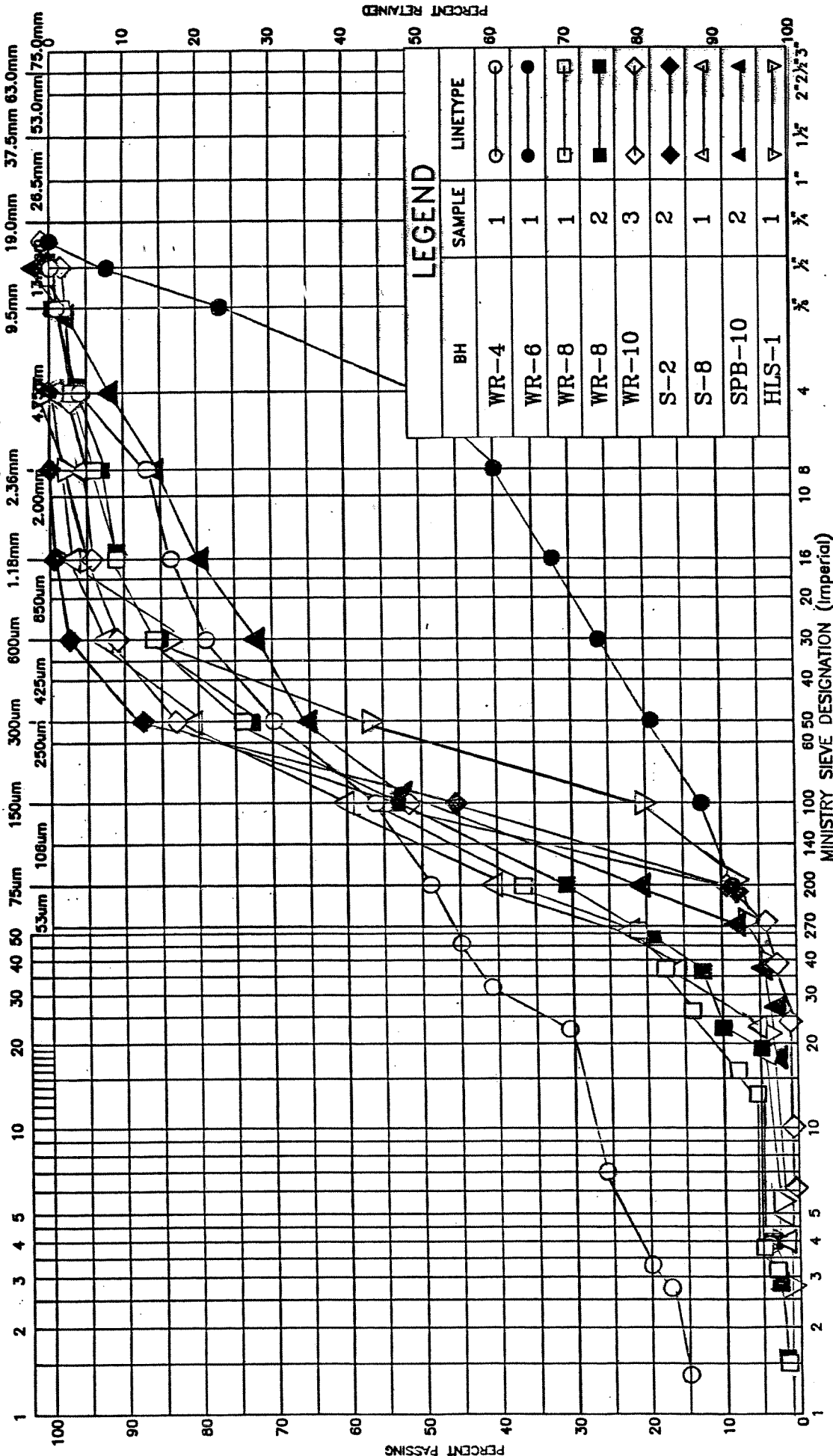
WP 5377-02-00

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT			SAND			GRAVEL		
Fine			Medium			Fine		
Coarse			Coarse			Coarse		

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



GRAIN SIZE DISTRIBUTION

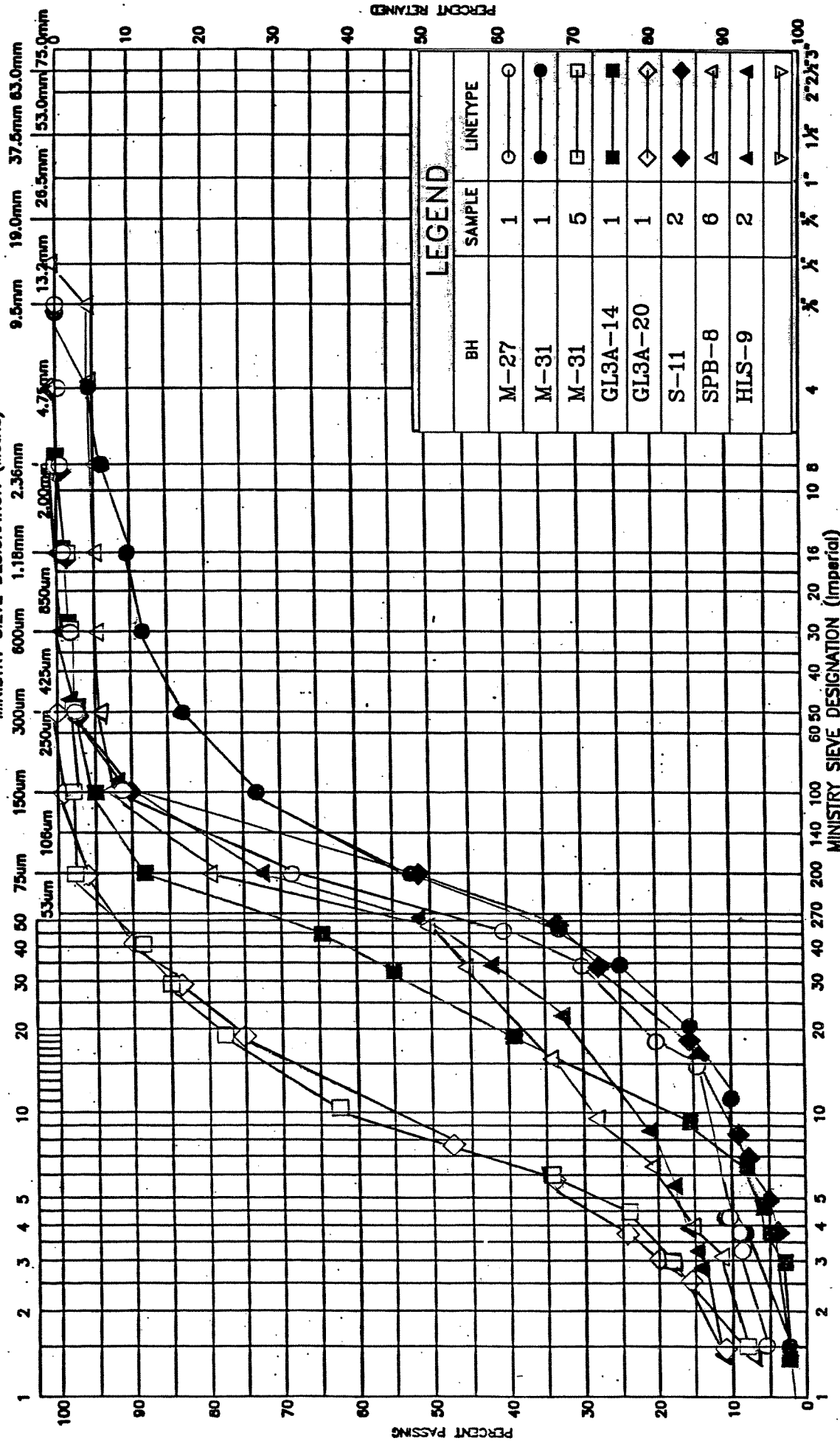
SAND, SILTY SAND

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT			SAND			GRAVEL		
			Fine	Medium	Coarse	Fine	Coarse	

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



LEGEND

BH	SAMPLE	LINETYPE
M-27	1	○
M-31	1	●
M-31	5	□
GL3A-14	1	■
GL3A-20	1	◇
S-11	2	◆
SPB-8	6	▲
HLS-9	2	▼

GRAIN SIZE DISTRIBUTION

SILT, SANDY SILT

FIG No. 4

WP 5377-02-00

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT		SAND			GRAVEL		
		Fine	Medium	Coarse	Fine	Coarse	

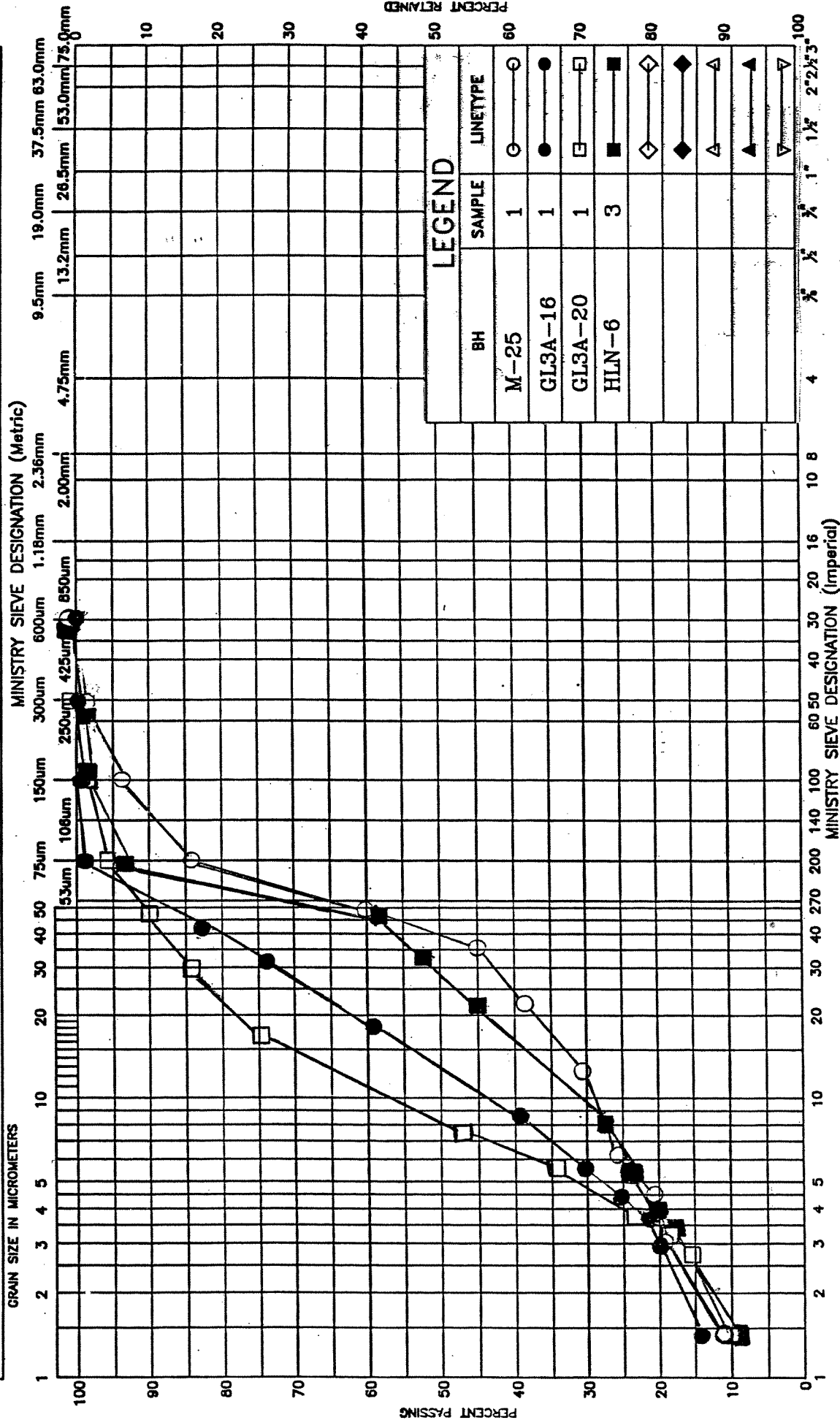


FIG No. 5

WP 5377-02-00

GRAIN SIZE DISTRIBUTION

CLAYEY SILT

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT		SAND			GRAVEL		
		Fine	Medium	Coarse	Fine	Coarse	

MINISTRY SIEVE DESIGNATION (Metric)

600um 1.18mm 2.36mm 4.75mm 7.5mm 9.5mm 19.0mm 37.5mm 63.0mm 125mm 250um 500um 1000um 2000um 4000um 8000um 16000um 31500um 63000um 125000um 250000um 500000um 1000000um

GRAIN SIZE IN MICROMETERS

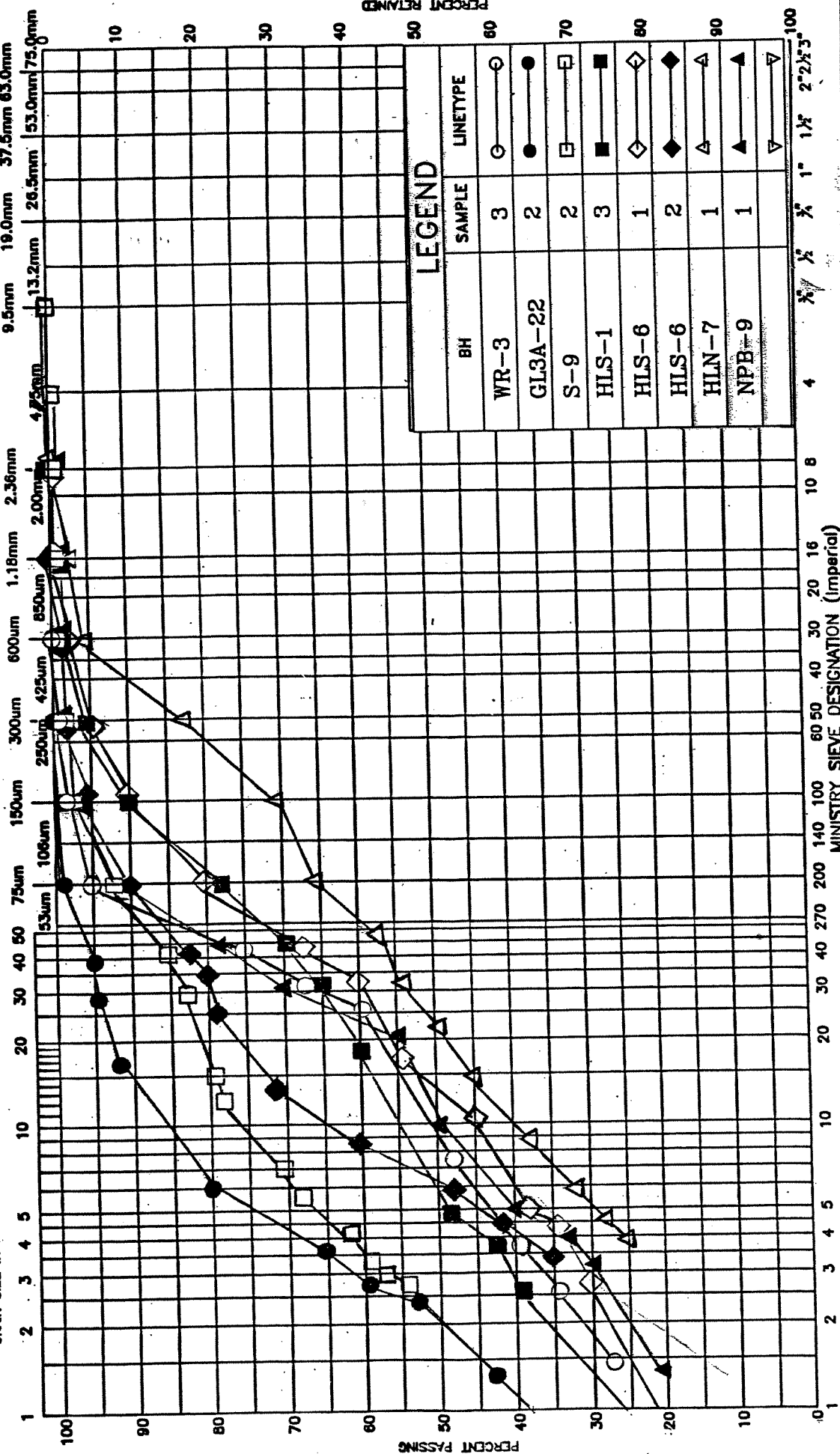


FIG No. 6

WP 5377-02-00

GRAIN SIZE DISTRIBUTION
CLAY, SILTY CLAY

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT		SAND			GRAVEL		
		Fine		Medium	Coarse	Fine	Coarse

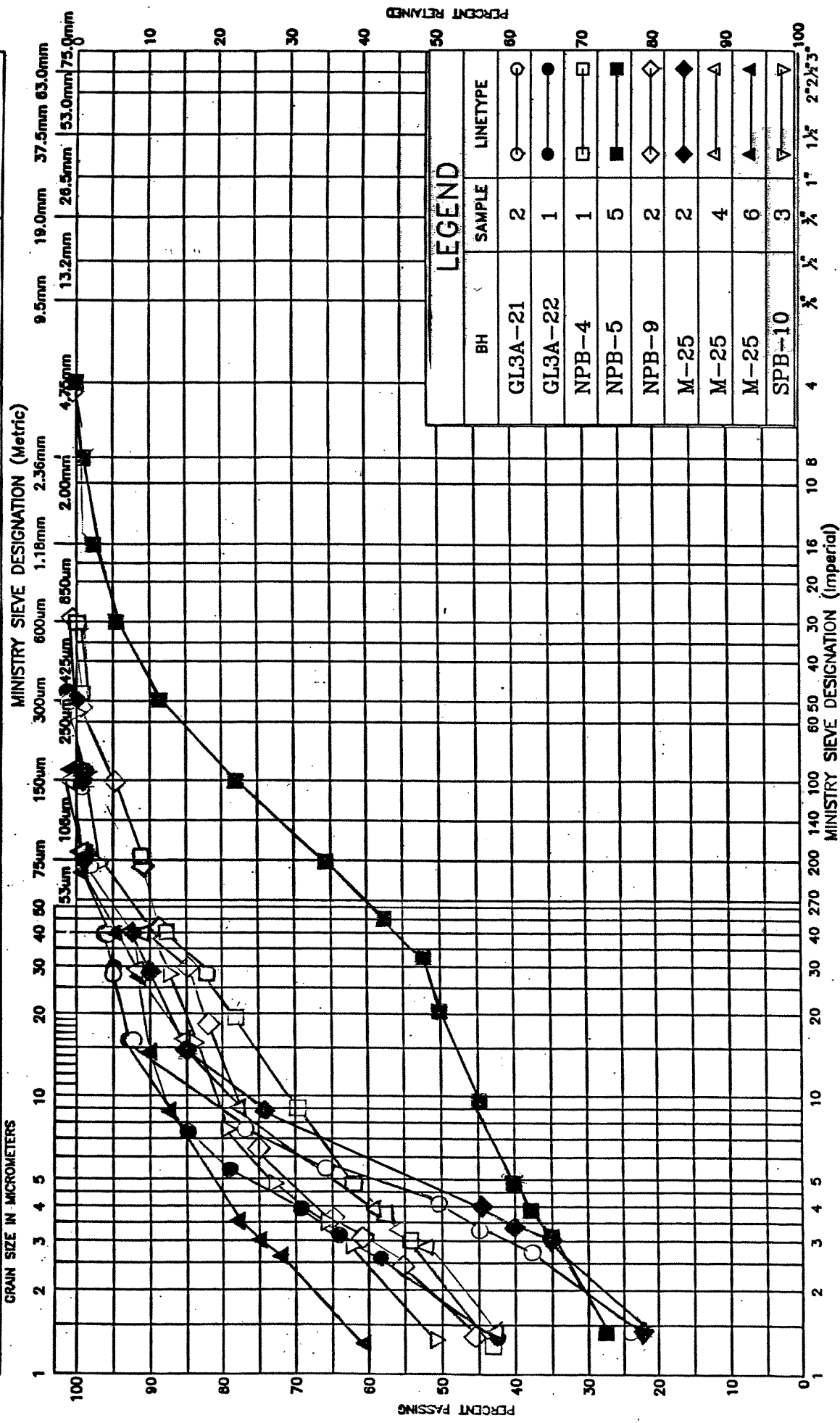
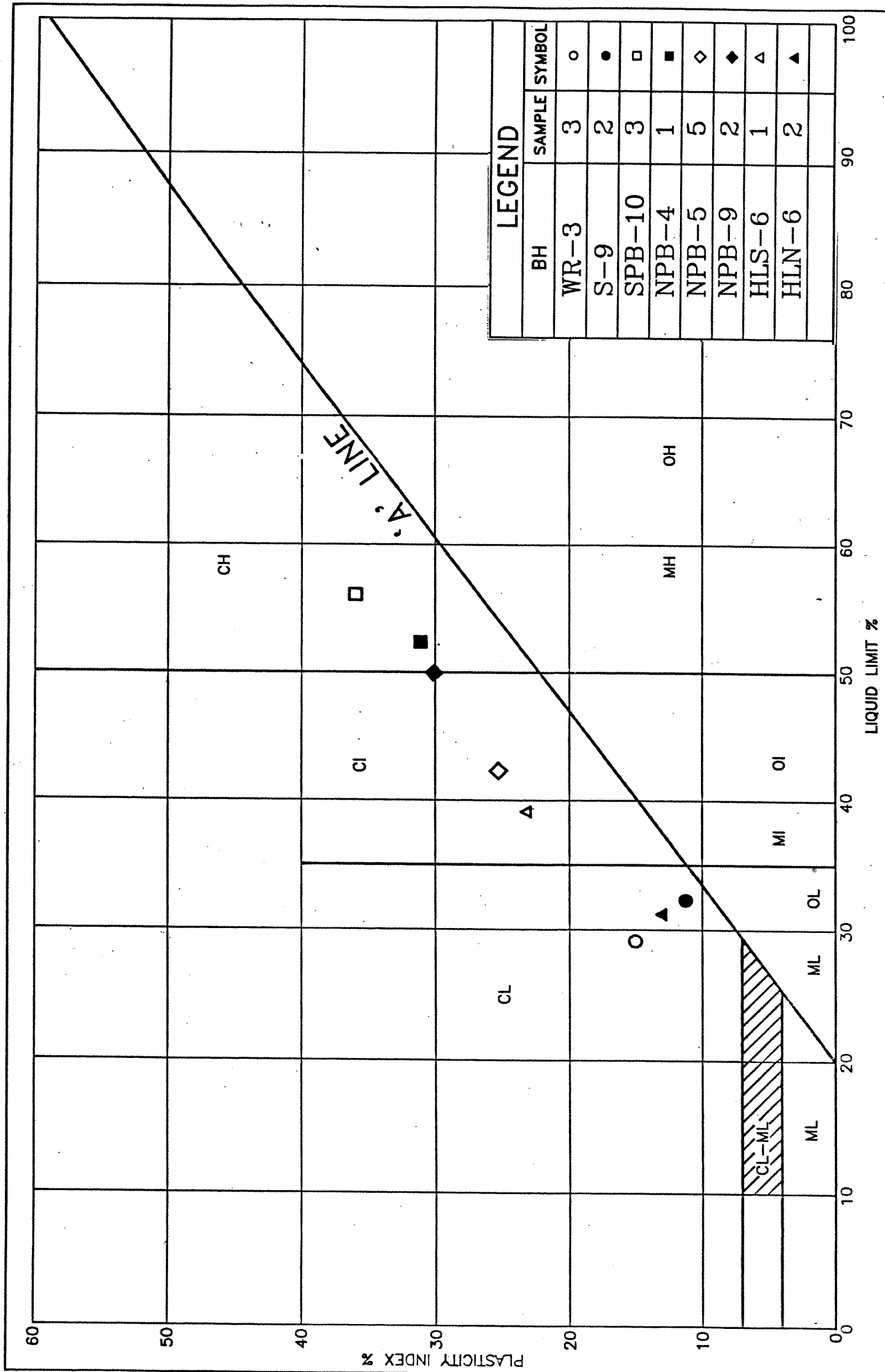
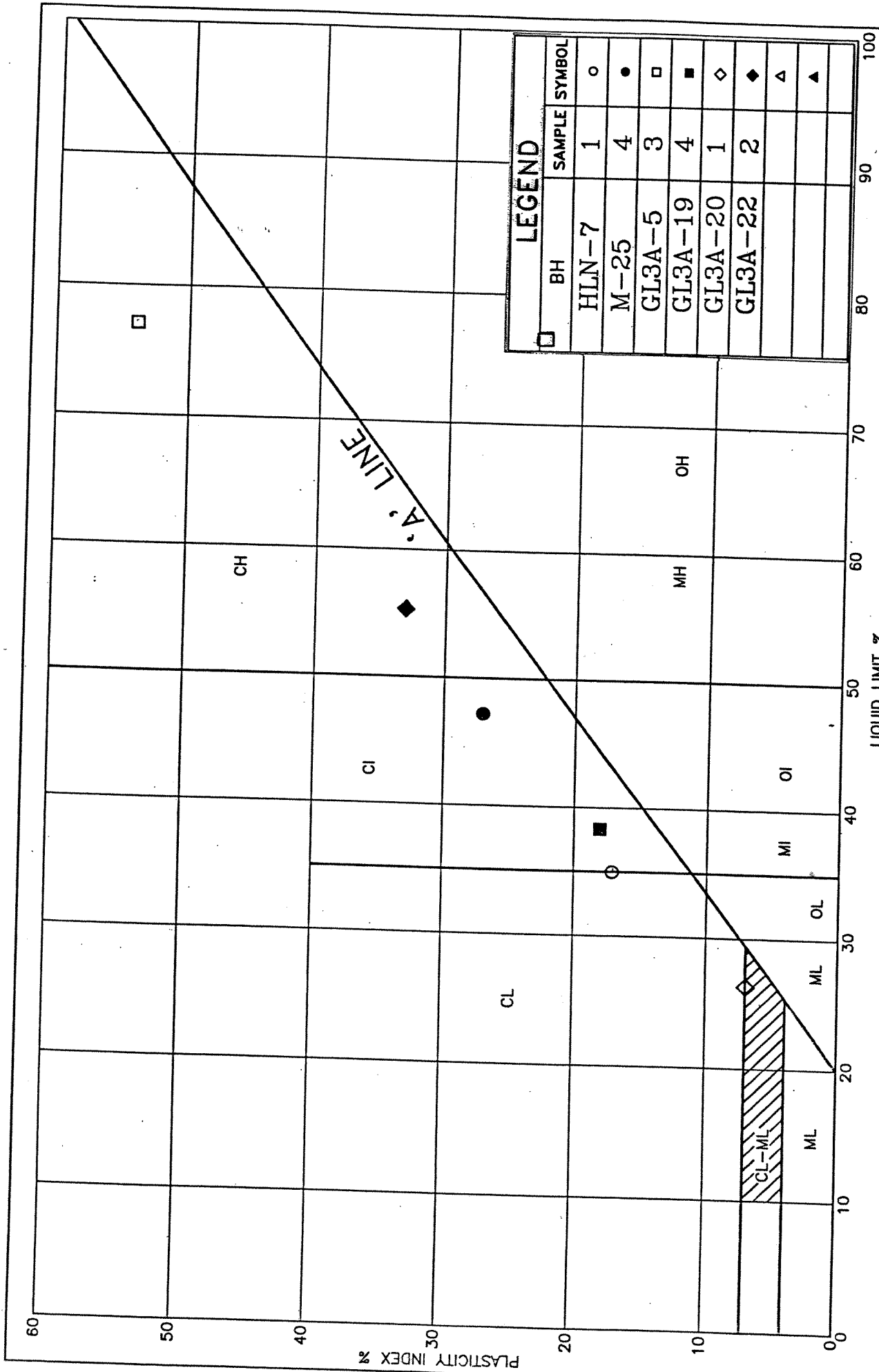


FIG No. 7
WP 5377-02-00





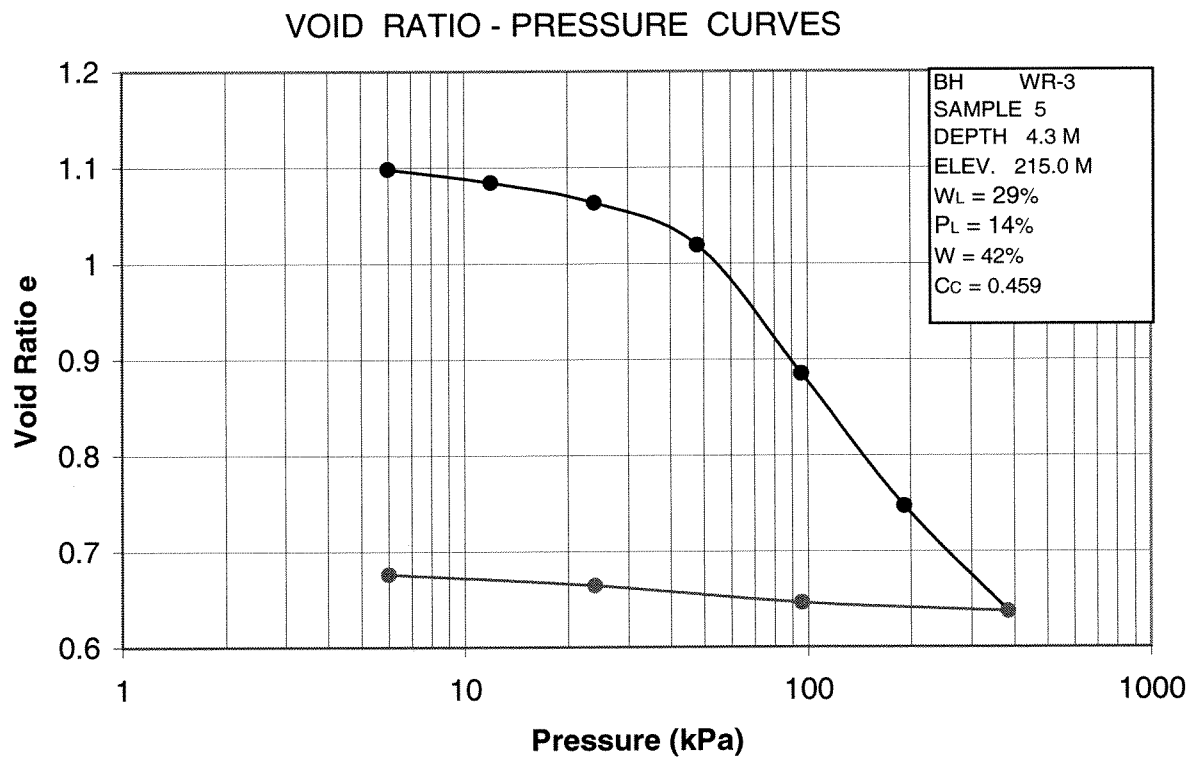


Fig 10

GWP 5377-02-00

Appendix B: Borehole Locations

Table 2 – Swamp Boreholes Locations

Area	Station	Offset	Borehole Designations	Cone Test Designations	Dwg. No.
Woods Road	12+000 to 12+400	18.5 R	WR-21, WR-22, WR-1, WR-2	DCPWR-11, DCPWR-12, DCPWR-1, DCPWR-2	Sheet 1
	12+850 to 13+500	11.5 to 18.5 R	WR-23, (WR-24 inaccessible) WR-3 to WR-6	DCPWR-13, (DCPWR-14 inaccessible) DCPWR-3 to DCPWR-6	Sheet 1
	13+720 to 14+000	18.5 R	WR-33, WR-7	-	Sheet 2
	15+080 to 15+350	18.5 to 8.5 R	WR-34, WR-8	-	Sheet 2
	16+400 to 16+525	18.5 R	WR-9	-	Sheet 3
	15+590 to 17+000	8 to 18.5 R	WR-32, WR-10, WR-11	DCPWR-18, DCPWR-19, DCPWR-7	Sheet 3
	18+200 to 18+575	18.5 R	WR-25, WR-37, WR-12 and WR-13	DCPWR-13, DCPWR-8	Sheet 4
	18+500 to 18+800	8.5 to 100 L	WR-26, WR-28, WR-14 and WR-15	DCPWR-9	Sheet 4
	18+730 to 10+275	18.5 R	WR-29, WR-30, WR-16 to WR-19	DCPWR-17, DCPWR-10	Sheet 4
	10+050	18.5 L	WR-20	-	Sheet 4
Shawanaga	11+700	18.5 L	S-1	-	Sheet 5
	13+375 to 13+425	18.5 L	S-2	-	Sheet 5
	14+275 to 14+500	18.5 L	S-3, S-4	DCPS-1	Sheet 6
	14+800 to 14+850	18.5 L 18.5 R	S-5 S-6	-	Sheet 6
	14+975	18.5 L	S-7	-	Sheet 6
	15+725 to 15+775	18.5 L to 18.5 R	S-8, S-9, S-10	-	Sheet 6
	16+425 to 16+525	18.5 L	S-11, S-12	-	Sheet 7

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

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Area	Station	Offset	Borehole Designations	Cone Test Designations	Dwg. No.
		18.5 R			
	17+225 to 17+325	18.5 L 18.5 R	S-13, S-14	—	Sheet 7
	17+700 to 17+950	L	SRS-3 (structure borehole)	(DCPS-2, DCPS-3 to be drilled), DCPS-4	Sheet 7
	18+500 to 18+675	L	S-15, S-16	DCPS-5	Sheet 8
South Pointe Au Baril	20+450 to 20+500	65 R	SPB-1	-	Sheet 9
	21+125 to 21+150	65 L	SPB-2	-	Sheet 9
	21+225 to 21+275	18.5 R 65 R	SPB-3 SPB-4	-	Sheet 9
	21+250	65 L	SPB-5	-	Sheet 9
	21+475 to 21+575	18.5 R	SPB-6	-	Sheet 9
	21+675 to 21+700	65 R	SPB-7	-	Sheet 9
	10+075 to 10+300	65 L	SPB-8, SPB-9	DCPSPB-1	Sheet 9
	10+275 to 10+575	18.5 L 18.5 R 65 R	SPB-10 SPB-11, SPB-12 SPB-13	DCPSPB-2, DCPSPB-3, DCPSPB-4, DCPSPB-5	Sheet 9, Sheet 10
	11+800	18.5 L	SPB-14	-	Sheet 10
	11+900 to 11+950	65 L	SPB-15	-	Sheet 10
	12+700 to 12+850	18.5 R	SPB-16	-	Sheet 11
North Pointe Au Baril	16+225 to 16+275	160 L	NPB-1	-	Sheet 12
	16+750 to 16+900	80 to 155 L	NPB-2 to NPB-4	DCPNPB-1 to DCPNPB-3	Sheet 12
	18+150 to 18+375	5 to 18.5 R	NPB-5 and NPB-6	DCPNPB-4	Sheet 13
	19+200 to 19+250	18.5 L 18.5 R	NPB-7 and NPB-8	-	Sheet 13
	19+650 to 19+750	18.5 L 18.5 R	NPB-9 and NPB-10	-	Sheet 13
Harris Lake South	23+075 to 23+125	18.5 L	HLS-1	-	Sheet 14
	23+925	18.5 L	HLS-2	-	Sheet 14

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

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Area	Station	Offset	Borehole Designations	Cone Test Designations	Dwg. No.
	24+400 to 24+475	18.5 L	HLS-3	-	Sheet 14
	24+825 to 24+900	18.5 L	HLS-4 and HLS-5	DCPHLS-1	Sheet 15
	25+225 to 25+250	18.5 L	HLS-6	-	Sheet 15
	10+325 to 10+500	18.5 L 18.5 R	HLS-7 to HLS-9	DCPHLS-2 DCPHLS-3	Sheet 15
Harris Lake North	13+900 to 13+950	18.5 R	HLN-1	-	Sheet 16
	17+725 to 17+850	18.5 R	HLN-2, HLN-3	DCPHLN-1	Sheet 17
	18+200 to 18+250	18.5 R	HLN-4	-	Sheet 17
	18+575 to 18+625	18.5 R	HLN-5	-	Sheet 17
	18+750 to 18+825	18.5 R	HLN-6	-	Sheet 17
	18+900 to 18+950	18.5 R	HLN-7	-	Sheet 17
	18+975 to 19+050	18.5 R	HLN-8	-	Sheet 17
	19+850 to 19+900	18.5 R	HLN-9	-	Sheet 18
Magnetawan	20+100	18.5 R	M-1	-	Sheet 18
	20+925 to 21+000	18.5 L 18.5 R	M-2, M-3	-	Sheet 18
	22+000 to 22+275	18.5 L 18.5 R	M-4 to M-8	DCPM-1 to DCPM-3	Sheet 19
	22+400 to 22+550	18.5 L 18.5 R	M-9 to M-11	DCPM-4	Sheet 19
	22+600 to 22+650	18.5 L	M-12	-	Sheet 19
	22+750 to 23+200	18.5 L 18.5 R	M-13 to M-16	DCPM-5	Sheet 19
	10+225 to 10+425	18.5 L	M-17, M-18	DCPM-6	Sheet 20
	10+550 to 10+700	18.5 L 18.5 R	M-19 to M-21	DCPM-7	Sheet 20
	11+050 to 11+100	18.5 L 18.5 R	M-22, M-23	-	Sheet 20
	12+200 to 12+700	18.5 L 18.5 R	M-24, M-25, M-26	DCPM-8, DCPM-9	Sheet 21
	13+200 to 14+600	18.5 L 18.5 R	M-27 to M-32	DCPM-10 to DCPM-13	Sheet 21 Sheet 22

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

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Area	Station	Offset	Borehole Designations	Cone Test Designations	Dwg. No.
Grundy Lake 3A-Rev	13+575 to 13+700	360 L	GL3A-1, GL3A-2	-	Sheet 21
	15+650 to 15+900	370 L	GL3A-3, GL3A-4	DCPGL3A-1 DCPGL3A-2	Sheet 23
	16+825	40 L	GL3A-5	-	Sheet 23
	17+000	150 L	GL3A-6	-	Sheet 23
	17+775 to 18+050	300 R to 340 R	(GL3A-7 to GL3A-9 to be drilled in First Nation)	(DCPGL3A-3 to be drilled in First Nation)	
	20+200 to 20+225	470 R	(GL3A-10, GL3A11 to be drilled in First Nation)	DCPGL-3A-4 to be drilled in First Nation)	
	12+250 (revised alignment)	220 L	PL-1, PL-2	-	Sheet 24
	12+300 to 12+650 (preferred alignment)	18.5 L	GL3A-12, GL3A-13, PL-4	DCPGL3A-5-	Sheet 24
	12+600 to 12+800 (revised alignment)	120 L	PL-3, PL-6	-	Sheet 24
	13+800	18.5 R	GL3A-14, PL-7	-	Sheet 24
	15+300 to 15+400	18.5 L 18.5 R	GL3A-15 GL3A-16	DCPGL3A-6	Sheet 25
	16+175 to 16+475	18.5 L 18.5 R	GL3A-17 to GL3A- 20	DCPGL3A-7 to DCPGL3A-10	Sheet 25
	16+675 to 16+725	18.5 L	GL3A-21	-	Sheet 25
	16+975 to 17+025	18.5 L	GL3A-22	-	Sheet 25

Appendix C: Summary of Subsurface Conditions

Table 3 – Summary of Subsurface Conditions

Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
Woods Road					
12+200 to 12+400	WR-21, WR-22, WR-1, WR-2, DCPWR-11, DCPWR-12, DCPWR-1, DCPWR-2	0 to 4.8	Clay not encountered	0 to 4.8	0 to 4.8
12+850 to 13+500	WR-23, WR-3 to WR-6 DCPWR-13, DCPWR-3 to DCPWR-6	0 to 3.4	4.2 in one hole	0 to 5.5	0 to 6.0
13+850	WR-7	0	Clay not encountered	0	0
15+300	WR-8	3.2	Clay not encountered	1.5	3.2
16+450	WR-9	0.5	Clay not encountered	0.5	0.5
15+590 to 17+000	WR-32, WR-10, WR-11, DCPWR-18, DCPWR-19, DCPWR-7	0.3 to 4.6	Clay not encountered	0.3 to 4.6	0.3 to 4.6
18+200 to 18+575	WR-25, WR-27, WR-12, WR-13, DCPWR-15, DCPWR-8	0 to 1.5	Clay not encountered	0 to 1.5	0 to 1.5
18+500 to 18+800	WR-26, WR-28, WR-14, WR-15, DCPWR-9	0.3 to 1.7, (2.3 m sand fill in one hole)	Clay not encountered	0 to 1.7	0.3 to 2.3
18+730 to 10+275	WR-29, WR-30, WR-16 to WR-19, DCPWR-17, DCPWR-10	0 to 1.9	Clay not encountered	0 to 1.9	0 to 1.9
10+050	WR-20	0	Clay not encountered	0	0
Shawanaga					
11+700	S-1	1.5	Clay not encountered	1.5	1.5
13+375 to 13+425	S-2	5.6	7.3	2.5	7.3

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

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Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
14+275 to 14+500	S-3, S-4, DCPS-1	1.1 to 3.1	Clay not encountered	1.1 to 1.5	1.1 to 3.1
14+800 to 14+850	S-5, S-6	0.8 to 9.0	Clay not encountered	0.8 to 5.0	0.8 to 9.0
14+975	S-7	10.0	Clay not encountered	1.8	10.0
15+725 to 15+775	S-8, S-9, S-10	2.5 to 7.3	4.3 to 6.4 (2 holes)	1.2 to 5.6	7.0 to 10.8
16+425 to 16+525	S-11, S-12	10.7 to 11.0	Clay not encountered	0.7 to 1.2	10.7 to 11.0
17+225 to 17+325	S-13, S-14	6.6 to 7.7	Clay not encountered	0.5 to 0.6	6.6 to 7.7
17+700 to 17+950	SRS-3	4.0	7.9	7.9	8.5
18+500 to 18+675	S-15, S-16, DCPS-5	1.7 to 4.0	Clay not encountered	1.2 to 1.7	1.7 to 4.0
South Pointe Au Baril					
20+450 to 20+500	SPB-1	0.8	Clay not encountered	0.8	0.8
21+125 to 21+150	SPB-2	0.5	Clay not encountered	0.5	0.5
21+225 to 21+275	SPB-3, SPB-4	0.2 to 0.9	Clay not encountered	0.2 to 0.9	0.2 to 0.9
221+250	SPB-5	0.2	Clay not encountered	0.2	0.2
21+475 to 21+575	SPB-6	2.3	Clay not encountered	1.2	2.3
21+675 to 21+700	SPB-7	0.5	Clay not encountered	0.5	0.5
10+075 to 10+300	SPB-8, SPB-9, DCPSPB- 1	3.2 to 9.9	Clay not encountered	3.2 to 9.9	3.2 to 9.9
10+275 to 10+575	SPB-10 to SPB-13, DCPSPB-2 to DCPSPB-5	0.1 to 4.0	5.5 in one hole	0.5 to 2.4	0.1 to 7.5

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

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Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
11+800	SPB-14	0.3	Clay not encountered	0.3	0.3
11+900 to 11+950	SPB-15	3.6	Clay not encountered	3.6	3.6
12+700 to 12+850	SPB-16	0.2	Clay not encountered	0.2	0.2
North Pointe Au Baril					
16+225 to 16+275	NPB-1	2.6	Clay not encountered	0.5	2.6
16+750 to 16+900	NPB-2 to NPB-4 DCPNPB-1 to DCPNPB- 3	0 to 0.6	1.8	0 to 1.8	0 to 1.8
18+150 to 18+375	NPB-5, NPB-6 DCPNPB-4	0 to 5.0	5.2 – 6.0	5.2 to 5.5	0 to 6.6
19+200 to 19+250	NPB-7, NPB-8	6.3 to 9.3	8.5	6.6 to 8.5	Rock not encountered
19+650 to 19+750	NPB-9, NPB10	0.2 to 0.9	3.8 (one hole)	0.2 to 4.0	0.2 to 4.0
Harris Lake South					
23+075 to 23+125	HLS-1	4.0	5.3	2.5	5.3
23+925	HLS-2	2.0	2.6	2.6	2.6
24+400 to 24+475	HLS-3	1.8	Clay not encountered	0.6	1.8
24+825 to 24+900	HLS-4, HLS-5 DCPHLS-1	4.3 to 9.5	Clay not encountered	4.3 to 9.5	4.3 to 9.5
25+225 to 25+250	HLS-6	0.3	2.9	2.9	2.9
10+325 to 10+500	HLS-7 to HLS-9 DCPHLS-2, DCPHLS-3	0 to >5.8	1.1 in one hole	0. to 3.0	0 to >5.8
Harris Lake North					
13+900 to 13+950	HLN-1	0	Clay not encountered	0	0

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
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Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
17+725 to 17+850	HLN-2, HLN-3, DCPHLN-1	0.6 to 8.3	Clay not encountered	0.6 to 8.3	0.6 to 8.3
18+200 to 18+250	HLN-4	0.4	Clay not encountered	0.4	0.4
18+575 to 18+625	HLN-5	1.1	2.3	2.9	2.9
18+750 to 18+825	HLN-6	2.6	6.8	6.8	6.8
18+900 to 18+950	HLN-7	0.9	1.8	1.8	1.8
18+975 to 19+050	HLN-8	0	Clay not encountered	0	0
19+850 to 19+900	HLN-9	1.0	8.7	8.7	8.7
Magnetawan					
20+100	M-1	7.9	Clay not encountered	7.9	7.9
20+925 to 21+000	M-2, M-3	1.6 to 2.8	Clay not encountered	1.4 to 1.6	1.6 to 2.8
22+000 to 22+275	M-4 to M-8, DCPM-1 to DCPM-3	0 to 0.8	Clay not encountered	0 to 0.8	0 to 0.8
22+400 to 22+550	M-9 to M-11, DCPM-4	0 to 0.5	Clay not encountered	0 to 0.5	0 to 0.5
22+600 to 22+650	M-12	0.2	Clay not encountered	0.2	0.2
22+750 to 23+200	M-13 to M-16, DCPM-5	0 to 1.5	Clay not encountered	0 to 1.0	0.6 to 2.1
10+225 to 10+425	M-17 to M-18, DCPM-5	0.2 to 0.5	Clay not encountered	0.2 to 0.5	0.2 to 0.5
10+550 to 10+700	M-19 to M-21, DCPM-7	0.6 to 2.1	Clay not encountered	0.6 to 2.1	0.6 to 2.1
11+050 to 11+100	M-22, M-23	3.4 to 3.7	Clay not encountered	3.4 to 3.7	3.4 to 3.7

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

brge00140201a

Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
12+200 to 12+700	M-24, M-26	0	Clay not encountered	0	0
12+500 to 12+600	M-25, DCPM-8, DCPM-9	0.9	11.1	7.5 to 12.4	9.1 to 13.4
13+200 to 14+600	M-27 to M-32, DCPM-10 to DCPM-13	0.8 to 9.8	Clay not encountered	1.5 to 7.1	0.8 to 9.8
Grundy Lake 3A-Rev					
13+575 to 13+700	GL3A-1, GL3A-2	4.8 to 11.1	Clay not encountered	4.8 to 11.1	4.8 to 11.1
15+650 to 15+900	GL3A-3, GL3A-4, DCPGL3A-1, DCPGL3A-2	14.2 in one hole	Clay not encountered	2.5 to 9.0	14.2 in one hole
16+825	GL3A-5	3.2	5.4	5.4	5.4
17+000	GL3A-6	1.8	Clay not encountered	1.8	1.8
12+250 (revised alignment)	PL-1, PL-2	0 to 2.1	3.1 in one hole	0 to 3.7	0 to 3.7
12+300 to 12+650 (preferred alignment)	GL3A-12, GL3A-13, PL-4	9.7 to 13.2	19.4 to 23.0	4.2 to 23.0	29.5 to 31.7
12+600 to 12+800 (revised alignment)	PL-3, PL-6	8.4 to 10.1	20.0 in one hole	8.4 to 26.1	8.4 to >37.5
13+800	GL3A-14, PL-7	0.2 to 1.5	4.0 in one hole	0.2 to 1.5	1.5 to 5.5
15+300 to 15+400	GL3A-15, GL3A-16, DCPGL3A-6	0.8 to 7.0	Clay not encountered	0.8 to 7.0	0.8 to 7.0
16+175 to 16+725	GL3A-17 to GL3A-20, DCPGL3A-7 to DCPGL3A-10	0.2 to 6.8	1.8 to >12.7	1.8 to >12.7	1.8 to >12.7
16+675 to	GL3A-21	0.3	4.7	4.7	4.7

**Preliminary Foundation Investigation and Design Report
for Swamp Crossings
Highway 69 Route Selection Study
3.5 km N of Hwy 559 to 3.8 km N of Hwy 522
GWP 5377-02-00, Highway 69**

brge00140201a

Station / Offset	Test Hole Designations	Peat / Topsoil / Alluvial Thickness (m)	Depth to Bottom of Clay (m)	Depth to Firm Bottom* (m)	Depth to Probable Bedrock (m)
16+725					
16+975 to 17+025	GL3A-22	0.3	8.2	8.2	8.2

* "Firm Bottom" is defined as the depth at which the Standard Penetration blow counts of non-cohesive soils equal or exceed 7 blows per 0.3 m, or where the undrained shear strength of cohesive soils is equal to or exceed 50 kPa.

Appendix D: Records of Boreholes and Dynamic Cone Tests

EXPLANATION OF TERMS AND SYMBOLS

N VALUE - STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO DRIVE A STANDARD 51-mm O.D. SPLIT SPOON SAMPLER 0.3 m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5 kg FALLING FREELY A DISTANCE OF 0.76 m. FOR PENETRATION LESS THAN 0.3 m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED AS \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 OR COMPACTNESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (C_u) AS FOLLOWS:

Cu(kPa)	0-12	12-25	25-50	50-100	100-200	>200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

COMPACTNESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF COMPACTNESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS /0.3m)	0-5	5-10	10-30	30-50	>50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH:

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES. 100mm + IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD(%)	0-25	25-50	50-75	75-90	90-100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	50mm	50-300mm	0.3m - 1m	1m-3m	>3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	VIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

SS SPLIT SPOON
WS WASH SAMPLE
ST SLOTTED TUBE SAMPLE
BS BLOCK SAMPLE
CS CHUNK SAMPLE
TW THINWALL OPEN

TP THINWALL PISTON
OS OSTERBERG SAMPLE
RC ROCK CORE
PH TW ADVANCED HYDRAULICALLY
PM TW ADVANCED MANUALLY
FS FOIL SAMPLE

MECHANICAL PROPERTIES OF SOIL

m_v Pa-1 COEFFICIENT OF VOLUME CHANGE
 C_v l COMPRESSION INDEX
 C_s l SWELLING INDEX
 C_α l COEFFICIENT OF SECONDARY CONSOLIDATION
 C_v m²/sec COEFFICIENT OF CONSOLIDATION
H m DRAINAGE PATH
 T_v l TIME FACTOR
U % DEGREE OF CONSOLIDATION
 σ_{vo} kPa EFFECTIVE OVERBURDEN PRESSURE
 σ_p kPa PRECONSOLIDATION PRESSURE
 τ_f kPa SHEAR STRENGTH
 c' kPa EFFECTIVE COHESION INTERCEPT
 ϕ' ° EFFECTIVE ANGLE OF INTERNAL FRICTION
 c_u kPa APPARENT COHESION INTERCEPT
 ϕ_u ° APPARENT ANGLE OF INTERNAL FRICTION
 τ_R kPa IDUAL SHEAR STRENGTH
 τ_r kPa DED SHEAR STRENGTH

STRESS AND STRAIN

u kPa PORE WATER PRESSURE
 r_u l 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 STRESSES
 ϵ % LINEAR STRAIN
 $\epsilon_1 \epsilon_2 \epsilon_3$ % PRINCIPAL STRAINS
v l POISSON'S RATIO
E kPa MODULUS OF LINEAR DEFORMATION
G kPa MODULUS OF SHEAR DEFORMATION
M l COEFFICIENT OF FRICTION

S_t l SENSIVITY = $\frac{C_u}{\tau_i}$

PHYSICAL PROPERTIES OF SOIL

ρ_s g/m³ DENSITY OF SOLID PARTICLES
 γ_s kg/m³ UNIT WEIGHT OF SOLID PARTICLES
 ρ_w kg/m³ DENSITY OF WATER
 γ_w kg/m³ UNIT WEIGHT OF WATER
 ρ kg/m³ DENSITY OF SOIL
 γ kg/m³ BULK UNIT WEIGHT OF SOIL
 ρ_d kg/m³ DENSITY OF DRY SOIL
 γ_d kg/m³ UNIT WEIGHT OF DRY SOIL
 ρ_{sat} kg/m³ DENSITY OF SATURATED SOIL
 γ_{sat} kg/m³ UNIT WEIGHT OF SATURATED SOIL
 ρ' kg/m³ DENSITY OF SUBMERGED SOIL
 γ' kg/m³ UNIT WEIGHT OF SUBMERGED SOIL
e VOID RATIO
n POROSITY
w % WATER CONTENT
 S_r % DEGREE OF SATURATION
 w_L % LIQUID LIMIT
 w_p % PLASTIC LIMIT
 w_s % SHRINKAGE LIMIT
 I_p % PLASTICITY INDEX = $w_L - w_p$
 I_L % LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
 I_c % CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
 e_{max} % VOID RATIO IN LOOSEST STATE
 e_{min} % VOID RATIO IN MOST DENSE STATE
 I_D l DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
D mm GRAIN DIAMETER
D_n mm n PERCENT - DIAMETER
Cu l UNIFORMITY COEFFICIENT
h m HYDRAULIC HEAD OR POTENTIAL
q m³/s RATE OF DISCHARGE
v m/s DISCHARGE VELOCITY
i l HYDRAULIC GRADIENT
k m/s HYDRAULIC CONDUCTIVITY
j kN/m³ SEEPAGE FORCE

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
219.8	Ground surface						<p>20 40 60 80 100</p> <p>20 40 60 80 100</p> <p>10 20 30</p>						

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
224.3	Ground surface												
0.0	Bedrock outcrop visible at surface					224							

RECORD OF BOREHOLE No WR-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 13+100 11.5 RT, Co-ords: 5036125 N; 253238 E ORIGINATED BY siva
DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				
219.3	Ice surface														
0.0	300 mm ice														
219.0															
0.3	Organic Silty Sand, grey, wet, very loose, poorly graded, fine grained, some clay, some organics, very loose		1	SS	2		219								
218.2															
1.1	Peat, brown, wet, very soft, fibrous		2	SS	1		218								
216.8														850	
2.5	Silty Clay, grey, wet, some fine sand and silt seams, very soft		3	SS	WH		217								
			4	VANE			216	2						52	0 4 69 27
			5	SH			215							42	Cc=0.459
214.8															
4.5	Silty Sand, grey, wet, very loose, fine grained, poorly graded, some clay		6	SS	WH										
214.3															
5.0	End of Borehole														
	Auger Refusal on Probable Bedrock														
	Groundwater encountered at surface at time of drilling														

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 13+200 11.5 RT, Co-ords: 5036199N; 253170E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
219.3	Ice surface													
0.0	250 mm ice													
219.1														
0.3	Silty Sand, grey, wet, very loose, fine grained, poorly graded, some clay, some organics		1	SS	WH		219							4 47 34 15
218.2														
1.1	Peat, brown, wet, fibrous, very soft						218							
217.3			2	SS	1								883	
2.0	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No WR-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 13+300 18.5 RT, Co-ords: 5036277N; 253108E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS ▽	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
219.5 0.0	Ice surface 75 mm Ice, over Silty Sand , dark brown, wet, very loose, fine grained, poorly graded		1	SS	1		219										
218.9 0.6	End of Borehole Auger Refusal on Probable Bedrock																

RECORD OF BOREHOLE No WR-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 13+400 18.5 RT, Co-ords: 5036351N; 253040E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				w _p	w	w _L		WATER CONTENT (%)	GR	SA	SI
221.2	Ice surface							20	40	60	80	100							
0.0	50 mm Ice, over Sand with gravel, dark brown, moist, very loose, fine to medium grained, poorly graded		1	AUGER			221											42	50 (8)
220.8	End of Borehole																		
0.5	Auger Refusal on Probable Bedrock																		

1 OF 1

METRIC

G.W.P.	5377-02-00	LOCATION	Hwy 69-Woods Road- Sta 13+950 18.5 RT, Co-ords: 5036757N; 252668E	ORIGINATED BY	siva
DIST	54	HWY	69	BOREHOLE TYPE	Continuous Flight Hollow Stem Augers
DATUM	Geodetic	DATE	2005.01.27	CHECKED BY	T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	20 40 60 80 100	W _p W W _L	10 20 30		
215.1	Ground surface												
0.0	Bedrock outcrop visible at surface						215						

RECORD OF BOREHOLE No WR-8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 15+300 8.0 RT, Co-ords: 5037745N; 251749E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)		
								20 40 60 80 100	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
211.1	Ice surface																	
0.0	75 mm Ice, over Sand, grey to brown, moist to wet, dense to very dense, fine to medium grained, poorly graded, with silt, trace gravel and cobbles		1	AUGER			211								3 60 35 2			
							210											
			2	SS	53		209								3 64 31 2			
							208											
207.9			3	SS	60													
3.2	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																	

ONTARIO MOT HWY 69 WOODS ROAD(NEW), GPJ, ONTARIO MOT, GDT 05/08/26

RECORD OF BOREHOLE No WR-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 16+450 18.5 RT, Co-ords: 5038563N; 250940E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.27 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
213.6	Ice surface																
0.0	250 mm of Ice, over Silt, brown, moist, with organics																
213.2																	
0.5	End of Borehole Auger Refusal on Probable Bedrock						213										

RECORD OF BOREHOLE No WR-10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Roa-Sta 16+800 8.0 RT, Co-ords: 5038794N; 250676E ORIGINATED BY siva
DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
DATUM Geodetic DATE 2005.01.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									WATER CONTENT (%)
216.3	Ice surface					▽											
0.0	75 mm Ice, over																
216.1	Water		1	AUGER			216										
0.3	Silt, brown, wet, with organics																
215.9																	
0.5	Sand, brown to grey, wet, compact to very dense, fine to medium grained, some silt, trace gravel and cobbles																
			2	SS	19												


ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 17+000 18.5 RT, Co-ords: 5038937N; 250537E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly


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ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				GR	SA	SI	CL
222.6	Ground surface							20	40	60	80	100		10	20	30				
0.0	Topsoil																			
222.3																				
0.3	End of Borehole Auger Refusal on Probable Bedrock						222													

RECORD OF BOREHOLE No WR-12

1 OF 1

METRIC

G.W.P.: 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+450 18.5 RT, Co-ords: 5039922N; 249473E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					W _p W W _L				
217.0	Ground surface																
0.0	Topsoil, brown, wet, some peat																
216.6																	
0.4	End of Borehole																
	Auger Refusal on Probable Bedrock																

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

METRIC

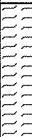

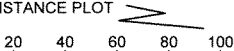
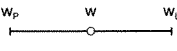

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No WR-14

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+500 18.5 LT, Co-ords: 5039929N; 249411E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly


SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
217.8 0.0	Ground surface Peat , brown, wet, very soft		1	SS	2		217							kN/m ³	GR SA SI CL		
216.9 0.9	Sand , brown, wet, fine to medium grained, some cobbles and boulders																
216.1 1.7	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at 0.81 m at time of drilling																

RECORD OF BOREHOLE No WR-15

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+700 18.5 LT, Co-ords: 5040065N; 249263E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
219.3	Ground surface																
0.0	Fill, fine to medium sand with some gravel and some cobbles, brown, wet		1	SS	14		219										
									218								
			2	SS	12												
217.0																	
2.3	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater not encountered at the time of drilling																

ONTARIO MOT HWY 69 WOODS ROAD(NEW); GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-16

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 19+000 18.5 RT, Co-ords: 5036204N; 253175E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
219.3	Ice surface																
0.0	75 mm Ice, over Water		1	SS	WH		219										
219.0	Peat, brown, wet																
0.3																	
218.1																	
1.2	Sand, grey, wet, fine to medium grained, poorly graded, trace silt, trace of organics, very dense						218										
217.5			2	SS	60												
1.9	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 WOODS ROAD(NEW), GPJ, ONTARIO MOT.GDT 05/08/26

1 OF 1





METRIC

DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

[illegible]

1 OF 1

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
218.2	Ground surface											GR SA SI C	

SOIL PROFILE						SAMPLES						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
218.2 0.0	Ground surface Bedrock outcrop visible at surface						218	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	W _p — W — W _L		γ	GR SA SI C

1 OF 1

METRIC

DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

[illegible]

METRIC

SOIL PROFILE															
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				
216.2	Ground surface							20 40 60 80 100	○ UNCONFINED	+ FIELD VANE	W _p	W	W _L		
0.0	Bedrock outcrop visible at surface						216	20 40 60 80 100	● QUICK TRIAXIAL	× LAB VANE				kN/m ³	GR SA SI CL

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No WR-21

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 12+000 18.5 RT, Co-ords: 5035315N; 253984E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
219.7 0.0	Ice surface 300 mm of Ice, over Water												
219.1 0.6	Peat, black, wet, very soft, fibrous		1	SS	WH		219					595	
218.2 1.5	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling												

RECORD OF BOREHOLE No WR-22

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 12+100 18.5 RT, Co-ords: 5035393N; 253919E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)											
219.6	Ice surface																				
0.0	300 mm of Ice, over Water																				
219.0	Peat, black, very wet, very soft, fibrous		1	SS	WH									219						1148	
0.6														218							
			2	SS	WH	217						937									
216.7	End of Borehole																				
2.9	Auger Refusal on Probable Bedrock																				
	Groundwater encountered at surface at time of drilling																				

1 OF 1

METRIC

DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No WR-25

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+225 16 RT, Co-ords: 5039769N; 249632E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
215.7	Ice surface													
0.0	150 mm of Ice, Water													
215.3														
0.5	Peat, black, very wet, firm, fibrous, some silty sand													
215.0			1	SS	7		215							
0.8	Silty Sand, grey, wet, compact, intermediate to fine grained													
214.6			2	SS	Refusal									
1.1	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 WOODS ROAD(NEW).G.P.J. ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-26

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+300 65 LT, Co-ords: 5039759N; 249526E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
215.6	Water surface												
0.0	Water												
215.4													
0.2	Peat, black, wet, very soft, some sand		1	SS	Refusal								
215.1													
0.5	End of Borehole						215						
	Auger Refusal on Probable Bedrock												
	Groundwater encountered at surface at time of drilling												

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-27

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+325 18.5 RT, Co-ords: 5039837N; 249565E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
								20	40	60	80	100					
215.8	Ice surface																
0.0	100 mm of Ice, over Water																
215.4																	
0.4	Peat, black, very wet, very soft, fibrous		1	SS	WH		215										
214.3																	
1.5	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

RECORD OF BOREHOLE No WR-28

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+400 100 LT, Co-ords: 5039802N; 249430E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					WATER CONTENT (%)			
						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W _p W W _L 10 20 30					
215.1	Ice surface															
0.0	100 mm of Ice, over Water					215										
214.5																
0.6	Peat, black, wet, very soft, fibrous, some silty sand		1	SS	1											
213.8						214										
1.2	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling															

RECORD OF BOREHOLE No WR-29

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+800 18.5 RT, Co-ords: 5040160N; 249216E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					WATER CONTENT (%)			
						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W _p W W _L 10 20 30					
215.4	Ice surface															
0.0	150 mm of Ice, over Water															
215.0																
0.5	Peat, black, very wet, very soft, fibrous		1	SS	1											
214.2																
1.2	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling															

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No WR-30

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+900 18.5 RT, Co-ords: 5040229N; 249143E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
215.3	Ice surface							20	40	60	80	100					
0.0	150 mm of Ice, over Water						215										
215.0																	
0.3	Peat, black, wet, soft, fibrous, some sand		1	SS	3												
214.2																	
1.1	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No WR-31

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 10+000 18.5 RT. Co-ords: 5040422N: 248934E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
215.6	Ice surface							20	40	60	80	100					
0.0	150 mm of Ice, over Water																
215.1	Peat, black, very wet, very soft, fibrous, some sand																
0.5			1	SS	WH		215									721	
				2	SS	WH		214								755	
213.1	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																
2.4																	

RECORD OF BOREHOLE No WR-32

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 16+700 18.5 RT, Co-ods: 5038733N; 250757E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa												
						20 40 60 80 100												
215.8	Ground surface																	
0.0	Peat, black, very wet, very soft, fibrous																	
			1	SS	WH											912		
			2	SS	1											1260		
212.1			3	SS	Refusal													
3.7	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																	

RECORD OF BOREHOLE No DCPWR-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 12+300 18.5 RT, Co-ords: 5035540N; 253783E ORIGINATED BY siva
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
222.9	Ground surface												
0.0	probable peat												
222.0	End of Dynamic Cone Penetration Test						222						
0.9	Refusal on Probable Bedrock												

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No DCPWR-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69- Woods Road-Sta 12+350 18.5 RT, Co-ords: 5035577N; 253750E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
224.3	Ground surface													
224.1	Topsoil													
	End of Dynamic Cone Penetration Test						224							
	Refusal on Bedrock													

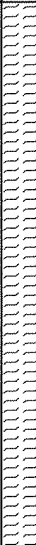

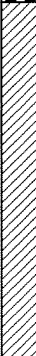
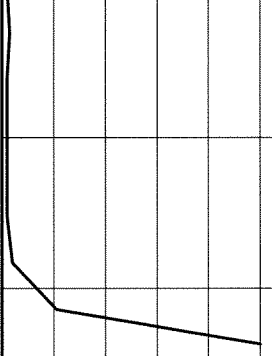
ONTARIO MOT HWY 69 WOODS ROAD(NEW); GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPWR-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 13+150 11.5 RT, Co-ords: 5036166N; 253201E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
219.5 0.0	Ground surface probable peat very soft													
215.9 3.6	probable clay very soft													
213.5 6.0	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock													

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPWR-7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 16+900 18.5 RT, Co-ords: 5038869N; 250610E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div> <div>20 40 60 80 100</div> <div> <div>○ UNCONFINED + FIELD VANE</div> <div>● QUICK TRIAXIAL × LAB VANE</div> </div> <div>20 40 60 80 100</div> </div>	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
221.1	Ground surface						221						
0.0	Topsoil and organics very soft												
220.6													
0.5	probable sand						220						
219.4													
1.7	End of dynamic cone penetration test Refusal on probable bedrock												

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT GDT 05/09/26

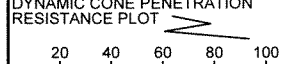

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPWR-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18+600 8.0 LT, Co-ords: 5036164N; 253198E ORIGINATED BY siva
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES						
219.6 0.0	Ground surface probable fill						219				
218.6 1.0	End of Borehole Refusal on Probable Bedrock										

1 OF 1

METRIC

DATUM Geodetic DATE 2005.01.31 CHECKED BY T. Crilly

[illegible]

RECORD OF BOREHOLE No DCPWR-11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 12+050 18.5 RT, Co-ords: 5035354N; 253952E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80
219.6	Ice surface															
0.0	300 mm of Ice, over Water															
219.0																
0.6	probable peat															
217.5																
2.1	End of Dynamic Cone Penetration Test															
	Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

ONTARIO MOT HWY 69 WOODS ROAD(NEW) GPJ ONTARIO MOT GDT 05/08/26

1 OF 1

METRIC

DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPWR-13

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 12+950 18.5 RT, Co-ords: 5036020N; 253345E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.04.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
219.9 0.0	Ice surface 300 mm of Ice, Water													
219.3 0.6	probable peat													
							219							
							218							
							217							
							216							
							215							
							214							
213.5 6.4	End of Dynamic Cone Penetration Test Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 WOODS ROAD(NEW), GPJ, ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPWR-15

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 18.275 18.5 RT, Co-ords: 5039804N; 249601E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)						
215.8	Ice surface														
0.0	200 mm of Ice, over Water														
215.2															
0.6	probable peat														
213.7															
2.1	End of Dynamic Cone Penetration Test														
	Groundwater encountered at surface at time of drilling														

1 OF 1

METRIC

DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPWR-18

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Woods Road-Sta 16+650 18.5 RT, Co-ords: 5038700N; 250794E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
215.8	Water surface													
0.0	Water													
215.5														
0.3	probable peat													
							215							
							214							
							213							
							212							
							211							
210.9	End of Dynamic Cone Penetration Test													
4.9	Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 WOODS ROAD(NEW).GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

METRIC

DATUM Geodetic DATE 2005.04.02 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No S-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 11+700 18.5 LT, Co-ords: 5041617N; 247725E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.18 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)					
						20	40	60	80	100						
212.0	Ground Surface															
0.0	150 mm Topsoil, over Silty Sand, brown, wet, very loose															
			1	AUGER												
210.4																
1.5	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling															

RECORD OF BOREHOLE No S-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 13+400 18.5 LT, Co-ords: 5042856N; 246562E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.18 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
210.9	Ground Surface							20 40 60 80 100						
0.0	Peat, black, wet, very soft, fibrous													
			1	SS	WH		210							
							209							
208.4	Sand, dark grey, wet, compact, fine grained, trace organics						208							
2.5			2	SS	11									
							207							
206.9	brown						206							
4.0			3	SS	14									
							205							
205.3	Clay, grey, wet, soft to firm, trace silt						204							
5.6			4	SS	WH									
203.6	End of Borehole													
7.3	Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling													

RECORD OF BOREHOLE No S-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 14+300 18.5 LT, Co-ords: 5043505N; 245941E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.17 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
213.4	Ground Surface													
0.0	Peat, black, wet, fibrous													
212.8	Silty Sand, brown, wet, compact, fine grained						213							
0.6							212							
211.2			1	SS	13									
2.2	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

RECORD OF BOREHOLE No S-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 14+450 17.5 LT, Co-ords: 5043609N; 245832E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.17 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40	60	80	100					
212.9	Ground Surface															
0.0	150 mm Topsoil, over Silty Sand, brown and grey, moist to wet				▽											
211.8						212										
1.1	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at 0.36m at time of drilling															

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT.GDT 05/08/28

RECORD OF BOREHOLE No S-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 14+825 18.5 LT, Co-ords: 5043860N; 245554E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.03 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
207.5	Ice Surface													
0.0	510 mm of Ice, over Water						207							
206.8														
0.7	Sand, brown/grey, wet, loose, poorly graded, fine to medium grained, trace silt, trace organics		1	SS	6									
206.0														
1.5	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling													

METRIC

ELEV DEPTH	SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40					
207.4	Ice Surface													
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		w_p	w	w_L		
								20 40 60 80 100		WATER CONTENT (%) 10 20 30				

[illegible]

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No S-7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 14+975 18.5 LT Co-ords: 5043962N; 245444E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.10 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
207.9	Ice Surface													
0.0	150 mm of Ice, over Water													
207.4	0.5 Peat, black, very wet, soft, fibrous													
206.0	1.8 Silty Sand, brown, wet, fine grained, compact		1	SS	21									
205.6	2.3 Dynamic Cone Penetration Test started													
	probable sand													
197.3	10.5 End of Dynamic Cone Penetration Test													
	Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No S-8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 15+750 70 LT, Co-ords: 5044448N; 244838E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
208.6	Ground Surface							20	40	60	80	100					
0.0	Peat, black, wet, loose, fibrous																
208.0							208										
0.6	Silty Sand, brown, wet, loose, fine grained, trace organics						207										
			1	SS	4												
							206										
205.9																	
2.7	Sand, brown, wet, loose to compact, fine grained, trace silt						205										
			2	SS	6												
							204										
			3	SS	7		203										
			4	SS	17		202										
201.3																	
7.3	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater at surface at time of drilling																

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No S-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 15+750 18.5 LT, Co-ords: 5044487N; 244872E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
208.1	Ground Surface												GR SA SI CL	
0.0	Peat, black, wet, loose, fibrous													
206.9														
1.2	Silty Sand, grey/brown, wet, compact, fine grained		1	SS	13									
205.6														
2.5	Clay, grey, wet, very soft, low plasticity, some silt		2	SS	WH									
203.9														
4.3	Silt, grey/brown, wet, loose, trace clay		3	SS	5									
201.8														
6.3	Sand, brown, wet, compact, fine grained, trace silts		4	SS	14									
199.9														
8.2	Dynamic Cone Penetration Test started													
	probable sand													
198.1														
10.1	End of Dynamic Cone Penetration Test													
	Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No S-10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 15+750 18.5 RT, Co-ords: 5044513N; 244898E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
207.9 0.0	Ground Surface Peat, black, wet, loose, fibrous													
206.7 1.2	Silty Sand, dark brown, wet, loose, fine grained, trace gravel		1	SS	10									
			2	SS	2									
203.9 4.0	Silty Clay, grey, wet, very soft to soft		3	SS	2									
201.6 6.4	Sand, brown, wet, very loose, fine grained, some silt		4	SS	2									
199.7 8.2	Dynamic Cone Penetration Test started probable sand													
197.1 10.8	End of Dynamic Cone Penetration Test Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No S-11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta16+450 18.5 LT, Co-ords: 5044960N; 244358E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%) w _p w w _L					GR	SA	SI	CL		
202.6	Ground Surface							20	40	60	80	100								
0.0	300 mm Snow, over Peat, black, very wet, very soft, fibrous						202													
201.4							201													
1.2	Sandy Silt, grey, wet to very wet, very loose to compact						200													
			1	SS	15															
			2	SS	3		199										0	47	50	3
							198													
							197													
							196													
							195													
							194													
193.5																				
9.1	Dynamic Cone Penetration Test started probable sand						193													
191.9																				
10.7	End of Dynamic Cone Penetration Test Groundwater encountered at surface at time of drilling						192													

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No S-12

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 16+450 18.5 RT, Co-ords: 5044988N; 244383E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
202.5 0.0	Ice Surface 460 mm of Ice, over Water											
201.8 0.8	Peat, black, very wet, very soft						202					
201.0 1.5	Sand, wet, compact, fine grained, trace organics		1	SS	13		201					
200.0 2.5	Silty Sand, grey, wet, loose to compact, fine grained		2	SS	5		200					
							199					
			3	SS	12		198					
							197					
			4	SS	4		196					
							195					
							194					
192.8 9.7	Dynamic Cone Penetration Test started probable sand		5	SS	9		193					
							192					
190.7 11.9	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling						191					

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No S-13

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 17+275 18.5 LT, Co-ords: 5045519N; 243750E ORIGINATED BY C. Roy
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.18 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
202.8	Water Surface													
0.0	300 mm Water, over Peat, black, very wet, very soft, fibrous													
202.2														
0.6	Sand, brown, wet, fine grained, compact						202							
200.8			1	SS	15		201							
2.0	Dynamic Cone Penetration test started						200							
	probable sand						199							
							198							
							197							
196.2														
6.6	End of Dynamic Cone Penetration test													
	Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No S-14

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 17+275 18.5 RT, Co-ords: 5045546N; 243775E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.18 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div> <div>20 40 60 80 100</div> <div> <div>○ UNCONFINED + FIELD VANE</div> <div>● QUICK TRIAXIAL × LAB VANE</div> </div> </div>	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
202.5 0.0	Water Surface Water												
201.3 1.2	Peat , black, very wet, stiff, with silty sand, grey, fine grained, some sand		1	SS	11								
200.8 1.7	Dynamic Cone Penetration Test started probable sand												
193.6 8.9	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling												

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT GDT 05/09/26

RECORD OF BOREHOLE No S-15

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 18+525 90 LT, Co-ords: 5046284N; 242771E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.12 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
209.2	Ground Surface					▽											
0.0 208.9	Peat, black, wet, fibrous						209										
0.3	Silty Sand, brown/grey, wet, loose, organic stained						208										
207.5			1	SS	Refusa												
1.7	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No S-16

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 18+650 75 LT, Co-ords: 5046369N; 242680E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.12 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
208.8	Ground Surface																
0.0	Peat, black, wet, very soft, fibrous																
207.5																	
1.2	Silty Sand, brown/grey, wet, compact, fine grained, trace organics		1	SS	11												
206.2																	
2.6	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 SHAWANAGA SWAMP GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No DCPS-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 14+362 18.5 LT, Co-ords: 5043547N; 245895E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.17 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	w_p	w	w_L		
213.5	Ground Surface							20 40 60 80 100					
0.0	probable sand							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
								20 40 60 80 100					

ONTARIO MOT HWY 69 SHAWANAGA SWAMP-GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPS-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Shawanaga-Sta 17+900 90 LT, Co-ords: 5045889N; 243242E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.14 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L				
198.7 0.0	Ground Surface probable peat													
190.8 7.9	probable sand													
189.9 8.8	End of Dynamic Cone Penetration Test Refusal on probable bedrock													

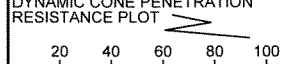

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPS-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69 - Shawanaga-Sta 18+575 85 LT, Co-ords: 5046318N; 242734E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.11 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
208.5 0.0	Ground Surface probable sand										
204.5 4.0	End of Dynamic Cone Penetration Test Refusal on probable bedrock										

ONTARIO MOT HWY 69 SHAWANAGA SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 20+450 65 RT, Co-ords: 5047373N; 241188E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
220.3 0.0	Water Surface Water																
219.7 0.6	Silty Sand, grey to brown, wet, poorly graded, loose		1	SS	5												
218.9 1.4	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling		2	SS	Refusa												

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No SPB-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 21+138 65 LT, Co-ords: 5047579N, 240532E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.08 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
212.8	Ground Surface															
0.0	200 mm of Peat, over															
212.4	Silty Sand, brown, wet, very loose,															
	poorly graded, fine graded															
0.5	End of Borehole															
	Auger Refusal on Probable Bedrock					212										
	Groundwater not encountered at time of drilling															

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No SPB-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 21+225 18.5 RT, Co-ords: 5047700N; 240484E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											
						20	40	60	80	100							
210.6	Water Surface																
0.0	300 mm Water, over																
210.1	Peat, black, very wet, very soft, fibrous																
0.5	Organic Silt, grey, wet, very loose, trace fine gravel																
209.4			1	SS	Refusa										407		
1.2	End of Borehole																
	Refusal on Probable Bedrock																
	Groundwater encountered at surface of time of drilling																

RECORD OF BOREHOLE No SPB-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 21+275 65 RT, Co-ords: 5047765N; 240462E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.07 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
211.0	Ground Surface													
210.8 0.2	50 mm of Peat, over Silty Sand , grey, wet, very loose, poorly graded, fine grained End of Borehole													
	Auger Refusal on Probable Bedrock						210							
	Groundwater not encountered at time of drilling													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 21+250.65 LT, Co-ord: 5047639N; 240422E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.07 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa												
212.8	Ground Surface																	
212.6	Peat, black, moist, soft, fibrous																	
0.2	End of Borehole																	
	Auger Refusal on Probable Bedrock																	
	Groundwater encountered at surface at time of drilling																	
					</													

ONTARIO MOT. HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69 - South Pointe Au Baril-Sta 21+500 18.5 RT, Co-ords: 5047831N; 240242E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.07 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%)
206.1	Water Surface							20	40	60	80	100			
0.0	Water						206								
205.8															
0.3	Peat, black, wet, soft														
204.9							205								
1.2	Sand, brown, wet, compact, poorly graded, fine to medium grained		1	SS	13		204								
203.5															
2.6	End of Borehole														
	Refusal on Probable Bedrock														
	Groundwater at surface of at time of drilling														

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No SPB-7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 21+700 65 RT, Co-ords: 5047969N; 240089E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.08 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	W _p W W _L	W _p W W _L					
206.9	Ground Surface																
0.0	150 mm Peat, over																
206.4	Silty Sand, brown, wet, loose,																
0.5	poorly graded, fine grained																
	End of Borehole																
	Auger Refusal on Probable Bedrock						206										
	Groundwater encountered at surface at time of drilling																

RECORD OF BOREHOLE No SPB-8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+100 65 LT, Co-ords: 5047962N; 239829E ORIGINATED BY K. Crowe

DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy

DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)						
								20 40 60 80 100	W _P W W _L							
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE										
203.7	Water Surface							20 40 60 80 100	10 20 30							
0.0	Water						203									
203.4							202									
0.3	Peat, black, very wet, very soft, fibrous						201									
			1	SS	WH		200									
							199									
			2	SS	WH		198									
							197									
			3	SS	WH		196									
							195									
			4	SS	1		194									
			5	SS	1											
194.7																
8.9	Sandy Silt, grey, wet, very loose, trace clay, some organics															
			6	SS	1											
193.4																
10.2	End of Borehole															
	Auger Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+275 65 LT, Co-ords: 5048044N; 239672E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _P W W _L				
205.3	Water Surface							20	40	60	80	100		
0.0	Water													
205.0														
0.3	Peat, black, very wet, very soft, fibrous													
			1	SS	WH								822	
202.2														
3.1	Silt, grey, wet, very loose, with sand		2	SS	Refusal								61	
201.8														
3.5	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No SPB-10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+300 18.5 LT, Co-ords: 5048097N; 239672E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				
205.3	Ground Surface						20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L		
0.0	Peat, black, wet, very soft, fibrous											
			1	SS	WH						417	
202.9												
2.4	Sand, brown, wet, loose, poorly graded, medium grained, trace silt, some gravel		2	SS	9							
												16 75 (9)
201.4												
4.0	Clay, grey, wet, very soft, high plasticity, some silt, CH		3	SS	WH						56	0 6 37 57
												w=84%
199.9												
5.5	Silt, grey, wet, very loose		4	AS								
197.9												
7.5	End of Borehole											
	Auger Refusal on Probable Bedrock											
	Groundwater encountered at surface at time of drilling											

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+300 17.5 RT, Co-ords: 5048125N; 239689E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
205.4	Ground Surface													
0.0 205.1	Peat, black, moist, soft													
0.3 204.8	Silty Sand, grey, wet, loose, poorly graded, fine grained						205							
0.6	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No SPB-12

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+400 18.5 RT, Co-ords: 5047177N; 239604E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE								
204.7	Snow Surface															
0.0	Snow and water															
203.9																
0.8	Peat, black, wet, soft															
203.6																
1.1	Silty Sand, grey, wet, very loose, poorly graded, fine grained															
			1	SS	2											
201.8																
2.9	End of Borehole															
	Auger Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.08 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No SPB-14

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 11+800 18.5 LT, Co-ords: 5048829 N; 238362 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa												
197.8	Snow Surface																	
0.0	Snow																	
197.5																		
0.3	Topsoil black, moist, soft																	
197.2																		
0.6	End of Borehole																	
	Auger Refusal on Probable Bedrock								197									
	Groundwater not encountered at time of drilling																	

RECORD OF BOREHOLE No SPB-15

1 OF 1

METRIC



G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 11+925 65LT, Co-ords: 5048878N, 238240E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
198.1	Water Surface													
0.0	Water						198							
197.7							197							
0.4	Peat, black, wet, very soft, fibrous		1	SS	WH		196							
			2	SS	1		195						89	
194.5			3	SS	3								81	
3.7 194.2	Silty Sand, grey, wet, very loose, some gravel													
4.0	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100 	w_p w w_L 			
205.8	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%) 10 20 30			GR SA SI CL	

SOIL PROFILE				SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
205.8	Ground Surface													
205.0	Topsoil, brown, moist													
0.2	End of Borehole													
	Auger Refusal on Probable Bedrock						205							
	Groundwater not encountered at time of drilling													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT GDT 05/08/26



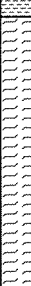

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPSPB-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+200 65 LT, Co-ords: 5048009N; 239738E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic cone penetration test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.03 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
205.3	Water Surface															
0.0	Water						205									
204.7																
0.6	Probable peat						204									
							203									
							202									
202.0																
3.4	probable silt						201									
200.9																
4.4	End of Dynamic Cone Penetration Test															
	Refusal on Probable Bedrock															


ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No DCPSPB-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+400 15 LT, Co-ords: 5048148N; 239585E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic cone penetration test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.08 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
202.0	Ground Surface																	
0.0	probable peat																	
201.1	End of Dynamic Cone Penetration Test																	
0.9	Refusal on Probable Bedrock																	

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/28

RECORD OF BOREHOLE No DCPSPB-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+500 18.5 RT, Co-ords: 5048224N; 239513E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic cone penetration test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
204.6	Ground Surface						20	40	60	80	100	10	20	30	
204.0	probable peat														
204.0	End of Dynamic Cone Penetration Test														
0.1	Refusal on Probable Bedrock					204									

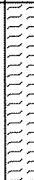
ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPSPB-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+450 18.5 RT, Co-ords: 5048201N; 2395558E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic cone penetration test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.02 CHECKED BY T. Crilly

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 (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _p W W _L							
204.5	Ground Surface							20 40 60 80 100									
0.0	probable peat						204										
202.7							203										
1.8	End of Dynamic Cone Penetration Test																
	Refusal on Probable Bedrock																

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No DCPSPB-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-South Pointe Au Baril-Sta 10+400 65 RT, Co-ords: 5048215N; 239624E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic cone penetration test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.08 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
207.7	Ground Surface							20 40 60 80 100		10 20 30				
0.0	probable silt						207							
206.5														
1.2	End of Dynamic Cone Penetration Test													

ONTARIO MOT HWY 69 SOUTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/28

RECORD OF BOREHOLE No NPB-1




1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 68, N Pointe Au Baril, Sta 16+250 o/s 160 Lt, Co-ords: 5052614 N; 236203 E ORIGINATED BY P. Ringuette

DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith

DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W _p W W _L WATER CONTENT (%)				GR	SA	SI	CL
197.2 0.0	Snow						197													
196.3 0.9	Sand, brown, moist, compact, fine grained, poorly graded		1	SS	11		196													
194.7 2.5	Silt, brown, moist, compact, poorly graded, with coarse grained sand, some cobbles		2	SS	21		194													
193.7 3.5	End of Borehole Groundwater not encountered at time of drilling																			

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No NPB-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 16+800 o/s 90 Lt, Co-ords: 5053103 N; 235971 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
201.9 0.0	Bedrock outcrop visible at surface																
							201										




ONTARIO MOT HWY 69 NORTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No NPB-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 16+875 o/s 80 Lt, Co-ords: 5053183 N; 235920 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
196.7 0.0	Snow													
195.9 0.8	Peat, dark brown, wet, soft, trace silt						196							
195.3 1.4	Clay, brown, wet, soft, low plasticity, some silt, trace sand		1	SS	2		195					52		0 9 43 48 w = 52%
194.1 2.6	End of Borehole Refusal on Probable Bedrock													

RECORD OF BOREHOLE No NPB-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 18+200 o/s 5 Rt, Co-ords: 5054338 N; 235306 E ORIGINATED BY P. Ringuette
DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith
DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _p	W	W _L		
205.7 0.0	Snow							20 40 60 80 100						GR SA SI CL
205.1 0.6	Peat, dark brown, wet, very soft, trace silt					▽	205							
			1	SS	WH		204					808		
							203							
			2	SS	WH		202					1067		
							201					278		
200.8 4.9	Clay, grey, wet, very soft, intermediate plasticity, some silt		3	SS	1		200		2					
			4	VANE										
			5	SS	10							62		0 34 35 31 w = 62%
199.1 6.6	End of Borehole													
	Refusal on Probable Bedrock													
	Groundwater at 0.76m at time of drilling													

ONTARIO MOT HWY 69 NORTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No NPB-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 18+300 o/s 5 Rt, Co-ords: 5054431 N; 235270 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
205.7 0.0	Snow							20 40 60 80 100		W _p W W _L				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
204.8 0.9	Peat, dark brown, wet, very soft, trace silt, trace fine sand							20 40 60 80 100		10 20 30				
			1	SS	WH							2125		
			2	SS	WH							1112		
			3	SS	WH							1475		
199.8 195.8 6.1	Clay, grey, wet, medium plasticity, some organics, some sand End of Borehole Refusal on Probable Bedrock Groundwater not encountered at time of drilling		4	SS	Refusa									

ONTARIO MOT HWY 69 NORTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No NPB-7

1 OF 2

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+225 o/s 18.5 Lt, Co-ords: 5055324 N; 235030 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Tripod and Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	10 20 30			
193.1 0.0	Water						193							
191.6 1.5	Peat, black, wet, soft, fibrous		1	SS	WH		191							
189.6 3.5	End of borehole Dynamic cone test started Possible peat		2	SS	WH		190							
185.0 8.1	Possible sand						185							
							184							

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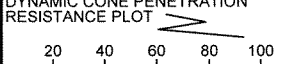
+ 3, x 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No NPB-7

2 OF 2

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+225 o/s 18.5 Lt. Co-ords: 5055324 N, 235030 ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Tripod and Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Possible sand (<i>continued</i>)						183				
182.3											
10.8	End of Dynamic Cone Penetration Test Groundwater at surface at time of drilling										

ONTARIO MOT HWY 69 NORTH POINTE AU BARIL GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No NPB-8

1 OF 2

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+225 o/s 18.5 RT, 5055332 N; 235066 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Tripod and Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
							20 40 60 80 100	20 40 60 80 100	10 20 30					
193.1 0.0	Water						193							
191.6 1.5	Peat, black, wet, soft to very soft, fibrous		1	SS	WH		192							
							191							
			2	SS	WH		190							
							189							
			3	SS	WH		188							
							187							
			4	SS	WH		186							
							185							
185.3 7.8	Clay, grey, wet, very soft, low plasticity		5	SS	WH		184							
185.0 8.1	End of Borehole													
	Dynamic cone penetration test started Possible clay													
183.1														

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No NPB-8

2 OF 2

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+225 o/s 18.5 RT, 5055332 N; 235066 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Tripod and Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				WATER CONTENT (%) w _p w w _L							
10.0	Possible sand						183										
181.7							182										
11.4	End of Dynamic Cone Penetration Test																
	Groundwater at surface at time of drilling																


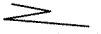
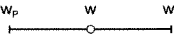







ONTARIO MOT HWY 69 NORTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No NPB-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+700 o/s 18.5 Lt. Co-ords: 5055787 N; 234924 E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Hollow Stem Auger COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
192.4												GR SA SI CL		
0.0	Ice													
192.1														
0.3	Water													
191.2														
1.2	Peat, black, wet													
190.9														
1.5	Silty Clay, brown, wet, firm, trace sand, trace organics, some clay		1	SS	2									0 9 66 25
190.3														
2.1	Clay, grey, moist, soft to firm, high plasticity, high sensitivity, some silt, trace fine sand CH													
			2	SS	WH							0 8 39 53 w = 42%		
			3	VANE										
187.4														
189.0	Sand, brown, wet, dense, poorly graded, fine grained, some cobbles and stones		4	SS	Refusa									
5.2	End of Borehole													
	Refusal on Probable Bedrock													
	Groundwater at 0.3m at time of drilling													

RECORD OF BOREHOLE No NPB-10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 19+700 o/s 18.5 Rt, Co-ords: 5055795 N; 234960 E ORIGINATED BY P. Ringuette

DIST 54 HWY 69 BOREHOLE TYPE Tripod and Dynamic Cone Penetration Test COMPILED BY D. Smith

DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											
						20 40 60 80 100 20 40 60 80 100											
194.2																	
194.0	Organics, brown, wet, soft																
0.2	End of borehole																
	Refusal on Probable Bedrock																

ONTARIO MOT HWY 69 NORTH POINTE AU BARIL.GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

METRIC[illegible]

1 OF 1

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
100.7							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)									
							20 40 60 80 100 10 20 30										

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	20 40 60 80 100			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100		
199.7 0.0	Bedrock outcrop visible at surface														

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPNPB-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, N Pointe Au Baril, Sta 16+850 o/s 95 Lt, Co-ords: 5053142 N; 235939 E ORIGINATED BY P. Ringuette

DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith

DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
198.6 0.0	Bedrock outcrop visible at surface																
							198										

ONTARIO MOT. HWY 69 NORTH POINTE AU BARIL GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

DATUM Geodetic DATE 2005.02.16 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No HLS-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 23+090 o/s 2 Lt, Co-ords: 5058560 N; 233135 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
195.8	Ground surface													
199.9	Organics, black, wet, fibrous													
0.2	Sand, brown, wet, loose, fine grained, poorly graded, trace silt		1	SS	5									0 91 (8)
193.3	Silty Sand, grey, wet, compact, poorly graded, fine grained		2	SS	16									0 50 46 4
191.8	Clay, grey, wet, stiff, some silt, some sand		3	SS	12								54	0 22 42 36
190.5	End of Borehole													
5.3	Refusal on Probable Bedrock													
	Ground water at 0.45m at time of drilling													

ONTARIO MOT HWY 69 HARRIS LAKE SOUTH GPJ ONTARIO MOT GDT 05/09/26

RECORD OF BOREHOLE No HLS-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 23+925 o/s 18.5 Lt, Co-ords: 5060589 N; 231282 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly





SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
195.2	Ground surface															
0.0	Peat, black, wet, fibrous															
194.9																
0.3	Sand, brown, wet, very loose, fine to medium grained, poorly graded															
			1	SS	2											
193.2																
2.0	Silty Clay, grey, wet, soft, some silt, low plasticity		2	AUGER												
192.6																
2.6	End of Borehole															
	Refusal on Probable Bedrock															
	Groundwater at 0.61m at time of drilling															

RECORD OF BOREHOLE No HLS-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 24+450 o/s 18.5 Lt. Co-ords: 5059550 N; 232200 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE										
194.1 0.0	Ice surface Water						194											
193.2 0.9	Peat , black, wet, fibrous						193											
192.6 1.5	Sand , brown, wet, compact, fine grained, poorly graded		1	SS	12		192											
191.4 2.7	End of Borehole Refusal on Probable Bedrock Groundwater at surface at time of drilling																	

RECORD OF BOREHOLE No HLS-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 24+825 o/s 18.5 Lt, Co-ords: 5059826 N; 231947 E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Tripod with dynamic cone penetrometer COMPILED BY D. Smith
DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
192.7	Ground surface													
0.0	30 mm water Peat, black, wet, very soft, fibrous													
190.4			1	SS	1									
2.3	Silty Sand, grey, wet, very loose, poorly graded, fine grained		2	SS	2									
190.1														
2.6	Dynamic Cone Penetration test started													
	Probable sand													
188.4														
4.3	End of Borehole Refusal on Probable Bedrock Groundwater found at surface at time of drilling													

RECORD OF BOREHOLE No HLS-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 24+850 o/s 18.5 Lt, Co-ords: 5059844 N; 231930 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with dynamic cone penetrometer COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
193.1 0.0	Ground surface Peat black, wet, very soft, fibrous		1	SS	1		193						GR SA SI CL
190.7 2.4	Dynamic Cone Penetration test started Probable peat						192						
187.3 5.8	End of Borehole Refusal probably on rock Groundwater at surface at time of drilling						191						
							190						
							189						
							188						

RECORD OF BOREHOLE No HLS-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 25+235 o/s 18.5 Lt, Co-ords: 5060127 N; 231669 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%) w _p w w _L				
197.5	Ice surface													
0.0	Water													
196.9							197							
0.6	Peat , black, wet, very soft													
196.6														
0.9	Silty Clay , grey, wet, firm to stiff, intermediate plasticity, some sand CI													
			1	SS	7									
			2	VANE				2.0						0 19 52 29
							195							
			3	SS	2									
194.0														0 10 68 22
3.5	End of Borehole						194							
	Refusal on Probable Bedrock													
	Groundwater at surface at time of drilling													

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly



+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No HLS-8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S. Sta 10+350 o/s 30 Rt. Co-ords: 5060520 N;231381 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _p W W _L					WATER CONTENT (%)
195.2	Ground surface							20	40	60	80	100			
0.0 195.0	Peat, black, wet, soft														
0.2	Silty clay, grey, wet, soft, intermediate plasticity		1	AUGER			195								
194.1 1.1	End of Borehole Refusal on Probable Bedrock Groundwater not encountered at time of drilling														

RECORD OF BOREHOLE No HLS-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 10+475 o/s 25 Rt, Co-ords: 5060595 N; 231320 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Augers COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									WATER CONTENT (%)	
195.5	Ground surface						195											
0.0	Peat, with silty sand		1	SS	1			194									139	0 28 61 11
193.0									193									
2.5	Silt, grey, wet, loose, with sand, some clay	2	SS	7	192								○					
191.2																		
4.3	End of Borehole	3	SS	Refusa														
	Refusal on Probable Bedrock																	
	Ground water at 0.3m at time of drilling																	

ONTARIO MOT HWY 69 HARRIS LAKE SOUTH.GPJ ONTARIO MOT.GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly



+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPHLS-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Harris Lake S, Sta 10+400 o/s 20 Rt, Co-ords: 506545 N; 231355 E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY D. Smith
 DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa										
195.5 0.0	Ice surface Water															
194.3 1.2	possible SILT															
191.0 4.5	End of Dynamic Cone Penetration Test															

ONTARIO MOT HWY 69 HARRIS LAKE SOUTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN- 1

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 13+925 18.5 RT, Co-ords: 5063787N; 229966E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
193.1	Ground Surface																
192.9	Snow and Topsoil																
0.2	End of Borehole																
	Refusal on Probable Bedrock																
	Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN-2

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 17+765 19 RT, Co-ords: 5067326N; 228495E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa											
197.9	Ice Surface																
0.0	200 mm of Ice, over 50 mm Water, over																
197.3	Peat, black, wet, soft, fibrous																
0.6	End of Borehole																
	Refusal on Probable Bedrock								197								
	Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN- 3

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 17+825 18.5 RT, Co-ords: 5067380N; 228469E ORIGINATED BY C. Roy
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
197.9	Ice Surface															
0.0	610 mm of Ice, over Water															
197.1																
0.8	Peat, black, wet, soft, fibrous		1	SS	1		197									
196.5																
1.4	Sand, grey, moist, very loose, poorly graded, fine to medium grained, trace silty clay		2	SS	2		196									
195.8																
2.1	Dynamic Cone Penetration Test started						195									
	probable sand						194									
							193									
							192									
							191									
							190									
							189									
188.8																
9.1	End of Dynamic Cone Penetration Test															
	Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN- 4

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 18+225 18.5 RT, Co-ords: 5067748N; 228311E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
195.5	Ice Surface							20	40	60	80	100					
0.0	460 mm of Ice, over Water																
195.1																	
0.5	Peat, black, wet, very soft, trace fine grained sand		1	SS	WH		195									125	
194.6																	
0.9	End of Borehole																
	Refusal on Probable Bedrock																
	Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN- 5

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 18+605 18.5 RT, Co-ords: 5068099N; 228163E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE										
189.1	Ice Surface						20 40 60 80 100											
0.0	610 mm of Ice, over Water						● QUICK TRIAXIAL × LAB VANE											
187.8							20 40 60 80 100											
1.4	Peat, black, wet, very soft, fibrous		1	SS	WH													
186.6																		
2.5	Silty Clay, grey, moist, firm, low to intermediate plasticity, trace fine grained sand		2	SS	7													
185.5																		
3.7	Dynamic Cone Penetration Test possible clay																	
184.9																		
4.3	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																	

RECORD OF BOREHOLE No HLN- 6

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 18+800 18.5 RT, Co-ords: 5068276N; 228085E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
195.4	Ice Surface							20 40 60 80 100		W _P W W _L				
0.0	510 mm Ice													
194.9														
0.5	510 mm of Ice, over Peat, black, wet, soft, fibrous													
			1	SS	WH									
192.4														
3.1	Clayey Silt, grey, moist, very soft, low plasticity, trace of fine grained sand		2	SS	1									
191.8														
3.7	Dynamic Cone Penetration Test started													
	probable clay													
										</				

ONTARIO MOT. HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No HLN- 7

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 18+925 18.5 RT, Co-ords: 5068391N; 228036E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
195.4	Ice Surface													
0.0	460 mm of Ice, over Water						195							
194.8	Peat, black, wet, soft, fibrous													
0.6														
193.9							194							
1.5	Silty Clay, grey, brown, moist, firm, intermediate plasticity, some sand, CR		1	SS	5									1 34 50 15
193.3														
2.1	Dynamic Cone Penetration Test started						193							
193.0	probable silty clay													
2.4	End of Dynamic Cone Penetration Test													
	Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No HLN- 9

1 OF 1

METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 19+875 18.5 RT, Co-ords: 5069264N; 227661E ORIGINATED BY C. Roy
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.02 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
194.0	Ice Surface														
0.0	510 mm of Ice, over Water														
193.2															
0.8	Peat, black, wet, soft, fibrous						193								
192.5															
1.5	Sand, grey, moist, loose, poorly graded, fine to medium grained		1	SS	10		192								
192.2	Silty Clay, grey brown, moist, stiff, intermediate plasticity, trace fine to medium grained sand														
191.8	Dynamic Cone Penetration Test started														
2.1	probable clay														
											</				

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26



RECORD OF BOREHOLE No DCPHLN- 1 1 OF 1 METRIC

G.W.P. 5377 - 02 - 00 LOCATION Hwy 69-Harris Lake N-Sta 17+775 18.5 RT, Co-ords: 5067334N; 228489E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.01 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
197.9	Ice Surface												
0.0	610 mm of Ice, over Water												
197.1													
0.8	Dynamic Cone Penetration Test started						197						
	probable sand						196						
							195						
193.9							194						
4.0	End of Dynamic Cone Penetration Test												
	Refusal on Probable Bedrock												
	Groundwater encountered at surface at time of drilling												

ONTARIO MOT HWY 69 HARRIS LAKE NORTH.GPJ ONTARIO MOT.GDT 05/08/26

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT 	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE						
195.6	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	W _p — W — W _L WATER CONTENT (%) 10 20 30	kN/m ³	GR SA SI

[illegible]

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No M-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 20+962 18.5 LT, Co-ords: 5070302N; 227363E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
190.3	Snow Surface																
0.0 190.0	300 mm Snow																
0.3	Peat, dark brown, wet, soft, trace fine sand						190										
189.1																	
1.2	Silty Sand, brown to grey, wet, loose, poorly graded, fine grained, some clay, trace fibrous organics						189										
			1	SS	8												
							188										
187.3																	
3.1	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 20+962 18.5 RT, Co-ords: 5070305N; 227400E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
190.9	Snow Surface																
0.0	150 mm of Ice, over Water																
190.2																	
0.8	Peat, black, dark brown, wet, fibrous						190										
189.4																	
1.5	Silty Sand, dark brown to grey, wet, loose, poorly graded, fine grained, some organics		1	SS	6		189										
188.5																	
2.4	End of Borehole Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+100 18.5 LT. Co-ords: 5071423N; 227220E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
196.7	Snow Surface																
0.0	150mm Snow, over,																
196.4	Sand , brown, moist, loose, poorly graded, fine grained, some organics																
0.3	End of Borehole																
	Auger Refusal on Probable Bedrock						196										
	Groundwater not encountered at time of drilling																

RECORD OF BOREHOLE No M- 5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+200 18.5 LT, Co-ords: 5071517N; 227185E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
196.7	Ice Surface					▽											GR SA SI CL
0.0	300 mm of Ice, over Water						196										
195.5																	
1.2	Peat, dark brown, wet, soft, some fine grained sand, some silt						195										
194.8																	
2.0	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+067 18.5 RT, Co-ords 5071403N; 227265E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	20			40	60	80	100						
196.7	Ice Surface																	
0.0	90 mm of Ice, over																	
196.3	160 mm Water, over																	
0.4	Peat, dark brown, wet, soft, fibrous, some fine sand End of Borehole																	
	Auger Refusal on Probable Bedrock																	
	Groundwater encountered at surface at time of drilling																	


ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+120 18.5 RT, Co-ords: 5071454N; 227249E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
196.7	Ice Surface							20	40	60	80	100					
0.0	300 mm of Ice, over Peat, dark brown, wet, soft, fibrous																
196.2																	
0.5	End of Borehole						196										
	Auger Refusal on Probable Bedrock																
	Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+180 18.5 RT, Co-ords: 5071502N; 227233E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)					
						20	40	60	80	100	10	20	30	kN/m ³	GR SA SI CL	
196.7	Ice Surface															
0.0	300 mm of Ice, over Water															
195.8																
0.9	Peat, dark brown, wet, soft, fibrous, some fine grained sand, trace silt															
195.5																
1.2	End of Borehole															
	Auger Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+500 18.5 LT, Co-ords: 5071787N; 227063E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa												
196.6	Ice Surface																	
0.0	460 mm of Ice, over Water																	
196.0																		
0.6	Peat, dark brown, very wet, soft, fibrous, some fine grained sand																	
195.5																		
1.1	End of Borehole																	
	Refusal on Probable Bedrock																	
	Groundwater encountered at surface at time of drilling																	

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/28

RECORD OF BOREHOLE No M- 11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+525 18.5 RT, Co-ords: 5071827N; 227083E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
196.6	Snow Surface																
0.0	610 mm Ice and Snow, over Peat, dark brown, wet, soft, fibrous, some fine sand																
195.9							196										
0.8	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 12

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+625 18.5 LT, Co-ords: 5071893N; 227000E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa									
198.5	Ice Surface														
0.0	300 mm of Ice, over Peat, dark brown, wet, soft, fibrous, some fine grained sand														
198.0	End of Borehole														
0.5	Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling														

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 13

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 23+000 18.5 LT, Co-ords: 5072186N; 226771E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
201.5	Ice Surface							20	40	60	80	100					
0.0	Ice and Snow																
201.2																	
0.3	End of Borehole						201										
	Auger Refusal on probable Bedrock																
	Groundwater not encountered at time of drilling																


ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 14

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+900 18.5 RT, Co-ords: 5072136N; 226866E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.06 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa											
199.1	Ice Surface							<div><div>20406080100</div><div>○ UNCONFINED + FIELD VANE</div><div>● QUICK TRIAXIAL × LAB VANE</div></div>					<div><div>102030</div><div>WATER CONTENT (%)</div></div>						
0.0	460 mm Ice, over Peat, dark brown, wet, soft, fibrous, trace sand																		
198.1	End of Borehole																		
1.0	Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																		

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/28

RECORD OF BOREHOLE No M- 15

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 23+200 40 RT, Co-ords: 5072367N; 226666E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
202.2	Snow Surface																
0.0	150 mm Snow, over																
201.9	Peat, brown, moist, soft, fibrous,																
0.3	trace sand																
	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 16

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 23+200 80 RT, Co-ords: 5072397N; 226693E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
201.0	Snow Surface													
0.0	300 mm Snow, over													
200.5	Peat, dark brown, wet, soft, fibrous,													
0.5	trace sand													
	Silty Sand, brown to grey, wet,													
	compact, poorly graded, fine grained													
199.2			1	SS	Refusa		200							
1.8	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater not encountered at time of drilling													

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 17

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+275 30 LT, Co-ords: 5073244N; 225506E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
194.7	Ice Surface																
0.0	300 mm of Ice, over Water																
194.1																	
194.0	Peat, dark brown, wet, soft, fibrous, some sand						194										
0.8	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater encountered at surface at time of drilling																

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/09/26

RECORD OF BOREHOLE No M- 18

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+350 30 LT, Co-ords: 5073298N; 225439E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				
194.7	Ice Surface					▽		20 40 60 80 100	○ UNCONFINED + FIELD VANE	○ QUICK TRIAXIAL × LAB VANE	W _p W W _L				
0.0	300 mm of Ice, over Water						194	20 40 60 80 100			10 20 30				
193.5															
1.2	Peat, dark brown, wet, soft, fibrous, some silt, trace sand														
193.0			1	SS	Refusa										
1.7	End of Borehole														
	Auger Refusal on Probable Bedrock														
	Groundwater encountered at surface at time of drilling														

RECORD OF BOREHOLE No M- 19

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+575 14 LT, Co-ords: 5073461N; 225274 E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
192.7	Snow Surface							20	40	60	80	100						
0.0	460 mm Snow, over Peat, dark brown, wet, soft, fibrous, some fine grained sand, trace silt						192											
191.9																		
0.8	Silty Sand, grey, wet, loose, poorly graded, fine grained																	
191.4																		
1.2	End of Borehole																	
	Auger Refusal on Probable Bedrock																	
	Groundwater not encountered at time of drilling																	



ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 20

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+675 18.5 LT, Co-ords: 5073510N; 225207E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
192.7	Snow Surface																
0.0 192.4	300 mm Snow																
0.3	Peat, dark brown, wet, soft, fibrous, some fine grained sand																
191.8							192										
0.9	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 21





1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+625 6 LT, Co-ords: 5073473N; 225268E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
192.7	Snow Surface							20	40	60	80	100					
0.0 192.4	300 mm Snow																
0.3	Peat, dark brown, wet, soft, fibrous, trace silt						192										
191.2																	
1.5	Silty Sand, grey, wet, very loose, poorly graded, fine grained, trace organics		1	SS	2		191										
190.3																	
2.4	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 22										1 OF 1		METRIC					
G.W.P. 5377-02-00			LOCATION Hwy 69-Magnetewan-Sta 11+075 18.5 RT, Co-ords: 5073796N; 224924E				ORIGINATED BY P. Rienguet										
DIST 54 HWY 69			BOREHOLE TYPE Continuous Hollow Stem Auger				COMPILED BY C. Roy										
DATUM Geodetic			DATE 2005.02.25				CHECKED BY T. Crilly										
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
188.8	Snow Surface																
0.0 188.8	300 mm Snow, over																
0.3	Peat, dark brown, wet, soft, some fine grained sand																
187.8							188										
0.9	Sand, brown, wet, loose, poorly graded, fine grained, trace organics																
187.2							187										
1.5	Silt, grey, moist, very loose to loose, poorly graded, trace to some sand, trace clay, trace cobbles		1	SS	5												
							186										
185.0			2	SS	3												
3.7	End of Borehole																
	Auger Refusal on Probable Bedrock																
	Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/09/26

RECORD OF BOREHOLE No M- 23

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 11+050 18.5 LT, Co-ords: 5073755N; 224912E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
188.6	Snow Surface							20	40	60	80	100						
0.0	300mm Snow																	
188.3	Peat, dark brown, wet, soft, some fine grained sand Silty Sand, grey to brown, wet, very loose, poorly graded						188											
188.3							187											
0.5			1	SS	2		186											
			2	SS	3		185											
184.6	End of Borehole																	
4.0	Auger Refusal on Probable Bedrock																	
	Groundwater not encountered at time of drilling																	

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA GPJ ONTARIO MOT GDT 05/08/26

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.21 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

1 OF 1

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		w _p	w	w _L		
179.1 0.0	Snow Surface 600 mm Snow	[Pattern]												GR SA SI CL
178.5 0.6	150mm of Topsoil, over Sand, brown, wet, loose, poorly graded, fine grained, some silt	[Pattern]												
177.5 1.5	Clayey Silt, brown, moist, very loose, poorly graded, some organics, some sand	[Pattern]	1	SS	WH							52	0 15 70 15	
176.3 2.7	Clay, grey, wet, very soft, intermediate plasticity, CI some silt	[Pattern]	2	SS	WH								0 2 70 28	
			3	VANE			+3							
			4	SS	WH							47	0 2 49 49	
			5	VANE			+4						w = 63 %	
			6	SS	WH							90	0 2 31 67	
			7	VANE			+2							
			8	SS	WH							74		
			9	VANE			+2							
			10	SS	1							65		
			11	VANE			+2							
			12	VANE			+2.7							
167.3 11.7	Silt, grey, wet, very loose to compact, trace sand, trace gravel	[Pattern]	13	SS	2							44		
166.1 13.0	End of Borehole Auger Refusal on Probable Rock Groundwater not encountered at time of drilling	[Pattern]	14	SS	Refusal									

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

1 OF 1

METRIC

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	Liquid Limit w _L	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
Elev. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES	20 40 60 80 100								
									SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
187.2	Rock Surface						20 40 60 80 100	WATER CONTENT (%) 10 20 30						

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 27

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+300 335 LT, Co-ords: 5075146N; 223010E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.21 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
194.7	Snow Surface							20	40	60	80	100					
0.0 194.4	300 mm Snow																
0.3	75 mm of Topsoil, over Sandy Silt , brown, wet, loose, poorly graded, fine grained, trace clay						194										
			1	SS	6		193										1 30 62 6
192.2 2.5	Sand , brown, wet, compact, poorly graded, fine grained, some cobbles						192										
191.1 3.7	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling		2	SS	13												

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 28

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 14+500 385 LT, Co-ords: 5076302N; 222595E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.23 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
193.9	Snow Surface							20	40	60	80	100					
0.0	Snow																
193.6																	
0.3	150 mm of Topsoil, over Sand, brown to grey, moist,very loose to loose, poorly graded, fine grained, trace organics, trace silt																
			1	SS	5		193										
							192										
			2	SS	4		191										
							190										
189.6																	
4.3	Silty Sand, grey, wet, very loose to loose, poorly graded, fine grained, trace clay																
			3	SS	3		189										
							188										
			4	SS	7												
							187										
186.6																	
7.3	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No M- 29

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+300 295 LT, Co-ords: 5075165N; 223049E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.21 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL	× LAB VANE							
188.1	Snow Surface							20	40	60	80	100						
0.0 187.8	300mm Snow						188											
0.3	150 mm of Topsoil, over Silty Sand , brown, moist, compact, poorly graded, fine grained						187											
185.6			1	SS	14		186											
2.5	Sand , brown, wet, very loose to loose, poorly graded, fine grained, trace silt		2	SS	4		185											
							184											
			3	SS	4		183											
182.6																		
5.5	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																	

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 30

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 14+500 350 LT, Co-ords: 5076314N; 222628E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.24 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
194.0	Snow Surface							20	40	60	80	100					
0.0	460 mm Snow, over Peat, brown, moist, soft, fibrous, trace fine grained sand																
193.2																	
0.8	Sand, brown, wet, very loose to loose, poorly graded, fine grained, trace silt		1	SS	4		193										
191.5							192										
2.5	Silty Sand, grey, wet, very loose to loose, poorly graded, fine grained, trace clay		2	SS	5		191										
							190										
			3	SS	3		189										
							188										
			4	SS	6		187										
186.9							186										
7.1	Sand, grey, moist, compact, poorly graded, fine grained, trace silt		5	SS	21												
185.6																	
8.4	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																





ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M-31

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+600 340 LT, Co-ords: 5075458N; 222904E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.22 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL	
								20 40 60 80 100				w _p w w _L								
185.1	Snow Surface																			
0.0	150 mm Snow, over																			
184.6	Peat, black, wet, soft, fibrous																			
0.5	Sand, brown, wet, loose, poorly graded, fine grained																			
183.6																				
1.5	Sandy Silt, brown, wet, very loose, poorly graded, fine grained, trace organics		1	SS	1												4	44	50	2
180.8																				
4.3	Silt, grey, wet, very loose to compact, trace clay		3	SS	3															

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No M- 32

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+900 345 LT, Co-ords: 5075741N; 222814E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.23 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
190.7	Snow Surface							20	40	60	80	100					
0.0 190.4	300 mm Snow																
0.3	150 mm of Topsoil, over Sand, brown, moist, compact, poorly graded, fine grained, trace silt						190										
							189										
			1	SS	20												
188.2																	
2.4	End of Borehole Auger Refusal on Probable Bedrock Groundwater not encountered at time fo drilling																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/09/26

1 OF 1

METRIC

DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPM- 2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+100 18.5 RT, Co-ords: 5071435N; 227256E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.27 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
197.0	Snow Surface																
196.0	Snow																
0.2	End of Dynamic Cone Penetration Test																
	Refusal on Bedrock																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

METRIC

DIST	54	HWY	69	BOREHOLE TYPE	Dynamic Cone Penetration Test	COMPILED BY	C. Roy
DATUM	Geodetic	DATE	2005.02.27	CHECKED BY	T. Crilly		

SOIL PROFILE					SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
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 (%)								
196.7	Rock Surface						20	40	60	80	100								
196.6																			
0.2	End of Dynamic Cone Penetration Test																		
	Refusal on Probable Bedrock									196									

RECORD OF BOREHOLE No DCPM- 4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 22+475 18.5 RT, Co-ords: 5071783N; 227108E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
196.7	Ice Surface												
0.0	300 mm of Ice, over probable peat												
196.1													
0.6	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock						196						

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 23+100 18.5 LT, Co-ords: 5072282N; 226726E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.26 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _p W W _L WATER CONTENT (%)				
201.4 0.0	probable peat						201							
200.4 0.9	probable silt						200							
199.8 1.5	End of Dynamic Cone Penetration Test													

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+300 30 LT, Co-ords: 5073258N; 225489E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa										
194.7	Ice Surface															
0.0	300 mm of Ice, over Water															
194.3																
194.5	probable peat															
0.6	End of Dynamic Cone Penetration Test						194									
	Refusal on Probable Bedrock															

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 10+625 18.5 LT, Co-ords: 5073477N; 225245E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					W _p	W		
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)					
						20	40	60	80	100						
192.9 0.0	probable peat															
191.8						192										
1.1	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock															

RECORD OF BOREHOLE No DCPM- 8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 12+500 80 LT, Co-ords: 5074551N; 223702 E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.17 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
179.1 0.0	Snow Surface possible clay						179							
							178							
							177							
							176							
							175							
							174							
							173							
							172							
							171							
170.0 9.1	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock													



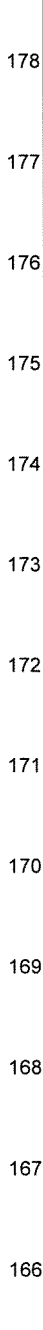
ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 12+600 105 LT, Co-ords: 5074611N; 223612E ORIGINATED BY P. Rienguet
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.17 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
178.8 0.0	possible clay										
165.4 13.4	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock										

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+600 375 LT, Co-ords: 5075447N; 222871E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.22 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)			
185.3 0.0	probable sand/silt						185							
							184							
							183							
							182							
							181							
							180							
							179							
							178							
177.1 8.2	End of Dynamic Cone Penetration Test													

ONTARIO MOT HWY 69 MAGNETEVAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 11

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 13+900 380 LT, Co-ords: 5075731N; 222779E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.23 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	w _p	w	w _L		
192.2																	
0.0	probable silt						192										
191.5																	
0.8	End of Dynamic Cone Penetration Test Refusal on Probable Bedrock																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPM- 12

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METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Magnetewan-Sta 14+200 385 LT, Co-ords: 5076018N; 222684E ORIGINATED BY P. Rienguet
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.23 CHECKED BY T. Crilly

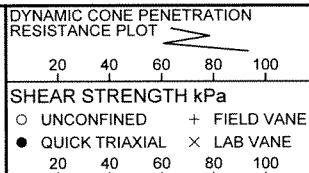
SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa				WATER CONTENT (%)							
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				w _p w w _L							
192.0 0.0	possible sand						20	40	60	80	100	10	20	30			
							191										
							190										
							189										
							188										
							187										
							186										
							185										
							184										
							183										
182.2 9.8	End of Dynamic Cone Penetration Test																

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT.GDT 05/08/26

1 OF 1

METRIC

SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	PLASTIC LIMIT w_p NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE						
100.7							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	WATER CONTENT (%) 10 20 30		GR SA SI CL



The diagram shows a horizontal axis labeled 'WATER CONTENT (%)' with numerical values 10, 20, and 30. Above the axis, three points are marked: w_p (Plastic Limit) at approximately 12%, w (Natural Moisture Content) at 20%, and w_L (Liquid Limit) at approximately 28%. A horizontal line segment with vertical end caps spans from w_p to w_L . A small circle is located on this line at the position of w . The text 'PLASTIC LIMIT' is above w_p , 'NATURAL MOISTURE CONTENT' is above w , and 'LIQUID LIMIT' is above w_L .

UNIT WEIGHT	γ
kN/m ³	

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

ONTARIO MOT HWY 69 MAGNETEWAN SWAMP AREA.GPJ ONTARIO MOT GDT 05/08/26

RECORD OF BOREHOLE No GL3A-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 13+575 360 LT, Co-ords: 5075466N; 222881E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.22 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
185.0	Ice Surface							20 40 60 80 100						
0.0	Ice							20 40 60 80 100						
184.7														
0.3	Peat, dark brown, wet, fibrous													
184.3														
0.8	Silty Sand, brown/grey, very wet, loose to very loose, fine grained, trace organics, trace clay, some gravel													
			1	SS	WH		184							
							183							
			2	SS	2		182							
							181							
			3	SS	5		180							
							179							
			4	SS	WH		178							
							177							
			5	SS	WH		176							
							175							
			6	SS	2		174							
			7	SS	4									
173.6	End of Borehole													
11.4	Auger Refusal on Probable Bedrock													
	Groundwater not encountered at time of drilling													

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 13+700 370 LT, Co-ords: 5075523N; 222863E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.22 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
186.1	Ground Surface													
0.0	300 mm Snow, over Topsoil, black, wet													
185.6														
0.5	Sand, brown to grey, wet to moist, very loose to compact, fine grained, trace silt, trace clay													
			1	SS	10									
			2	SS	WH									
			3	SS	3									
180.8														
5.3	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater not encountered at time of drilling													

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-3

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+675 370 LT, Co-ords: 5077431N; 22264E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.04 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
193.8	Ground Surface																
193.8	Organic Sand, brown, wet																
193.7	Sand, brown, wet, very loose to compact, well graded, fine grained, trace medium grained sand, trace to some silt																
			1	SS	10											0 96 (4)	
			2	SS	4												
			3	SS	WH												
			4	SS	2											0 80 (20)	
			5	SS	28												
185.7	End of Borehole																
8.1	Groundwater not encountered at time of drilling																

ONTARIO MOT GRUNDY LAKE SWAMP GPJ ONTARIO MOT GDT 05/08/28

RECORD OF BOREHOLE No GL3A-4

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+800 370 LT, Co-ords: 5077551N; 222227E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.04 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				w _p	w	w _L		GR	SA	SI	CL		
194.0	Ground Surface							20	40	60	80	100									
0.0	Organic Sand , brown, wet																				
192.8																					
1.2	Sand , grey to brown, wet, loose, well graded, fine grained, trace medium grained sand		1	SS	9													0	92	(8)	
				2	SS		3												0	97	(3)
	- very wet below 4.57m depth		3	SS	3																
188.7																					
5.3	Silty Sand , brown, wet, very loose to compact, poorly graded, fine grained sand																				
				4	SS	2															
				5	SS	4															
				6	SS	14															
				7	SS	WH															
			8	SS	9																
			9	SS	5																
179.8																					
14.2	End of Borehole Auger Refusal on Probable Bedrock Groundwater encountered at 0.76 m at time of drilling																				

ONTARIO MOT GRUNDY LAKE SWAMP-GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-5

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+825 40 LT, Co-ords: 5078624N; 222240E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
187.0	Snow Surface							20 40 60 80 100						
0.0	610 mm Snow, over 50 mm Ice, over Water													
186.2														
0.8	Peat, black, wet, very soft, trace of intermediate grained sand, trace silt, CH		1	SS	1								130	
			2	SS	2								97	
183.0														
4.0	Clay, grey, moist, soft to firm, high plasticity		3	SS	1								77	w = 67%
182.0	Dynamic Cone Penetration Test started probable clay													
5.0														
180.8	End of Dynamic Cone Penetration Test Groundwater encountered at 0.61m at time of drilling													
6.2														

RECORD OF BOREHOLE No GL3A-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 17+000 150 LT, Co-ords: 5078759N; 222083E ORIGINATED BY C. Roy
 DIST 54 HWY 69 BOREHOLE TYPE Tripod COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
186.4	Ice Surface														
0.0	460 mm of Ice, over Water														
182.3															
4.1	Peat, black, wet, soft, fibrous		1	SS	WH										
180.6															
180.5	Sand, grey, wet, loose, intermediate grained, trace silt		2	SS	Refusa										
5.9	End of Borehole														
	Refusal on Probable Bedrock														
	Groundwater encountered at surface at time of drilling														

1 OF 1

METRIC

G.W.P.	5377-02-00	LOCATION	Hwy 69-Grundy Lake 3A Sta 12+300 18.5 Lt, Co-ords: 5075753N; 222166E	ORIGINATED BY	S. McAuliffe
DIST	54	HWY	69	BOREHOLE TYPE	Continuous Hollow Stem Auger
DATUM	Geodetic	DATE	2005.03.23	CHECKED BY	T. Crilly

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1 OF 3

METRIC

G.W.P. 5377-02-00

LOCATION

Hwy 69-Grundy Lake 3A-Sta 12+500 18.5 Lt, Co-ords: 5085950N; 222057E

ORIGINATED BY S. McAuliffe

DIST 54

HWY 69

BOREHOLE

Continuous Hollow Stem Auger

COMPILED BY C. Roy

DATUM Geodetic

DATE _____

2005.03.21

CHECKED BY T. Crilly

Continued Next Page $+3, \times 3:$

Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-13

2 OF 3

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 12+500 18.5 Lt. Co-ords: 5085950N; 222057E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.21 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
	Clay, grey, wet, very soft, high plasticity, trace silt (continued)		11	SS	1		165	+				67	
			12	VANE									
160.5 20.0	Silty Clay, grey, wet, firm		13	SS	1		162	+				69	
			14	VANE									
							161						
							160						
							159						
157.5 23.0	Silt, grey, wet, loose to compact, trace clay		15	SS	6		159						
							158						
							157						
155.7 24.8	Dynamic Cone Penetration Test started probable silt		16	SS	10		156						
							155						
							154						
							153						
							152						
							151						

Continued Next Page

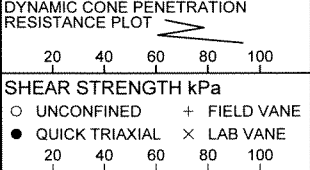
+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No GL3A-13

3 OF 3

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 12+500 18.5 Lt. Co-ords: 5085950N; 222057E ORIGINATED BY S. McAuliffe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.03.21 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
148.8	Dynamic Cone Penetration Test started						150				
31.7	probable silt (continued)						149				
	End of Dynamic Cone Penetration Test										
	Refusal on Probable Bedrock										
	Groundwater encountered at 1.22 m at the time of drilling										

ONTARIO MOT GRUNDY LAKE SWAMP GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-14

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 13+800 18.5 RT, Co-ords: 5087083N; 221472E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
184.7	Snow Surface							20	40	60	80	100					
0.0	Snow																
184.2																	
0.5	200 mm of Topsoil, over Silt, brown, moist, loose						184										
	-becoming grey		1	SS	7		183										0 13 83 4
182.7	End of Borehole																
2.0	Auger Refusal on Probable Bedrock Groundwater not encountered at time of drilling																

RECORD OF BOREHOLE No GL3A-15

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+300 18.5 LT, Co-ords: 5088383N; 220724E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.22 CHECKED BY T. Crilly

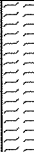

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
196.6	Ground Surface																
0.0	150 mm of Topsoil, over Clayey Silt, brown, wet, very soft, low to intermediate plasticity, trace coarse sand to fine grained sand																
195.8							196										
0.8	End of Borehole Auger Refusal on Probable Bedrock																

RECORD OF BOREHOLE No GL3A-16

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+300 18.5 RT, Co-ords: 5088393N; 220760E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
191.8	Ground Surface							20	40	60	80	100					
0.0	Peat, black, frozen						191										
190.3																	
1.5	Clayey Silt, brown, moist, soft, trace oxidation, trace roots		1	SS	2		190										0 1 82 17
189.5																	
2.3	End of Borehole Auger Refusal on Probable Bedrock																

RECORD OF BOREHOLE No GL3A-17

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+175 18 LT, Co-ords: 5089258N; 220721E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
194.5	Water Surface															
0.0	Water															
193.9							194									
0.6	Peat, black, wet, fibrous															
193.5																
1.1	Clay, grey, wet, very soft															
			1	SS	WH		193									
			2	VANE												
							192									
			3	SS	WH											
			4	VANE			191									
							190									
189.4																
5.2	End of Borehole															
	Auger Refusal on Probable Bedrock															
	Groundwater encountered at surface at time of drilling															

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No GL3A-18

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-STA 16+175 18.5 RT, Co-ords: 5089250N; 220757E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
194.5	Water Surface																
0.0	Water																
193.5																	
0.9	Peat, black, wet, some wood																
193.2																	
1.2	Clay, grey, wet to moist, very soft																
			1	SS	WH												
			2	VANE													
191.7																	
2.7	End of Borehole																
	Refusal on Probable Bedrock																
	Groundwater encountered at surface at time of drilling																

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT GDT 05/08/28

RECORD OF BOREHOLE No GL3A-19

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-STA 16+225 18.5 RT, Co-ords: 5089298N; 220769E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W _p W W _L					
195.5	Water Surface														
0.0	Water														
195.2															
0.3	Peat, black, very wet, very soft, fibrous, trace clay seams														
			1	SS	WH										
			2	SS	1										
190.8															
4.7	Sand, brown, wet, very loose		3	SS	2										
188.4															
7.1	Clay, grey, very wet, firm, intermediate plasticity, some silt														
			4	SS	2										
185.9															
9.6	Dynamic Cone Penetration Test started														
	probable clay														

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No GL3A-20

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+473 18.5 RT, Co-ords: 5089542N; 220822E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.29 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
195.0	Ground Surface							20 40 60 80 100							GR SA SI CL
194.8 0.2	Topsoil Silt, grey, moist, firm, trace of brown oxidation, some clay, slightly plastic							20 40 60 80 100							
			1	SS	6		194								
			2	VANE			193		5.3						0 3 83 14
192.0							192								
3.1 191.7	Gravel, very wet, compact, some silt		3	SS	27/ 150										
3.4	End of Borehole Groundwater encountered at 0.61m at time of drilling				mm										

RECORD OF BOREHOLE No GL3A-21

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+725 18.5 LT, Co-ords: 5089795N; 220840E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
DATUM Geodetic DATE 2005.01.29 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
194.5	Water Surface					▽	194									54 ○	0 0 68 32	
0.0	Water																	
193.9								193										
0.6	Peat																	
193.6																		
0.9	Clay, grey, wet, very soft to soft, trace brown oxidation, some silt		1	SS	2	192												
			2	SS	WH		191											
190.5						190												
4.0	Silty Clay, grey, very wet, very soft, traces of brown oxidation		3	SS	2													
189.2																		
5.3	End of Borehole																	
	Auger Refusal on Probable Bedrock																	
	Groundwater encountered at surface at time of drilling																	

ONTARIO MOT GRUNDY LAKE SWAMP GPJ ONTARIO MOT GDT 05/08/28

RECORD OF BOREHOLE No GL3A-22

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 17+030 18.5 LT Co-ords: 5090089N; 220882E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.29 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
195.1	Water Surface							20 40 60 80 100		W _P	W	W _L		GR SA SI CL
0.0	Water							○ UNCONFINED + FIELD VANE						
194.5								● QUICK TRIAXIAL × LAB VANE						
0.6	Peat													
194.2														
0.9	Clay, grey to brown, wet to moist, soft to firm, some silt, high plasticity, CI		1	SS	5		195							0 1 46 53
							194							
							193							
			2	SS	2		192		6.4			55		0 1 49 50 W = 46 %
			3	VANE			191							
			4	SS	WH		190		4.7					
			5	VANE			189							
			6	SH			188							
188.0							187							
7.1	Silty Clay, grey, wet, soft		7	SS	3									
186.3														
8.8	End of Borehole													
	Auger Refusal on Probable Bedrock													
	Groundwater encountered at surface at time of drilling													

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPGL3A-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+750 370 LT, Co-ords: 5077503N; 222242E ORIGINATED BY P. Ringuette
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.04 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE						
194.1 0.0	Ground Surface probable sand									
182.5 11.6	End of Dynamic Cone Penetration Test									

RECORD OF BOREHOLE No DCPGL3A-2

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+800 370 LT, Co-ords: 5077623N; 222205E ORIGINATED BY C. Roy
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
194.3 0.0	Ground Surface probable sand						194						
							193						
							192						
							191						
							190						
189.7 4.6	End of Dynamic Cone Penetration Test												

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/28

1 OF 2

METRIC

DATUM Geodetic DATE 2005.03.21 CHECKED BY T. Crilly

ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	SHEAR STRENGTH kPa		WATER CONTENT (%)			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE	PLASTIC LIMIT W _p	MOISTURE CONTENT w	LIQUID LIMIT W _L		
180.9 0.0	Ground Surface Cone test only No sample taken possible CLAY							20 40 60 80 100		10 20 30				
							180							
							179							
							178							
							177							
							176							
							175							
							174							
							173							
							172							
							171							
							170							
							169							
							168							
							167							
							166							

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No DCPGL3A-5

2 OF 2

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 12+625 18.5 LT, Co-ords: 5086037N; 222009E ORIGINATED BY S. McAuliffe
DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.03.21 CHECKED BY T. Crilly


SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
	Cone test only No sample taken possible CLAY (continued)							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
161.1							165							
164							164							
163							163							
162							162							
161.1	End of Dynamic Cone Penetration Test													
19.8														

RECORD OF BOREHOLE No DCPGL3A-6

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 15+375 18.5 RT, Co-ords: 5088460N; 220743E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.01.28 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
195.5 0.0	Ground Surface probable peat						20 40 60 80 100		w _p w w _L				GR SA SI CL	
							○ UNCONFINED + FIELD VANE							
							● QUICK TRIAXIAL × LAB VANE							
192.8 2.7	probable sand						20 40 60 80 100	10 20 30						

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPGL3A-7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+275 25 LT, Co-ords: 5089356N; 220737E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
195.5 0.0	Ice Surface probable peat							20 40 60 80 100						
							195							
							194							
							193							
							192							
191.2 4.3	possible CLAY						191							
							190							
							189							
187.6 7.9	End of Dynamic Cone Penetration Test						188							

ONTARIO MOT GRUNDY LAKE SWAMP GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPGL3A-8

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A - Sta 16+375 23 LT, Co-ords: 5089454N; 220758E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			WATER CONTENT (%) w _p w w _L				
195.5 0.0	Ice Surface probable peat							20 40 60 80 100							
							195								
							194								
							193								
							192								
							191								
							190								
							189								
188.5 7.0	Possible SAND						188								
187.6 7.9	End of Dynamic Cone Penetration Test														

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/28

RECORD OF BOREHOLE No DCPGL3A-9

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+275 18.5 RT, Co-ords: 5089347N; 220780E ORIGINATED BY K. Crowe
DIST 54 HWY 69 BOREHOLE TYPE Tripod with Dynamic Cone Penetration Test COMPILED BY C. Roy
DATUM Geodetic DATE 2005.02.15 CHECKED BY T. Crilly

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	20 40 60 80 100	W _P W W _L	10 20 30		
159.5 0.0	Ice Surface probable peat												
152.8 6.7	possible CLAY												
150.1 9.4	possible SAND												
149.1 10.4	End of Dynamic Cone Penetration Test												

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No DCPGL3A-10

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69-Grundy Lake 3A-Sta 16+375 18.5 RT, Co-ords: 5089445N; 220801E ORIGINATED BY K. Crowe
 DIST 54 HWY 69 BOREHOLE TYPE Tripod with dynamic cone penetrometer COMPILED BY C. Roy
 DATUM Geodetic DATE 2005.02.25 CHECKED BY T. Crilly

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)		
								○ UNCONFINED	+	FIELD VANE								
195.5	Ice Surface						● QUICK TRIAXIAL	×	LAB VANE									
0.0	probable peat						20 40 60 80 100			10 20 30								
193.4																		
2.1	possible CLAY																	
</																		

ONTARIO MOT GRUNDY LAKE SWAMP.GPJ ONTARIO MOT.GDT 05/08/26

RECORD OF BOREHOLE No PL-1

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Portage Lake Additional BHs, Co-ords: 5085608 N; 221985 E ORIGINATED BY P.R
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY H.G
 DATUM Geodetic DATE 2005.03.03 - 2005.03.03 CHECKED BY H.G

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					W _p W W _L				GR SA SI CL			
182.4	Ground Surface					▽	182	20 40 60 80 100					10 20 30							
0.0	Snow / Ice							○ UNCONFINED + FIELD VANE												
182.1								● QUICK TRIAXIAL × LAB VANE												
0.3	Peat, dark brown, wet, soft, fibrous																			
			1	SS	WH		181													
	Remoulded strength too low to register		2	VANE			180													
180.0	Clay, brown, wet, very soft, high plasticity																			
2.4			3	SS	2		179													
179.1	Sand, grey, wet, very loose, poorly graded, fine to medium grained, trace clay																			
3.4			4	SS	Refusal															
178.5	End of borehole, auger refusal on probable bedrock																			
4.0	Groundwater encountered at 0.91 m at time of drilling.																			

1 OF 1

METRIC

SOIL PROFILE						DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER TYPE "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%) w _p w w _L				
						20 40 60 80 100						
183.5	Ground Surface											
180.9	Bedrock outcrop visible at ground surface					183						

RECORD OF BOREHOLE No PL-7

1 OF 1

METRIC

G.W.P. 5377-02-00 LOCATION Hwy 69, Portage Lake Additional BHs, Co-ords: 5087121 N; 221492 E ORIGINATED BY P.R.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Hollow Stem Auger COMPILED BY H.G.
 DATUM Geodetic DATE 2005.03.31 - 2005.03.31 CHECKED BY H.G.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
185.4	Ground Surface													
186.0 0.2	Peat, dark brown, wet, soft Clay, brown, wet, medium plasticity, very soft to firm, with silt													
			1	SS	WH									
			2	VANE										
			3	SS	4									
181.4 4.0	Silt, grey, wet, compact													
			4	SS	10									
179.9 5.5	End of borehole, auger refusal on probable bedrock Groundwater encountered at surface at time of drilling													


ONTARIO MOT 22 PORTAGE LAKE ADDITIONAL BHs.GPJ ONTARIO MOT GDT 05/08/26


Appendix E: Drawings

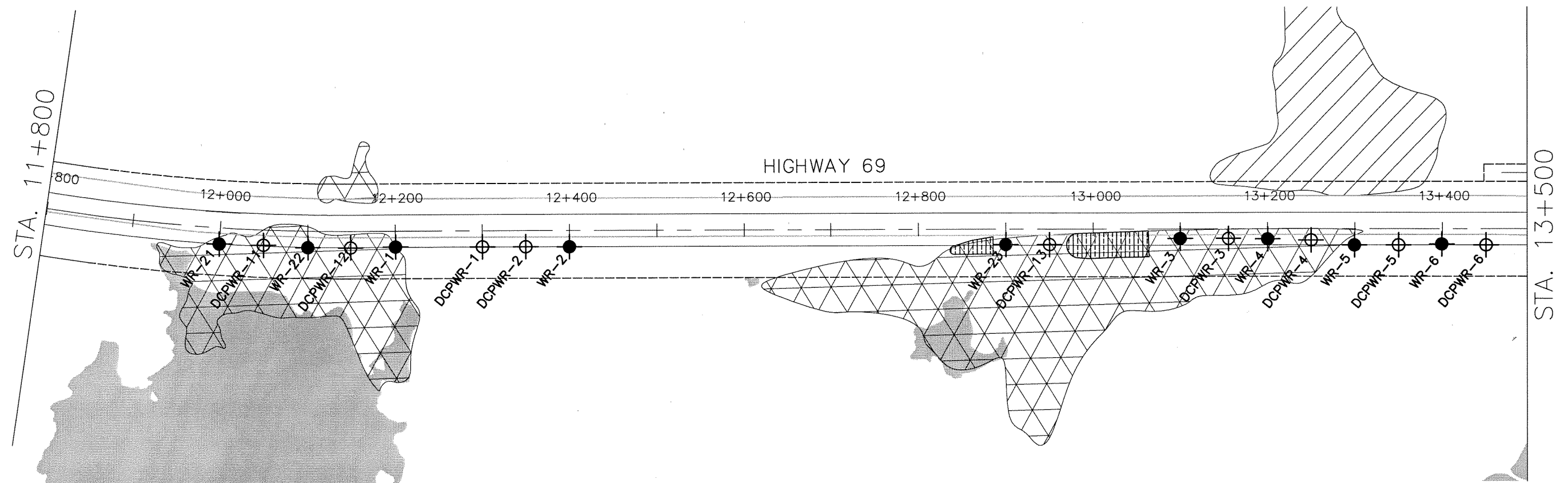
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 11+800 TO STA 13+500
Survey _____ Revised _____

 Trow Associates Inc.












SHEET
1

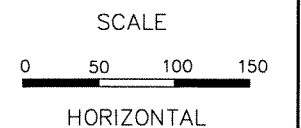
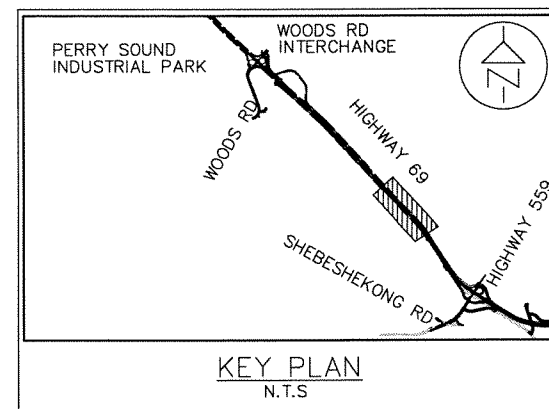


BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-1	5035467	253851	219.8
DCPWR-1	5035540	253783	222.9
DCPWR-2	5035577	253750	224.3
WR-2	5035614	253716	224.3
WR-3	5036125	253238	219.3
DCPWR-3	5036166	253201	219.5
WR-4	5036199	253170	219.3
DCPWR-4	5036237	253138	219.5
WR-5	5036277	253108	219.5
DCPWR-5	5036314	253074	220.4
WR-6	5036351	253040	221.2
DCPWR-6	5036388	253006	217.2

BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-21	5035316	253984	219.7
WR-22	5035393	253919	219.6
WR-23	5035983	253378	219.8
DCPWR-11	5035354	253952	219.6
DCPWR-12	5035430	253885	219.6
DCPWR-13	5036020	253345	219.9

LEGEND


 STRUCTURAL BOREHOLE
 SWAMP BOREHOLE
 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
 SWAMP BOREHOLE & CONE
 STRUCTURAL BOREHOLE & CONE
 MAJOR SWAMP (CONFIRMED)
 MAJOR SWAMP (UNCONFIRMED)
 MINOR SWAMP
 AREA FOR FURTHER INVESTIGATION




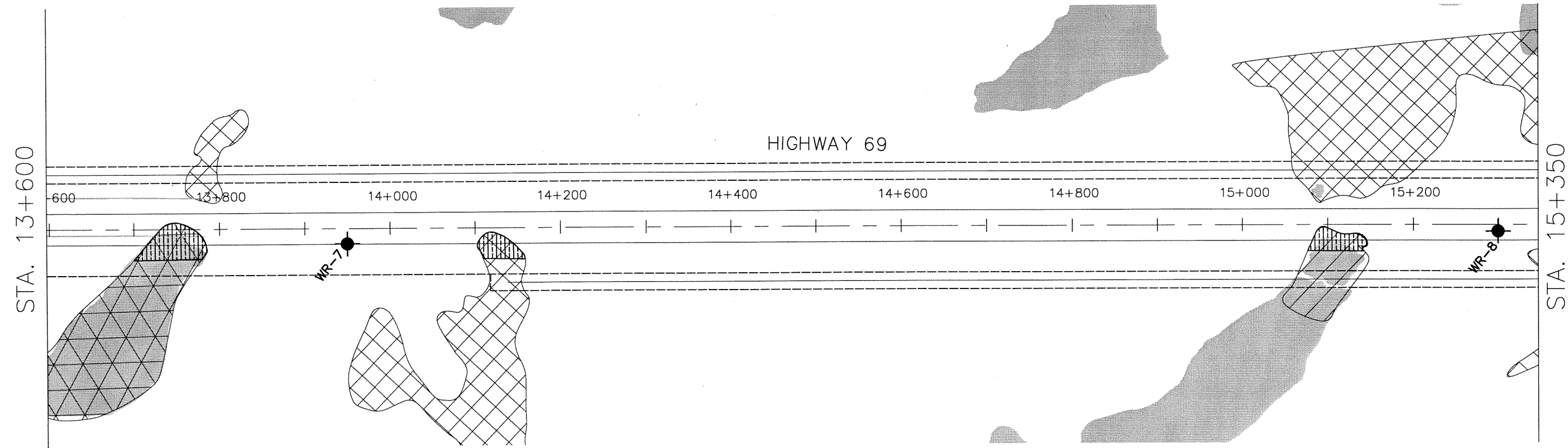
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 13+600 TO STA 15+350
Survey _____ Revised _____











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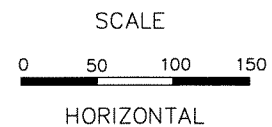
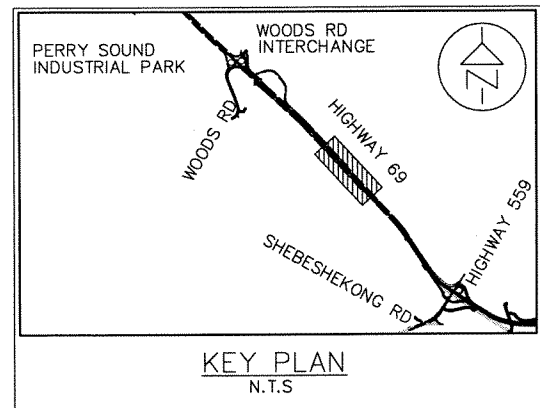

SHEET
2



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-7	5036757	252668	215.1
WR-8	5037745	251749	211.1

LEGEND

 STRUCTURAL BOREHOLE
 SWAMP BOREHOLE
 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
 SWAMP BOREHOLE & CONE
 STRUCTURAL BOREHOLE & CONE
 MAJOR SWAMP (CONFIRMED)
 MAJOR SWAMP (UNCONFIRMED)
 MINOR SWAMP
 AREA FOR FURTHER INVESTIGATION



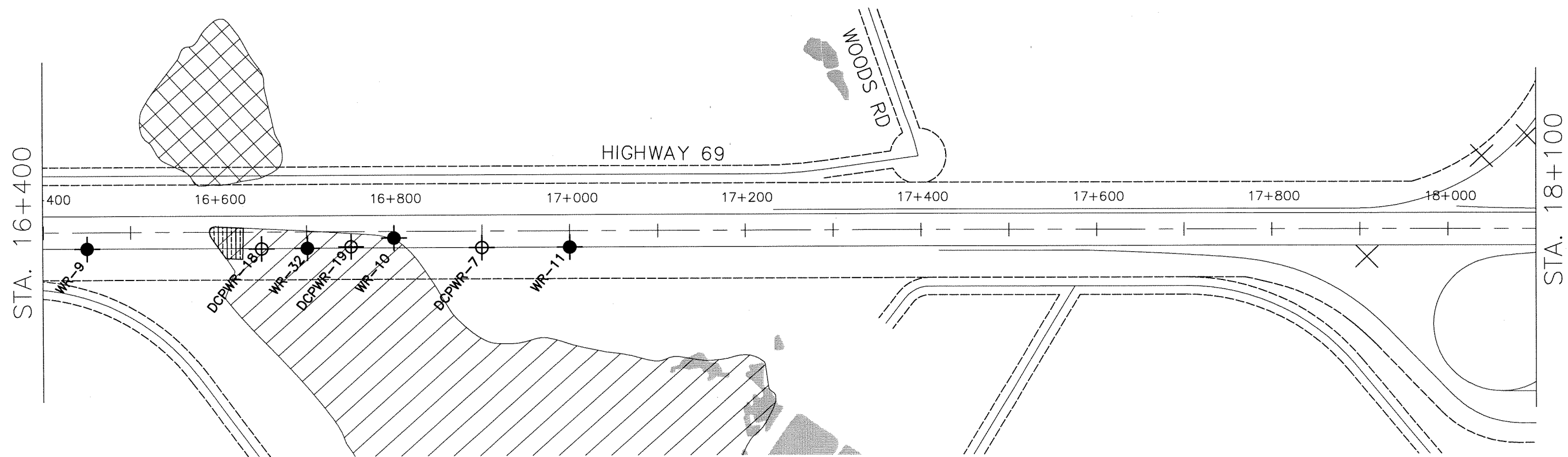
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 16+400 TO STA 18+100
Survey _____ Revised _____

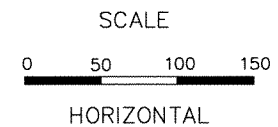
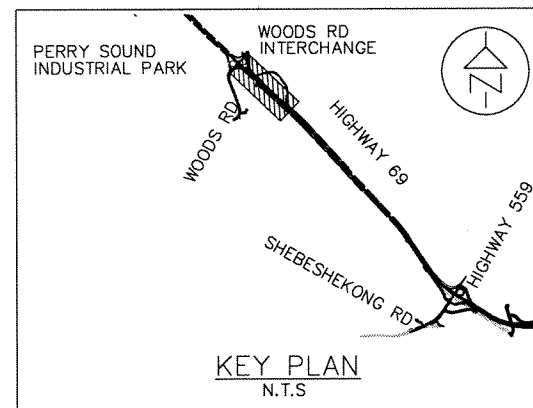
Trow Associates Inc.

SHEET
3



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-9	5038563	250940	213.6
WR-10	5038794	250676	216.3
WR-11	5038937	250537	222.6
DCPWR-7	5038869	250610	221.1
WR-32	5038733	250757	215.8
DCPWR-18	5038700	250794	215.8
DCPWR-19	5038768	250721	215.8

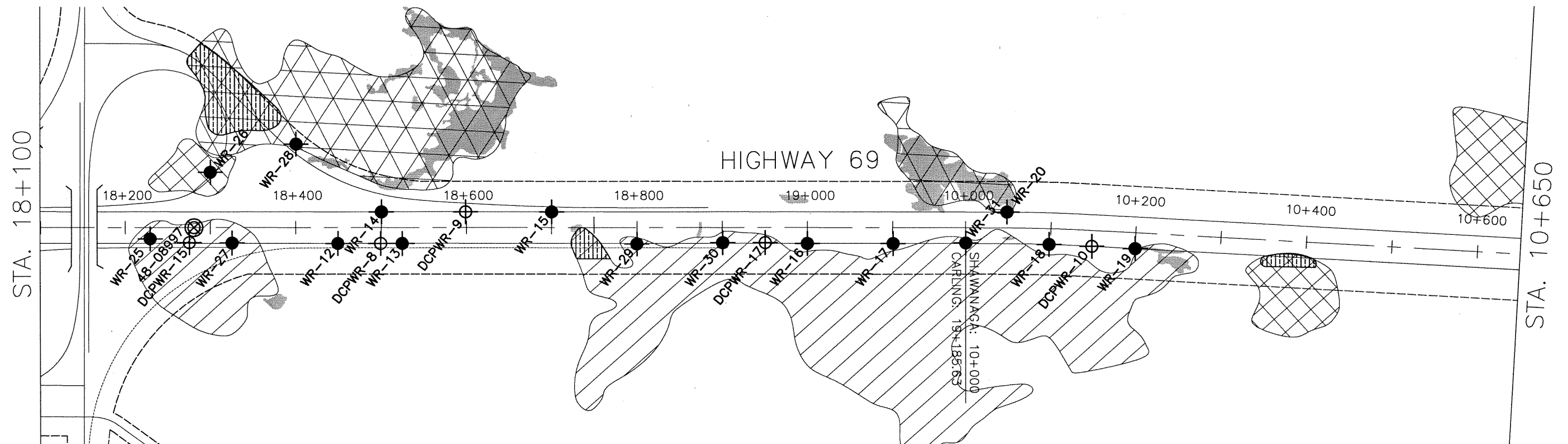
LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00
FOUNDATION INVESTIGATION
STA 18+100 TO STA 10+650
Survey _____ Revised _____
Trow Associates Inc.

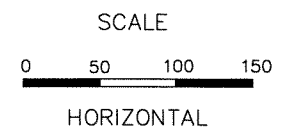
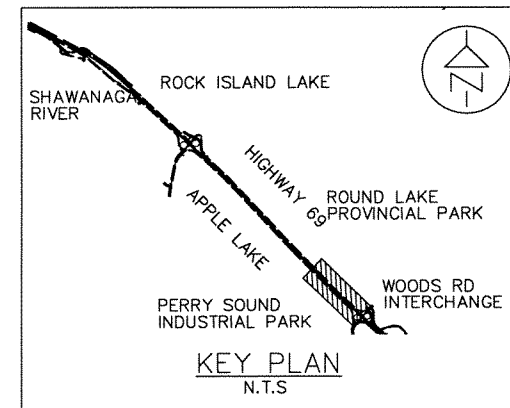
SHEET
4



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-12	5039922	249473	217.0
WR-13	5039973	249418	218.6
DCPWR-8	5039956	249436	217.4
WR-14	5039929	249411	217.8
WR-15	5040065	249263	219.3
DCPWR-9	5036164	253198	219.6
WR-16	5036204	253175	219.3
WR-17	5036241	253142	219.6
WR-18	5040490	248861	218.2
WR-19	5040561	248791	216.9
DCPWR-10	5040525	248826	217.6
WR-20	5040428	248872	216.2
48-08997	5039795	249585	

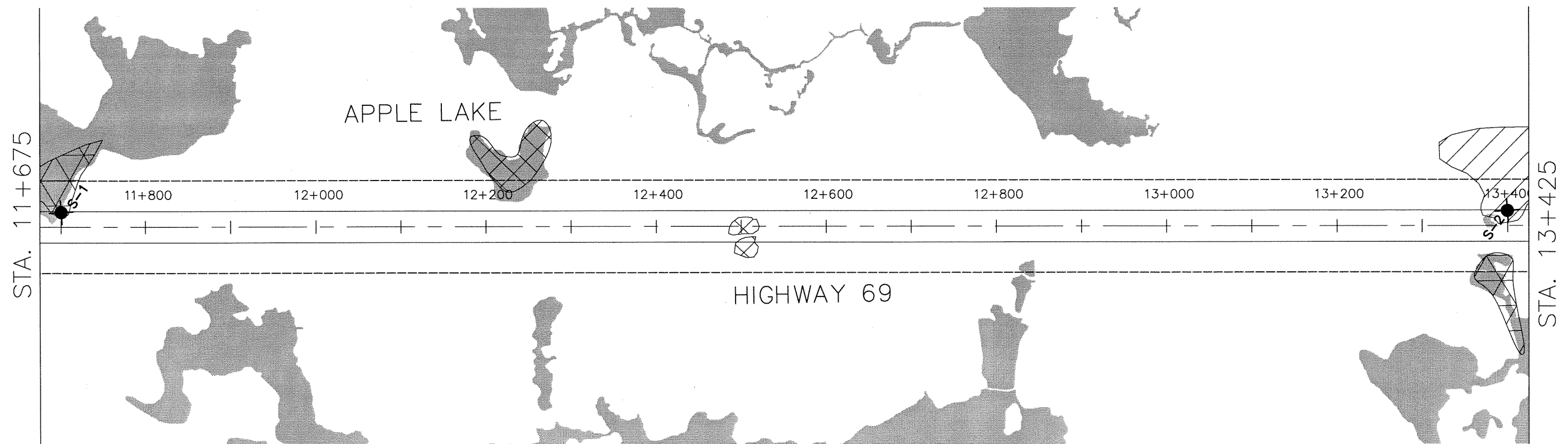
BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
WR-25	5039769	249632	215.7
WR-26	5039759	249526	215.6
WR-27	5039837	249565	215.8
WR-28	5039802	249430	215.1
WR-29	5040160	249216	215.4
WR-30	5040229	249143	215.3
WR-31	5040422	248934	215.6
DCPWR-15	5039804	249601	215.8
DCPWR-17	5040262	249106	215.5

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION



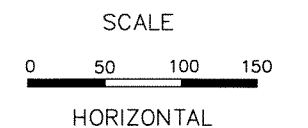
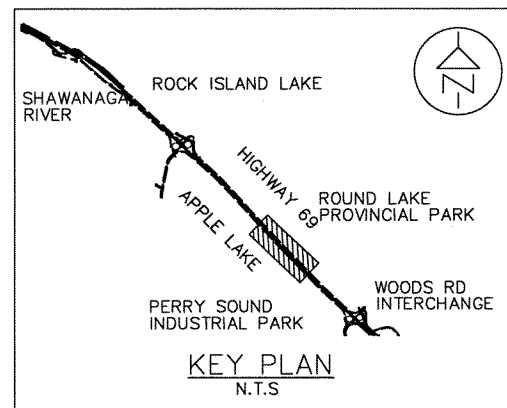
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No	CONT No 5004-E-0028	SHEET 5
	GWP No 5377-02-00	
FOUNDATION INVESTIGATION STA 11+675 TO STA 13+425 Survey _____ Revised _____		
Trow Associates Inc.		



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
S-1	5041617	247725	212.0
S-2	5042856	246562	210.9

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION




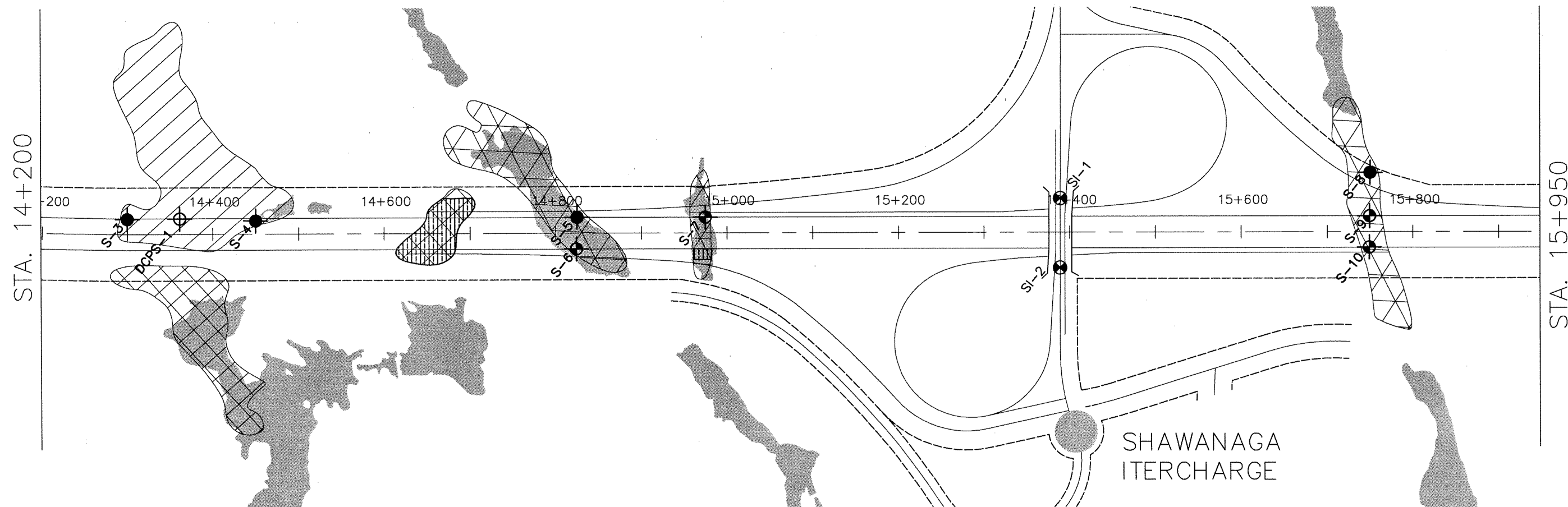
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 14+200 TO STA 15+450
Survey _____ Revised _____


Trow Associates Inc.



SHEET
6





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
S-3	5043505	245941	213.4
S-4	5043609	245832	212.9
S-5	5043860	245554	207.5
S-6	5043888	245579	207.4
S-7	5043962	245444	207.9
S-8	5044448	244838	208.6
S-9	5044487	244872	208.1
S-10	5044513	244898	207.9
DCPS-1	5043547	245895	213.5


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

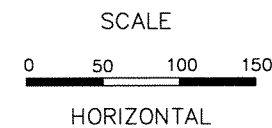
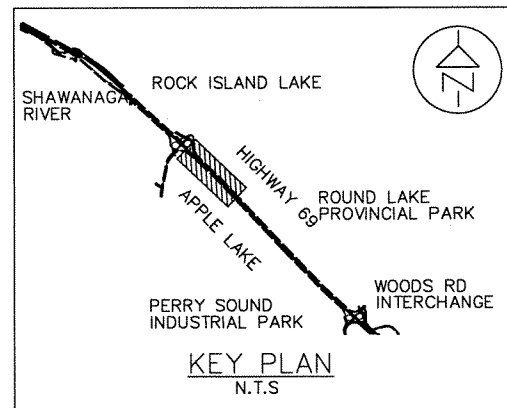
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP


 AREA FOR FURTHER INVESTIGATION



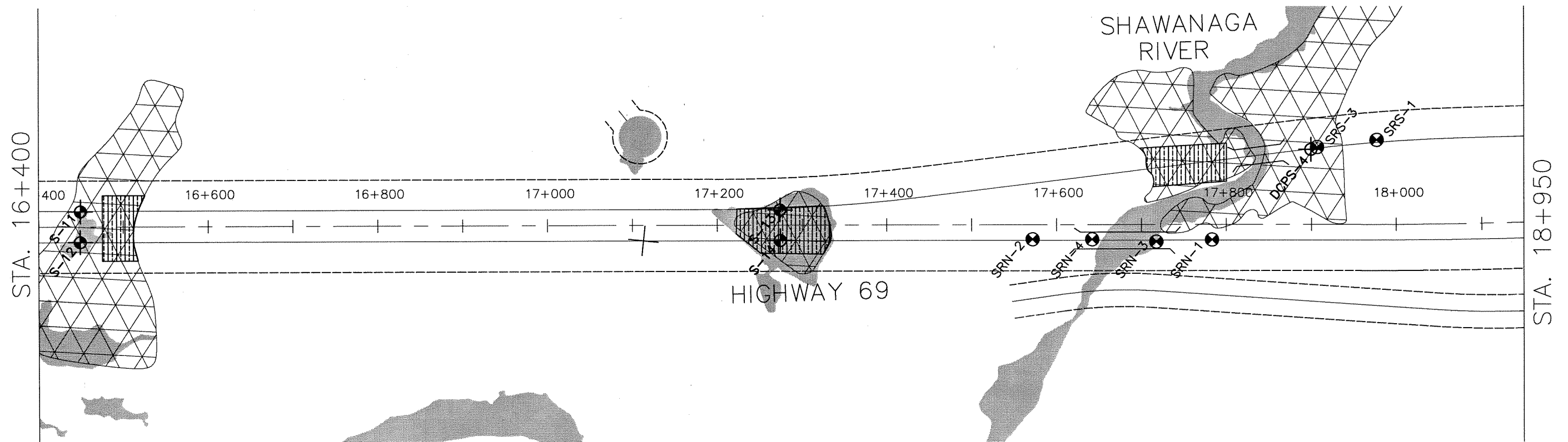
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 16+400 TO STA 18+950
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
7





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
S-11	5044960	244358	202.6
S-12	5044988	244383	202.5
S-13	5045519	243750	202.8
S-14	5045546	243775	202.5
DCPS-4	5045889	243242	198.7
SRS-3	5045892	243235	214.4
SSR-1	5046720	242167	211.9


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

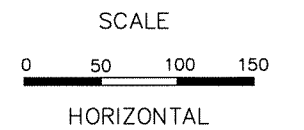
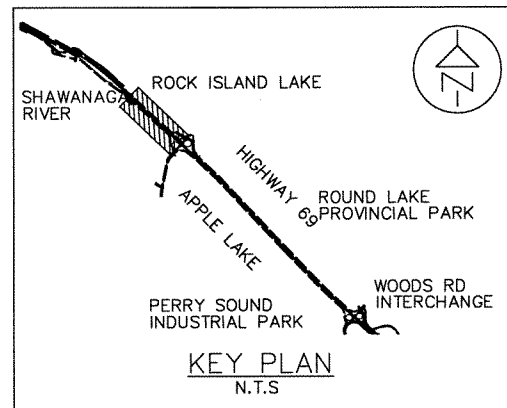
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION




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PR-D-707 88-05


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CREATED:
MODIFIED:

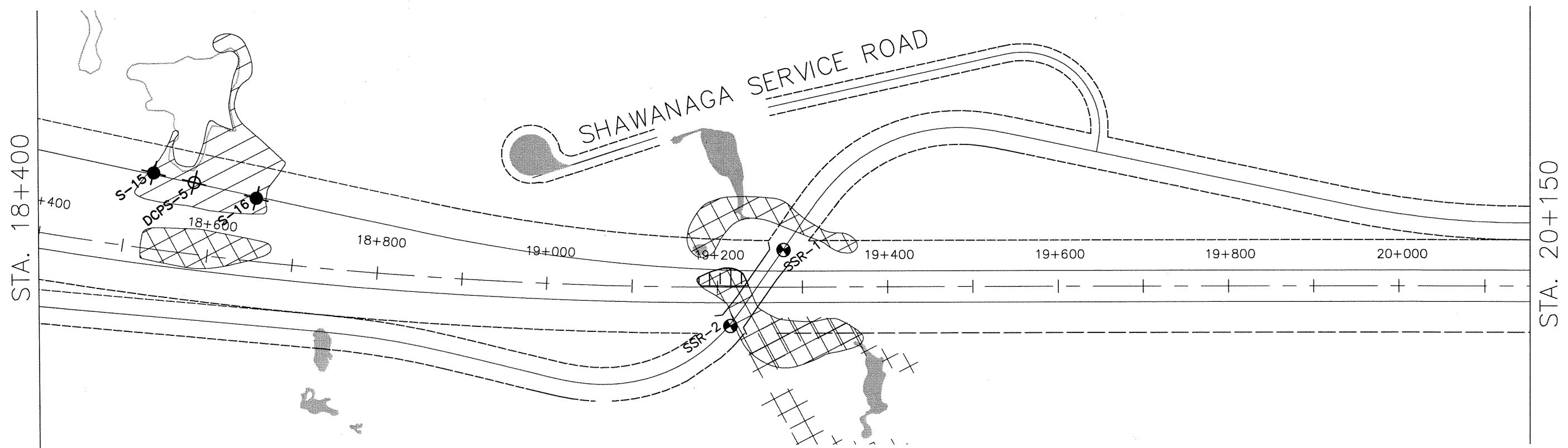
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AND/OR MILLIMETRES
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PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 18+400 TO STA 20+150
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
8





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
S-15	5046284	242771	209.2
S-16	5046369	242680	208.8
DCPS-5	5046318	242734	208.5


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

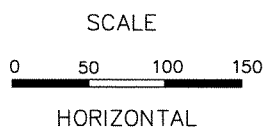
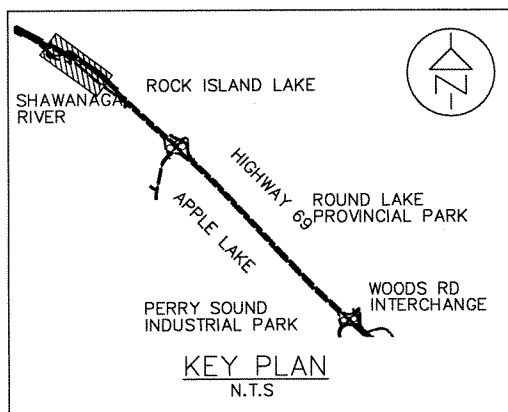
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP


 AREA FOR FURTHER INVESTIGATION




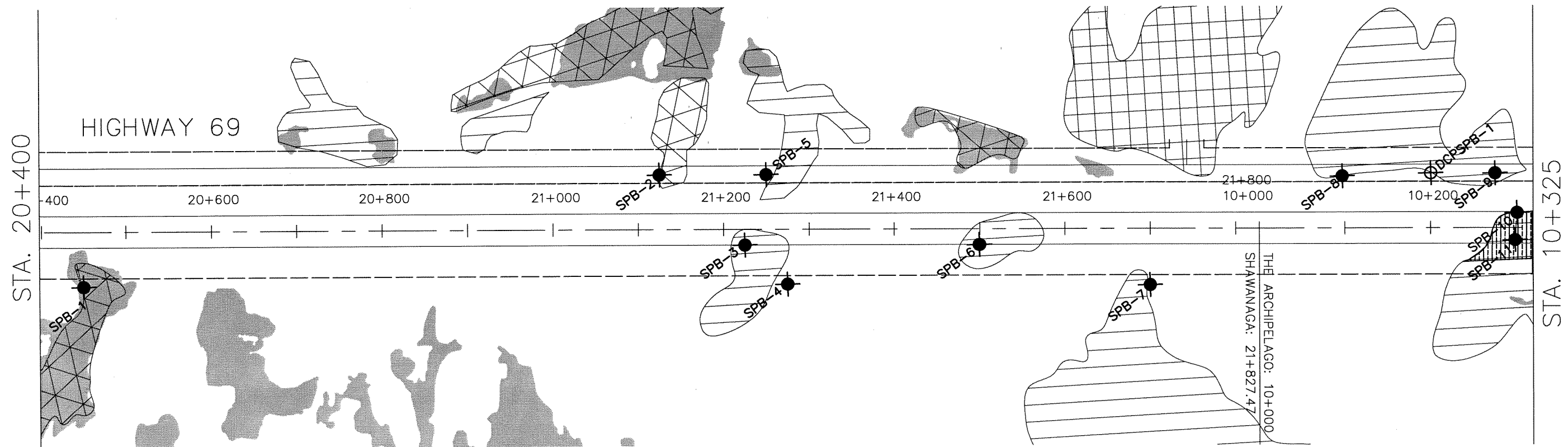
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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 20+400 TO STA 10+325
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
9





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
SPB-1	5047373	241188	220.3
SPB-2	5047579	240532	212.8
SPB-3	5047700	240484	210.6
SPB-4	5047765	240462	211.0
SPB-5	5047639	240422	212.8
SPB-6	5047831	240242	206.1
SPB-7	5047969	240089	206.9
SPB-8	5047962	239829	203.7
SPB-9	5048044	239672	205.3
SPB-10	5048097	239672	205.3
SPB-11	5048125	239689	205.4
DCPSPB-1	5048009	239738	205.3


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

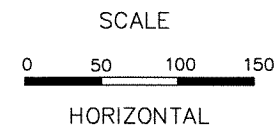
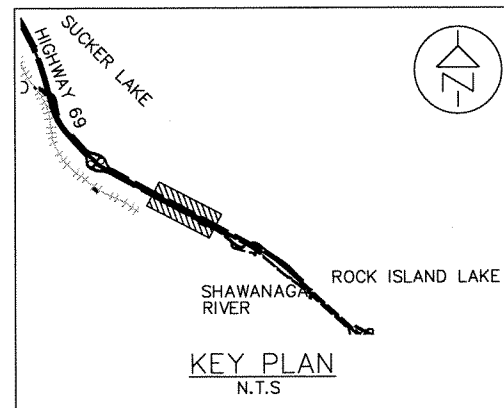
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION





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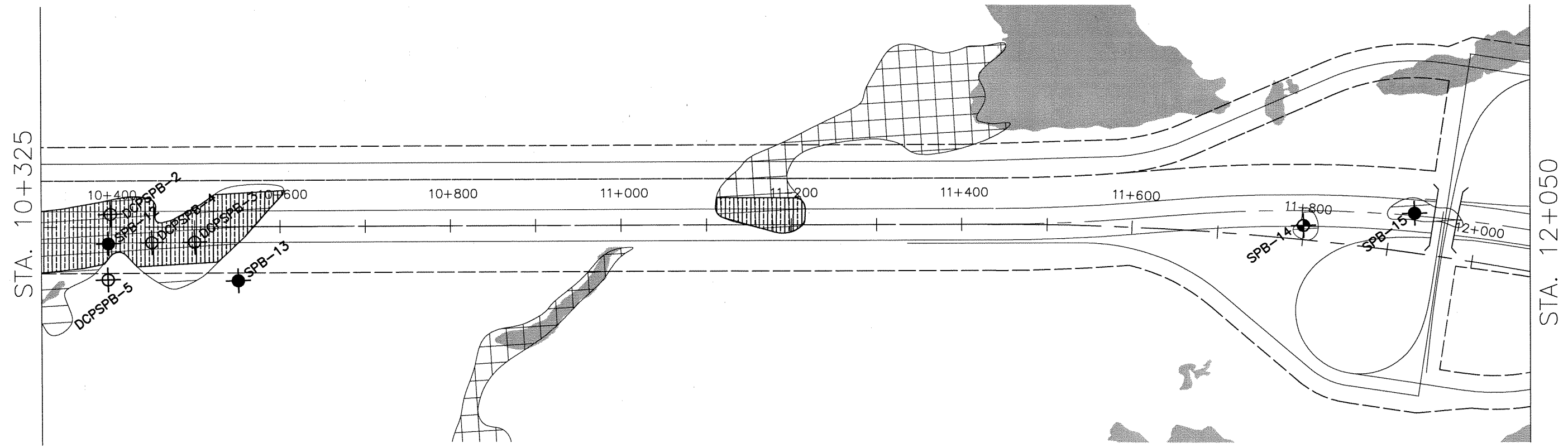
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UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 10+325 TO STA 12+050
Survey Revised


 Trow Associates Inc.



SHEET
10





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
SPB-12	5048177	239604	204.7
SPB-13	5048289	239490	207.4
SPB-14	5048829	238362	197.8
SPB-15	5048878	238240	198.1
DCPSPB-2	5048148	239585	202.0
DCPSPB-3	5048224	239513	204.6
DCPSPB-4	5048201	239558	204.5
DCPSPB-5	5048215	239624	207.7


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

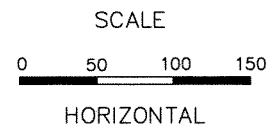
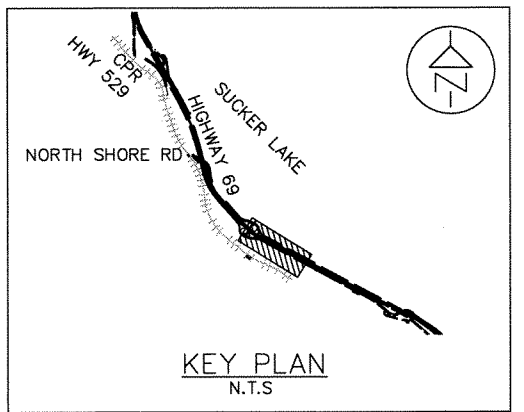
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 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

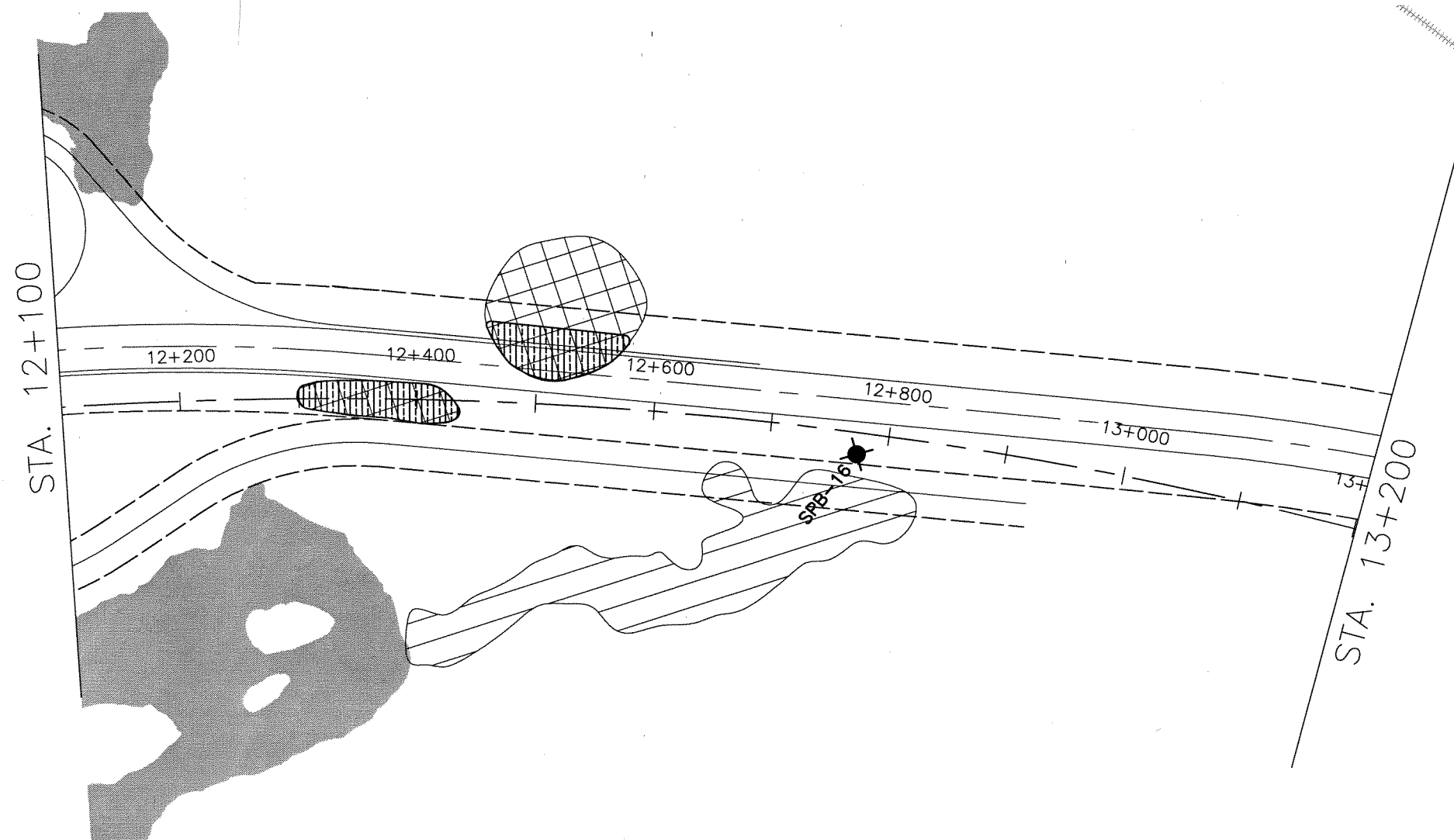
 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION



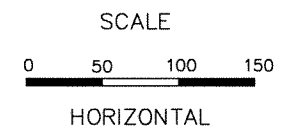
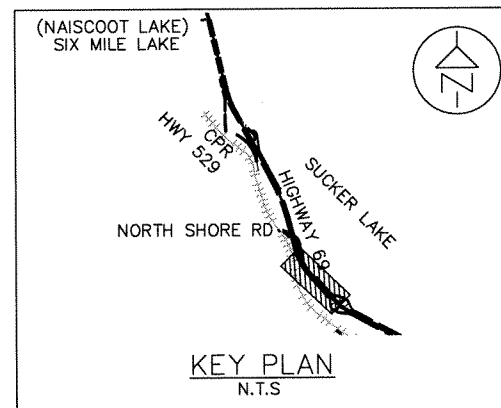
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No	CONT No 5004-E-0028
	GWP No 5377-02-00
FOUNDATION INVESTIGATION	SHEET
STA 12+100 TO STA 13+200	11
Survey _____ Revised _____	
Trow Associates Inc.	



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
SPB-16	5049509	237666	205.8

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION



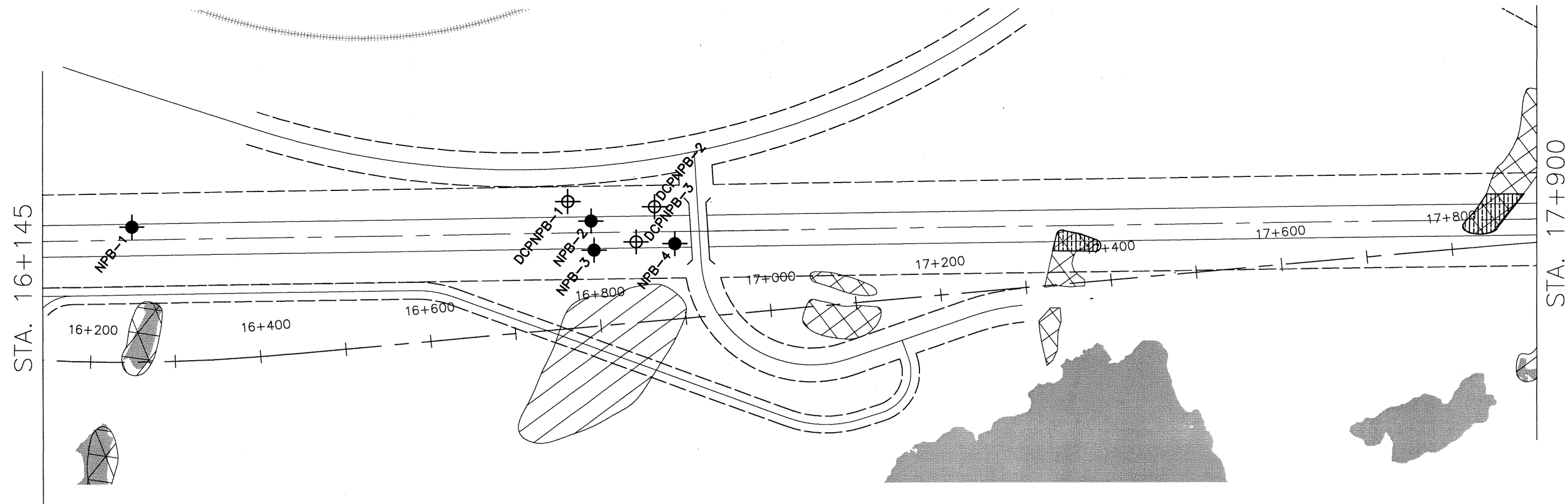
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
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PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 16+145 TO STA 17+900
Survey _____ Revised _____

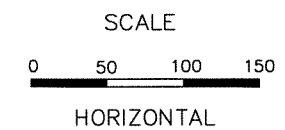
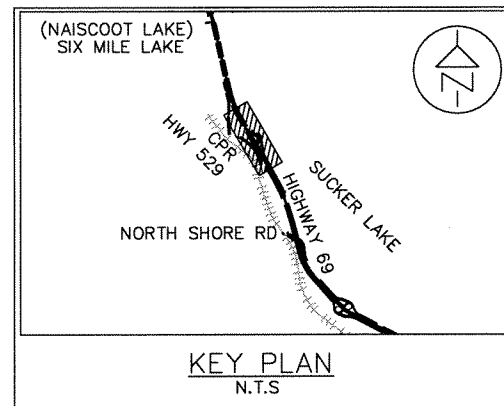
Trow Associates Inc.

SHEET
12



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
NPB-1	5052614	236203	197.2
NPB-2	5053084	235942	203.0
NPB-3	5053103	235971	201.9
NPB-4	5053183	235920	196.7
DCPNPB-1	5053049	235935	202.0
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DCPNPB-3	5053142	235939	198.6

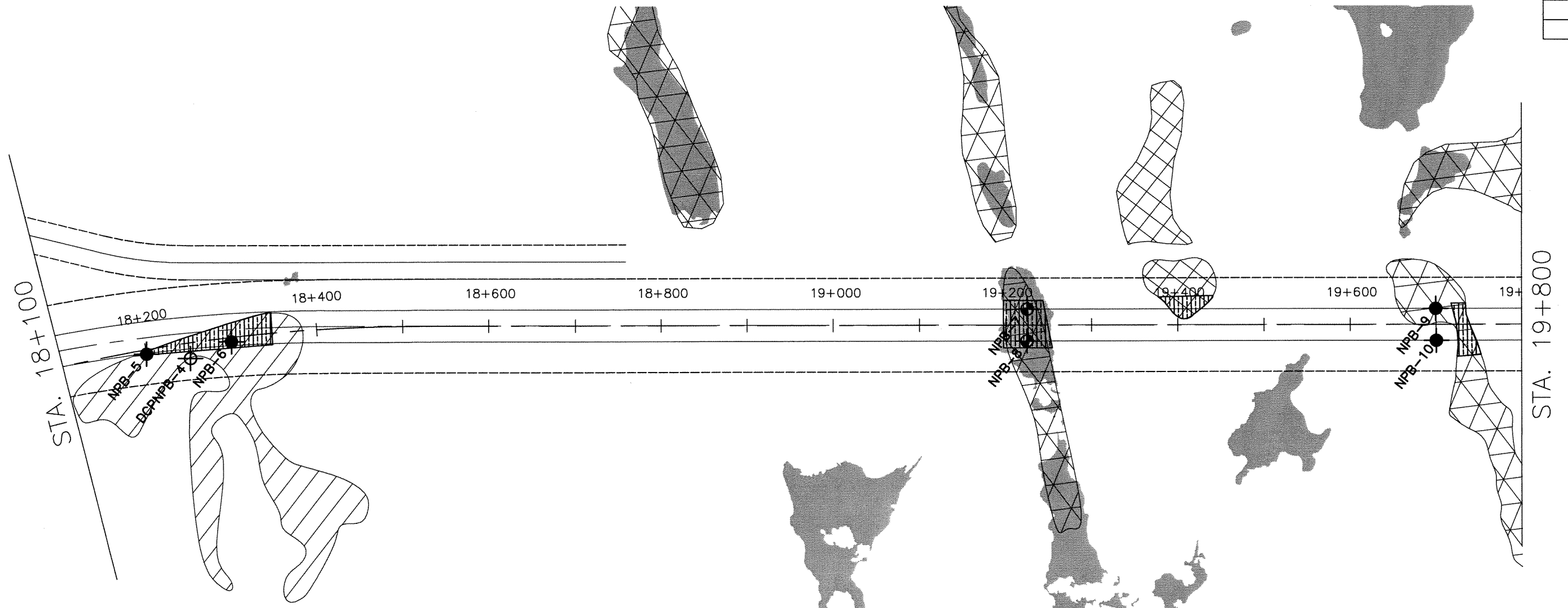
LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

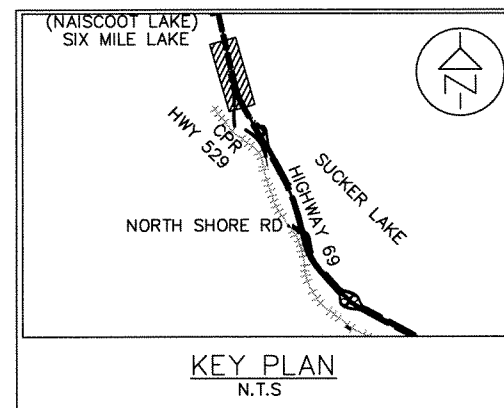
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CONT No 5004-E-0028
GWP No 5377-02-00
FOUNDATION INVESTIGATION
STA 18+100 TO STA 19+800
Survey _____ Revised _____
Trow Associates Inc.

SHEET
13



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
NPB-5	5054338	235306	205.7
NPB-6	5054431	235270	205.7
NPB-7	5055324	235030	193.1
NPB-8	5055332	235066	193.1
NPB-9	5055787	234924	192.4
NPB-10	5055795	234960	194.2
DCPNPB-4	5054389	235300	205.7

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION

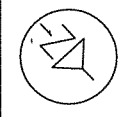


SCALE
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HORIZONTAL

MINISTRY OF TRANSPORTATION, ONTARIO
PR-D-707 88-05
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CREATED:
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METRIC
DIMENSIONS ARE IN METRES
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PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00



FOUNDATION INVESTIGATION
STA 22+900 TO STA 24+650
Survey _____ Revised _____

SHEET
14

Trow Associates Inc.

STA. 22+900

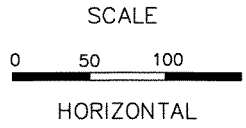
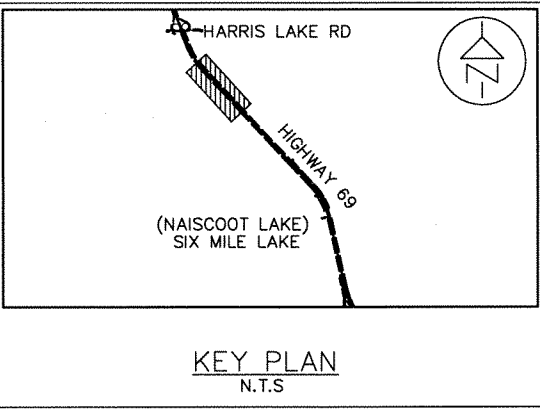
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HIGHWAY 69

BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
HLS-1	5058560	233135	195.8
HLS-2	5060589	231282	195.2
HLS-3	5059550	232200	194.1

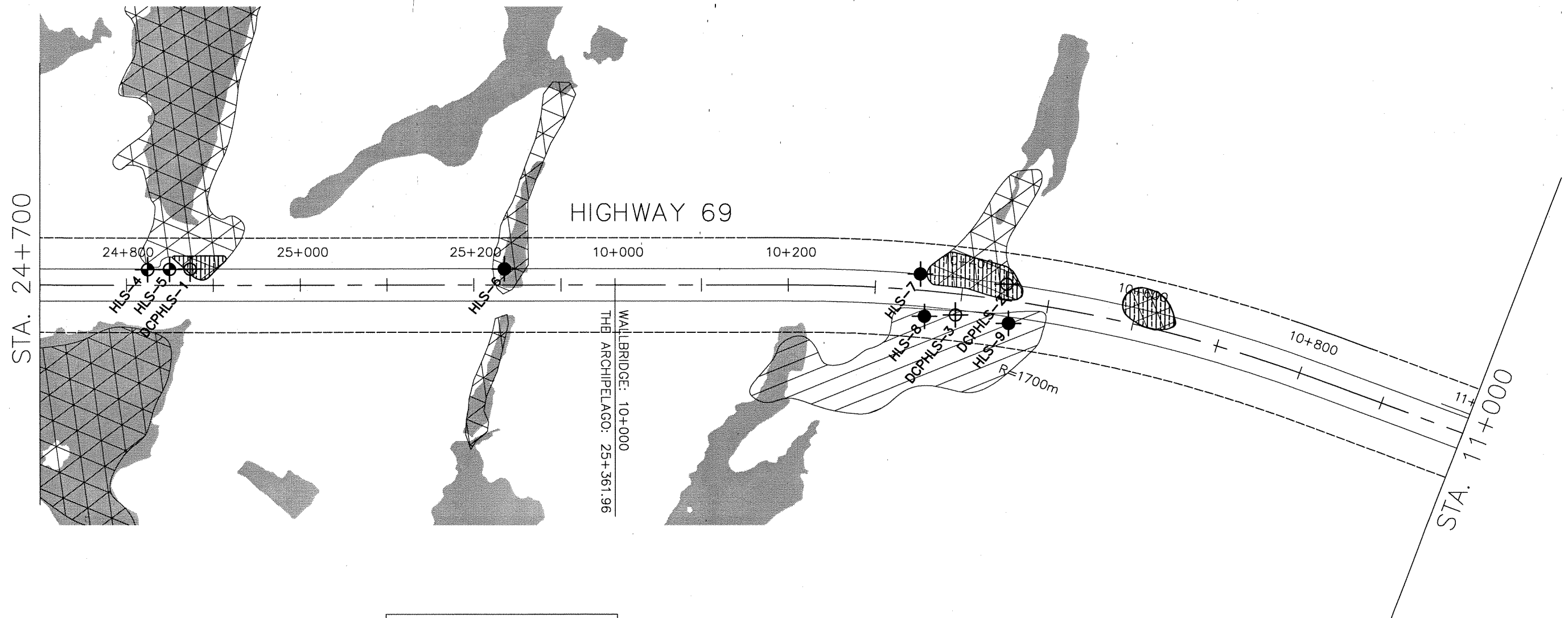
- LEGEND
- STRUCTURAL BOREHOLE
 - SWAMP BOREHOLE
 - SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
 - STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
 - SWAMP BOREHOLE & CONE
 - STRUCTURAL BOREHOLE & CONE
 - MAJOR SWAMP (CONFIRMED)
 - MAJOR SWAMP (UNCONFIRMED)
 - MINOR SWAMP
 - AREA FOR FURTHER INVESTIGATION



METRIC
DIMENSIONS ARE IN METRES
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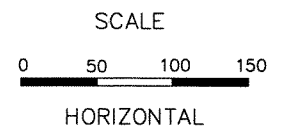
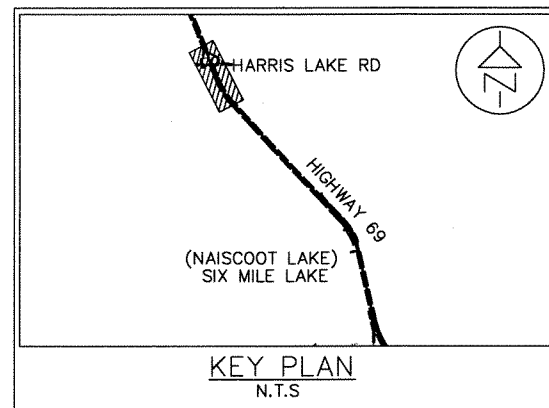
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	GWP No 5377-02-00
FOUNDATION INVESTIGATION	
STA 24+700	TO STA 11+000
Survey	Revised
Trow Associates Inc.	

SHEET 15



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
HLS-4	5059826	231947	192.7
HLS-5	5059844	231930	193.1
HLS-6	5060127	231669	197.5
HLS-7	5060482	231348	202.1
HLS-8	5060520	231381	195.2
HLS-9	5060595	231320	195.4
DCPHLS-1	5059862	231914	191.5
DCPHLS-2	5060564	231288	196.8
DCPHLS-3	5060545	231355	195.5

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION

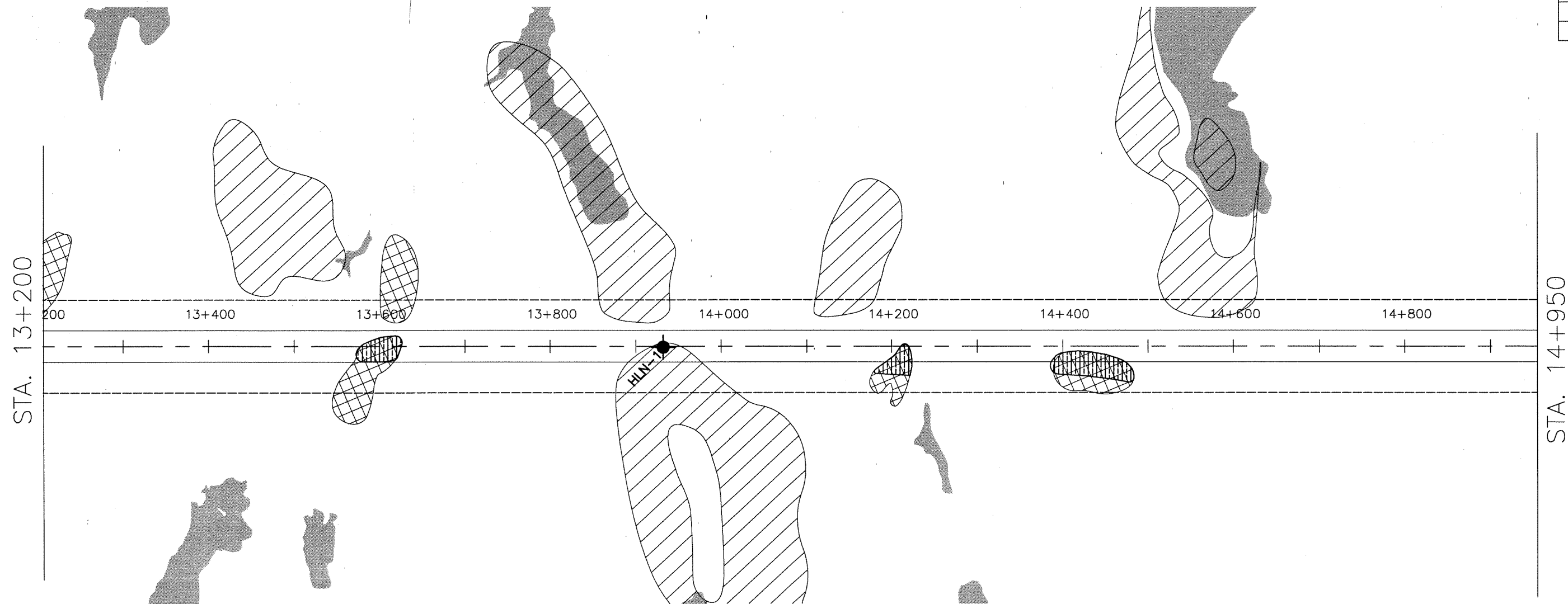


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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

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GWP No 5377-02-00
FOUNDATION INVESTIGATION
STA 13+200 TO STA 14+950
Survey _____ Revised _____

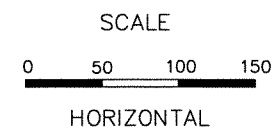
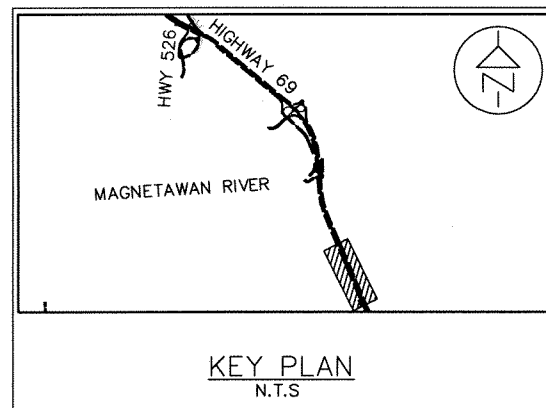
SHEET
16

Trow Associates Inc.



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
HLN-1	5063787	229966	193.1

LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
	MAJOR SWAMP (CONFIRMED)
	MAJOR SWAMP (UNCONFIRMED)
	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION




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88-05


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CREATED:
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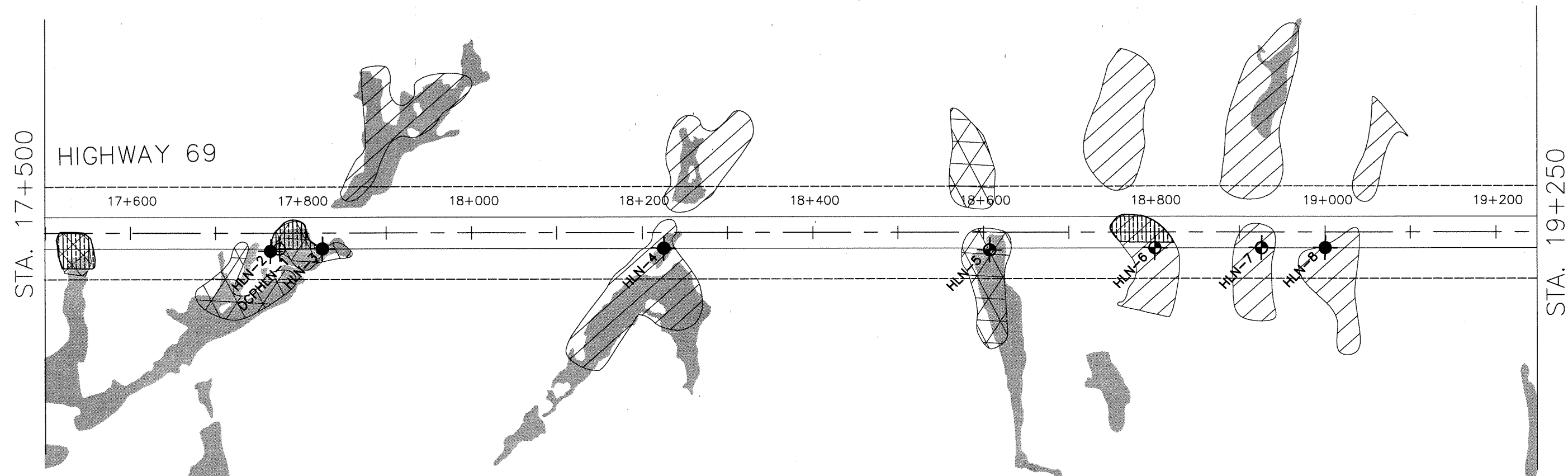
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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 17+500 TO STA 19+250
Survey _____ Revised _____

 Trow Associates Inc.

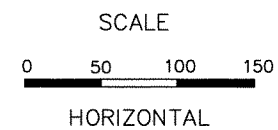
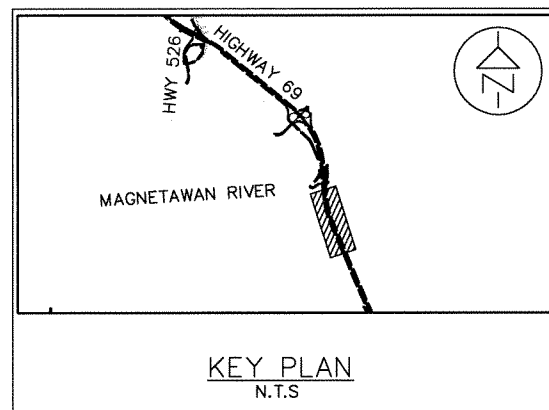

SHEET
17



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
HLN-2	5067326	228495	197.9
HLN-3	5067380	228469	197.9
HLN-4	5067748	228311	195.5
HLN-5	5068099	228163	189.1
HLN-6	5068276	228085	195.4
HLN-7	5068391	228036	195.4
HLN-8	5068460	228006	198.6
DCPHLN-1	5067334	228489	197.9

LEGEND


- STRUCTURAL BOREHOLE
- SWAMP BOREHOLE
- SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
- STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
- SWAMP BOREHOLE & CONE
- STRUCTURAL BOREHOLE & CONE
- MAJOR SWAMP (CONFIRMED)
- MAJOR SWAMP (UNCONFIRMED)
- MINOR SWAMP
- AREA FOR FURTHER INVESTIGATION




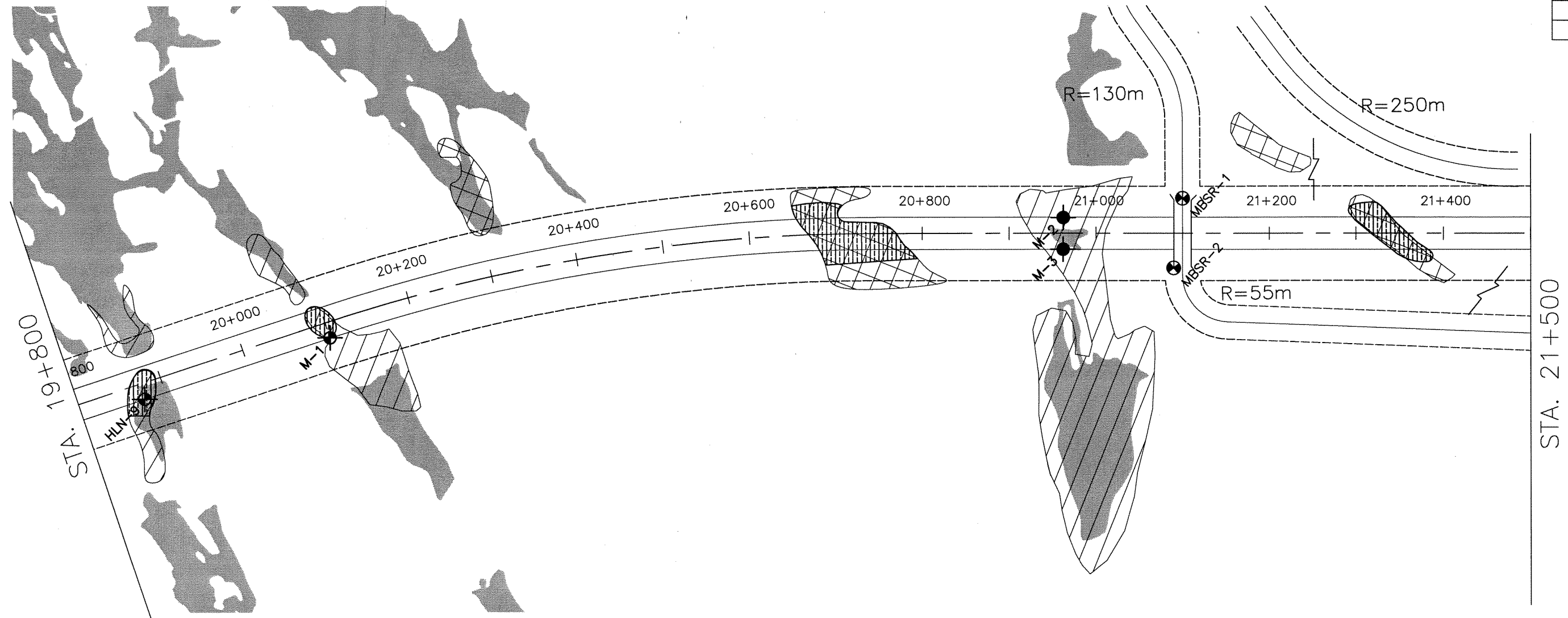
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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 19+800 TO STA 21+500
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
18





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
HLN-9	5069264	227661	194.0
M-1	5069471	227572	195.6
M-2	5070302	227363	190.3
M-3	5070305	227400	190.9


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

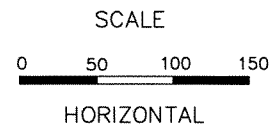
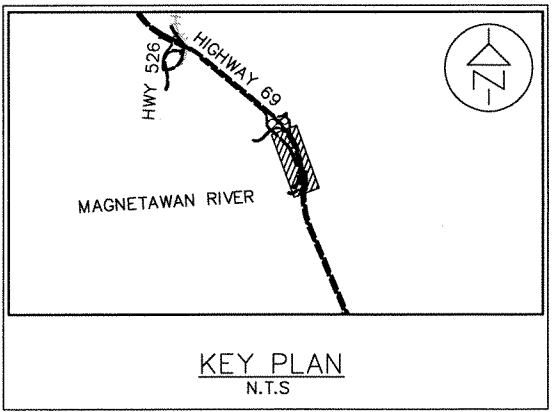
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 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP


 AREA FOR FURTHER INVESTIGATION



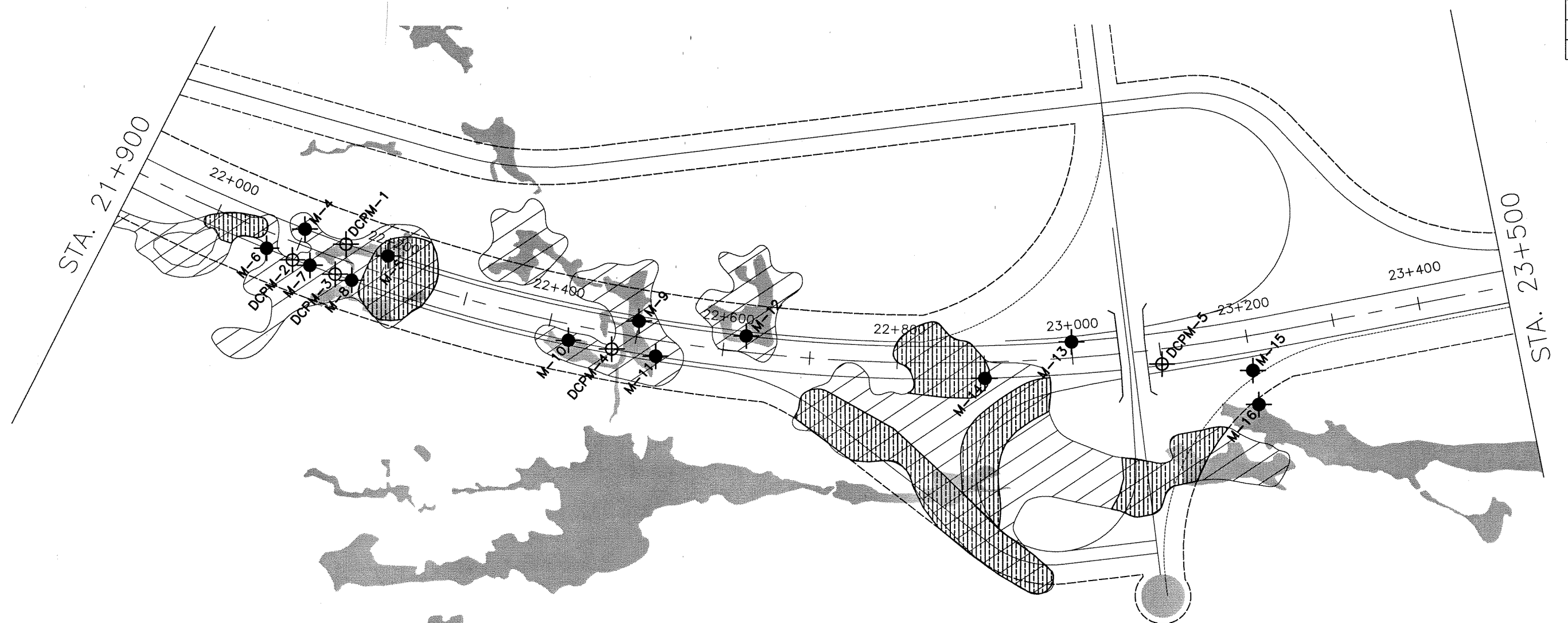
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PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 21+900 TO STA 23+500
Survey _____ Revised _____

 Trow Associates Inc.


SHEET
19





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
M-4	5071423	227220	196.7
M-5	5071517	227185	196.7
M-6	5071403	227265	196.7
M-7	5071454	227249	196.7
M-8	5071502	227233	196.7
M-9	5071787	227063	196.6
M-10	5071738	227131	197.3
M-11	5071827	227083	196.6
M-12	5071893	227000	198.5


BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
M-13	5072186	226771	201.5
M-14	5072136	226866	199.1
M-15	5072367	226666	202.2
M-16	5072397	226693	201.0
DCPM-1	5071471	227205	196.8
DCPM-2	5071435	227256	197.0
DCPM-3	5071483	227239	196.7
DCPM-4	5071783	227108	196.7
DCPM-5	5072282	226726	201.4


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

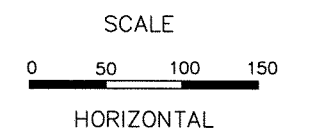
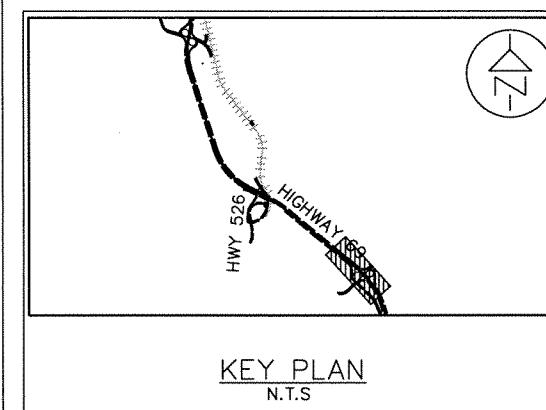
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION





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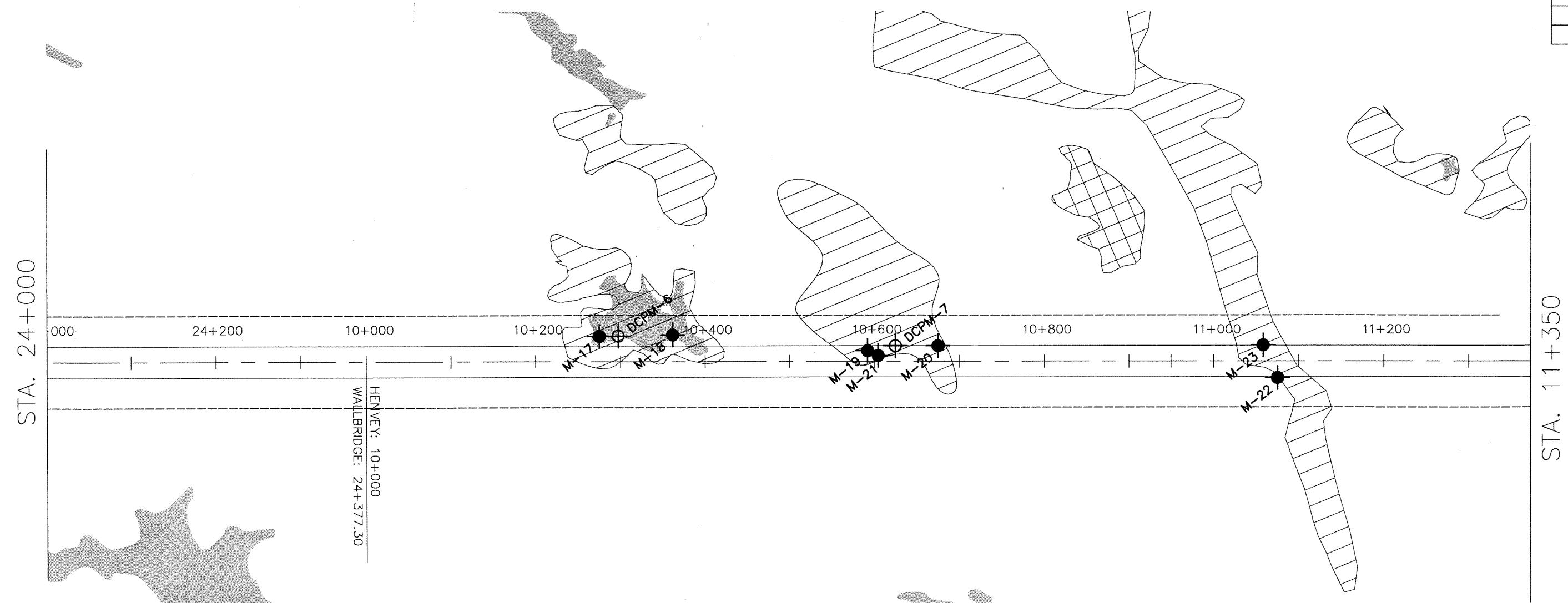
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CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 24+000 TO STA 11+350
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
20





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
M-17	5073244	225506	194.7
M-18	5073298	225439	194.7
M-19	5073461	225274	192.7
M-20	5073510	225207	192.7
M-21	5073473	225268	192.7
M-22	5073796	224924	188.8
M-23	5073755	224912	188.6
DCPM-6	5073258	225489	194.7
DCPM-7	5073477	225245	192.9


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

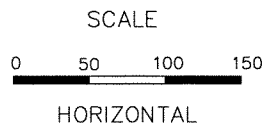
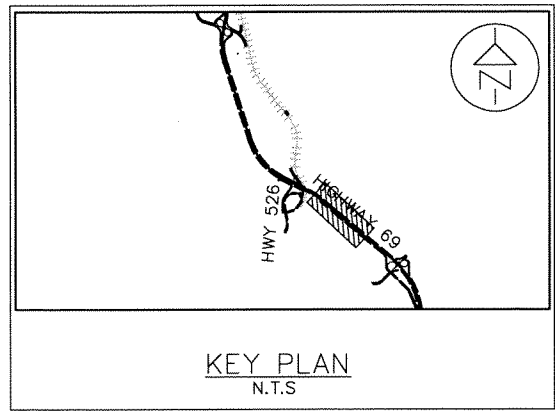
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 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP


 AREA FOR FURTHER INVESTIGATION




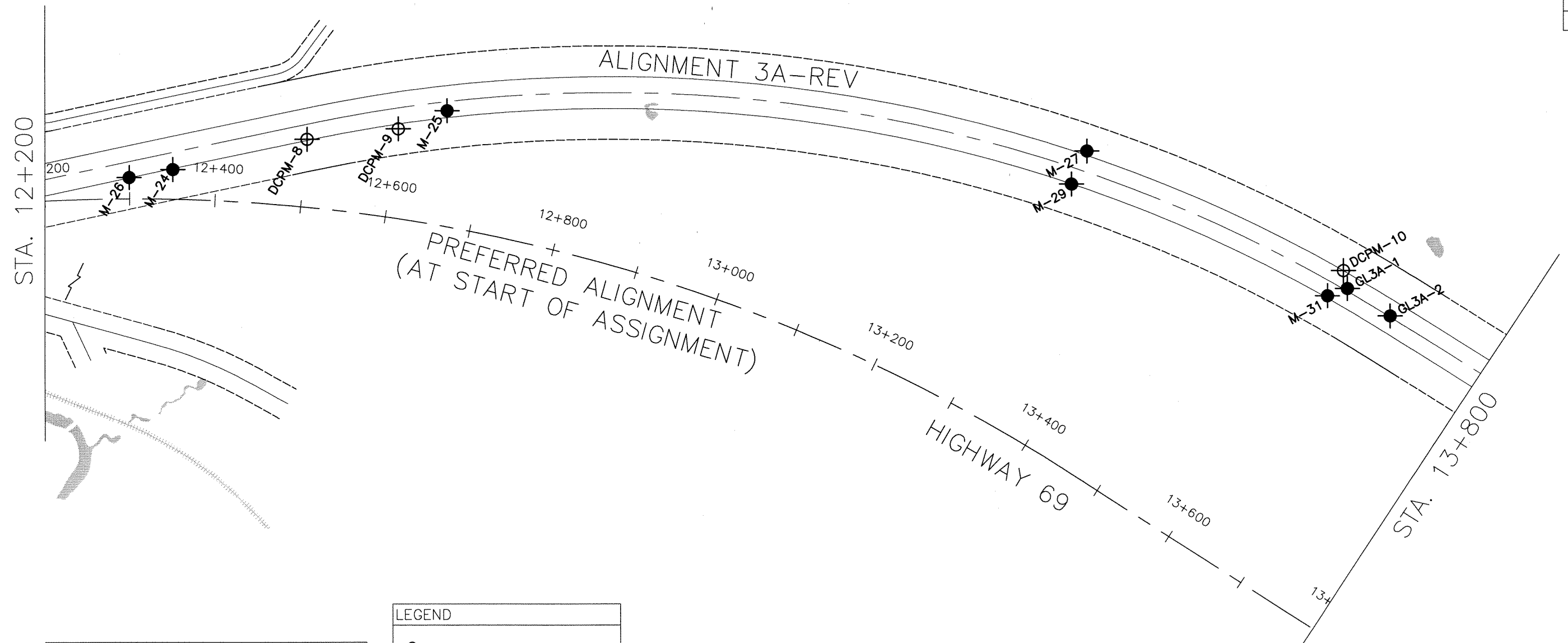
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CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 12+200 TO STA 13+800
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
21





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
M-24	5074479	223845	185.0
M-25	5074631	223554	179.1
M-26	5074453	223890	187.2
M-27	5075146	223010	194.7
M-29	5075165	223049	188.1
M-31	5075458	222904	185.1
DCPM-8	5074551	223702	179.1
DCPM-9	5074611	223612	178.8
DCPM-10	5075447	222871	185.3
GL3A-1	5075466	222881	185.0
GL3A-2	5075523	222863	186.1


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

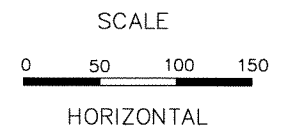
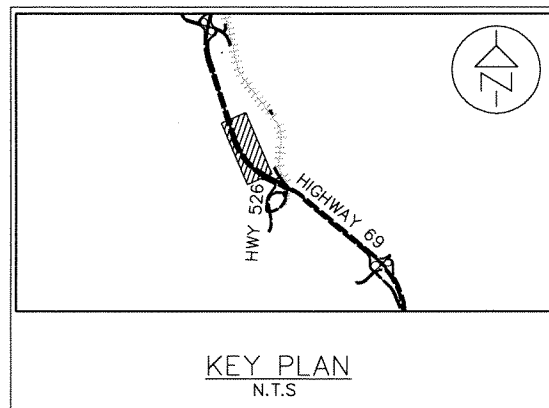
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 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

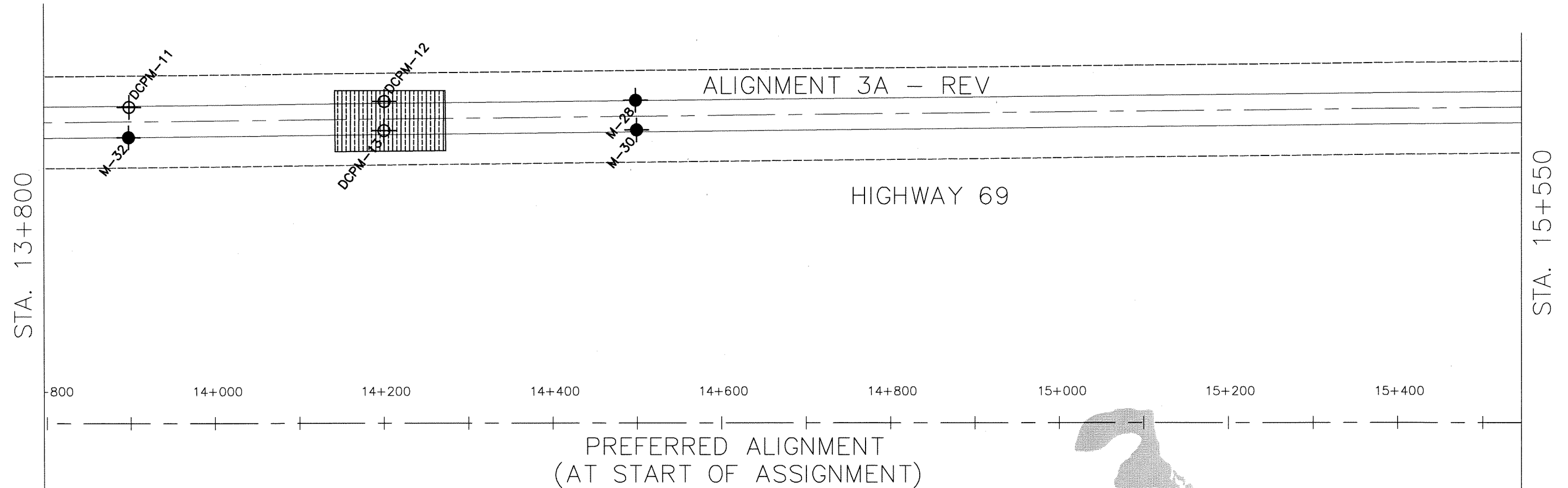
 AREA FOR FURTHER INVESTIGATION



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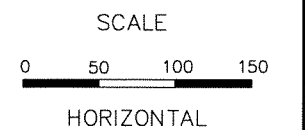
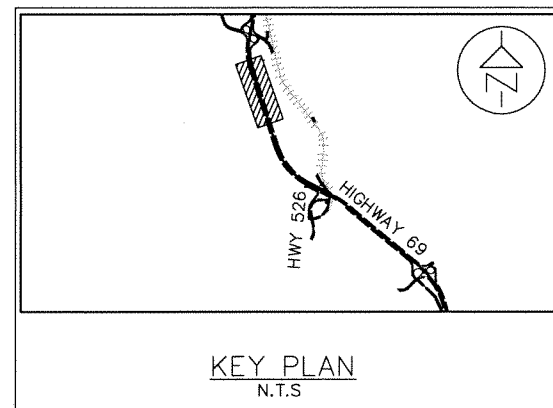
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	GWP No 5377-02-00
FOUNDATION INVESTIGATION	
STA 13+800	TO STA 15+550
Survey	Revised
Trow Associates Inc.	

SHEET 22



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
M-28	5076302	222595	193.9
M-30	5076314	222628	194.0
M-32	5075741	222814	190.7
DCPM-11	5075731	222779	192.2
DCPM-12	5076018	222684	192.0
DCPM-13	5076028	222717	190.7


LEGEND	
	STRUCTURAL BOREHOLE
	SWAMP BOREHOLE
	SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
	STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
	SWAMP BOREHOLE & CONE
	STRUCTURAL BOREHOLE & CONE
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	MINOR SWAMP
	AREA FOR FURTHER INVESTIGATION




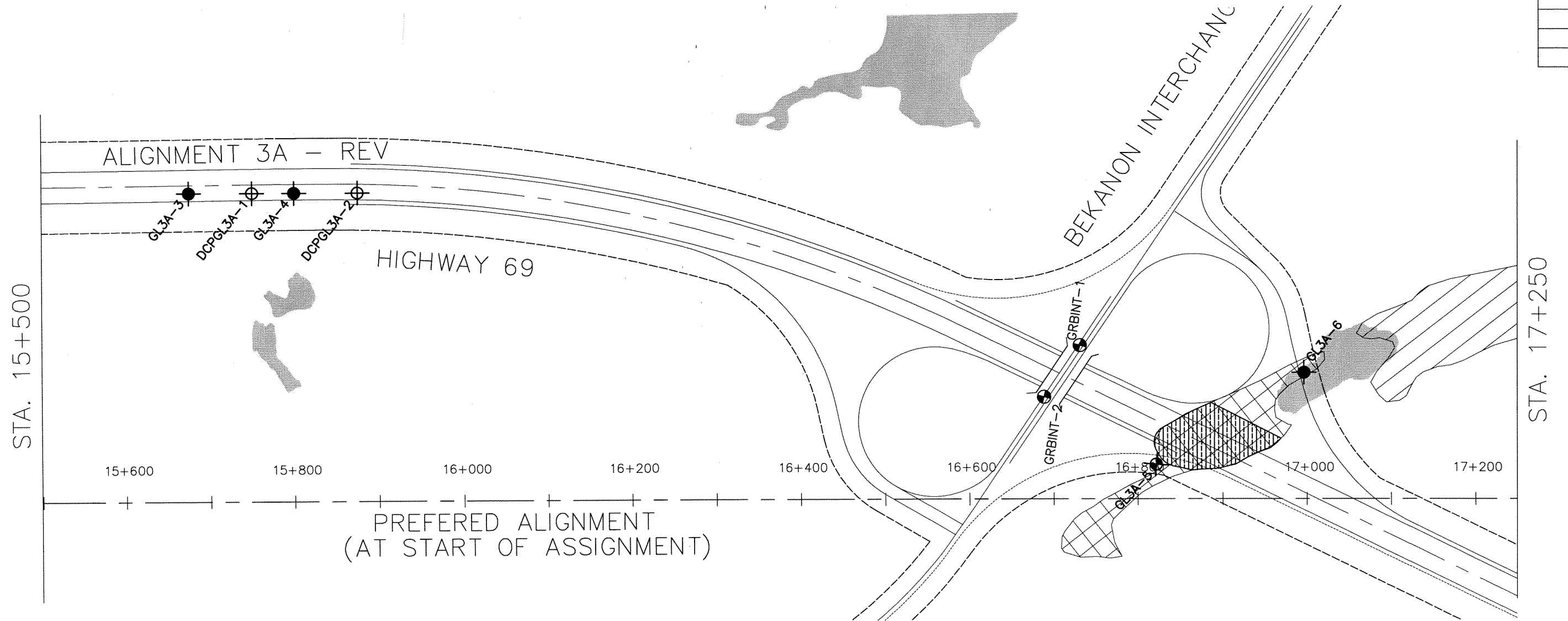
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CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 15+500 TO STA 17+250
Survey _____ Revised _____











 Trow Associates Inc.

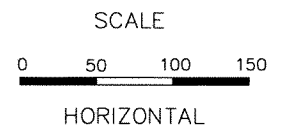
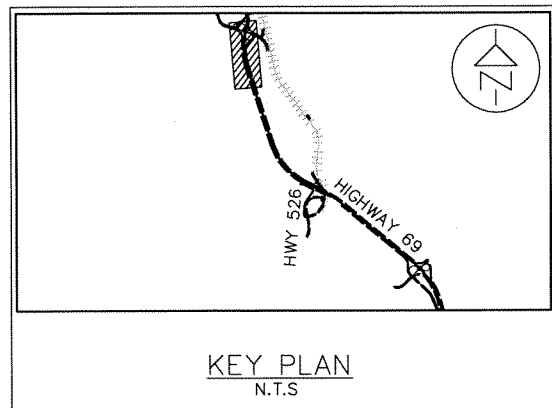

SHEET
23



BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
GL3A-3	5077431	222264	193.8
GL3A-4	5077551	222227	194.0
GL3A-5	5078624	222240	187.0
GL3A-6	5078759	222083	186.4
DCPGL3A-1	5077503	222242	194.1
DCPGL3A-2	5077623	222205	194.3

LEGEND

-  STRUCTURAL BOREHOLE
-  SWAMP BOREHOLE
-  SWAMP DYNAMIC CONE PENETRATION TEST (CONE)
-  STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)
-  SWAMP BOREHOLE & CONE
-  STRUCTURAL BOREHOLE & CONE
-  MAJOR SWAMP (CONFIRMED)
-  MAJOR SWAMP (UNCONFIRMED)
-  MINOR SWAMP
-  AREA FOR FURTHER INVESTIGATION



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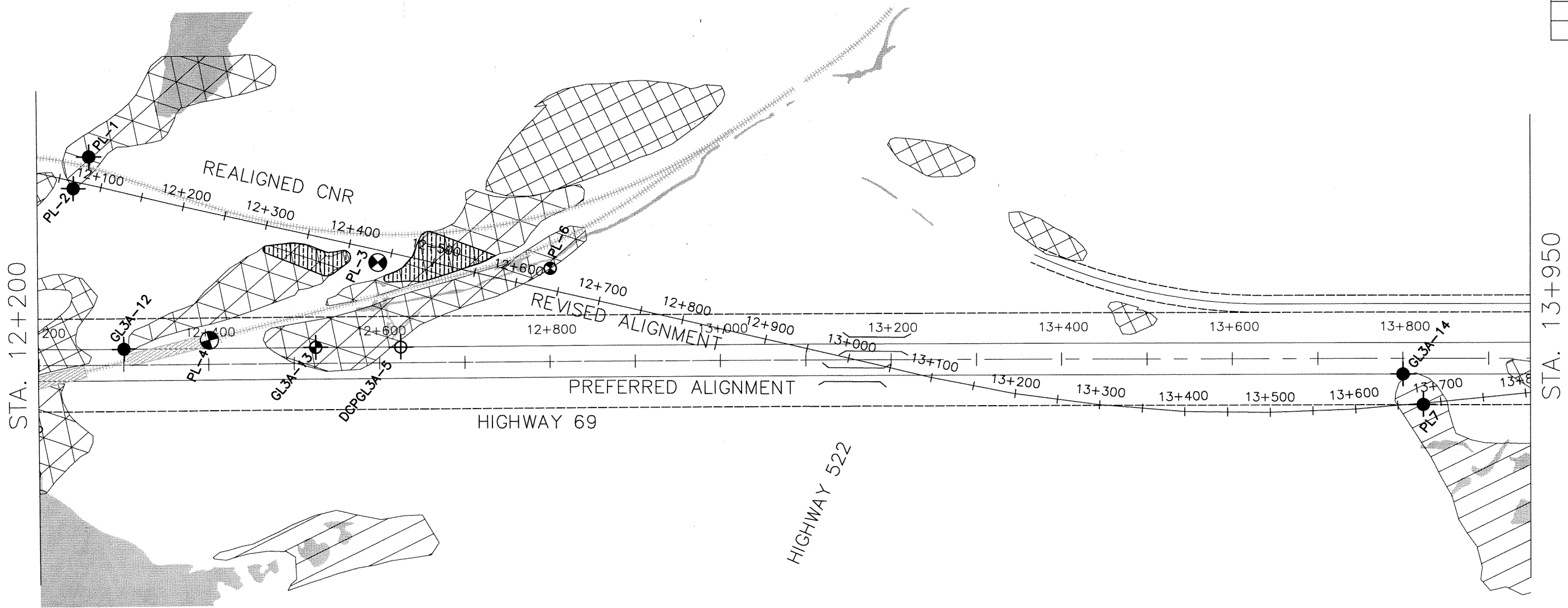
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PLATE No
CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 12+200 TO STA 13+950
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
24





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
PL-1	5085608	221986	182.4
PL-2	5085610	222027	183.5
GL3A-12	5085753	222166	181.9
GL3A-13	5085950	222057	180.5
DCPGL3A-5	5086037	222009	180.9
GL3A-14	5087083	221472	184.7
PL-7	5087121	221492	185.4
PL-3	5085964	221935	182.3
PL-4	5085837	222108	182.0
PL-6	5086147	221844	180.1


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


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 SWAMP BOREHOLE & CONE

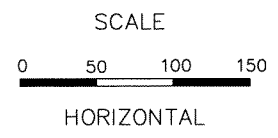
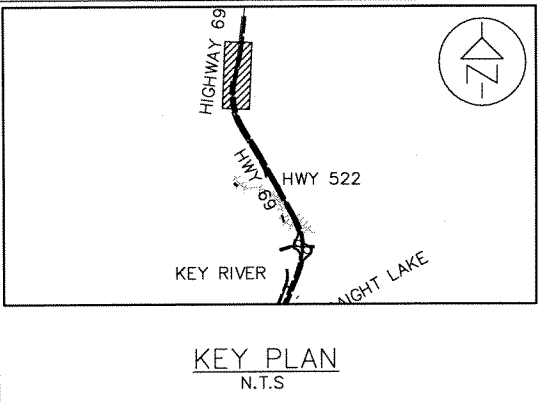
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION




MINISTRY OF TRANSPORTATION, ONTARIO
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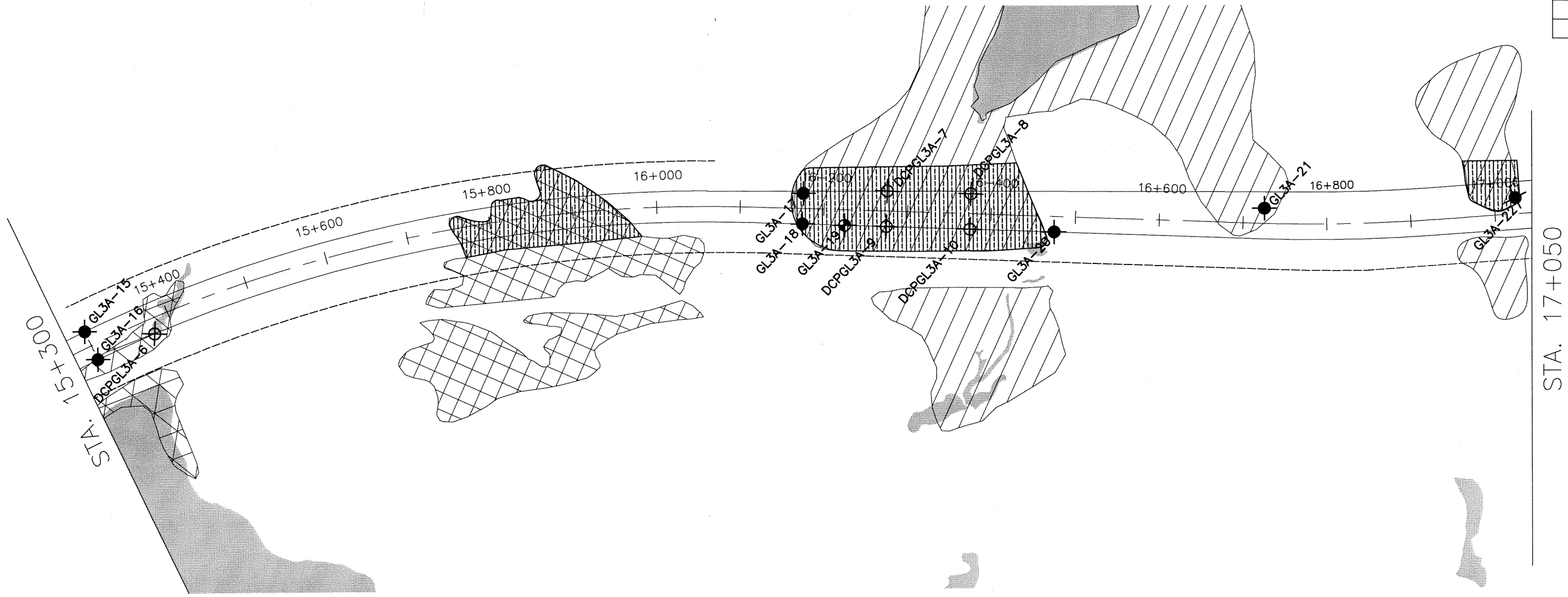
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CONT No 5004-E-0028
GWP No 5377-02-00

FOUNDATION INVESTIGATION
STA 15+300 TO STA 17+050
Survey _____ Revised _____


 Trow Associates Inc.



SHEET
25





BH No.	MTM COORDINATES		ELEVATION
	NORTHING	EASTING	
GL3A-15	5088383	220724	196.6
GL3A-16	5088393	220760	191.8
GL3A-17	5089258	220721	194.5
GL3A-18	5089250	220757	194.4
GL3A-19	5089298	220769	195.5
GL3A-20	5089542	220822	195.0
GL3A-21	5089795	220840	194.5
GL3A-22	5090089	220882	195.1
GL3A-2	5089747	220828	194.6
DCPGL3A-6	5088466	220743	195.5
DCPGL3A-7	5089356	220737	195.5
DCPGL3A-8	5089454	220758	195.5
DCPGL3A-9	5089347	220780	195.5
DCPGL3A-10	5089445	220801	195.5


LEGEND


 STRUCTURAL BOREHOLE


 SWAMP BOREHOLE


 SWAMP DYNAMIC CONE PENETRATION TEST (CONE)


 STRUCTURAL DYNAMIC CONE PENETRATION TEST (CONE)


 SWAMP BOREHOLE & CONE

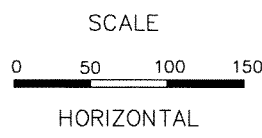
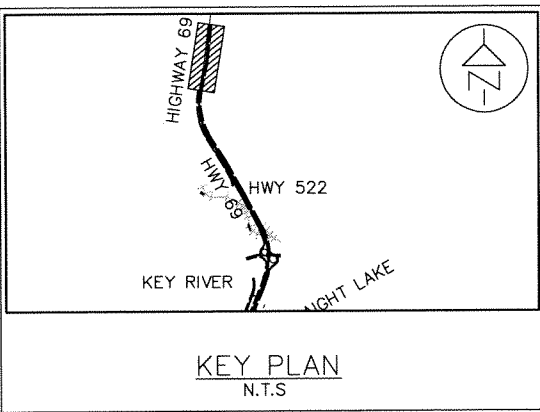
 STRUCTURAL BOREHOLE & CONE

 MAJOR SWAMP (CONFIRMED)

 MAJOR SWAMP (UNCONFIRMED)

 MINOR SWAMP

 AREA FOR FURTHER INVESTIGATION



Appendix F: Locations for Further Investigation

Table 4 – Swamp Locations for Further Investigation

Area	Station	Offset	Estimated Depth of Boreholes (m)
Woods Road	12+850	18.5 R	8
	13+000 to 13+050	18.5 R	8
	13+700 to 13+800	18.5 R	8
	14+100 to 14+125	18.5 R	6
	15+100	18.5 R	8
	16+600	18.5 R	6
	18+300	200 L	6
	18+500	65 L	6
	18+740	18.5 R	6
	10+380	18.5 R	6
Shawanaga	14+650	18.5 L, 18.5 R	8
	15+000	18.5 R	10
	16+500	18.5 L, 18.5 R	12
	17+200 to 17+330	18.5L, 18.5 R	4 holes to 8 m
	17+700 to 17+800	90 L, 50 L	10
	19+180	18.5 L	8
South Pointe Au Baril	10+260 to 10+560	18.5 L, 18.5 R	7
	11+110 to 11+225	18.5 L	6
	12+200 to 12+430	18.5 L, 18.5 R	6
	12+500	30 L	6
North Pointe Au Baril	17+350	50 L	6
	17+825	50 L	6
	18+200	5 R	6
	18+350	16 R, 20 L	6
	19+200	18.5 R	11
	19+400	18.5 L	6
	19+740	18.5 R	6
Harris Lake South	24+890	18.5 L	10
	10+400	18.5 L	6
	10+600	18.5 L	6
Harris Lake North	13+575 to 13+625	18.5 R	6
	14+200	18.5 R	6
	14+390 to 14+475	18.5 R	6
	17+530	18.5 R	6
	17+850	18.5 R	10
	18+775	18.5 L	7
	19+850	18.5 R	10

Area	Station	Offset	Estimated Depth of Boreholes (m)
Magnetawan	20+100	18.5 L	8
	20+650 to 20+770	18.5 L, 18.5 R	6
	21+300 to 21+350	18.5 L, 18.5 R	6
	22+000	18.5 R	6
	22+250	18.5 L, 18.5 R	6
	22+800 to 22+900	18.5 L, 18.5 R	6
	22+700 to 22+950	80 R, 160 R	6
	23+050 to 23+150	120 R, 130 R	6
	14+200	380 L	10
Grundy Lake 3A-Rev	16+825 to 16+925	40 L, 50 L	6
	12+500 to 12+550	140 L	8
	12+600 to 12+700	120 L	15
	15+750 to 15+950	18.5 L, 18.5 R	5
	16+160 to 16+460	18.5 L, 18.5 R	5 holes to 10 m
	16+975	40 L	9