

**FOUNDATION ENGINEERING  
ASSESSMENT REPORT  
HIGHWAY 401 AND LESLIE STREET  
INTERCHANGE, TORONTO, ONTARIO  
G.W.P. 2130-01-00, GEOCRE 30M14-328**

Delcan Corporation

TRANETOB01245AA-AA  
August 10, 2011

August 10, 2011

Delcan Corporation  
625 Cochrane Drive, Suite 500  
Markham, Ontario  
L3R 9R9

**Attention: Ms. Draga Daniel, P.Eng.**

Dear Ms. Daniel

**RE: Foundation Engineering Assessment Report, Highway 401 and Leslie Street Interchange,  
Toronto, Ontario, G.W.P. 2130-01-00, Agreement No. 2008-E-0012, MTO Central Region**

Please find attached the Foundation Engineering Assessment Report relating to the above noted site.

For and on behalf of Coffey Geotechnics Inc.

  
**Ramon Miranda, P. Eng.**  
Principal

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## 1 INTRODUCTION

Coffey Geotechnics Inc. (Coffey) was retained by Delcan Corporation (Delcan) to undertake a preliminary foundation engineering assessment of the Highway 401 and Leslie Street interchange in Toronto. The existing interchange consists of seven (7) existing structures, as described below and shown on Drawing 1.

Structure No.	Description of Structure	No. of Spans
37-206/1	East Bound Lanes – Collectors	16 spans
37-206/2	West Bound Lanes – Collectors	33 spans
37-206/3	East Bound Lanes – Core	16 spans
37-206/4	West Bound Lanes – Core	16 spans
37-206/5	Ramp W-N/S	6 spans
37-206/6	Ramp N-E	2 spans
37-206/7	Ramp N-W	6 spans

We understand the above noted existing structures, which span over Leslie Street and the CNR Tracks, are nearing the end of their serviceable life expectancy and that a number of rehabilitation alternatives are currently being considered. The Leslie Street interchange, which was initially constructed in the mid 1950's and later modified in the mid 1960's and early 1990's, has been the subject of various geotechnical and structural assessments over the years. As such, in order to provide geotechnical input, it was concluded to first review the existing data and establish what if any additional geotechnical work would be required.

The primary objectives of this study were to:

- Review of existing subsurface information for each of structures;
- Review of foundation design recommendations for the existing core, collector and ramp structures;
- Describe the existing conditions with an assessment of the performance of the substructure and associated retaining structures and embankments based on visual inspection;
- Estimate foundation engineering design values of the existing foundations as per the CHBDC; and
- Identification of sites requiring supplemental field investigations.

This portion of the work provides an overview of the past geotechnical work conducted at the site, and a discussion of the existing foundation elements. The preliminary foundation investigation study and structural condition assessment of the structures are presented under separate cover. Note no field or laboratory work was conducted for purposes of this report.

This report has been prepared for Delcan Corporation in accordance with our proposal PO 9086, dated December 8, 2008.

Third party use of this report without Coffey Geotechnics Inc. consent is prohibited. The limitation conditions presented in Appendix D form an integral part of the report and they must be considered in conjunction with this report.

## **2 SITE DESCRIPTION AND GEOLOGY**

The site is located generally to the west of Leslie Street and the existing CNR tracks, as shown on Drawing 1. In general, the grade along this section of the 401 Highway falls from the west from about Elevation (El.) 152 m, to the east to about El. 144 m, above Leslie Street. The elevation of Leslie Street, below the interchange, is approximately El. 136 m.

Within this general area, the overburden consists of Pleistocene or glacial deposits, which were laid down under a vast thickness of ice or as result of deposition by glacial rivers and lakes associated with the glaciers. Soils which were deposited by the ice are described as glacial till deposits which are mainly unsorted, heterogeneous materials, while those formed by melt waters are typically stratified deposits.

In summary, below the existing fill materials at the site, this stretch of land along Highway 401 near Leslie Street is underlain by silty sands (shallow lake deposits - Peel Pond), silty clay (deeper lake deposits - Peel Pond), glacial till and sand deposits.

The depth of the overburden in the general area can be expected to be more than 50 m, with the surface of the shale bedrock anticipated at about El. 75 to 90 m.

## **3 EXISTING BOREHOLE INFORMATION**

Various geotechnical investigations have been conducted at the site between 1953 and 1990. The following section provides a brief overview of the purposes and scopes of the studies. Results of the studies are presented in Sections 4 and 5 of this report, with a list of references provided at the end of this report. Copies of the borehole logs, from these reports, as well as laboratory results plans and sections, where available, are presented in Appendix A and B of this report. Note some of the data are difficult to read.

### **The Foundation Company of Canada Limited, Toronto Bypass Highway #401, Soil Conditions – C.N.R. & Leslie St. Overpass, C7142, September 30, 1953.**

The purposes of this study were to assess the embankment failure which took place during its construction of the west approach of the core lanes and to provide remedial measure recommendations for the proposed embankments. Nineteen (19) explorations were advanced for this study (Designated G1, etc. on Drawing 1). This report was also presented under the cover of Geocon Limited with the same date.

### **Geocon Limited, Soil Conditions and Stability, Proposed Embankment, Leslie St. & Hwy. 401, S7002, April 8, 1960.**

The purposes of this study were to assess if there had been strength gain in the underlying clay soils as a result of embankment loading and comment on if a reduction of the previously recommended berm requirements could be altered. Three (3) boreholes were advanced in proximity to the previously drilled boreholes (Designated 1, etc. on Drawing 1).

**Department of Highways Ontario, Foundation Investigation Report for Structures on Leslie St. & Hwy. 401, W.P. 252-61-3, July 2, 1964.**

The purpose of this study was to determine the depth to the underlying dense till layer in order to establish the lengths of piles to be used to support the proposed structures associated with the widening of the existing overpass. Eighteen (18) sampled boreholes and two dynamic cone penetration tests were performed (Designated B1, etc. on Drawing 1).

**Department of Highways Ontario, Foundation Section, Materials and Testing Division, Report on Vertical and Lateral Load Tests on 30"  $\phi$  Concrete Caisson and Steel H-Pile at Leslie Street and Hwy. 401 Interchange, W.P. 266-61, April 9, 1965.**

This memorandum provides the results of load tests conducted at the site, one borehole log and a cross section indicating boreholes 201 to 211 which were advanced by H. Q. Golder and Associates Ltd. Report No. 6205, dated October 1962. As noted above, only one borehole log was available for purposes of our data compilation. However, subsurface data were obtained by scaling from the cross section provided. Boreholes were designated 201, etc. on Drawing 1.

**Department of Highways Ontario, Materials and Testing Division, Structures on Leslie St. & Hwy. 401 Interchange, W.P. 252-61-3, April 5, 1966.**

This memorandum indicated 12 borings were advanced following the blow-out of caissons 424-3 and 426-3. Twelve borings were advanced in proximity to the proposed caissons. Borehole logs were however not provided.

**Department of Highways Ontario, Foundation Section, Materials and Testing Division, Caisson Installation, Structure on Leslie St. & Hwy. 401 Interchange, W.P. 252-61-3, January 26, 1967.**

This memorandum provides a discussion of the subsurface conditions encountered by Dominion Soil Investigation Limited (Soil Investigation, Hwy. 401 and Leslie Street, 6-12-1, W.P. 266-61, February 9, 1967) in proximity to the caissons to be used to support the core lanes and recommendations for the installation of future caissons. Eighteen (18) borings were advanced (Designated 1A, etc. on Drawing 1).

**Ministry of Transportation, Engineering Material Office, Foundation Design Section Foundation Investigation Report, Structure Widening Leslie Street & C.N.R. Overpass Hwy 401, W.B. Collector Lanes, W.P. 260-86-01/A, February 21, 1990.**

This report presents a historic summary of work conducted related to the embankment, west of the railway tracks, and the results of a recent foundation investigation conducted for the proposed widening of the West Bound Collector Lanes. For this work, an additional five boreholes were advanced (Designated 1-1, etc. on Drawing 1).

**Additional Studies**

Some additional subsurface exploration work was also conducted in the area but not incorporated into this work due to the shallow depths of the boreholes or distance from the site.

## **4 COMPILED SUBSURFACE CONDITIONS**

### **4.1 Background**

In order to gain a better understanding of the subsurface conditions below the Highway 401 and Leslie Street interchange, the data from the previously completed geotechnical studies were compiled and reviewed. To assist in the compilation of the data, the locations of the previously completed boreholes were transferred to a base plan (Drawing 1) and the major strata encountered by others were summarized in tabular format. The stratigraphy was based on the borehole logs, cross sections and descriptions provided in the various reports.

Note the geotechnical data used in this study were logged and prepared by a number of consultants and personnel, as such their descriptions and classifications varied somewhat. Therefore, some limited refinement of their interpretations was made when comparing the data as a whole.

Table 4.1 provides a summary of the primary stratigraphic contacts. Table 4.2 provides a summary of the field and laboratory results, and a general description of the units as encountered and logged by others.

These data were then transposed in plan format, based on elevations to assess the anticipated subsurface topography of the various units. See Drawings 2, 3, 4, 5 and 6. Drawing 7 presents estimated subsurface profiles along the West Bound, Core and East Bound Collector Lanes.

For purposes of this study the following assumptions were made:

- Elevations were assumed to be based on the geodetic datum.
- The surface elevation was based on those indicated on the borehole logs and no correction was made; existing topography was unavailable.
- Depths noted below, for the various units, were based on measurements below the existing ground surface, at the time the explorations were completed, no correction was made.
- Imperial elevations were directly converted to metric and no correction factor was used.
- Locations of boreholes were approximated based on those indicated on the drawings provided in the referenced reports.
- Due to the age of some of the documents and the quality of the original scanning, some of the data were difficult to read. Where borehole locations and/or data could not be accurately interpreted, these data were not plotted and/or not used.

The following provides a compiled overview of the subsurface conditions encountered below the Highway 401 and Leslie Street Interchange, based on a summary of the existing data. The following descriptions of the individual strata are provided to assist the designers of the project with an understanding of the anticipated subsurface conditions underlying the site.

Note the material boundaries indicated on the attached drawings are approximate and are based on data by others. These boundaries typically represent a transition from one material type to another and should

not be regarded as an exact plane of geological change. It should be pointed out that the subsurface conditions will vary across this site.

## 4.2 Fill/Native Clayey Silt

Fill, topsoil, asphalt and/or native clayey silt were generally encountered from surface in each of the boreholes to depths ranging from approximately 0 m to 13 m below the ground surface, existing at the time of the explorations, or to elevations of approximately El. 133 m to 143 m. Note the surface of the fill (See Drawing 2) was determined based on the surface elevation of a number of boreholes that was advanced between 1953 and 1990. Since these times, construction has taken place, which, in places, may have either resulted in the removal and/or addition of materials. As such, the accuracy of the surface topography and thicknesses based on 2010 elevations are considered very rough. The native clayey silt deposit appears to have been used as a portion of the fill material used during construction of the interchange and as such the two materials have been combined for purposes of this report.

The average thickness of the fill and/or clayey silt material encountered was approximately 4 m, based on past explorations, extending to an average elevation of about El. 139 m (See Drawing 3).

The fill and/or clayey silt material at the site has been described as a brown to olive brown, sand and silt, some gravel, trace to some clay with trace to some organics to a brown, clayey silt, trace to some sand, trace gravel and organics. At some boreholes, organics and topsoil was encountered below the fill.

The fill for the most part was described as a basically granular (i.e. non-cohesive) soil. However, some fill material and the upper clayey silt soils was described as exhibiting some apparent cohesion, due to its clay content. The clayey silt was considered to be basically a cohesive material.

Results of past grain size distribution tests are plotted as an envelope in Figure B-1, in Appendix B. As mentioned previously, it appears from the available information that portions of the fill were derived from the native clayey silt deposit.

Atterberg Limits tests performed on cohesive samples gave the following range of index values (See Figure B-2, Appendix B).

Liquid Limit:	15 - 26%
Plastic Limit:	11 - 16%
Plasticity Index:	4 - 12%

Natural water contents measured from collected samples of the fill and clayey silt ranged between approximately 9% and 16%.

Standard Penetration Tests (SPT) 'N'-values of 8 to 100 blows/0.3 m (average approximately 35 blows/0.3 m) were recorded within the fill and clayey silt, indicating a loose to very dense relative density in the upper basically granular portions of the fill or firm to hard consistency in the lower cohesive fill and in the underlying cohesive clayey silt deposit. These values indicated that the fill, in some places had not received systematic compaction during the fill placement.

Bulk unit weights were determined on select samples of the fill. These values ranged from approximately 20.4 kN/m<sup>3</sup> to 22.0 kN/m<sup>3</sup>.

### 4.3 Silty Sand

Underlying the fill, topsoil, asphalt and/or clayey silt materials, a silty sand was encountered at elevations of approximately El. 133 m to 143 m (See Drawing 3). The thickness of the silty sand encountered ranged between 0 and 9.4 m, with an average of approximately 3.7 m. The silty sand was not encountered in boreholes advanced at the western end of the study area.

This stratum was typically described as brown, medium to fine sand, some gravel to a brown to grey, silty fine sand to silt, trace organics. This stratum was considered a granular (i.e. non-cohesive) material. Results of past grain size distribution tests are plotted as an envelope in Figure B-3, in Appendix B.

Natural water contents measured from collected samples of the silty sand ranged between approximately 10% and 22%.

SPT 'N'-values of 5 to 100 blows/0.3 m (average approximately 30 blows/0.3 m) were recorded within the silty sand, indicating a loose to very dense relative density. Typically the stratum was described as compact.

Bulk unit weights determined on select samples of the silty sand were approximately 19.6 kN/m<sup>3</sup>.

### 4.4 Silty Clay

A grey, silty clay deposit was encountered, typically below the silty sand, at Elevations 129 to 147 m (Average El. 136 m). See Drawing 4. This deposit was found to be approximately 8.5 to 16 m thick (Average 12 m).

The stratum was typically described as grey, stratified clay some silt and sand layers, some gravel to grey, silty clay some fine sand, trace to some fine gravel. Note occasional boulders were also encountered within this unit. In some reports there was a distinction between an upper fine silty clay stratum and a lower till like stratum. However, in these cases it was noted the two units had similar geotechnical properties. Results of past grain size distribution tests are plotted as an envelope in Figure B-4, in Appendix B.

Atterberg Limits tests performed on samples from the deposit indicated the following index values (See Figure B-5, Appendix B):

Liquid Limit:	14 - 69%
Plastic Limit:	9 - 31%
Plasticity Index:	1 - 42%
Natural Water Content:	10 - 63%

The above values are characteristic of a clayey silt to clay soil of low to high plasticity. However, as indicated by the range of values, clayey silt and silt seams were also encountered.

SPT 'N'-values of 1 to 39 blows/0.3 m were recorded within the silty clay deposit. Field vane tests were also carried out within this cohesive soil deposit resulting in undrained, in-situ shear strengths of 10 kPa to in excess of 67 kPa. Based on these test results and a tactile evaluation by others, the silty clay deposit was considered to have a consistency of very soft to stiff with occasional very stiff to hard zones. The sensitivity of the silty clay as measured by field vane tests was typically between 2 and 6.

Undrained triaxial tests were also conducted on samples from this stratum. In general, the measured values were substantially lower than the vane results probably indicating disturbance of the collected samples.

Figure B-6 in Appendix B presents an envelope of the vane test results from the historic subsurface explorations conducted at the site. As indicated by the profile, there was a distinct crust noted with strength gain at depth.

Figures B-7 and B-8 in Appendix B presents results of past consolidation tests conducted on samples collected from the silty clay stratum. Based on past results and discussions by others the silty clay stratum was described slightly over-consolidated.

## 4.5 Glacial Till

Below the silty clay, a glacial till deposit was encountered in the boreholes at depths ranging from about 11 m to 28 m (Average 20 m) below the existing ground surface at the time of the explorations or at elevations of approximately El. 117 m to 137 m (Average El. 123 m). See Drawing 5. At the borehole locations, where the till was penetrated, the deposit was found to be about 1.5 m to 7 m thick. The till deposit was described as a heterogeneous mixture of clayey silt, sand and trace of gravel to sandy silt containing cohesive layers/lenses and boulders. In some cases, rock coring methods were used to advance the boreholes through cobbles or boulders. Results of past grain size distribution tests are plotted as an envelope in Figure B-9, in Appendix B. This shows the wide range of particle sizes from basically coarse grained to fine grained, basically a cohesive material.

In general however, the till was classified as a basically granular (i.e. non-cohesive) soil. But it also exhibited some apparent cohesion, due to its clay content, especially where the clay content was relatively high. Atterberg Limits tests were performed on such samples which exhibited some cohesion. These tests gave the following index values, as shown in Figure B-10 in Appendix B.

Liquid Limit:	16 to 31%
Plastic Limit:	11 to 15%
Plasticity Index:	2 to 16%

Natural water contents measured from collected samples of the till ranged between approximately 7% and 16%.

SPT 'N'-values ranging from 2 to in excess of 100 blows/0.3m (average approximately 66 blows/0.3 m) were recorded within the till indicating a very loose to very dense condition. The high 'N'-values were recorded due to the presence of cobbles and boulders. From the recorded test results, the relative density of the deposit was generally described as very dense with occasional very loose to loose zones.

## **4.6 Lower Sand**

Below the till, a lower sand deposit was encountered in some of the deeper boreholes advanced at the site at depths ranging from approximately 24 m to 32 m (Average 27 m) below the existing ground surface at the time of the explorations or at elevations of approximately El. 113 m to 118 m (Average El. 116 m). See Drawing 6. This lower sand was not fully explored and its lateral and vertical extent are unknown (i.e. even the deeper boreholes were terminated with the lower sand).

The sand deposit was described as a fine to medium sand, trace gravel, boulders and pockets of clay and silt. Results of past grain size distribution tests are plotted as an envelope in Figure B-11, in Appendix B.

The sand was classified as a basically granular (i.e. non-cohesive) soil.

SPT 'N'-values were generally in excess of 100 blows/0.3m indicating a very dense condition.

## **4.7 Groundwater Conditions**

Groundwater levels were reportedly observed in the open boreholes while drilling and upon completion of each borehole. In addition, several piezometers were installed to enable the monitoring of the groundwater level over a prolonged period of time, without interference from surface water.

The observed groundwater levels ranged between elevations of approximately 129 and 149 m. In addition excess hydrostatic pressure was observed in the borings which penetrated through the glacial till into the underlying sand unit. The elevation to which the water was observed was however not noted on the borehole logs. Table 4-1 indicates the boreholes in which groundwater elevations were measured.

Based on the range of observations, it appears a perched water level should be anticipated in the fill and silty sand, another level corresponding to the clay and till units and another under excess hydrostatic pressure within the lower sand unit.

It should be pointed out that the groundwater would be subject to seasonal fluctuations and fluctuations in response to major weather events. The groundwater in the upper units would also be controlled by the water level in the adjacent watercourse.

# **5 GEOTECHNICAL OVERVIEW**

## **5.1 Foundation Elements**

Table 5-1 provides a brief summary of the foundation elements which have been installed in conjunction with the construction of the Highway 401 and Leslie Street Interchange. Note as as-built reports were not available, some estimates were made with respect to depths and sizes. Where no clear drawings, notes or reports were available, these foundation elements were not described. Copies of the primary drawings associated with the Highway 401 and Leslie Street Interchange and used in preparation of this report are included in Appendix C.

In general the foundation elements consisted of HP310x79 (12BP53) H-piles and 762 mm (30") caissons (i.e. drilled and cast-in-place concrete deep foundation elements). In some cases the base diameter of the caisson units was proposed to be increased, probably by "belling"; however, based on available data



whether or where this was done is not clear. The average depth of the foundation elements was approximately 23 m.

## **5.2 Summary of Past Reports**

The following section provides a brief summary of the geotechnical recommendations provided in the previous reports, memoranda and drawings used to prepare this report. An overview of these findings is provided in Sections 5.3 and 5.4 of this report. As previously discussed, a list of references used to prepare this report is provided at the end of this report.

### **The Foundation Company of Canada Limited, Toronto Bypass Highway #401, Soil Conditions – C.N.R. & Leslie St. Overpass, C7142, September 30, 1953 (GEOCRE 30M14-091, structure number 37-206/2 and 37-206/7)**

Based on the results of this work, which was also presented under the cover of Geocon Limited, it was recommended for embankments greater than 6.4 m (21 ft) high, counterweight berms should be added and that the side slopes should be no steeper than 2H to 1V. For the proposed 10.7 m (35 ft) high approach embankment, it was recommended that the berms should be 15 m (50 ft) wide and 4.3 m (14 ft) high. It was further recommended that the structures should be supported on piles terminated in the dense till, approximately 18 m (60 ft) below the grade at that time. It was not noted in the report the type of pile.

### **Department of Highways Ontario, Pile Load Tests of Leslie Street and 401 Highway, F-54-22, May 10, 1955 (GEOCRE 30M14-089)**

Pile load tests were conducted on two piles; 18.6 m below grade, just above the competent till, and the other at approximately 23 m, founded within the till. Piles were designed to carry 355 kN (40 tons). Based on the report, it appeared the piles could not be taken to failure. The discussion indicated that the skin friction alone was sufficient for 355 kN (40 tons). Based on the cross-sectional area of the piles noted, it is anticipated the piles tested were HP310x79 (12BP53) steel H piles.

### **Geocon Limited, Soil Conditions and Stability, Proposed Embankment, Leslie St. & Hwy. 401, S7002, April 8, 1960 (GEOCRE 30M14-091, structure number 37-206/2 and 37-206/7)**

Based on the results of this work, it was concluded that limited to no strength gain had taken place in the silty clay deposit as a result of the embankment loading, and therefore the initial recommendation that embankments greater than 6.4 m (21 ft) high be provided with counterweight berms should be followed.

### **Department of Highways Ontario, Foundation Investigation Report for Structures on Leslie St. & Hwy. 401, W.P. 252-61-3, July 2, 1964 (GEOCRE 30M14-093)**

Factual report no discussion of recommendations.

### **Department of Highways Ontario, Foundation Section, Materials and Testing Division, Report on Vertical and Lateral Load Tests on 30" $\phi$ Concrete Caisson and Steel H-Pile at Leslie Street and Hwy. 401 Interchange, W.P. 266-61, April 9, 1965 (GEOCRE 30M14-092, structure number 37-206/2 and 37-206/7)**

The results of load tests conducted at the site indicated the following:

HP360x108 (14BP73) H Piles, 21 m (about 71 to 79 ft) long piles driven into the glacial till (tip elevations about EL. 122 to 119 m or El. 400 to 390 ft) would have an ultimate capacity of 2,224 kN (250 tons). The suggested design capacity was 890 kN (100 tons).

For 762 mm (30 inch) caissons, 18.6 m (61 ft) long caisson founded on the glacial till (caisson bottoms about EL. 122 m or El. 400 ft), an ultimate capacity of greater than 3,558 kN (400 tons) was suggested. The recommended design capacity of 1,779 kN (200 tons) was suggested.

**Department of Highways Ontario, Materials and Testing Division, Structures on Leslie St. & Hwy. 401 Interchange, W.P. 252-61-3, April 5, 1966 (GEOCRE 30M14-93, structure number 37-206/1 and 37-206/6)**

This memorandum indicated the presence of a very dense granular (lower sand) deposit, below the glacial till deposit. As the presence of excess hydrostatic pressure was noted, emanating from within this lower sand, it was recommended that future caissons be installed 1.2 to 1.5 m higher than the surface of the lower sand (i.e. base installed within the glacial till) and that the base diameters be increased from 672 mm to 1219 mm (30 to 48 inches). Recommendations for tip elevations were also provided as follows:

**Recommended Caisson Base Elevations (1966)**

Bent number	Caisson Base Elevations in metre (ft)			Remark
	Caisson #1	Caisson #2	Caisson #3	
424	118.6 (389)	118.3 (388)	Blow-out	Caisson 424-3 replaced with H-pile
425	118.0 (387)	118.3 (388)	118.8 (389)	
426	118.3 (388)	118.3 (388)	383 (Blow-out)	Caisson 426-3 replaced with H-pile
427	118.3 (388)	118.0 (387)	118.0 (387)	
428	117.3 (385)	117.3 (385)	117.3 (385)	
429	117.3 (385)	117.3 (385)	installed	Caisson 429-3 installed prior to investigation
729	117.3 (385)	117.3 (385)	N/A	
430	117.6 (386)	117.6 (386)	N/A	

It was further recommended to replace caissons 424-3 and 426-3 with HP310x79 (12BP53) steel H piles with a design load of 533 kN (60 tons) per pile.

**Department of Highways Ontario, Foundation Section, Materials and Testing Division, Caisson Installation, Structure on Leslie St. & Hwy. 401 Interchange, W.P. 252-61-3, January 26, 1967 (GEOCRE 30M14-93, structure number 37-206/3 and 37-206/4)**

Based on the presence of the permeable granular (lower sand) layer underlying the more cohesive till deposit, it was elected to found the caissons above the lower granular material (i.e. the lower sand) to reduce the risk of basal heave. It was further recommended that the base diameter of future caissons be enlarged from 672 mm to 1067 mm (30 to 42 inches). Recommendations for tip elevations were also provided as follows:

Recommended caisson base elevations (1967)

Bent number	Caisson Base Elevations in metre (ft)			Remark
	1	2	3	
230	118.6 (389)	118.6 (389)	117.3 (385)	Boreholes 1 and 2
330	117.3 (385)	117.3 (385)	117.3 (385)	Boreholes 2 and 3
229	118.6 (389)	118.6 (389)	118.9 (390)	Boreholes 4 and 5
329	118.9 (390)	118.3 (388)	118.3 (388)	Boreholes 5 and 6
228	119.5 (392)	119.5 (392)	118.9 (390)	Boreholes 7 and 8
328	118.9 (390)	118.3 (388)	118.3 (388)	Boreholes 8 and 9
227	119.2 (391)	119.2 (391)	117.7 (386)	Boreholes 10 and 11
327	117.7 (386)	118.6 (389)	118.6 (389)	Boreholes 11 and 12
226	119.3 (391.5)	119.3 (391.5)	118.3 (388)	Boreholes 13 and 14
326	118.3 (388)	118.3 (388)	118.3 (388)	Boreholes 14 and 15
225	119.2 (391)	119.2 (391)	118.3 (388)	Boreholes 16 and 17
325	118.0 (387)	117.3 (385)	117.3 (385)	Boreholes 17 and 18

**Ministry of Transportation, Engineering Material Office, Foundation Design Section Foundation Investigation Report, Structure Widening Leslie Street & C.N.R. Overpass Hwy 401, W.B. Collector Lanes, W.P. 260-86-01/A, February 21, 1990 (GEOCRE 30M14-191A, structure number 37-206/2 and 37-206/7)**

The following recommendations were provided for the design of the foundation elements:

0.9 m (3 ft) Diameter Caissons

Factored Capacity at ULS	3,000 kN (337 tons)
Bearing Capacity at SLS Type II	2,000 kN (225 tons)
Factored Lateral Capacity at ULS	300 kN (34 tons)
Lateral Capacity at SLS Type II	200 kN (22 tons)

1.1 m (3.5 ft) Diameter Caissons

Factored Capacity at ULS	3,500 kN (393 tons)
	Revised {1990 02 22} 4,400 kN (495 tons)
Bearing Capacity at SLS Type II	2,300 kN (259 tons)
	Revised {1990 02 22} 2,900 kN (326 tons)
Factored Lateral Capacity at ULS	340 kN (38 tons)
Lateral Capacity at SLS Type II	230 kN (26 tons)

1.2 m (4 ft) Diameter Caissons

Factored Capacity at ULS	4,000 kN (450 tons)
	Revised {1990 02 22} 5,300 kN (596 tons)

Bearing Capacity at SLS Type II	2,650 kN (298 tons)
	Revised {1990 02 22} 3,500 kN (393 tons)
Factored Lateral Capacity at ULS	400 kN (45 tons)
Lateral Capacity at SLS Type II	270 kN (30 tons)

It was recommended the founding level be at El. 121 to 132 m or approximately 20 to 31 m below grade.

#### Steel H Piles 310x 110

Factored Capacity at ULS	1,650 kN (185 tons)
Bearing Capacity at SLS Type II	1,150 kN (129 tons)
Ultimate Pile Capacity (Hiley Formula)	3,450 kN (388 tons)

It was also recommended in this report that the findings related to the previous stability work conducted by Geocon and Golder be followed with respect to limiting the embankments heights and slope configurations.

#### **Ministry of Transportation, Engineering Material Office, Foundation Design Section, August 16, 1990 (structure number 37-206/7)**

Based on some movement noted that at the abutment walls (N-W Ramp) it was elected to use a light weight slag rather than Granular A as backfill.

### **5.3 Geotechnical Events**

The Leslie Street and Highway 401 interchange has been the subject of a number of studies over the years as a result of events which have taken place during or post construction. Table 5-2 provides a summary of the major reported geotechnical events and remedial measures taken at the Highway 401 and Leslie Street Interchange since 1953. Drawing 8 presents the location of these events in plan.

### **5.4 Summary of Foundation Recommendations**

The following presents a summary of the foundation recommendations provided by others during construction of the Highway 401 and Leslie Street Interchange, based on historic data. Note recommendations provided from the pile load tests, discussed above, have not been repeated as the data presented below are representative of the values used in preparation of the design drawings. The values have been updated to reflect CHBDC guidelines.

#### HP310x79 (12BP53) steel H-Piles

Factored ULS 800 kN (90 tons) per pile

SLS 533 kN (60 tons) per pile

#### 762 mm (30") concrete filled caissons

Factored ULS 2,669 kN (300 tons)

SLS 1,779 kN (200 tons)

220 mm diameter, 30 MPa concrete in filled steel tube piles

Factored ULS 825 kN/pile (93 ton/pile)

SLS 550 kN (62 ton/pile)

## **6 SITE RECONNAISSANCE**

In conjunction with review of available data, a brief site reconnaissance of the site was conducted during the course of this study. At that time, photographs of the various structures were taken as well noting evidence of instability. Note this reconnaissance was not considered to be a detailed condition assessment study but more of a cursory review of the site. Figure 6-1 presents a selection of photographs taken during the course of the work.

The following items were noted:

- Erosion of the embankment below the West Bound Collector Lanes was noted at a number of locations.
- No visual evidence of instability along the soil embankments was noted, i.e. such as cracking, bulging, etc.
- Migration of fines from below the concrete pavement, to the east of Leslie Street, was observed along with movement of the concrete pavement below the West Bound Collector Lanes.
- Deterioration of some of the concrete piers and beams was noted at a number of locations.
- Previous repair of many of the concrete piers and beams was noted.

## **7 ADDITIONAL WORK**

Based on our work to date, there appears to be a wealth of geotechnical data related to this site. It appears the primary tasks for future geotechnical work would be to address if strength gain has been obtained within the underlying silty clay to better address future embankment geometries and to better establish the depth to the lower sands if caissons are to be used for future construction. The extent of such future work should be established based on knowledge of the future proposed plans for the interchange.

## **8 REFERENCES**

Department of Highways Ontario, Pile Load Tests of Leslie Street and 401 Highway, F-54-22, May 10, 1955.

Department of Highways Ontario, Foundation Investigation Report for Structures on Leslie St. & Hwy. 401, W.P. 252-61-3, July 2, 1964.

Department of Highways Ontario, Foundation Company of Canada Engineering Corporation Limited, Drawings for Leslie St. and C.N.R. Trestle:

Drawing # D 5522-1	General Layout, January 1965.
Drawing # D 5522-2	General Arrangement - Sheet 1, January 1965.
Drawing # D5522-3	General Arrangement - Sheet 2, January 1965.
Drawing # D 5522-4	General Arrangement - Sheet 3, January 1965.
Drawing # D 5522-5	General Arrangement - Sheet 4, January 1965.
Drawing # D 5522-6	General Arrangement - Sheet 5, January 1965.
Drawing # D 5522-7	General Arrangement - Sheet 6, January 1965.
Drawing # D 5522-9	Foundation Layout - Sheet 1, January 1965.
Drawing # D 5522-10	Foundation Layout - Sheet 2, January 1965.
Drawing # D 5522-12	Foundation Layout - Sheet 4, January 1965.

Department of Highways Ontario, Foundation Section, Materials and Testing Division, Report on Vertical and Lateral Load Tests on 30"  $\phi$  Concrete Caisson and Steel H-Pile at Leslie Street and Hwy. 401 Interchange, W.P. 266-61, April 9, 1965.

Department of Highways Ontario, 65-205 Leslie Street & C.N.R. Trestle, Highway 401, Letter December 20, 1965.

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Ministry of Transportation, Engineering Material Office, Foundation Design Section Foundation Investigation Report, Structure Widening Leslie Street & C.N.R. Overpass Hwy 401, W.B. Collector Lanes, W.P. 260-86-01/A, February 21, 1990.

Ministry of Transportation, Engineering Material Office, Foundation Design Section, Memorandum, August 16, 1990.

Morrison Hershfield Limited, Substructure Rehabilitation of Leslie Street and C.N.R. Overpass at Hwy 401, Foundations for Pier 123 & 126, Sheets 23 and 26, November 1994.

The Foundation Company of Canada Limited, Toronto Bypass Highway #401, Soil Conditions – C.N.R. & Leslie St. Overpass, Report C7142, September 30, 1953. (Also by Geocon Limited).

## 9 GENERAL COMMENTS

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

For and on behalf of Coffey Geotechnics Inc.

*Mingmin Wang*

for **Robert D. Powell, P.Eng.**

Principal Geotechnical Engineer

*Ramon Miranda*

**Ramon Miranda, P.Eng.**

Principal



*Zuhtu Ozden*

**Zuhtu Ozden, P.Eng.**

Senior Principal



## Tables



Table 4-1: Stratigraphic Contacts - Highway 401 and Leslie Street Interchange  
Project Number: TRANETOB01245AA-AA

Project Number: 100																
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Fill or Clayey Silt- Organics	Thickness			Fill or Clayey Silt- Organics	Thickness		
	Sand	Clay	Till		Sand	Clay	Till
	(m)	(m)	(m)		(ft)	(ft)	(ft)
0.0	0.0	8.5	1.5	0.0	0.0	28.0	5.0
13.3	9.4	16.0	7.2	43.6	31.0	52.4	23.6
4.0	3.8	12.4	3.3	13.0	12.3	40.6	11.0
4.4	3.8	12.5		14.5	12.5	41.0	
0.2	4.3	12.3		0.5	14.0	40.5	
4.9	2.9			16.0	9.5		
3.7	5.2	12.2		12.0	17.0	40.0	
2.7	7.0	11.0		9.0	23.0	36.0	
4.3	3.4	13.3		14.0	11.0	43.5	
2.7	3.7	14.3		9.0	12.0	47.0	
4.9	2.1	11.7		16.0	7.0	38.5	
3.4	4.6	11.3		11.0	15.0	37.0	
6.4	4.0	10.1		21.0	13.0	33.0	
6.4	7.3	12.5		21.0	24.0	41.0	
4.6	0.9	12.5		15.0	3.0	41.0	
4.6	0.8	12.9		15.0	2.6	42.4	
0.2	5.0	14.5		0.5	16.5	47.5	
4.1	4.1	12.5		13.5	13.5	41.0	
4.9	0.9	16.0		16.0	3.0	52.4	
0.2	4.4	13.5		0.5	14.5	44.3	
7.0	4.7	13.0		23.0	15.5	42.5	
0.2	6.6	13.0		0.5	21.5	42.8	
4.9	5.9	11.4		16.0	19.5	37.5	
0.0	5.2	12.6		0.0	17.0	41.5	
0.0	8.5	13.1	3.8	0.0	28.0	43.0	12.5
5.2	4.7	12.8	4.1	17.2	15.3	42.0	13.5
5.6	7.6	12.8	3.3	18.5	25.0	42.1	10.9
3.7	5.8	12.6	4.0	12.0	19.0	41.5	13.0
5.3	6.3	11.4	2.6	17.3	20.7	37.5	8.5
8.5	4.3	13.1	4.3	28.0	14.0	43.0	14.0
4.6	5.5	12.0	2.9	15.0	18.0	39.5	9.5
6.1	4.5	12.5	1.8	20.1	14.9	41.0	6.0
5.5	8.8	12.0	3.4	18.0	29.0	39.3	11.0
8.5	2.1	11.9	1.5	28.0	7.0	39.0	5.0
4.3	6.2	13.1	2.3	14.0	20.5	43.0	7.5
6.1	9.4	11.4	1.8	20.0	31.0	37.5	6.0
8.5	3.0	11.5	1.9	28.0	10.0	37.8	6.2
5.8	4.6	13.4	2.6	19.0	15.0	44.0	8.5
4.0	6.6	13.6		13.0	21.5	44.7	
6.4	6.7	11.9	7.2	21.0	22.0	39.0	23.6
5.2	5.2	14.1		17.0	17.0	46.2	
8.1	6.6	13.4	3.4	26.5	21.5	44.0	11.0
13.3	2.8	9.2		43.6	9.2	30.2	
11.8	1.3	9.5		38.7	4.3	31.2	
10.1	0.0	12.8		33.1	0.0	42.0	
8.5	0.0	9.8		27.9	0.0	32.2	
5.4	0.0	9.8		17.7	0.0	32.2	
5.0	4.6	12.2		16.5	15.0	40.0	
2.4	4.6	13.1		8.0	15.0	43.0	
2.7	4.0	12.5		9.0	13.0	41.0	
3.8	2.1	12.2		12.5	7.0	40.0	
4.1	1.5	12.5		13.5	5.0	41.0	
4.1	1.8	12.2		13.5	6.0	40.0	
3.5	2.4	13.7		11.5	8.0	45.0	
3.5	2.4	13.4		11.5	8.0	44.0	
4.1	1.5	12.5		13.5	5.0	41.0	
4.4	1.8	13.7		14.5	6.0	45.0	
4.0	1.2	12.8		13.0	4.0	42.0	
2.3	0.0	10.4		7.5	0.0	34.0	
2.4	0.0	10.7		7.8	0.0	35.0	
2.1	0.0	8.5		7.0	0.0	28.0	
4.1	1.8	12.2		13.5	6.0	40.0	
3.0	0.0	12.0		10.0	0.0	39.5	
0.5	2.5			1.5	8.3		
0.7	5.2	12.6		2.2	17.0	41.3	
0.1	5.7			0.3	18.6		
3.1	1.8	13.4		10.1	5.9	44.0	
0.2	3.4	12.0		0.8	11.2	39.5	
10.1	2.0	11.7		33.0	6.5	38.4	
0.6	2.9	12.0		2.0	9.5	39.5	
1.9	3.9	13.2		6.3	12.7	43.3	
0.4	5.4	13.3		1.3	17.7	43.6	
0.0	5.4	12.6		0.1	17.8	41.5	
0.5	3.5	13.1		1.5	11.5	43.0	
0.1	5.4	13.7	6.1	0.4	17.6	45.0	20.0
0.4	5.6	13.9		1.2	18.5	45.5	
0.1	5.4	13.9		0.4	17.6	45.5	
0.0	0.0	11.4		0.0	0.0	37.5	
1.6	0.0	10.6		5.2	0.0	34.8	

Table 4-2: Description of Subsurface Materials - Highway 401 and Leslie Street Interchange  
Project Number: TRANETOB01245AA-AA

Project Number: TRANETB01245AA-AA		Description of Subsurface Materials (Right)		Remarks																										
Reference	Borehole Designations	Structure	Material	Stratigraphy General Descriptions	Relative Density or Consistency Descriptions	Water Content (%)		Atterberg Data						N Values (Blows/0.3 m)			Vane Data (psf)			Vane Data (kPa)			Bulk Unit Weight (pcf)		Bulk Unit Weight (kN/m³)		Sensitivity			
						Low	High	Plastic Limit (%)		Liquid Limit (%)		PI (%)		Low	High	Low	High	Avg.	Low	High	Avg.	Low	High	Low	High	Low	High			
								Low	High	Low	High	Low	High																	
							13							24	52								130	140	20.4	22.0				
Geocon, 1953	G1 to G 15 & G25	Approach Embankments	Fill	brown to olive brown till fill	compact to dense									8	47														upper material described as clayey silt to silty sand attempted to separate between units , sometimes as one	
Geocon, 1960	1 to 3	Approach Embankments	Fill											8	38															
DHO, 1964	B-1 to B-18	Collectors and Ramps	Clayey Silt	brown, trace to some sand, trace gravel and organics, to silty sanc																									organics noted below fill at some locations	
DHO & Golder 1965	201 to 211	WB Collectors	Fill	clayey silt some sand trace gravel										10	100															
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Fill	brown Sand and silt, some gravel, trace to some clay and organics	loose to dense	9	16	11	16	15	26	4	12	8	60															
MTO, 1990	1-1 to 1-5	WB Collectors	Fill	sandy silt, containing clayey silt and sand																										
					loose to compact		22							5	54								125	125	19.6	19.6				
Geocon, 1953	G1 to G 15 & G25	Approach Embankments	Sand	brown medium to fine sand, some gravel	compact									20	39															
Geocon, 1960	1 to 3	Approach Embankments	Sand	brown	loose									8	35															
DHO, 1964	B-1 to B-18	Collectors and Ramps	Silt and Fine Sand	brown changing to grey, organics at depth	loose to compact									23	29															
DHO & Golder 1965	201 to 211	WB Collectors	Silty fine sand	brown to brown grey, trace organics	compact to very dense									7	100															
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Silty fine sand to silt	brown to grey	compact to firm		10							15	35															
MTO, 1990	1-1 to 1-5	WB Collectors	Silty Sand																									4		
					firm to soft	14	45	9	22	18	51	9	30	1	14			600			29	104	128	16.3	20.1					
Geocon, 1953	G1 to G 15 & G25	Approach Embankments	Clay	grey, stratified clay some silt and sand layers, some gravel	firm	20	30		31		51		20	3	28			300			14	129	133	20.3	20.9					
Geocon, 1953	G1 to G 15 & G25	Approach Embankments	Clayey Till	clayey till grading to sandy till, similar to above unit	Soft to firm	19	63	15	27	29	69	14	42	5	8	210	1400	600	10	67	29	111	128	17.4	20.1		2	6		
Geocon, 1960	1 to 3	Approach Embankments	Clay Clayey Till	grey, layers of silt, sand, pebbles, sand seams	firm to stiff	22	35	12	19	22	26	7	10	4	38	300	1200		14	57								5		
DHO, 1964	B-1 to B-18	Collectors and Ramps	Silty Clay	grey, some fine sand, trace to some fine gravel	Soft to Firm	10	45	11	23	16	52	3	29		41			290	750		14	36								
DHO & Golder 1965	201 to 211	WB Collectors	Silty Clay	grey, trace fine sand occasional layers of sand and gravel	soft to stiff									3	39														appeared organics and sand near top of unit, started clayey silt below upper sand unit	
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Clayey Silt to Silty Clay	with some sand to sandy, trace gravel, trace boulder	firm to hard	10	37	10	20	14	50	1	30	5	39															
MTO, 1990	1-1 to 1-5	WB Collectors	Clayey Silt to Silty Clay	containing silty sand to sandy silt layers up to 3m thick, trace gravel, occasional boulder																										
					loose to very dense									3	100															
Geocon, 1953	G1 to G 15 & G25	Approach Embankments	Sandy Till	grey	very dense									100	100															
Geocon, 1960	1 to 3	Approach Embankments	Sandy Till	Grey	dense to very dense									32	100															
DHO, 1964	B-1 to B-18	Collectors and Ramps	Glacial Till	grey, heterogeneous mixture clayey silt, sand and trace of gravel	very loose to very dense	10	14	14	15	18	24	4	10	2	100															
DHO & Golder 1965	201 to 211	WB Collectors	Glacial Till	grey, heterogeneous mixture clayey silt, sand and trace of gravel, boulders	very dense									25	100															
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	Sandy silt, trace clay and gravel, cemented to clayey silt matrix and coarse sanc	hard																									
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	hard grey clayey silt some sand trace gravel	very dense																									
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	very dense grey silt some clay and sand, trace gravel	very dense																									
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	very dense grey sandy silt trace clay trace gravel	very dense																									
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	very dense grey sand and gravel some silt, trace clay	very dense																									
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Glacial Till	containing cohesive layers and boulders	very dense	7	16	11	15	16	31	2	16	33	100															
MTO, 1990	1-1 to 1-5	WB Collectors	Sandy Silt to Silty Sand Till											100	100															
DSIL, 1967	1A to 18A	Core between Leslie and tracks	Sand	Fine to medium sand, trace gravel, boulders and pockets of clay silt	very dense																									

Legend  
Geocon  
DHO  
Golder  
DSIL  
MTO

Geocon Ltd.  
Department of Highways Ontario  
H.Q. Golder and Associates Ltd.  
Dominion Soil Investigation limited  
Ministry of Transportation

Table 5-1 Foundation Elements - Highway 401 and Leslie Street Interchange  
 Project Number: TRANETO801245AA

Note: This table is prepared based on the available information at the time of preparing this report, details of the existing foundations need to be verified at the detail design phase.

Structure No.	Bent No.	Foundation Type	Depth (ft)	* Estimated	Diameter (in)	Base Diameter ** Estimated based on table no as-builts	Depth (m)	Diameter (mm)	Base Diameter (mm)	Battered	Legend and Notes: Signifies event took place Hot Clear indicates data either not available or could not be read drawing.		Notes
37-206/1  HWY 401 over pass at Leslie EBL Collectors (16 Spans)	418	12BP53 H-Pile	15.0	*			45.7			1 to 3			
	418	12BP53 H-Pile	88	*			26.8						
	419	Concrete Caisson	n/a	n/a	36		n/a			1 to 6			working load 250 Ton/Caisson
	420	12BP53 H-Pile	n/a	n/a			n/a			1 to 6			design load 60 Ton/pile
	421	12BP53 H-Pile	n/a	n/a			n/a			1 to 6			design load 60 Ton/pile
	422	Concrete Caisson	n/a	n/a	36								working load 250 Ton/Caisson
	423	Concrete Caisson	n/a	n/a	36								working load 250 Ton/Caisson
	424	Concrete Caisson#1	81	n/a	30	42	24.7	762	1067				working load 250 Ton/Caisson
	424	Concrete Caisson#2	78	n/a	30	42	23.8	762	1067				working load 250 Ton/Caisson
	424-3	12BP53 H-Pile											caisson blow out/Replaced by H-Pile 60 Ton/Pile
	425	Concrete Caisson#1	82		30	42	25.0	762	1067				working load 250 Ton/Caisson
	425	Concrete Caisson#2	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	425	Concrete Caisson#3	78		30	42	23.8	762	1067				working load 250 Ton/Caisson
	426	Concrete Caisson#1	81		30	42	24.7	762	1067				working load 250 Ton/Caisson
	426	Concrete Caisson#2	78		30	42	23.8	762	1067				working load 250 Ton/Caisson
416-3	427	12BP53 H-Pile											caisson blow out/Replaced by H-Pile 60 Ton/Pile
	427	Concrete Caisson#1	77		30	42	23.5	762	1067				working load 250 Ton/Caisson
	427	Concrete Caisson#2	77		30	42	23.8	762	1067				working load 250 Ton/Caisson
	427	Concrete Caisson#3	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	428	Concrete Caisson#1	79		30	42	24.1	762	1067				working load 250 Ton/Caisson
	428	Concrete Caisson#2	78		30	42	23.8	762	1067				working load 250 Ton/Caisson
	428	Concrete Caisson#3	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	429	Concrete Caisson#1	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	429	Concrete Caisson#2	77		30	42	23.5	762	1067				working load 250 Ton/Caisson
	429	Concrete Caisson#3	76		30	42	21.3	762	1067				working load 250 Ton/Caisson
	430	Concrete Caisson#1	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	430	Concrete Caisson#2	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	430	Concrete Caisson#3	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	430	Concrete Caisson#4	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
	430	Concrete Caisson#5	76		30	42	23.2	762	1067				working load 250 Ton/Caisson
434	431	12BP53 H-Pile	65	*			19.8			1 to 6			
	431	12BP53 H-Pile	65	*			19.8			1 to 6			
	433	12BP53 H-Pile	70	*			21.3			1 to 6			
	434	12BP53 H-Pile	80	*			24.4			1 to 3			



Table 5-1  
Project Number: Foundation Elements - Highway 401 and Leslie Street Interchange  
TRANET001245AA  
Note: This table is prepared based on the available information at the time of preparing this report, details of the existing foundations need to be verified at the detail design phase.

Structure No.	Bent No.	Foundation Type	Depth	* Estimated	Diameter	Base Diameter ** Estimated based on table no as-bults	Depth	Diameter		Base Diameter	Battered	Notes
								(ft)	(in)			
37-206/2 Hwy 401 over pass at Leslie St. WVI Collectors (13 Spans)	101	12BP53 H-Pile	54	*	30	36	16.5			914	1 to 3	Note data based on interpretation of drawings and/or tables. No as-built construction records were located.
	102	Concrete Caisson	50	*	30	36	15.2	762	914			
	103	Concrete Caisson	50	*	30	36	15.2	762	914			
	104	Concrete Caisson	51	*	30	36	15.2	762	914			
	105	Concrete Caisson	52.5	*	30	36	16.0	762	914			
	106	Concrete Caisson	63	*	30	36	19.2	762	914			
	107	Concrete Caisson	69	*	30	36	21.0	762	914			
	108	Concrete Caisson	74	*	30	36	22.6	762	914			
	109	Concrete Caisson	72	*	30	36	21.9	762	914			
	110	Concrete Caisson	67	*	30	36	20.4	762	914			
	111	Concrete Caisson	87	*	30	36	26.5	762	914			
	112	Concrete Caisson	80.5	*	30	36	24.5	762	914			
	113	Concrete Caisson	70.5	*	30	36	21.5	762	914	embankment failure north of the bent/working load 200 Ton/caisson		
	114	Concrete Caisson	70.5	*	30	36	21.5	762	914	embankment failure north of the bent/working load 200 Ton/caisson		
115	Concrete Caisson	72	*	30	36	21.9	762	914	embankment failure north of the bent/working load 200 Ton/caisson			
116	Concrete Caisson	72	*	30	36	21.9	762	914	embankment failure north of the bent/working load 200 Ton/caisson			
117	Concrete Caisson	74	*	30	36	22.6	762	914	embankment failure north of the bent/working load 200 Ton/caisson			
118	Concrete Caisson	80	*	30	36	24.4	762	914	embankment failure north of the bent/working load 200 Ton/caisson			
119	Concrete Caisson	n/a	n/a						design load 60 ton/pile			
120	12BP53 H-Pile	n/a	n/a							working load 250 Ton/caisson		
121	Concrete Caisson	n/a	n/a	n/a	30	36	21.5	762	914	settlement problem, caisson replaced with 6 new tube piles of 220 mm diameter, also replaced the Pier		
122	Concrete Caisson	77	*	30	36	23.5	762	914	working load 250 Ton/caisson			
123	Concrete Caisson	76	*	30	36	23.5	762	914	working load 250 Ton/caisson			
124	Concrete Caisson	77	*	30	36	23.8	762	914	settlement problem, caisson replaced with 6 new tube piles of 220 mm diameter, also replaced the Pier			
125	Concrete Caisson	77	*	30	36	23.8	762	914	working load 250 Ton/caisson			
126	Concrete Caisson	78	*	30	36	23.8	762	914	working load 250 Ton/caisson			
127	Concrete Caisson	77	*	30	36	23.8	762	914	working load 250 Ton/caisson			
128	Concrete Caisson	78	*	30	36	23.8	762	914	working load 250 Ton/caisson			
129	Concrete Caisson	78	*	30	36	23.8	762	914	working load 250 Ton/caisson			
130	Concrete Caisson	78	*	30	36	23.8	762	914	working load 250 Ton/caisson			
131	12BP53 H-Pile	64	*				19.5				1 to 6	
132	12BP53 H-Pile	64	*				19.5				1 to 6	
133	12BP53 H-Pile	64	*				19.5				1 to 6	
134	12BP53 H-Pile	78	*				23.8				1 to 3	

Table 5-1  
Project Number: Foundation Elements - Highway 401 and Leslie Street Interchange  
TRANET0801245AA

Note: This table is prepared based on the available information at the time of preparing this report, details of the existing foundations need to be verified at the detail design phase.

Structure No.	Bent No.	Foundation Type	Depth (ft)	* Estimated	Diameter (in)	Base Diameter ** Estimated based on table no as-built	Depth (m)	Diameter (mm)	Base Diameter (mm)	Battered	Legend and Notes Significant event total place Not Clear indicates data either not available or could not be read drawing.	Notes
37-206/3	318	12BP53 H-Pile										
Hwy 401 over pass at Leslie St.	319	Not Clear										
EBL Express	320	Not Clear										
(16 Spans)	321	Not Clear										
	322	Not Clear										
	323	Not Clear										
	324	12BP53 H-Pile	78	*	30	42	23.8	762	1067	Not Clear		Previously recognized as caisson, H pile design load 60 Ton
	325	Concrete Caisson#1	85		30	42	25.9	762	1067			Working load 250 Ton/caisson
	325	Concrete Caisson#2	98		30	42	29.5	762	1067			Working load 250 Ton/caisson
	325	Concrete Caisson#3	98		30	42	29.5	762	1067			Working load 250 Ton/caisson
	326	Concrete Caisson#1	82		30	42	25.9	762	1067			Working load 250 Ton/caisson
	326	Concrete Caisson#2	81		30	42	24.7	762	1067			Working load 250 Ton/caisson
	326	Concrete Caisson#3	81		30	42	24.7	762	1067			Working load 250 Ton/caisson
	327	Concrete Caisson#1	82		30	42	25.9	762	1067			Working load 250 Ton/caisson
	327	Concrete Caisson#2	92		30	42	28.6	762	1067			Working load 250 Ton/caisson
	327	Concrete Caisson#3	92		30	42	28.6	762	1067			Working load 250 Ton/caisson
	328	Concrete Caisson#1	79		30	42	24.1	762	1067			Working load 250 Ton/caisson
	328	Concrete Caisson#2	91		30	42	27.2	762	1067			Working load 250 Ton/caisson
	328	Concrete Caisson#3	91		30	42	27.2	762	1067			Working load 250 Ton/caisson
	329	Concrete Caisson#1	77		30	42	23.5	762	1067			Working load 250 Ton/caisson
	329	Concrete Caisson#2	89		30	42	27.1	762	1067			Working load 250 Ton/caisson
	329	Concrete Caisson#3	89		30	42	27.1	762	1067			Working load 250 Ton/caisson
	330	Concrete Caisson#1	80		30	42	24.4	762	1067			Working load 250 Ton/caisson
	330	Concrete Caisson#2	91		30	42	27.7	762	1067			Working load 250 Ton/caisson
	330	Concrete Caisson#3	91		30	42	27.7	762	1067			Working load 250 Ton/caisson
	331	Concrete Caisson#1	64	*			19.5			1 to 6		
	331	12BP53 H-Pile	64	*			19.5			1 to 6		
	332	12BP53 H-Pile	64	*			19.5			1 to 6		
	333	12BP53 H-Pile	78	*			23.8			1 to 3		
	334	12BP53 H-Pile	78	*			23.8			1 to 3		

Table 5-1  
Project Number: Foundation Elements - Highway 401 and Leslie Street Interchange  
TRANETO801245AA  
Note: This table is prepared based on the available information at the time of preparing this report, details of the existing foundations need to be verified at the detail design phase.

Structure No.	Bent No.	Foundation Type	Depth	* Estimated	Diameter	Base Diameter ** Estimated based on table no as-builts	Depth	Diameter	Base Diameter	Battered	Legend and Notes		Notes
											(ft)	(in)	
37-206/4 HWY 401 over pass at Leslie St. WILL Express (16 Spans)	218	Not clear	Installed to surficial sand									Signifies event took place	
	219	128P53 H-Pile	installed to v dense till									Not Clear indicates data either not available or could not be read drawing.	
	220	128P53 H-Pile	installed to v dense till									Note data based on interpretation of drawings and/or tables. No as-built construction records were located.	
	221	128P53 H-Pile	installed to v dense till									Embankment failure north of the bent, pile tip at surficial sand deposit	
	222	128P53 H-Pile	installed to v dense till									Replaced the Pier	
	223	128P53 H-Pile	installed to v dense till										
	224	128P53 H-Pile	Installed to surficial sand										
	225	Concrete Caisson#1	84		30	42	25.6	762	1067	not clear		Previously recognized as caisson. H pile design load 60 Ton	
	226	Concrete Caisson#2	84		30	42	25.6	762	1067			working load 250 Ton/caisson	
	227	Concrete Caisson#3	84		30	42	25.6	762	1067			working load 250 Ton/caisson	
	228	Concrete Caisson#1	78		30	42	23.8	762	1067			working load 250 Ton/caisson	
	229	Concrete Caisson#2	78		30	42	23.8	762	1067			working load 250 Ton/caisson	
	230	Concrete Caisson#3	82		30	42	25.0	762	1067			working load 250 Ton/caisson	
	231	Concrete Caisson#1	77		30	42	23.3	762	1067			working load 250 Ton/caisson	
	232	Concrete Caisson#2	77		30	42	23.3	762	1067			working load 250 Ton/caisson	
	233	Concrete Caisson#3	82		30	42	25.0	762	1067			working load 250 Ton/caisson	
	234	Concrete Caisson#1	74		30	42	22.8	762	1067			working load 250 Ton/caisson	
	235	Concrete Caisson#2	74		30	42	22.8	762	1067			working load 250 Ton/caisson	
	236	Concrete Caisson#3	79		30	42	24.1	762	1067			working load 250 Ton/caisson	
	237	Concrete Caisson#1	76		30	42	23.2	762	1067			working load 250 Ton/caisson	
	238	Concrete Caisson#2	77		30	42	23.5	762	1067			working load 250 Ton/caisson	
	239	Concrete Caisson#3	75		30	42	22.9	762	1067			working load 250 Ton/caisson	
	240	Concrete Caisson#1	75		30	42	22.9	762	1067			working load 250 Ton/caisson	
	241	Concrete Caisson#2	80		30	42	24.4	762	1067			working load 250 Ton/caisson	
	242	Concrete Caisson#3	80		30	42	24.4	762	1067			working load 250 Ton/caisson	
	243	128P53 H-Pile	64	*			19.5			1 to 6			
	244	128P53 H-Pile	64	*			19.5			1 to 6			
	245	128P53 H-Pile	64	*			19.5			1 to 6			
	246	128P53 H-Pile	64	*			19.5			1 to 6			
	247	128P53 H-Pile	78	*			23.8			1 to 3			

Table 5-1 Foundation Elements - Highway 401 and Leslie Street Interchange  
 Project Number: TRANET0801245AA  
 Note: This table is prepared based on the available information at the time of preparing this report, details of the existing foundations need to be verified at the detail design phase.

Structure No.	Bent No.	Foundation Type	* Estimated		Diameter	Base Diameter ** Estimated based on table no as-builts	Depth	Diameter	Depth	Diameter	Base Diameter	Battered	Legend and Notes	Notes				
			(ft)	(m)											(in)	(mm)	(in)	(mm)
37-206/5 Hwy 401 over pass at Leslie St. RAMP W-N/S (6 Spans)	618	12BP53 H-Pile	90	27.4								1 to 3	Note data based on interpretation of drawings and/or tables. No as-built construction records were located. one pile went to 45 m depth during the installation working load 250 Ton/caisson					
	619	Concrete Caisson	85	25.9	30	42			762	1067	1 to 6							
	620	12BP53 H-Pile	60	18.3							1 to 6							
	621	12BP53 H-Pile	56	17.1					762	1067	1 to 6							
	622	Concrete Caisson	77	23.5	30	42			762	1067	1 to 6							
	623	Concrete Caisson	77	23.5	30	42			762	1067	1 to 6							
37-206/6 Hwy 401 over pass at Leslie St. RAMP N-E (2 Spans)	728	12BP53 H-Pile	84	25.6								1 to 3	working load 250 Ton/caisson working load 250 Ton/caisson working load 250 Ton/caisson					
	729	Concrete Caisson#1	75	22.9	30	42			762	1067								
	729	Concrete Caisson#2	75	22.9	30	42			762	1067								
37-206/7 Hwy 401 over pass at Leslie St. RAMP N-W (6 Spans)	518	Concrete Caisson	74	22.6	30	36			762	914			working load 250 Ton/caisson working load 250 Ton/caisson working load 250 Ton/caisson working load 250 Ton/caisson					
	519	Concrete Caisson	72.5	22.1	30	36			762	914	1 to 6							
	520	12BP53 H-Pile									1 to 6							
	521	12BP53 H-Pile																
	522	Concrete Caisson																
	523	Not Clear																
	524	12BP53 H-Pile	83	26.8									working load 250 Ton/caisson					

Table 5-2: Review of Geotechnical Events

Year	Area Based on Bent Numbers (Structure number, description)	Geotechnical Events	Remedial Measures
1953	113 to 120 (37-206/2, West bound lanes- collectors and 37-206/7, Ramp N-W)	Failure of West and East Approaches when embankment heights were constructed to heights greater than 9.8 and 9.1 m, respectively.	Flatten the side slopes to 2H:1V, add buttresses and found the structure on piles.
1965	418 & 618 (37-206/1, East bound lanes- collectors and 37-206/5, Ramp W-N/S)	Piles deeper than anticipated.	Piles advanced to 46 m, when typically 27 m long.
1966	424-3 & 426-3 (37-206/1, East bound lanes- collectors)	Blow-out of caissons during construction.	Drilled additional boreholes and replaced caissons with H Piles. Suggested increasing the base width of the caissons and raising the founding elevation.
1973	115, 123 & 126 (37-206/2, West bound lanes- collectors)	Overstressing of beams noted and settlement of caissons at 123 and 126.	Underpinning and re-construction of beams at 123 and 126. Caissons replaced with 220 mm diameter, 30 MPa concrete in filled steel tube piles. Piles approximately 22 m long. ULS 825 kN/pile (93 ton/pile).
1990	101 & 524 (37-206/2, West bound lanes- collectors and 37-206/7, Ramp N-W)	Movement of wall noted, during construction.	Use of light weight (i.e. slag) backfill at abutments.

\*Bent numbers are shown on the Drawing 5522-1 in Appendix C.



## Figures



Photograph 1 Typical erosion noted below West Collector Lanes.



Photograph 2 Looking west along slope, to the north of West Collector Lanes.



Photograph 3 View of west abutment of East Collector Lanes.



Photograph 4 Looking north at concrete paved slope to the west of Leslie Street.




Photograph 5 North end of concrete paved slope, east of Leslie Street. Note displacement of concrete and evidence of migration of fines at toe.



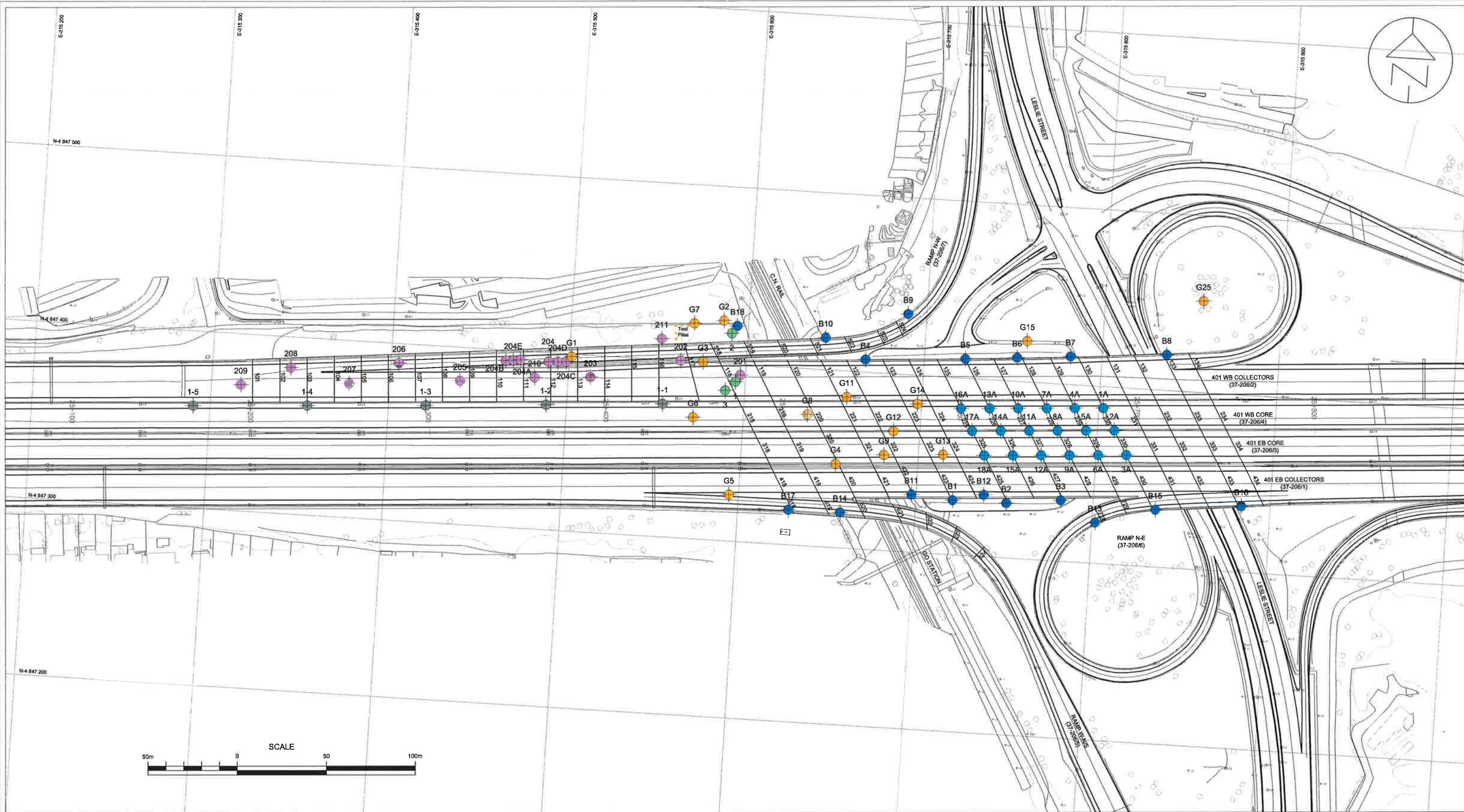
Photograph 6 View looking west, north end of Bent 126 through 123. Note difference in beam depths where repairs have been made.

Notes:  
1 This figure to be read in conjunction with accompanying report.

drawn	RDP	 SPECIALISTS MANAGING THE EARTH	client:	Delcan Corporation
approved	ZO		project:	Foundation Engineering Assessment
date	3/03/10		title:	Highway 401 and Leslie Street Interchange Photographs
scale	NTS		project no:	TRANETO01245AA-AA
original	11x17		figure no:	6-1

**Drawings**





LEGEND

- Borehole (Ministry of Transportation, 1990)
- Borehole (Department of Highways Ontario, 1965 and Golder, 1962)
- Borehole (Department of Highways Ontario, 1969)
- Borehole (Gecocon Ltd., 1960)
- Borehole (Dominion Soil Investigation Limited/Department of Highways Ontario, 1957)
- Borehole (The Foundation Company of Canada/Gecocon, 1953)
- Bent Number (TYP)

NOTES

1. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.
2. Base plan provided by Delcan.

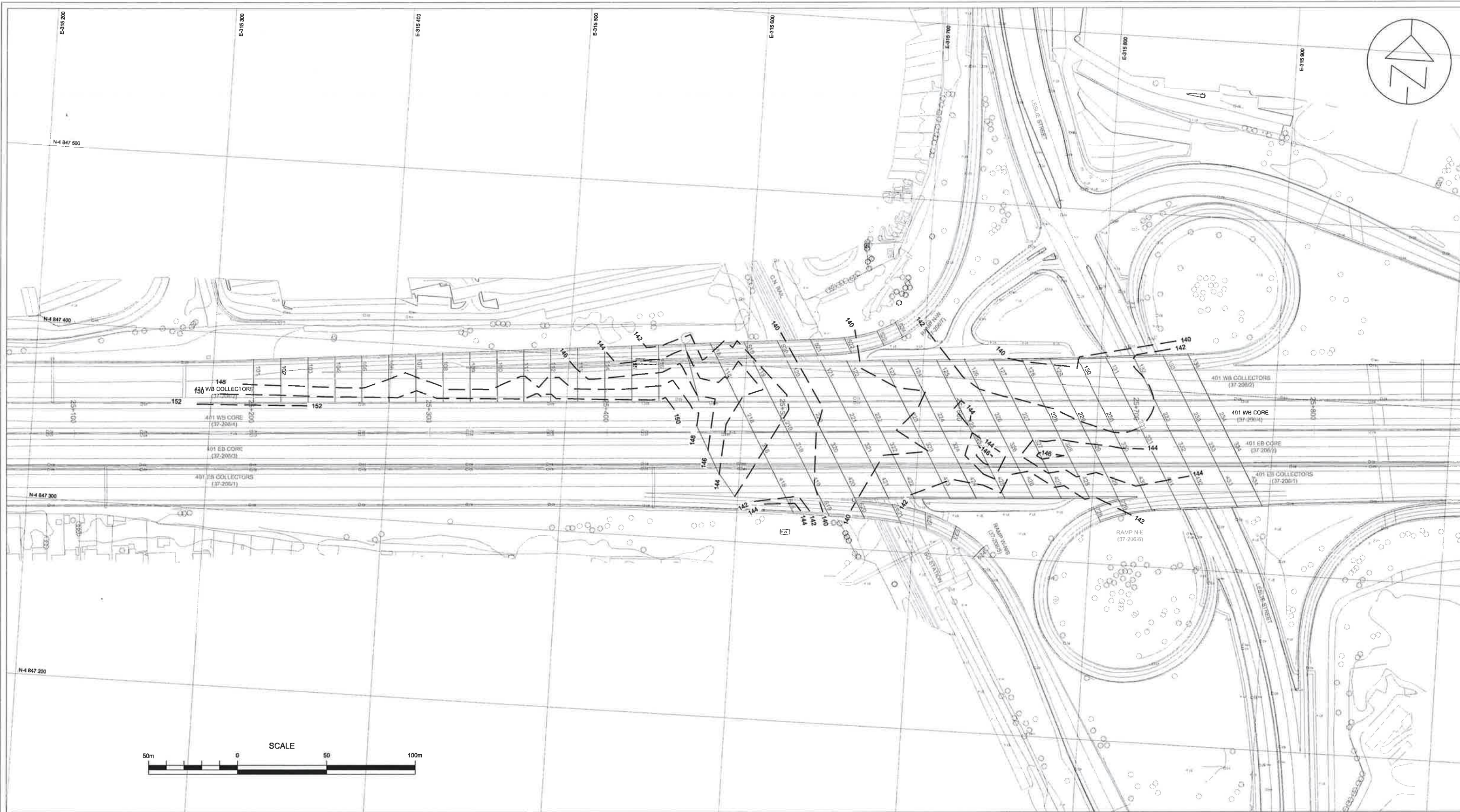
drawn	PHK
approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid



geotechnics  
SPECIALISTS MANAGING THE EARTH

client:	DELCAN CORPORATION
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO
title:	SITE AND BOREHOLE LOCATION PLAN
project no:	TRANETOB01245AA-AA
drawing no:	1





**LEGEND**  
— 140 —  
Estimated Topography  
(Elevation in metres)

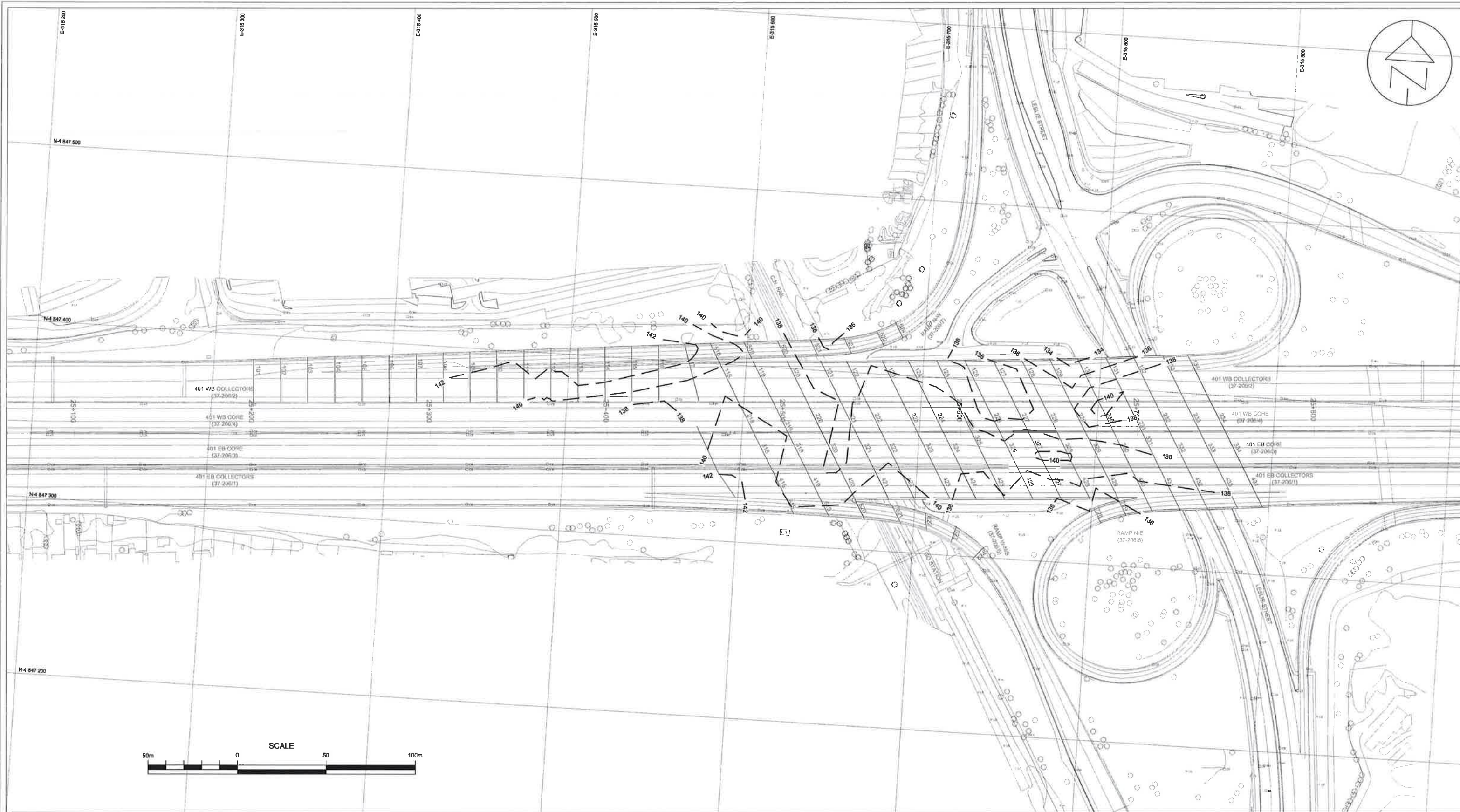
**NOTES**  
1. The topography has been interpreted from historic borehole data completed at the site by others. Between boreholes the topography was assumed from geological evidence. The topography between boreholes may vary from that shown.  
2. For strata details see borehole logs appended to this report.  
3. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.  
4. Base plan provided by Delcan.  
5. Dimensions are in metres unless otherwise noted.

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approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid



client:	DELCAN CORPORATION	
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO	
title:	ESTIMATED SURFACE TOPOGRAPHY BASED ON HISTORIC BOREHOLES	
project no:	TRANETO01245AA-AA	drawing no: 2





**LEGEND**

— 140 — Estimated Topography (Elevation in metres)

**NOTES**

1. The topography has been interpreted from historic borehole data completed at the site by others. Between boreholes the topography was assumed from geological evidence. The topography between boreholes may vary from that shown.

2. For strata details see borehole logs appended to this report.

3. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.

4. Base plan provided by Delcan.

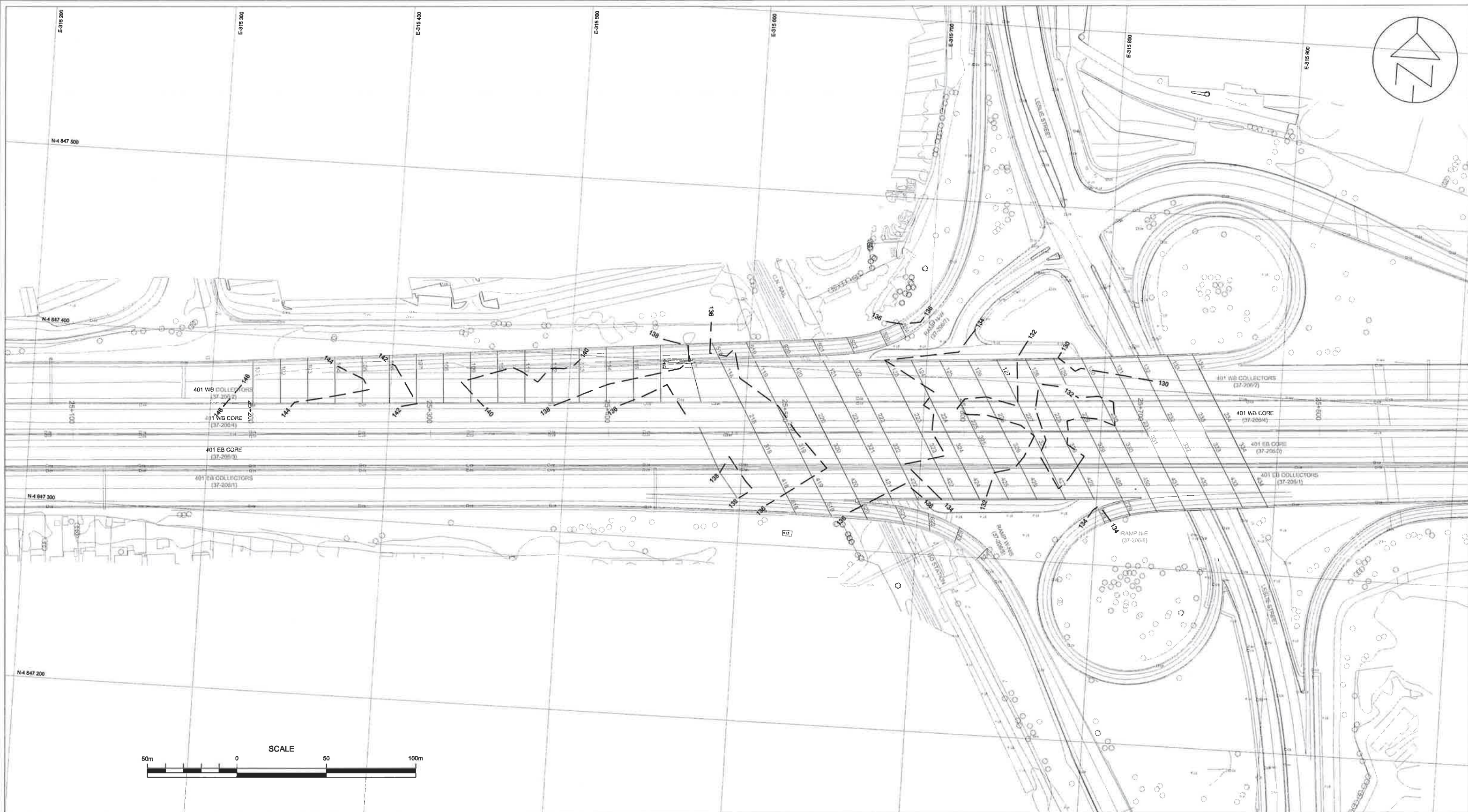
5. Dimensions are in metres unless otherwise noted.

drawn	PHK
approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid



client:	DELCAN CORPORATION	
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO	
title:	ESTIMATED TOP OF SILTY SAND TOPOGRAPHY	
project no:	TRANETO01245AA-AA	drawing no: 3





**LEGEND**  
— 140 — Estimated Topography  
(Elevation in metres)

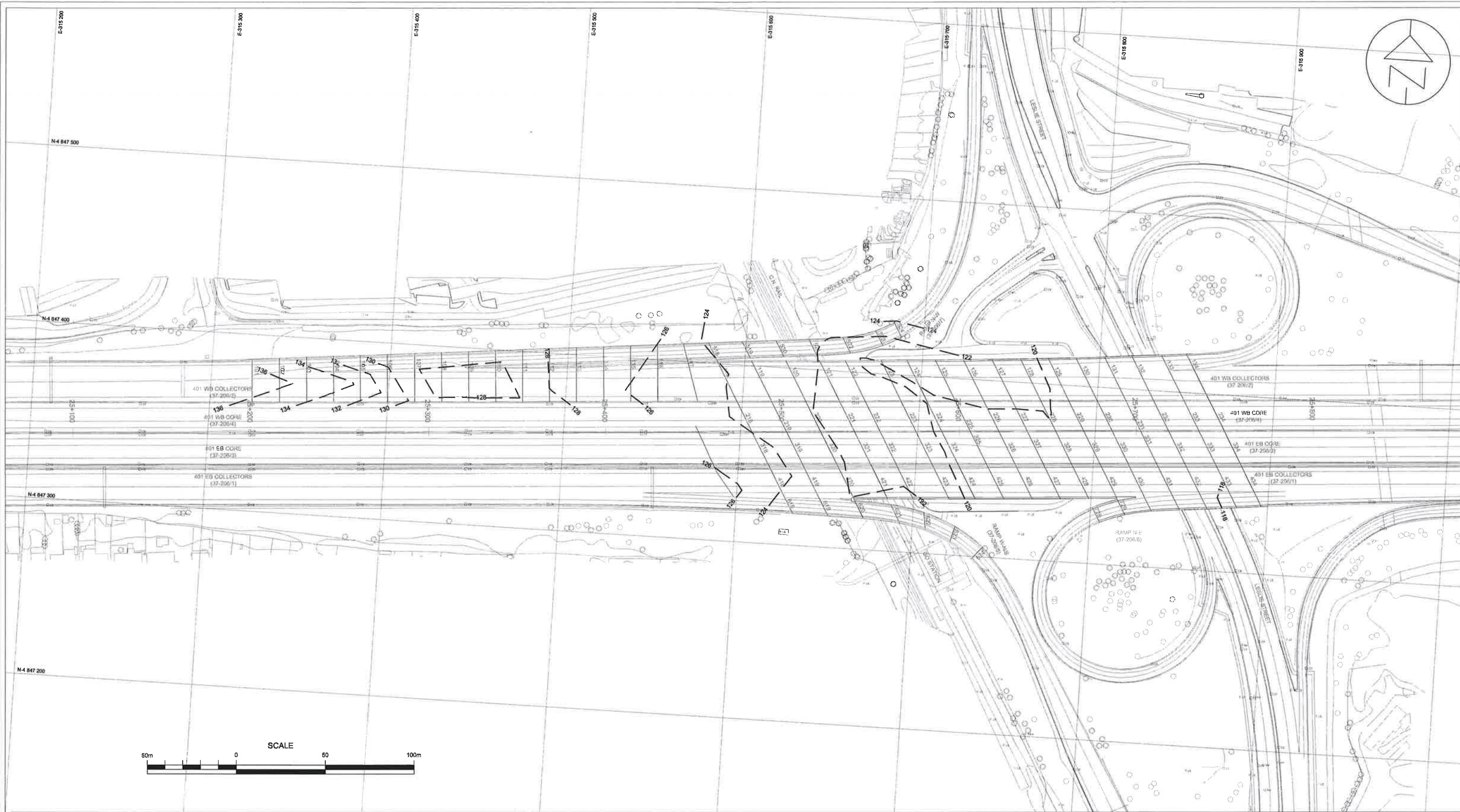
**NOTES**  
1. The topography has been interpreted from historic borehole data completed at the site by others. Between boreholes the topography was assumed from geological evidence. The topography between boreholes may vary from that shown.  
2. For strata details see borehole logs appended to this report.  
3. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.  
4. Base plan provided by Delcan.  
5. Dimensions are in metres unless otherwise noted.

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approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid

**coffey**  **geotechnics**  
SPECIALISTS MANAGING THE EARTH

client:	DELCAN CORPORATION	
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO	
title:	ESTIMATED TOP OF SILTY CLAY TOPOGRAPHY	
project no:	TRANETO01245AA-AA	drawing no: 4





LEGEND

— 140 — —  
Estimated Topography  
(Elevation in metres)

NOTES

1. The topography has been interpreted from historic borehole data completed at the site by others. Between boreholes the topography was assumed from geological evidence. The topography between boreholes may vary from that shown.
2. For strata details see borehole logs appended to this report.
3. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.
4. Base plan provided by Delcan.
5. Dimensions are in metres unless otherwise noted.

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approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid

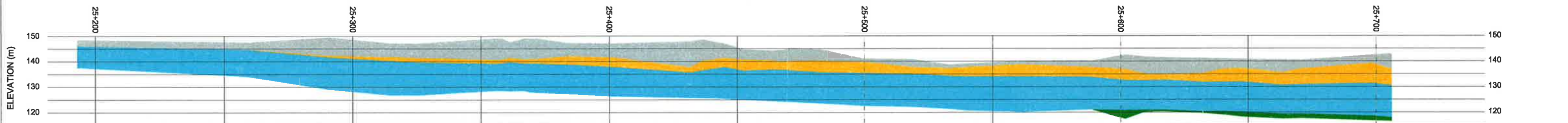
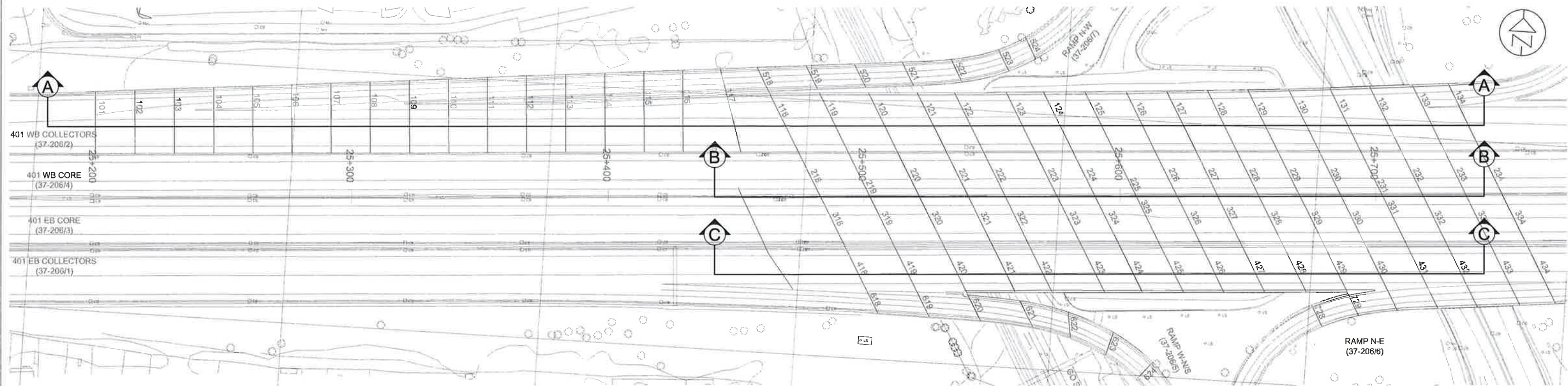
**coffey**  **geotechnics**  
SPECIALISTS MANAGING THE EARTH

client:	DELCAN CORPORATION	
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO	
title:	ESTIMATED TOP OF GLACIAL TILL TOPOGRAPHY	
project no:	TRANETO01245AA-AA	drawing no: 5





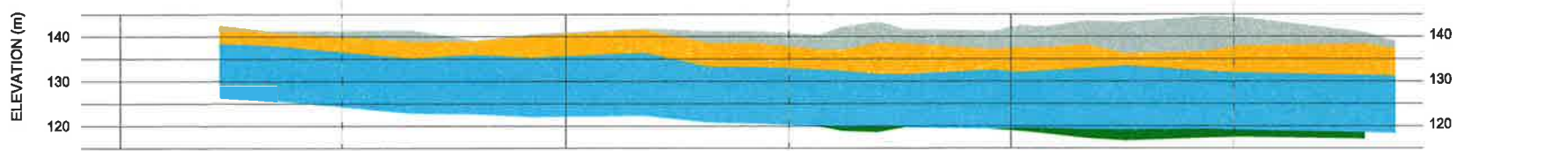
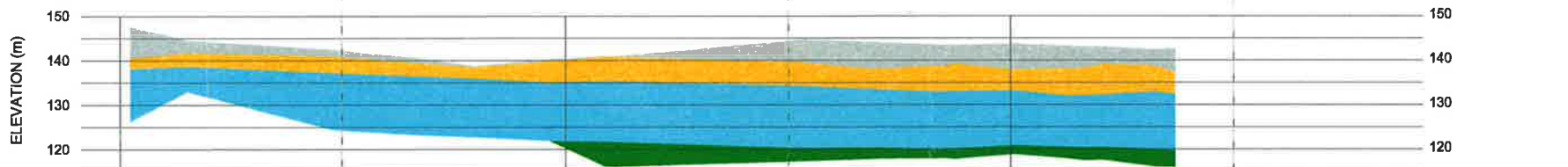




PROFILE A-A  
WEST BOUND COLLECTORS  
HORIZONTAL SCALE  
25m 0 25 50m

PROFILE B-B  
CENTRELINE OF CORE  
HORIZONTAL SCALE  
25m 0 25 50m

PROFILE C-C  
EAST BOUND COLLECTORS  
HORIZONTAL SCALE  
25m 0 25 50m



LEGEND	
	Fill / Clayey Silt
	Silty Sand
	Silty Clay
	Glacial Till

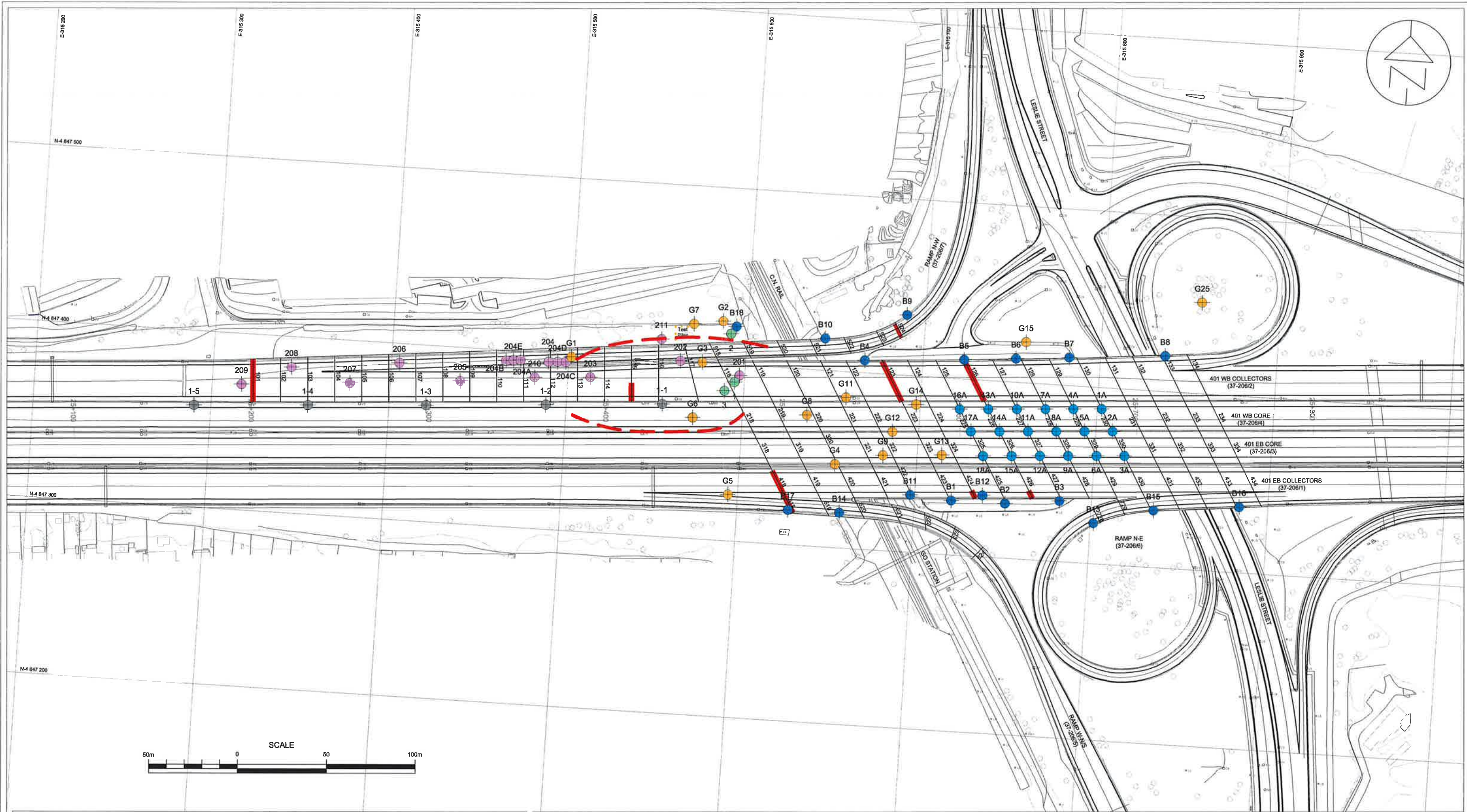
- NOTES
1. The topography has been interpreted from historic borehole data completed at the site by others. Between boreholes the topography was assumed from geological evidence. The topography between boreholes may vary from that shown.
  2. For strata details see borehole logs appended to this report.
  3. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.
  4. Base plan provided by Delcan.
  5. Dimensions are in metres unless otherwise noted.

drawn	PHK
approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid



client:	DELCAN CORPORATION	
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO	
title:	ESTIMATED SUBSURFACE PROFILES	
project no:	TRANETO01245AA-AA	drawing no: 7





LEGEND

- Borehole (Ministry of Transportation, 1990)
- Borehole (Department of Highways Ontario, 1965 and Golder, 1962)
- Borehole (Department of Highways Ontario, 1964)
- Borehole (Gecocon Ltd., 1960)
- Borehole (Dominion Soil Investigation Limited/Department of Highways Ontario, 1967)
- Borehole (The Foundation Company of Canada/Gecocon, 1953)
- Geotechnical Events

NOTES

1. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.
2. Base plan provided by Delcan.

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approved	RDP
date	Mar. 10, 2010
scale	As Shown
original size	Tabloid



client:	DELCAN CORPORATION		
project:	FOUNDATION ENGINEERING ASSESSMENT HIGHWAY 401 AND LESLIE STREET INTERCHANGE TORONTO, ONTARIO		
title:	LOCATION OF PAST GEOTECHNICAL EVENTS		
project no:	TRANETOB01245AA-AA	drawing no:	8

# Appendix A

## **Previous Geotechnical Studies**

C7142

REPORT

TO

ONTARIO DEPARTMENT OF HIGHWAYS

ON

SOIL CONDITIONS

C.N.F. & LESLIE ST. OVERPASS

TORONTO, ONTARIO

**Distribution -**

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September 30th, 1953

THE **FOUNDATION** COMPANIES  
CANADA



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REPORT

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TO

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ONTARIO DEPARTMENT OF HIGHWAYS

ON

SOIL CONDITIONS

C.N.R. & LESLIE ST. OVERPASS

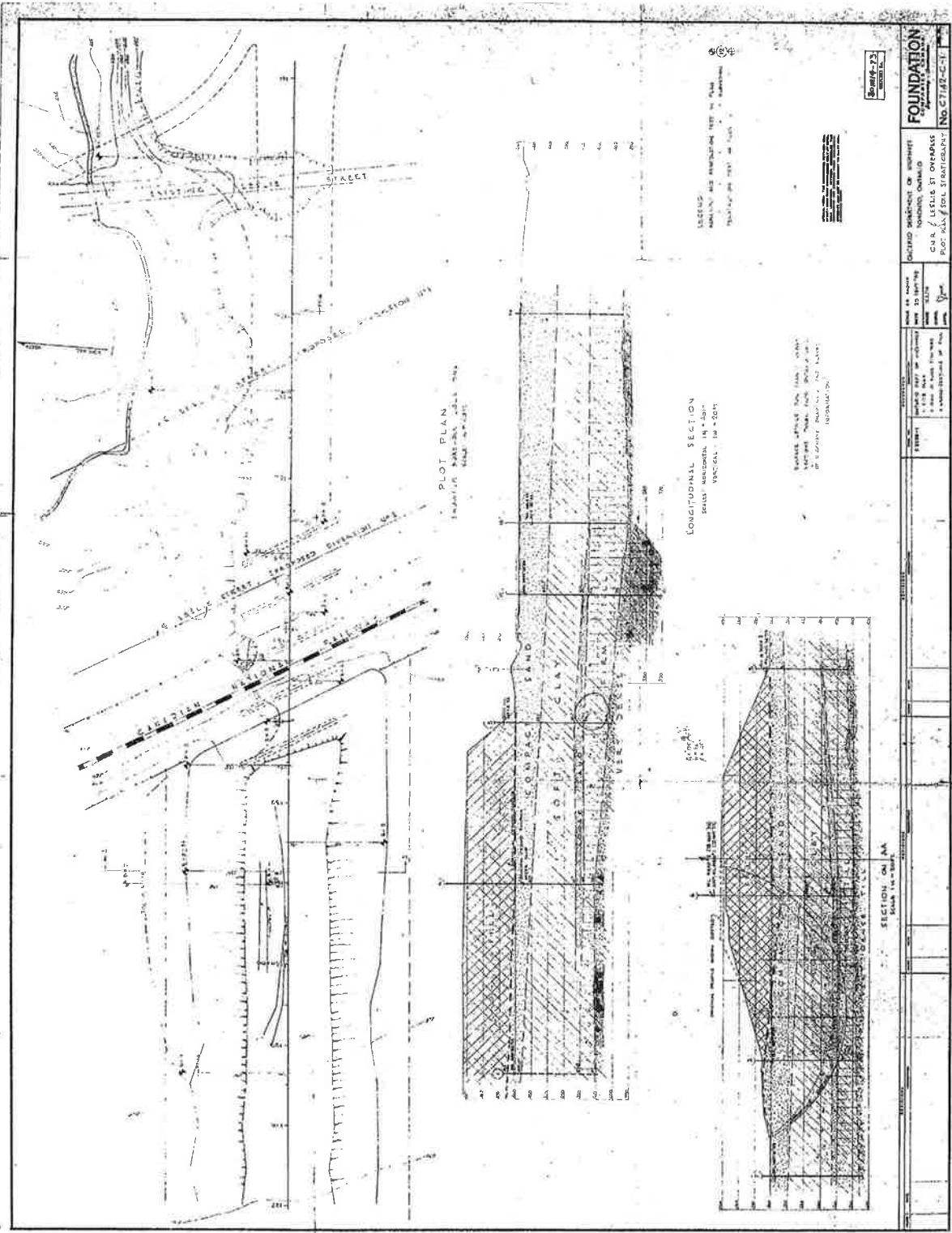
TORONTO, ONTARIO

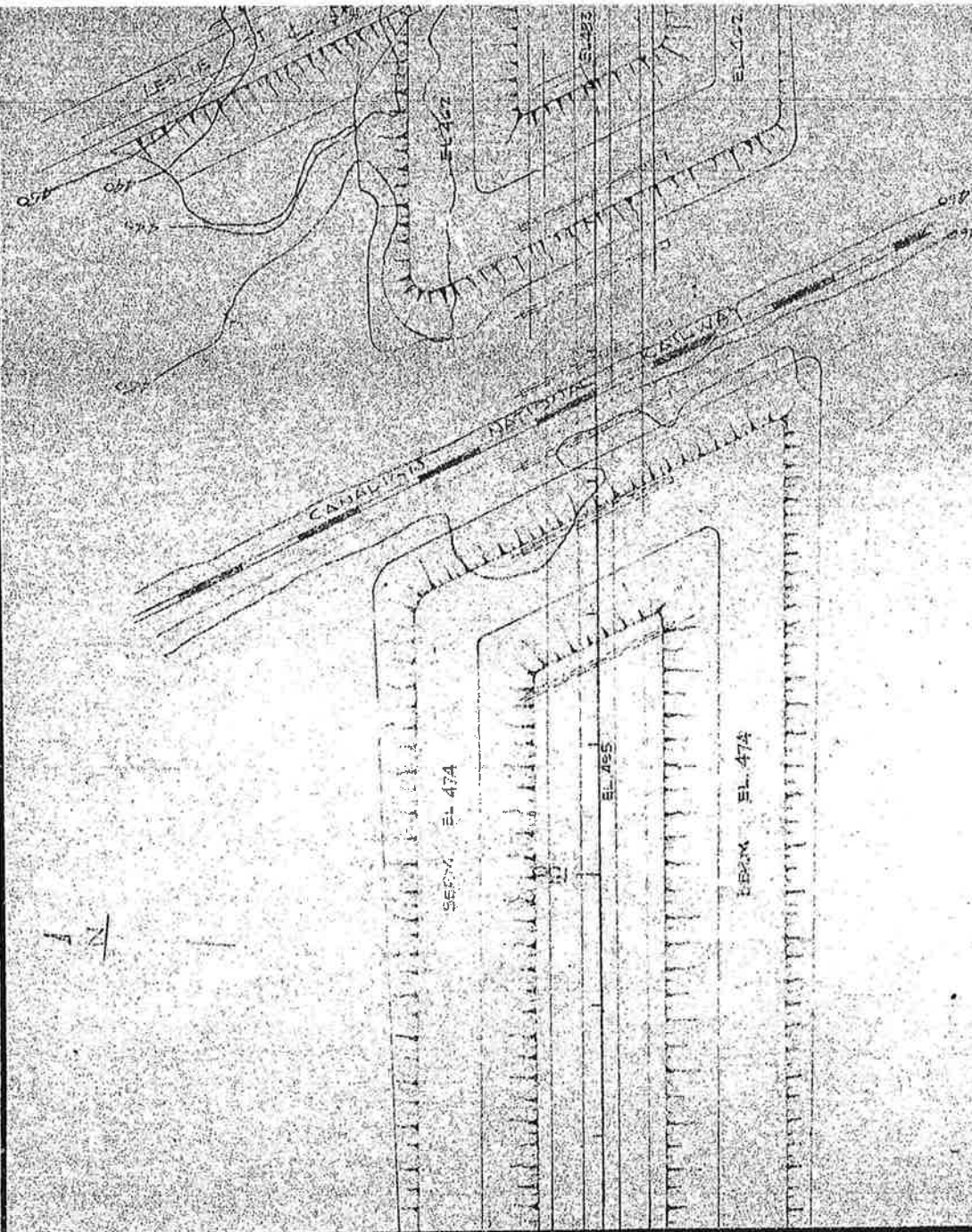
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September 30th, 1953

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# OFFICE REPORT ON SOIL EXPLORATION

30M14-73

**GEOCRES No.**

DRILL RIG. MACHILE JOB 2792 BORING # 1  
CASING 4" B.X. (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM BEADSTIC DATE REPORT SEP. 24/58  
SAMPLER HAMMER WT. 320 DROP 12 1/2 INCHES COMPILED BY J.G.G. CHECKED BY J.H. BORING DATE 11 AUG 58

### SAMPLE CONDITION

**DISTURBED  
FAIR  
GOOD  
LOST**

## SAMPLE TYPES

C. S. - CHUCK  
D. O. - DRIVE-OPEN  
D. F. - DRIVE-FOOT VALVE  
D. P. - DRIVE PISTON  
T. O. - THIN WALLED OPEN  
T. P. - THIN WALLED PISTON

F. S. - FOIL SAMPLE  
B. A. - BARREL AUGER  
S. A. - SPIRAL AUGER  
W. S. - WASHED SAMPLE  
R. C. - ROCK CORE

## ABBREVIATIONS

V. -IN-SITU VANE SHEAR TEST      7. -UNIT WEIGHT  
M. -MECHANICAL ANALYSIS      K. -PERMEABILITY  
U. -UNCONFINED COMPRESSION      C. -CONSOLIDATION  
QC. -TRIAxIAL CONSOLIDATED QUICK      CA. -CASING  
Q. -TRIAxIAL QUICK      WL. -WATER LEVEL IN CASING  
S. -TRIAxIAL SLOW      WT. -WATER TABLE IN SOIL

### SOIL PROFILE

[illegible]

THE FOUNDATION COMPANIES  
CANADA

## OFFICE REPORT ON SOIL EXPLORATION

30M14-93

GEOCRES No.

DRILL RIG. SHAC JOB 0714 PEN. TEST 1A  
CASING STANDARD SAMPLERS TO FIT UNLESS NOTED DATUM GROUND DATE REPORT 3 SEP 53  
SAMPLER HAMMER WT. 375 DROP 30 INCHES COMPILED BY WAL CHECKED BY WAL BORING DATE 11 AUG 53

## SAMPLE CONDITION

 DISTURBED  
 FAIR  
 GOOD  
 LOST

## SAMPLE TYPES

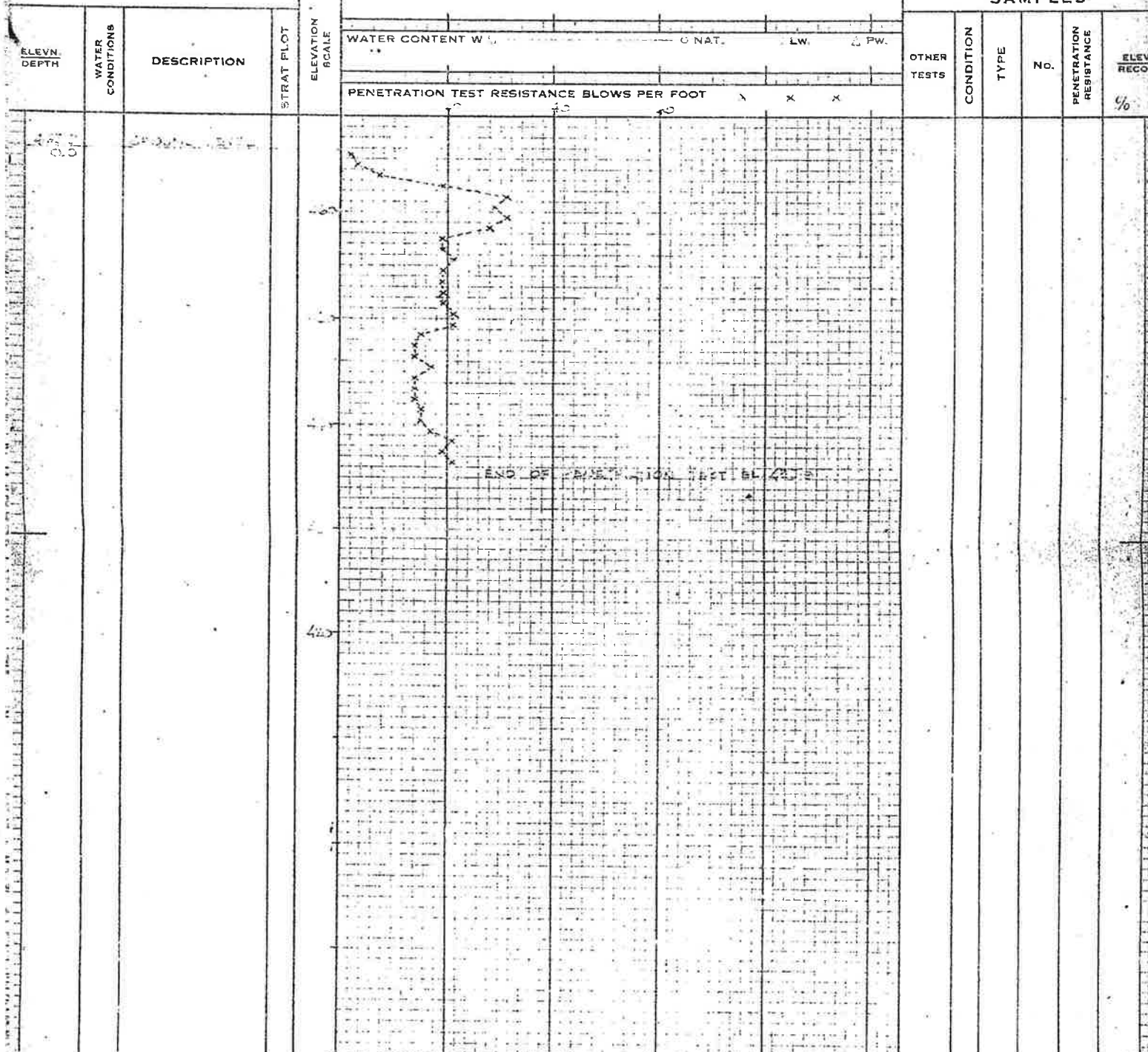
C. S. - CHUNK  
D. O. - DRIVE-OPEN  
D. F. - DRIVE-FOOT VALVE  
D. P. - DRIVE PISTON  
T. O. - THIN WALLED OPEN  
T. P. - THIN WALLED PISTON  
F. S. - FOIL SAMPLE  
B. A. - BARREL AUGER  
S. A. - SPIRAL AUGER  
W. S. - WASHED SAMPLE  
R. C. - ROCK CORE

## ABBREVIATIONS

V. - IN-SITU VANE SHEAR TEST  
M. - MECHANICAL ANALYSIS  
U. - UNCONFINED COMPRESSION  
QC. - TRIAXIAL CONSOLIDATED QUICK  
Q. - TRIAXIAL QUICK  
S. - TRIAXIAL SLOW  
γ. - UNIT WEIGHT  
K. - PERMEABILITY  
C. - CONSOLIDATION  
CA. - CASING  
WL. - WATER LEVEL IN CASING  
WT. - WATER TABLE IN SOIL

## SOIL PROFILE

## SAMPLES





**THE FOUNDATION COMPANIES**  
**CANADA**
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG: MANHOLE JOB: 00142 BORING #: 12  
 CASING: 4 IN. (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM: SEA LEVEL DATE REPORT: SEP 4/53  
 SAMPLER HAMMER WT.: 35 LBS DROP: 30 INCHES COMPILED BY: J.C.D. CHECKED BY: J.S. BORING DATE: AUG 13 to 15/53

**SAMPLE CONDITION**

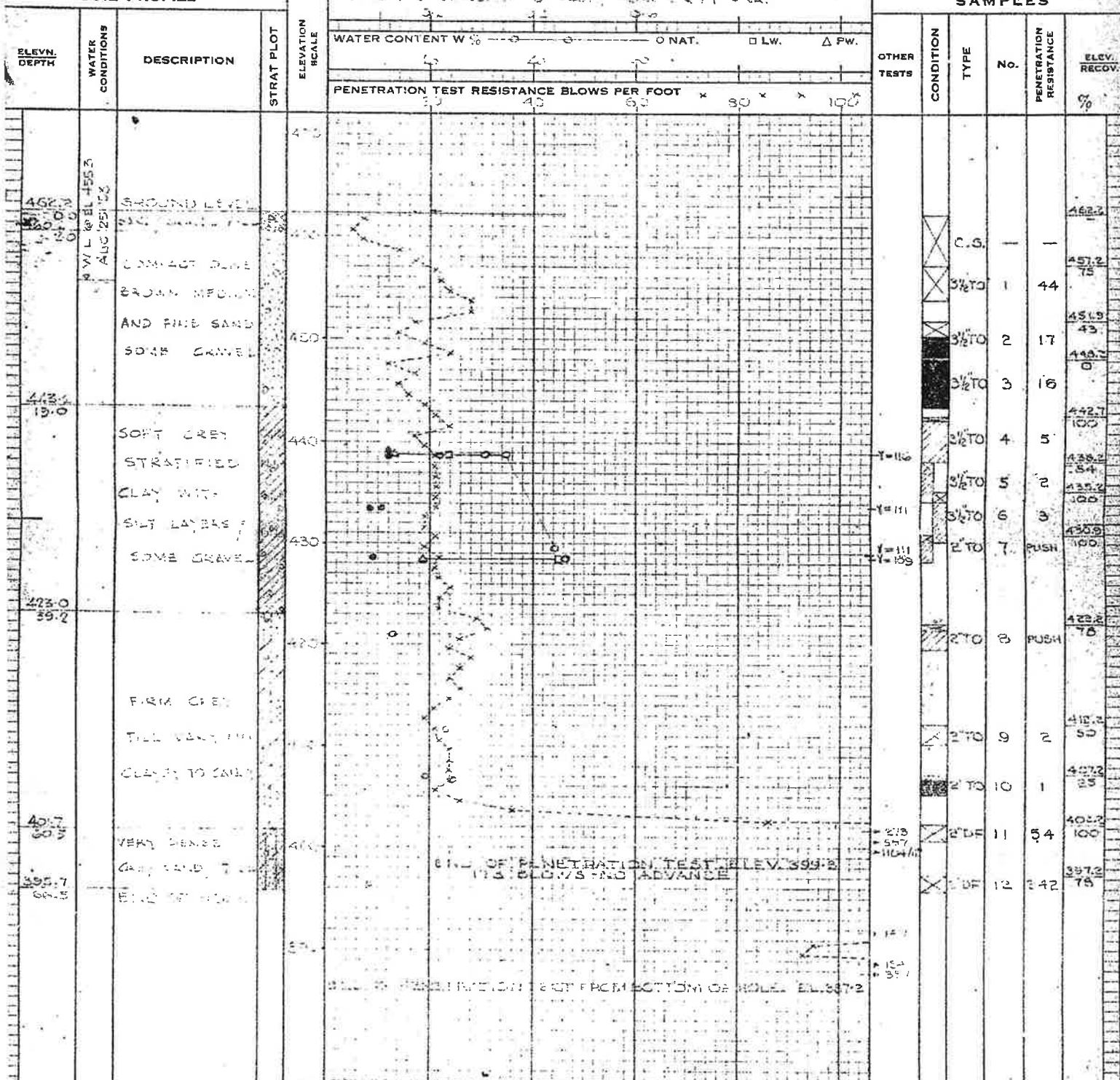

DISTURBED  
 FAIR  
 GOOD  
 LOST

**SAMPLE TYPES**

C.S. - CHUNK  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 D.P. - DRIVE PISTON  
 T.O. - THIN WALLED OPEN  
 T.P. - THIN WALLED PISTON  
 F.S. - FOIL SAMPLE  
 B.A. - BARREL AUGER  
 S.A. - SPIRAL AUGER  
 W.S. - WASHED SAMPLE  
 R.C. - ROCK CORE

**ABBREVIATIONS**

V. - IN-SITU VANE SHEAR TEST  
 M. - MECHANICAL ANALYSIS  
 U. - UNCONFINED COMPRESSION  
 Q.C. - TRIAXIAL CONSOLIDATED QUICK  
 Q. - TRIAXIAL QUICK  
 S. - TRIAXIAL SLOW  
 7. - UNIT WEIGHT  
 K. - PERMEABILITY  
 C. - CONSOLIDATION  
 CA. - CASING  
 WL. - WATER LEVEL IN CASING  
 WT. - WATER TABLE IN SOIL

**SOIL PROFILE**
**SAMPLES**


**OFFICE REPORT ON SOIL EXPLORATION**

 DRILL RIG. MACHINE JOB. ST-14 BORING #. 343A  
 CASING 4" BX STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM CEILING DATE REPORT 3 SEP 58  
 SAMPLER HAMMER WT. 372 # DROP 2 INCHES COMPILED BY J.M.W. CHECKED BY J.M.W. BORING DATE 1 AUG 58

SAMPLE CONDITION			SAMPLE TYPES			ABBREVIATIONS					
DISTURBED FAIR GOOD LOST	C.S. - CHUNK D.O. - DRIVE-OPEN D.F. - DRIVE-FOOT VALVE D.P. - DRIVE PISTON T.O. - THIN WALLED OPEN T.P. - THIN WALLED PISTON	F.S. - FOIL SAMPLE B.A. - BARREL AUGER S.A. - SPIRAL AUGER W.S. - WASHED SAMPLE R.C. - ROCK CORE	V. - IN-SITU VANE SHEAR TEST M. - MECHANICAL ANALYSIS U. - UNCONFINED COMPRESSION QC. - TRIAXIAL CONSOLIDATED QUICK Q. - TRIAXIAL QUICK S. - TRIAXIAL SLOW	γ. - UNIT WEIGHT K. - PERMEABILITY C. - CONSOLIDATION CA. - CASING WL. - WATER LEVEL IN CASING WT. - WATER TABLE IN SOIL							
SOIL PROFILE			SAMPLES								
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W %	OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELEV. RECOV.
					NAT.    LW.    Δ Pw.						
					PENETRATION TEST RESISTANCE BLOWS PER FOOT						
425.7 0.0	W.L. 424.45 HOLE 3A SENT	1.00' - 1.50' LEVEL LOOSE SAND COMPACT COARSE BROWN MEDIUM FINE SAND SOME GRAVEL		425							
427.4 16.9		SOFT GREY STRATIFIED CLAY WITH SILT LAYERS AND SOME GRAVEL		427							
428.0 28.3		FIRM GREY SILTY TILL		428							
429.5 42.8		END OF HOLE		429							
				430							
				435							
				440							
				445							
				450							
				455							
				460							
				465							
				470							
				475							
				480							
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				970							
				975							
				980							
				985							
				990							
				995							
				1000							

## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINE JOB. 07142 BORING #14  
CASING 4" BX (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM 30015112 DATE REPORT AUG. 24/58  
SAMPLER HAMMER. WT. 372 DROP 15 1/2 INCHES COMPILED BY J.C.D. CHECKED BY DUKE BORING DATE AUG. 18-22/58

**SAMPLE CONDITION**



**DISTURBED**  
**FAIR**  
**GOOD**  
**LOST**

C.S. - CHUCK  
D.O. - DRIVE-OPEN  
D.F. - DRIVE-FOOT VALVE  
D.P. - DRIVE PISTON  
T.O. - THIN WALLED OPEN  
T.P. - THIN WALLED PISTON

## SAMPLE TYPES

F. S. - FOIL SAMPLE  
B. A. - BARREL AUGER  
S. A. - SPIRAL AUGER  
W. S. - WASHED SAMPLE  
R. C. - ROCK CORE

## ABBREVIATIONS

V. -IN-SITU VANE SHEAR TEST	7. -UNIT WEIGHT
M. -MECHANICAL ANALYSIS	K. -PERMEABILITY
U. -UNCONFINED COMPRESSION	C. -CONSOLIDATION
QC. -TRIAXIAL CONSOLIDATED QUICK	CA.-CASING
Q. -TRIAXIAL QUICK	WL.-WATER LEVEL IN CASING
S. -TRIAXIAL SLOW	WT. -WATER TABLE IN SOIL

### SOIL PROFILE

[illegible]



[illegible]

## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINIST JOB. CHINA BORING #. 6  
 CASING. 4 1/2" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM. SEA LEVEL DATE REPORT. SEP 1 1953  
 SAMPLER HAMMER. WT. 35 LB DROP. 13 INCHES COMPILED BY. H.D.O. CHECKED BY. J.M.A. BORING DATE. AUG 24 1953

### SAMPLE CONDITION



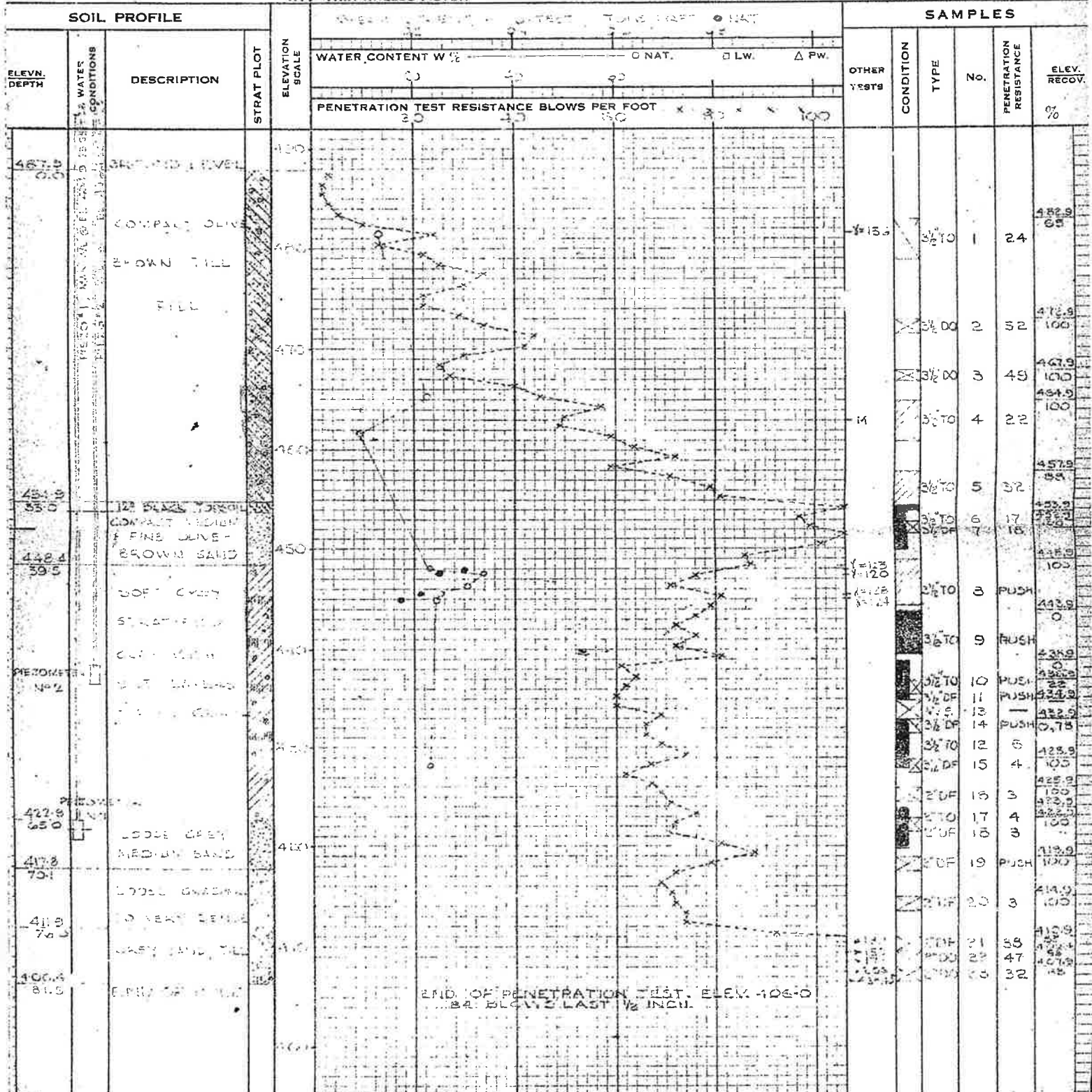
DISTURBED  
FAIR  
GOOD  
LOST

### SAMPLE TYPES

C.S. - CHUNK  
D.O. - DRIVE-OPEN  
D.F. - DRIVE-FOOT VALVE  
D.P. - DRIVE PISTON  
T.O. - THIN WALLED OPEN  
T.P. - THIN WALLED PISTON  
F.S. - FOIL SAMPLE  
B.A. - BARREL AUGER  
S.A. - SPIRAL AUGER  
W.S. - WASHED SAMPLE  
R.C. - ROCK CORE

### ABBREVIATIONS

V. - IN-SITU VANE SHEAR TEST  
M. - MECHANICAL ANALYSIS  
U. - UNCONFINED COMPRESSION  
QC. - TRIAXIAL CONSOLIDATED QUICK  
Q. - TRIAXIAL QUICK  
S. - TRIAXIAL SLOW  
γ. - UNIT WEIGHT  
K. - PERMEABILITY  
C. - CONSOLIDATION  
CA. - CASING  
WL. - WATER LEVEL IN CASING  
WT. - WATER TABLE IN SOIL





## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINE JOB. 2744 BORING 7  
 CASING 4" EX (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GROUND DATE REPORT SEP 9/53  
 SAMPLER HAMMER, WT. 37.2 DROP 12 INCHES COMPILED BY GGG CHECKED BY JWA BORING DATE SEP 9/53



## SAMPLE CONDITION

DISTURBED  
FAIR  
GOOD  
LOST

## SAMPLE TYPES

C.S. - CHUCK  
D.O. - DRIVE-OPEN  
D.F. - DRIVE-FOOT VALVE  
D.P. - DRIVE PISTON  
T.O. - THIN WALLED OPEN  
T.P. - THIN WALLED PISTON

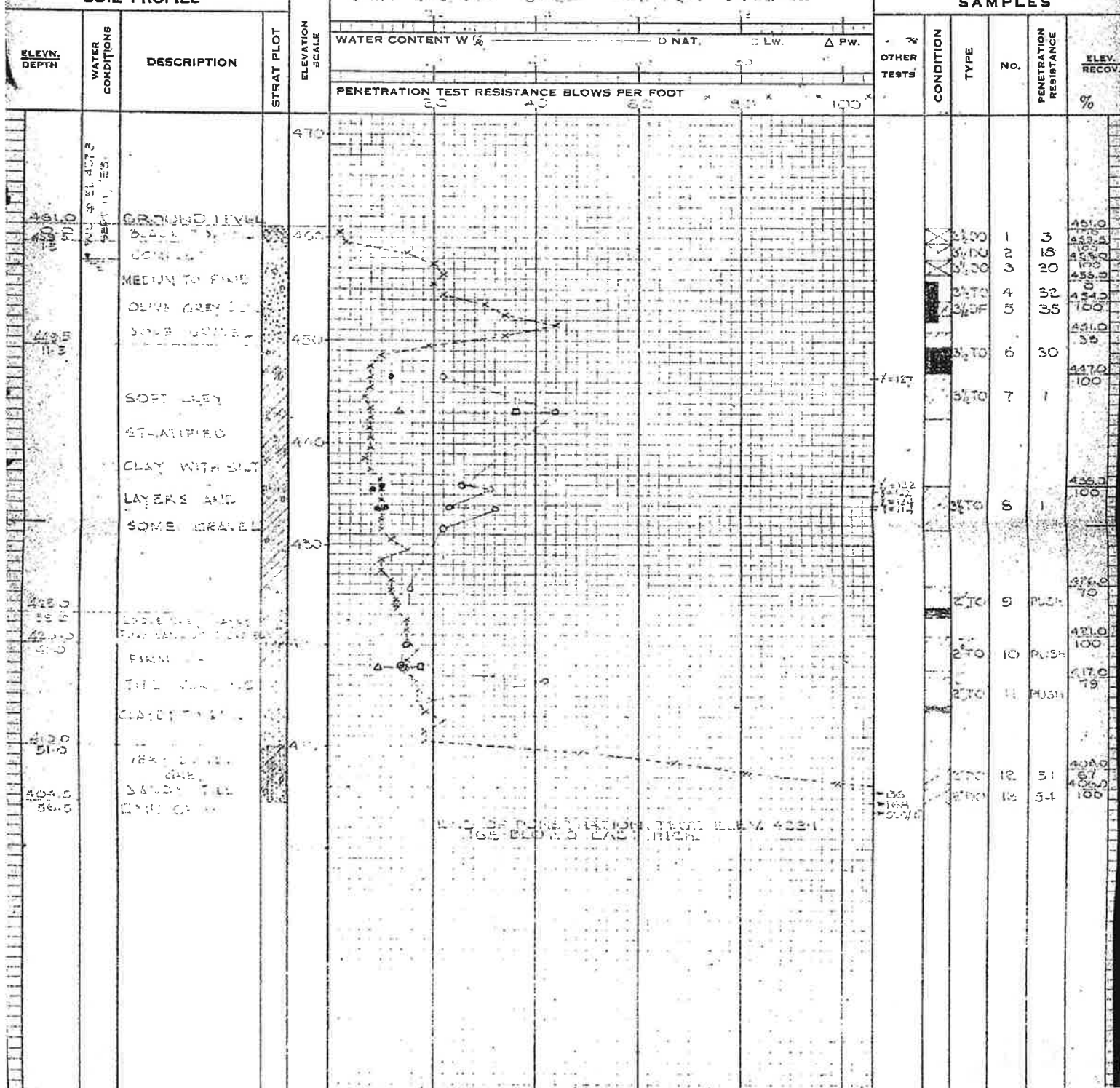
F.S. - FOIL SAMPLE  
B.A. - BARREL AUGER  
S.A. - SPIRAL AUGER  
W.S. - WASHED SAMPLE  
R.C. - ROCK CORE

## ABBREVIATIONS

V. - IN-SITU VANE SHEAR TEST  
M. - MECHANICAL ANALYSIS  
U. - UNCONFINED COMPRESSION  
QC. - TRIAXIAL CONSOLIDATED QUICK  
Q. - TRIAXIAL QUICK  
S. - TRIAXIAL SLOW  
Y. - UNIT WEIGHT  
K. - PERMEABILITY  
C. - CONSOLIDATION  
CA. - CASING  
WL. - WATER LEVEL IN CASING  
WT. - WATER TABLE IN SOIL

## SOIL PROFILE

## SAMPLES



## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINE JOB. 07142 BORING # 8  
 CASING 4" 3x (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM SEA LEVEL DATE REPORT SEP 10 1953  
 SAMPLER HAMMER, WT. 372 DROP 15 INCHES COMPILED BY ACG CHECKED BY JWA BORING DATE SEP 24 1953

## SAMPLE CONDITION



DISTURBED  
FAIR  
GOOD  
LOST

## SAMPLE TYPES

C.S. - CHUNK  
D.O. - DRIVE-OPEN  
D.F. - DRIVE-FOOT VALVE  
D.P. - DRIVE PISTON  
T.O. - THIN WALLED OPEN  
T.P. - THIN WALLED PISTON

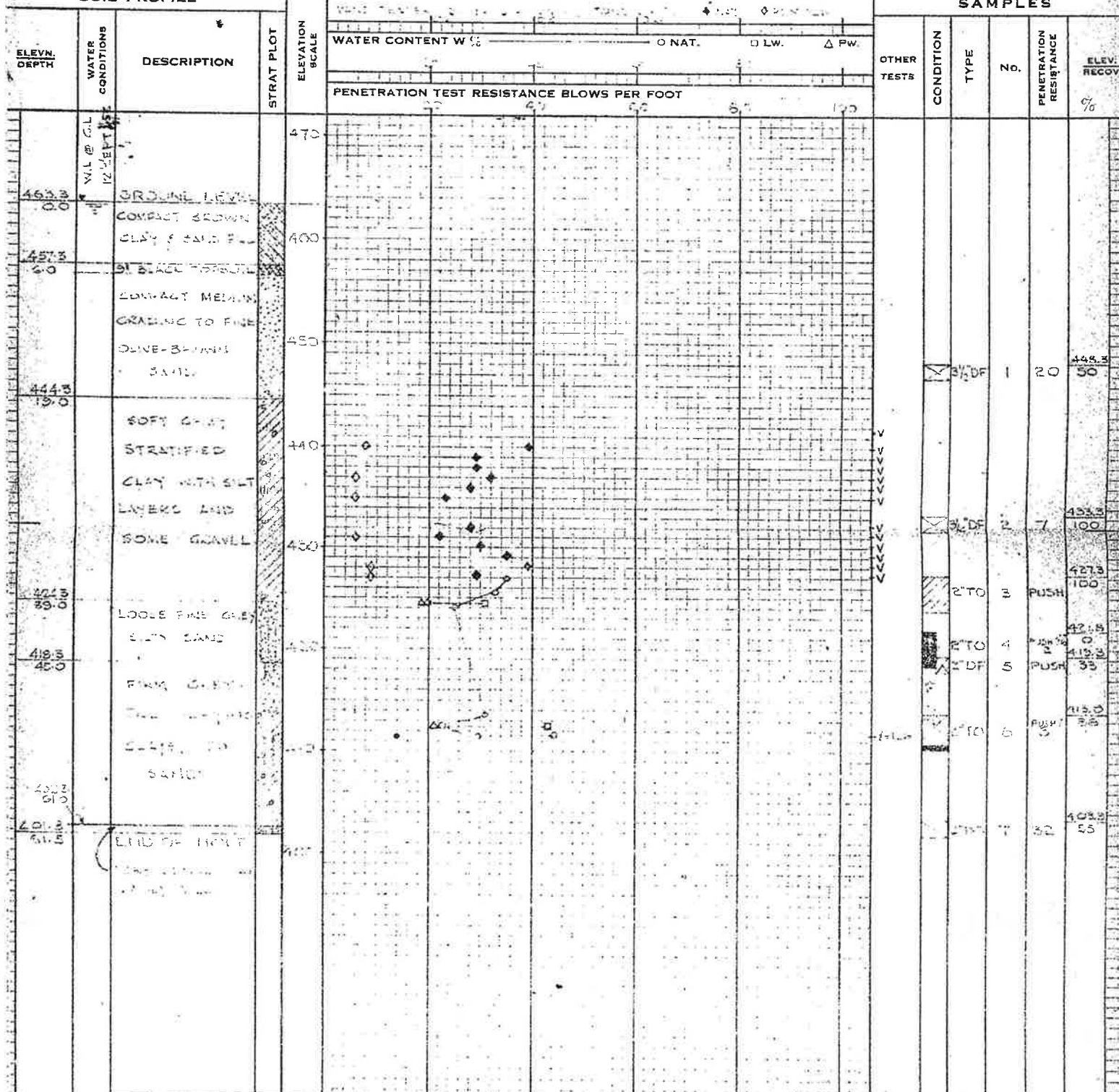
F.S. - FOIL SAMPLE  
B.A. - BARREL AUGER  
S.A. - SPIRAL AUGER  
W.S. - WASHED SAMPLE  
R.C. - ROCK CORE

## ABBREVIATIONS

V. - IN-SITU VANE SHEAR TEST  
M. - MECHANICAL ANALYSIS  
U. - UNCONFINED COMPRESSION  
QC. - TRIAXIAL CONSOLIDATED QUICK  
Q. - TRIAXIAL QUICK  
S. - TRIAXIAL SLOW  
γ. - UNIT WEIGHT  
K. - PERMEABILITY  
C. - CONSOLIDATION  
CA. - CASING  
WL. - WATER LEVEL IN CASING  
WT. - WATER TABLE IN SOIL

## SOIL PROFILE

## SAMPLES



**OFFICE REPORT ON SOIL EXPLORATION**

 DRILL RIG: MACHINIST JOB: 27-10-10 BORING #: 5  
 CASING: 1 1/2" DIA. (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM: SEA LEVEL DATE REPORT: SEPT 20 1958  
 SAMPLER HAMMER WT.: 350 DROP: 30 INCHES COMPILED BY: W. J. G. G. CHECKED BY: W. J. G. G. BORING DATE: AUG 25 1958
**SAMPLE CONDITION**

 DISTURBED  
 FAIR  
 GOOD  
 LOST

**SAMPLE TYPES**

 C.S. - CHUNK  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 D.P. - DRIVE PISTON  
 T.O. - THIN WALLED OPEN  
 T.P. - THIN WALLED PISTON

 F.S. - FOIL SAMPLE  
 B.A. - BARREL AUGER  
 S.A. - SPIRAL AUGER  
 W.S. - WASHED SAMPLE  
 R.C. - ROCK CORE

**ABBREVIATIONS**

 V. - IN-SITU VANE SHEAR TEST  
 M. - MECHANICAL ANALYSIS  
 U. - UNCONFINED COMPRESSION  
 Q. - TRIAXIAL CONSOLIDATED QUICK  
 Q. - TRIAXIAL QUICK  
 S. - TRIAXIAL SLOW  
 Y. - UNIT WEIGHT  
 K. - PERMEABILITY  
 C. - CONSOLIDATION  
 CA. - CASING  
 WL. - WATER LEVEL IN CASING  
 WT. - WATER TABLE IN SOIL

**SOIL PROFILE**
**SAMPLES**

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W %			OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELEV. RECOV.
					PENETRATION TEST RESISTANCE BLOWS PER FOOT								
459.3		GROUND LEVEL		460									
458.0		LOOSE SILT		458									454.9 90
		TO FINE SAND											449.3 55
		SOME GRAVEL											444.3 100
													440.3 100
													439.3 100
													430.3 100
													428.3 100
													419.3 100
													410.3 100
													405.3 100
													400.3 100
													395.3 80
													390.3 100



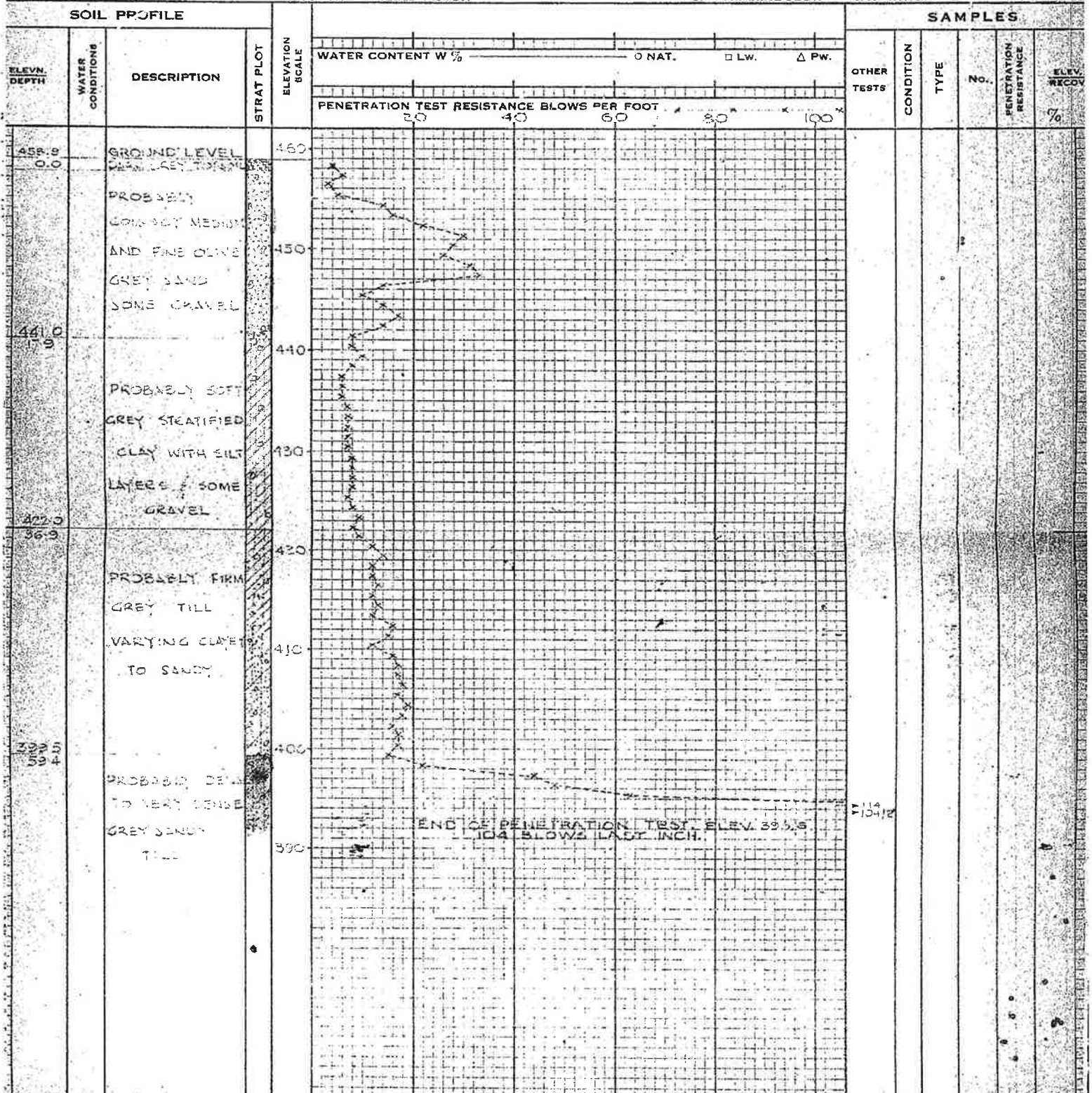
## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHIN JOB 50182 PEN. TEST 10  
 CASING (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GROUND SURF DATE REPORT APR 1952  
 SAMPLER HAMMER WT. 340 DROP 30 INCHES COMPILED BY J.C.O. CHECKED BY J.W.A. BORING DATE APR 28/52

**SAMPLE CONDITION**  
 DISTURBED  
 FAIR  
 GOOD  
 LOST

**SAMPLE TYPES**  
 C.S. - CHUNK  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 D.P. - DRIVE PISTON  
 T.O. - THIN WALLED OPEN  
 T.P. - THIN WALLED PISTON

**ABBREVIATIONS**  
 F.S. - FOIL SAMPLE  
 B.A. - BARREL AUGER  
 S.A. - SPIRAL AUGER  
 W.S. - WASHED SAMPLE  
 R.C. - ROCK CORE  
 V. - IN-SITU VANE SHEAR TEST  
 M. - MECHANICAL ANALYSIS  
 U. - UNCONFINED COMPRESSION  
 Q.C. - TRIAXIAL CONSOLIDATED QUICK  
 Q. - TRIAXIAL QUICK  
 S. - TRIAXIAL SLOW  
 γ. - UNIT WEIGHT  
 K. - PERMEABILITY  
 C. - CONSOLIDATION  
 CA. - CASING  
 WL. - WATER LEVEL IN CASING  
 WT. - WATER TABLE IN SOIL



**OFFICE REPORT ON SOIL EXPLORATION**

 DRILL RIG. 1000 JOB 1000 BORING # 1  
 CASING 2 (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM ORIGINAL DATE REPORT SEP 28 1953  
 SAMPLER HAMMER WT. 100 DROP 11 INCHES COMPILED BY WILL CHECKED BY WILL BORING DATE 28 29 1953
**SAMPLE CONDITION**

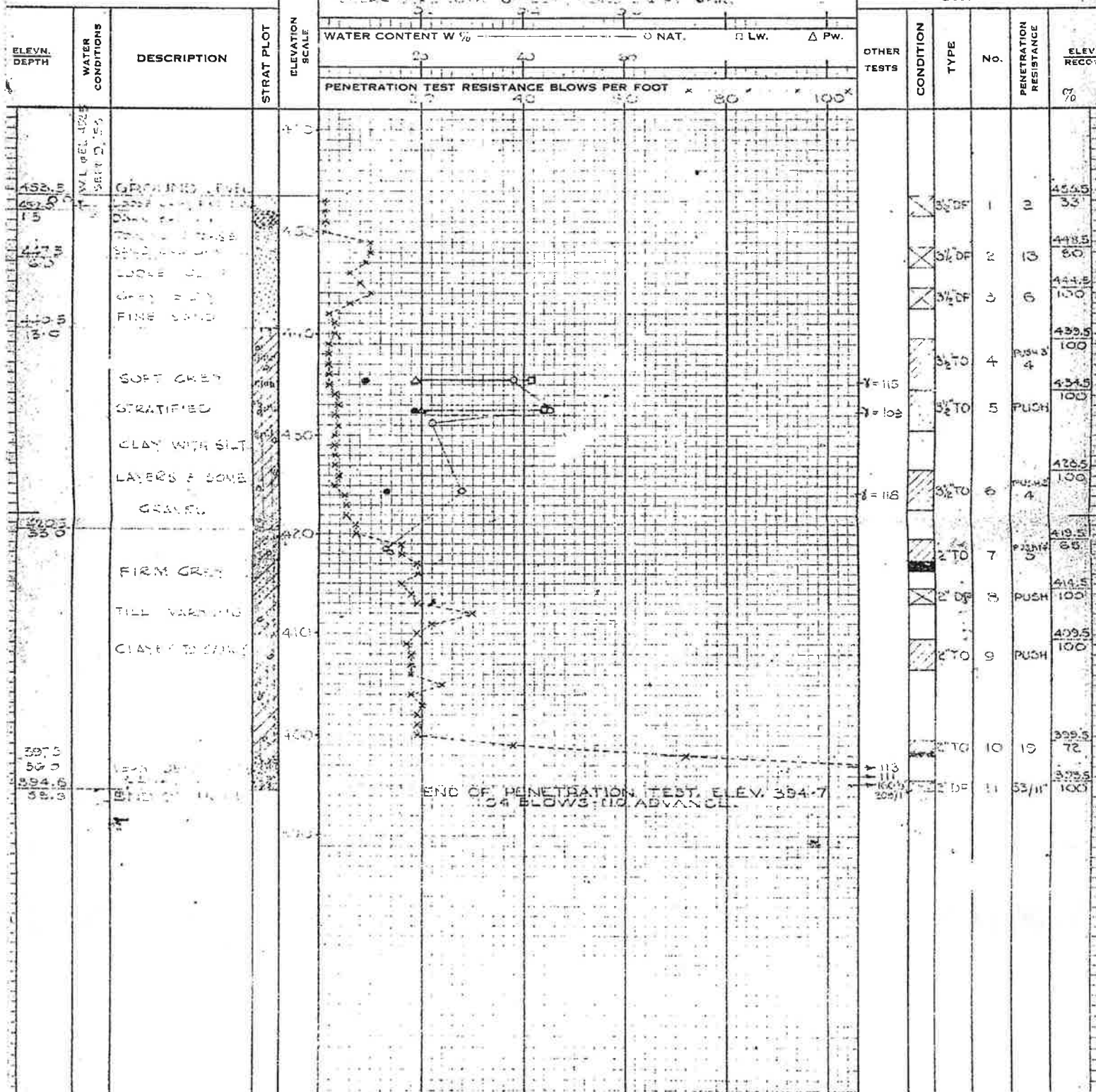
 DISTURBED  
 FAIR  
 GOOD  
 LOST

**SAMPLE TYPES**

 C.S. - CHUNK  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 D.P. - DRIVE PISTON  
 T.O. - THIN WALLED OPEN  
 T.P. - THIN WALLED PISTON  
 F.S. - FOIL SAMPLE  
 B.A. - BARREL AUGER  
 S.A. - SPIRAL AUGER  
 W.S. - WASHED SAMPLE  
 R.C. - ROCK CORE

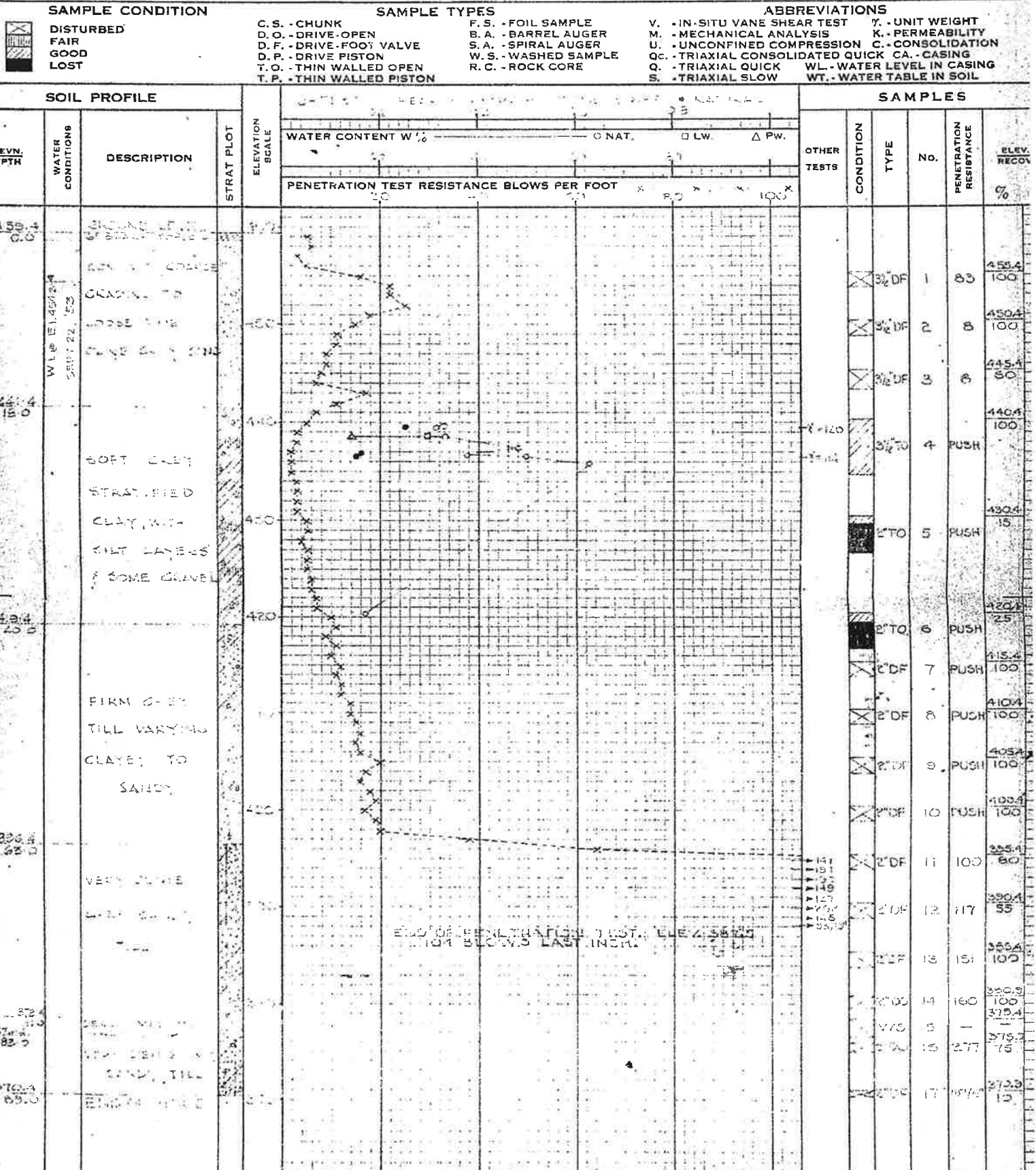
**ABBREVIATIONS**

 V. - IN-SITU VANE SHEAR TEST  
 M. - MECHANICAL ANALYSIS  
 U. - UNCONFINED COMPRESSION  
 QC. - TRIAXIAL CONSOLIDATED QUICK  
 Q. - TRIAXIAL QUICK  
 S. - TRIAXIAL SLOW  
 γ. - UNIT WEIGHT  
 K. - PERMEABILITY  
 C. - CONSOLIDATION  
 CA. - CASING  
 WL. - WATER LEVEL IN CASING  
 WT. - WATER TABLE IN SOIL

**SOIL PROFILE**
**SAMPLES**


## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG: 144H ONE JOB: 00184 BORING # 10  
 CASING: 1.5" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM: 100' 0" DATE REPORT: SEP 10 1953  
 SAMPLER HAMMER WT.: 350 DROP: 11" INCHES COMPILED BY: J.C.D. CHECKED BY: J.W.E. BORING DATE: SEP 10 1953





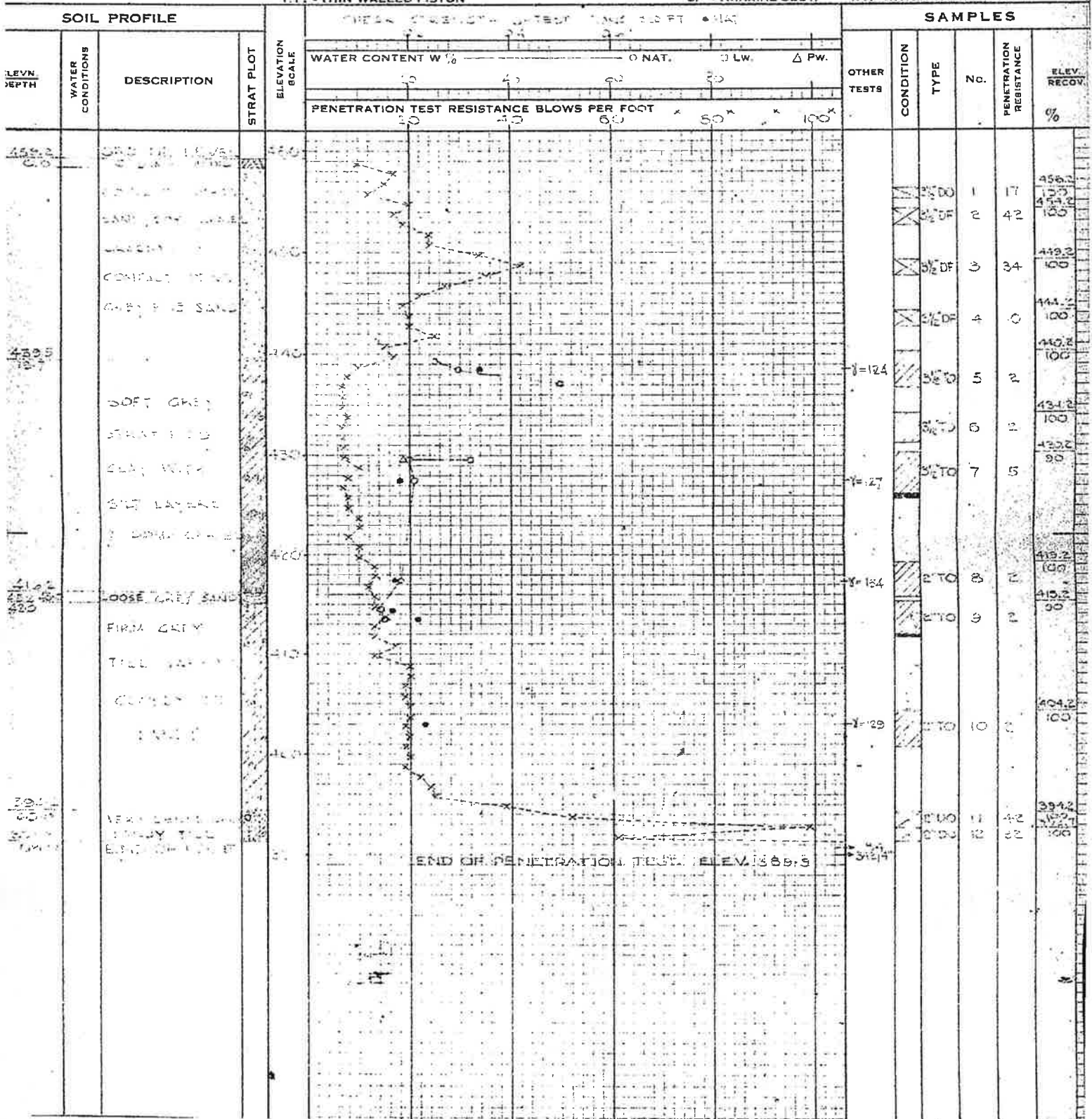
## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG: MANUEL JOB: CHUR BORING: 13  
 CASING: 1" 22 (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM: GROUND DATE REPORT: SEP 1962  
 SAMPLER HAMMER WT: 140 DROP: 18 INCHES COMPILED BY: JAC CHECKED BY: JMA BORING DATE: SEP 22 1962

**SAMPLE CONDITION**  
  
 DISTURBED  
 FAIR  
 GOOD  
 LOST

**SAMPLE TYPES**  
 C.S. - CHUNK  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 D.P. - DRIVE PISTON  
 T.O. - THIN WALLED OPEN  
 T.P. - THIN WALLED PISTON  
 F.S. - FOIL SAMPLE  
 B.A. - BARREL AUGER  
 S.A. - SPIRAL AUGER  
 W.S. - WASHED SAMPLE  
 R.C. - ROCK CORE

**ABBREVIATIONS**  
 V. - IN-SITU VANE SHEAR TEST  
 M. - MECHANICAL ANALYSIS  
 U. - UNCONFINED COMPRESSION  
 Q.C. - TRIAXIAL CONSOLIDATED QUICK  
 Q. - TRIAXIAL QUICK  
 S. - TRIAXIAL SLOW  
 γ. - UNIT WEIGHT  
 K. - PERMEABILITY  
 C. - CONSOLIDATION  
 CA. - CASING  
 WL. - WATER LEVEL IN CASING  
 WT. - WATER TABLE IN SOIL



## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINE JOB CHURCH BORING 111  
 CASING 1" DIA (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GROUND DATE REPORT 11 JUN 53  
 SAMPLER HAMMER WT. 35.0 DROP 10 1/2 INCHES COMPILED BY 1110 CHECKED BY 111 BORING DATE 22 FEB 53

SAMPLE CONDITION			SAMPLE TYPES			ABBREVIATIONS					
	DISTURBED	C.S. - CHUNK	F.S. - FOIL SAMPLE	V. - IN-SITU VANE SHEAR TEST	Y. - UNIT WEIGHT		FAIR	D.O. - DRIVE-OPEN	B.A. - BARREL AUGER	M. - MECHANICAL ANALYSIS	K. - PERMEABILITY
	GOOD	D.F. - DRIVE-FOOT VALVE	S.A. - SPIRAL AUGER	U. - UNCONFINED COMPRESSION	C. - CONSOLIDATION		LOST	D.P. - DRIVE PISTON	W.S. - WASHED SAMPLE	Q.C. - TRIAXIAL CONSOLIDATED QUICK	CA. - CASING
		T.O. - THIN WALLED OPEN	R.C. - ROCK CORE	Q. - TRIAXIAL QUICK	WL. - WATER LEVEL IN CASING			T.P. - THIN WALLED PISTON	S. - TRIAXIAL SLOW	WT. - WATER TABLE IN SOIL	
SOIL PROFILE			PENETRATION TEST RESISTANCE BLOWS PER FOOT			SAMPLES					
LEVN. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W %	OTHER TESTS	CONDITION	TYPE	No.	PENETRATION RESISTANCE	ELEV. RECOV.
459.4	45.0	GROUND LEVEL		460							459.4
459.4	45.0	COMPACT TO LOOSE CLAY		450							459.4
459.4	45.0	CLEAN SILT AND FINE SAND		440							459.4
459.4	45.0	SOFT GREY STRATIFIED CLAY WITH SOME SILT LAYERS & GRAVEL		430							459.4
417.4	41.0	COMPACT SILTY FINE SAND & GRAVEL		420							417.4
417.4	41.0	FIRM GREY TILL VARYING CLAYEY TO SANDY		410							417.4
394.9	39.5	VERY DENSE SAND		400							394.9
394.9	39.5	END OF HOLE		390							394.9
END OF PENETRATION TEST ELEV. 391.7 104 BLOWS LAST INCH											



# OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHIDE JOB. CL-1 BORING # 15  
CASING 4 1/2 (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM GROUND DATE RT PORT SEPT 20/53  
SAMPLER HAMMER. WT. 500 DROP 5 INCHES COMPILED BY WAC CHECKED BY WAC BORING DATE SEP 20/53

[illegible]

## OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG. MACHINE JOB. 25 BORING #. 25  
 CASING. 4" RY (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM. SEA LEVEL DATE REPORT. 22 SEPT 53  
 SAMPLER HAMMER. WT. 222 DROP. 6 INCHES COMPILED BY. WAVY CHECKED BY. WAVY BORING DATE. 21 SEPT 53

## SAMPLE CONDITION



DISTURBED  
FAIR  
GOOD  
LOST

## SAMPLE TYPES

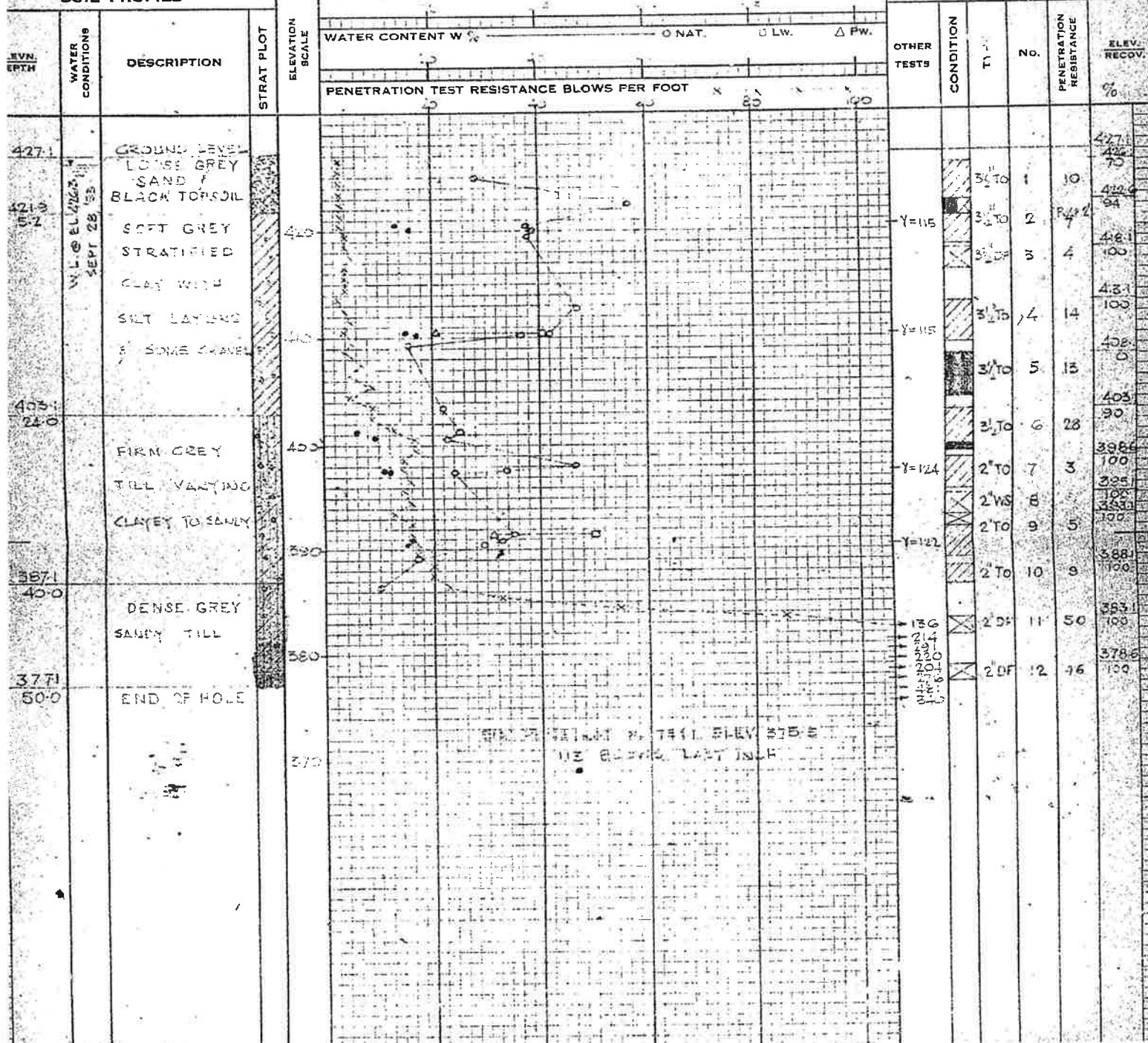
C.S. - CHUNK  
O.O. - DRIVE-OPEN  
D.F. - DRIVE-FOOT VALVE  
D.P. - DRIVE PISTON  
T.O. - THIN WALLED OPEN  
T.P. - THIN WALLED PISTON  
F.S. - FOIL SAMPLE  
B.A. - BARREL AUGER  
S.A. - SPIRAL AUGER  
W.S. - WASHED SAMPLE  
R.C. - ROCK CORE

## ABBREVIATIONS

V. - IN-SITU VANE SHEAR TEST  
M. - MECHANICAL ANALYSIS  
U. - UNCONFINED COMPRESSION  
QC. - TRIAXIAL CONSOLIDATED QUICK  
Q. - TRIAXIAL QUICK  
S. - TRIAXIAL SLOW  
γ. - UNIT WEIGHT  
K. - PERMEABILITY  
C. - CONSOLIDATION  
CA. - CASING  
WL. - WATER LEVEL IN CASING  
WT. - WATER TABLE IN SOIL

## SOIL PROFILE

## SAMPLES





S7002  
REPORT  
TO  
DEPARTMENT OF HIGHWAYS, ONTARIO  
SOIL CONDITIONS AND STABILITY  
PROPOSED EMBANKMENT  
TORONTO                      ONTARIO

Distribution:

- 10 copies - Department of Highways, Ontario,  
Downsview, Ontario.
- 2 copies - Geocon Ltd,  
Rexdale, Ontario.

**GEOCON**



# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

APPEX. I

CONTRACT 57002 BORING # 1 AND 1A DATUM GEODETIC CASING BX  
 BORING DATE OCT. 27 - NOV. 3, 1959 REPORT DATE MARCH 11, 1960 COMPILED BY M.W. CHECKED BY J.S.  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

### SAMPLE CONDITION

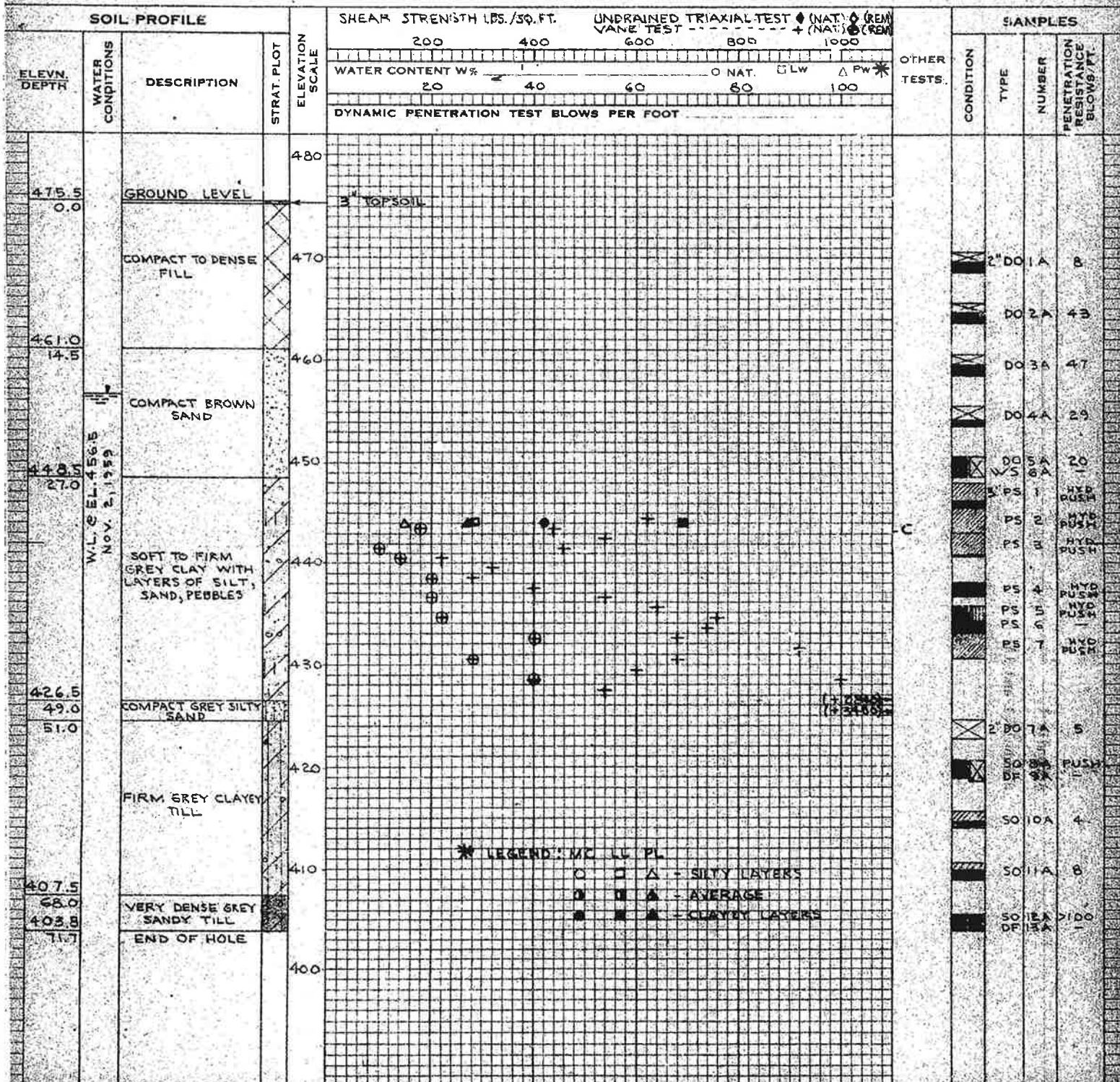


### SAMPLE TYPES

A.S. - AUGER SAMPLE  
 S.T. - SLOTTED TUBE  
 W.S. - WASHED SAMPLE  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 C.S. - CHUNK SAMPLE  
 F.S. - FOIL SAMPLE  
 S.O. - SLEEVE-OPEN  
 S.F. - SLEEVE-FOOT VALVE  
 T.O. - THIN WALLED OPEN  
 R.C. - ROCK CORE  
 P.S. - PISTON SAMPLE

### ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW  
 Y - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION  
 WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL



# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

APPENDIX I

CONTRACT 57002 BORING # 2 AND 2A DATUM GEODETIC CASING BX  
 BORING DATE NOV. 4-6, 1959 REPORT DATE MARCH 11, 1960 COMPILED BY M.W. CHECKED BY 196  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

### SAMPLE CONDITION



A.S. - AUGER SAMPLE  
 S.T. - SLOTTED TUBE  
 W.S. - WASHED SAMPLE  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 C.S. - CHUNK SAMPLE

### SAMPLE TYPES

F.S. - FOIL SAMPLE  
 S.O. - SLEEVE-OPEN  
 S.F. - SLEEVE-FOOT VALVE  
 T.O. - THIN WALLED OPEN  
 R.C. - ROCK CORE  
 P.S. - PISTON SAMPLE

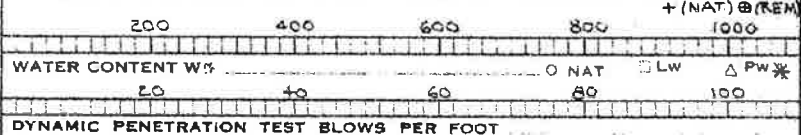
### ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW  
 γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION  
 WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

### SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
461.8 0.0		GROUND LEVEL		460
		COMPACT BROWN SAND		450
447.3 14.5		SOFT TO FIRM GREY CLAY WITH LAYERS OF SILT, SAND, PEBBLES		440
428.8 33.0		FIRM GREY CLAYEY TILL		430
406.8 55.0		END OF HOLE VERY DENSE GREY SANDY TILL		420
56.0				410
				400

### SHEAR STRENGTH LBS / SQ. FT. UNDRAINED TRIAXIAL TEST



### OTHER TESTS

### SAMPLES

CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
	2" DO	1A	31
	DO	2A	26
	3" PS	1	HYD. PUSH
	PS	2	"
	PS	3	"
	PS	4	"
	PS	5	"
	PS	6	"
	PS	7	"
	PS	8	"
	2" SO	3A	4
	SO	4A	4
	SO	5A	4
	DO	6A	90

\* LEGEND MC LL PL  
 ○ □ Δ - SILTY LAYERS  
 □ □ Δ - AVERAGE  
 ● ■ ▲ - CLAYEY LAYERS



# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

### APPENDIX I

CONTRACT 57002 BORING # 3 AND 3A DATUM GEODETIC CASING BK  
 BORING DATE NAN. 21 - FEB. 4, 1960 REPORT DATE MARCH 14, 1960 COMPILED BY MMV CHECKED BY PC  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

#### SAMPLE CONDITION

☐ DISTURBED  
☐ FAIR  
☐ GOOD  
☐ LOST

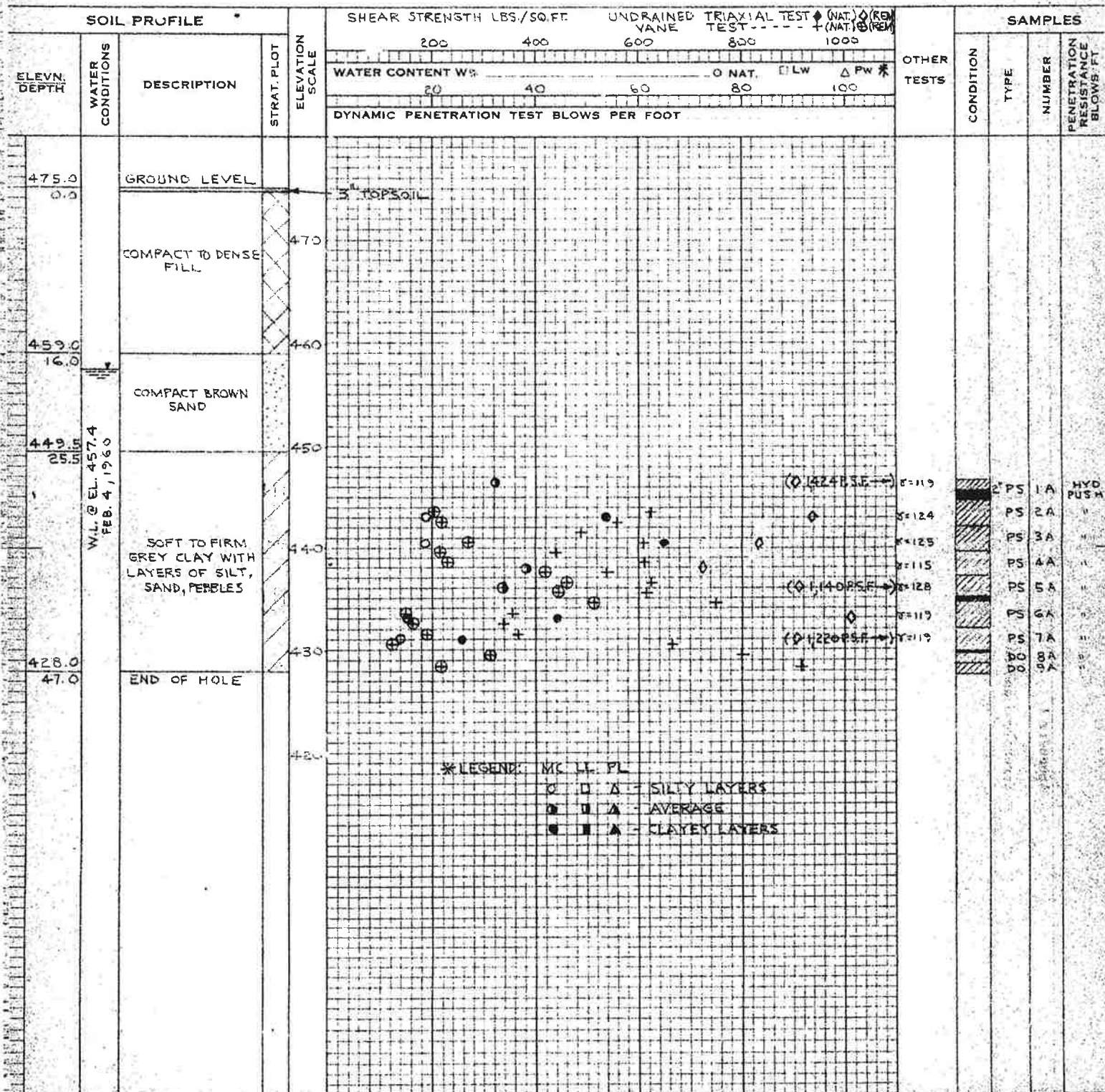
A.S. - AUGER SAMPLE  
 S.T. - SLOTTED TUBE  
 W.S. - WASHED SAMPLE  
 D.O. - DRIVE-OPEN  
 D.F. - DRIVE-FOOT VALVE  
 C.S. - CHUNK SAMPLE

#### SAMPLE TYPES

F.S. - FOIL SAMPLE  
 S.O. - SLEEVE-OPEN  
 S.F. - SLEEVE-FOOT VALVE  
 T.O. - THIN WALLED OPEN  
 R.C. - ROCK CORE  
 P.S. - PISTON SAMPLE

#### ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW  
 γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION  
 WL - WATER LEVEL IN CASI  
 WT - WATER TABLE IN SOIL



[illegible]

... ..

### INTEREST IN EDUCATION

Journal of Management Education 35(1)

Journal of Management Education 35(1)

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TABLE 2. *Estimated Mean (SD) Age-Related Changes in the Physical and Psychological Health of the Study Population*

STRATIGRAPHY

STANDARD NO. 14-2000, P. 11.

CONTACT: 800-944-6469

See the index page 654b

CALPACT KEY NOTE PAGE

FROM SALLY CANNON, 916.6.

LEARN ABOUT THESE ADS

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DEPARTMENT OF HIGHWAYS ONTARIO MINISTRY	PROPOSED EMBANKMENT LESLIE ST. AT HWY. 7 - ONTARIO BORING PLAN AND SOIL STRATIGRAPHY	<b>GEOCON LTD.</b> 1000 HWY. 7 UNIT 1000 MISSISSAUGA, ONT. L4V 1P6 TEL: (905) 276-1111 FAX: (905) 276-1111 DATE: MARCH 11, 1994 TIME: 1:00 PM
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DEPARTMENT OF HIGHWAYS ONTARIO

## MEMORANDUM

To: Mr. A. M. Toye,  
Bridge Engineer,  
Bridge Division.

FROM: Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

DATE: July 2, 1964

OUR FILE REF.

IN REPLY TO

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For

Structures on Leslie St. & Hwy. 401,  
County of North York, Con.III, E.Y.S.  
Lot 14 - 15, District 6, Toronto

W.J. 64-F-41 -- W.P. 252-61-3

It is proposed to widen the existing overpass and construct new structures at the above-mentioned location.

A foundation investigation at this site was requested verbally by FENCO, on May 25, 1964.

A foundation investigation consisting of 18 sampled boreholes and 2 dynamic cone penetration tests was subsequently carried out at this site, during the period from May 27, 1964 to June 22, 1964. The purpose of this investigation was to establish the depth to the dense, glacial till layer, in order to determine the lengths of the piles to be used. The proposed structures are to be pile-supported.

Attached to this report is a drawing (64-F-41A) showing the locations of the boreholes. These locations were established

cont'd. /2 ...



- LEGEND**
- Bore Hole
  - Cone Penetration Hole
  - Bore Hole
  - Water Levels established at time of field investigation, May, 1964

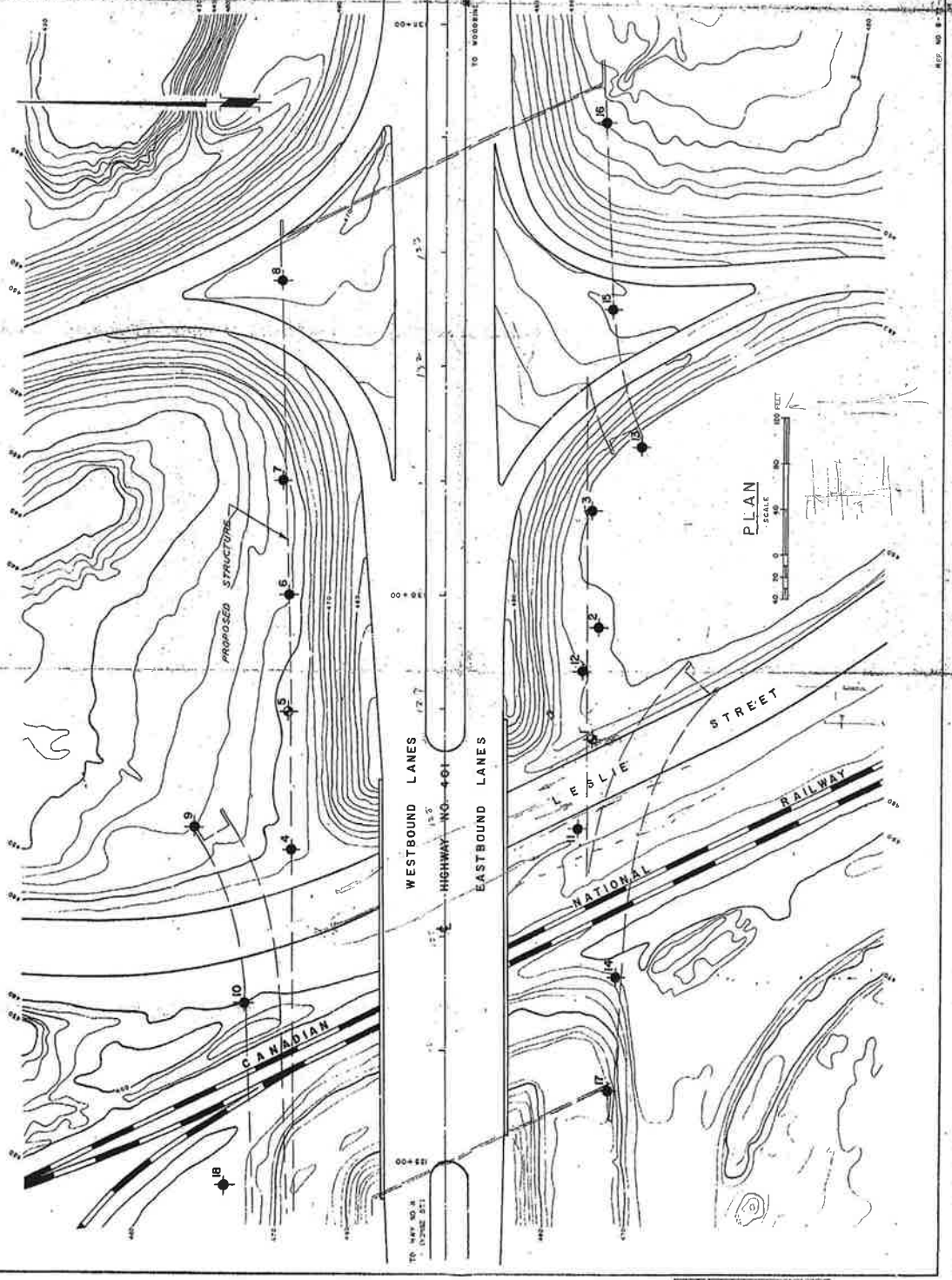
NO.	ELEVATION	STATION	OFFSET
1	461.0	128+25	155 RL
2	458.5	130+75	150 RL
3	461.0	127+75	155 RL
4	461.0	128+00	155 RL
5	461.0	128+00	155 RL
6	461.0	128+00	155 RL
7	461.0	128+00	155 RL
8	461.0	128+00	155 RL
9	461.0	128+00	155 RL
10	461.0	128+00	155 RL
11	461.0	128+00	155 RL
12	461.0	128+00	155 RL
13	461.0	128+00	155 RL
14	461.0	128+00	155 RL
15	461.0	128+00	155 RL
16	461.0	128+00	155 RL
17	461.0	128+00	155 RL
18	461.0	128+00	155 RL

NOTE: STATIONS ARE FROM NEW HWY. NO. 401

DEPARTMENT OF HIGHWAYS - ONTARIO  
ROADS & HIGHWAYS DIVISION - TORONTO DISTRICT

**LESLIE STREET**

PROJECT NO. 64-41A  
SHEET NO. 1 OF 1  
DATE: JUNE 30, 1964



DATE	BY	CHKD

DEPARTMENT OF HIGHWAYS AND  
MATERIALS & RESEARCH

RECORD OF BOREHOLE NO. 1

JOB 64-F-41

Stn. 128+73 and 130' Rt. of E. Hwy. 401

ORIGINATED BY

B.M.G.

W.P. 252-61-3

May 28, 1964.

APPROVED BY

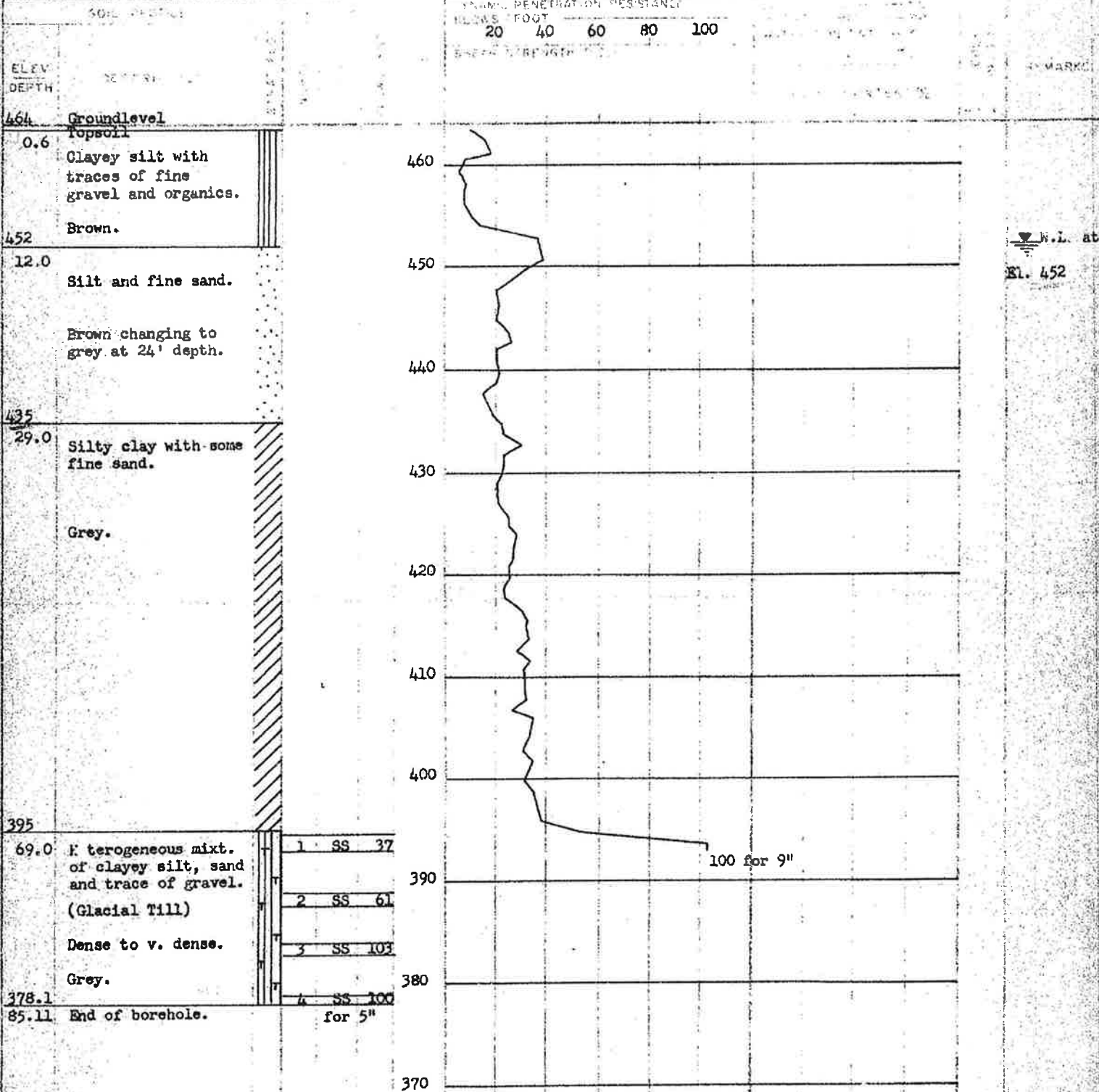
B.M.G.

DATE G.S.C.

Washboring using BX casing.

DATE

M.D.





DEPARTMENT OF THE ARMY  
MATERIAL & ENGINEERING

COORDINATE OF LOCATION

2

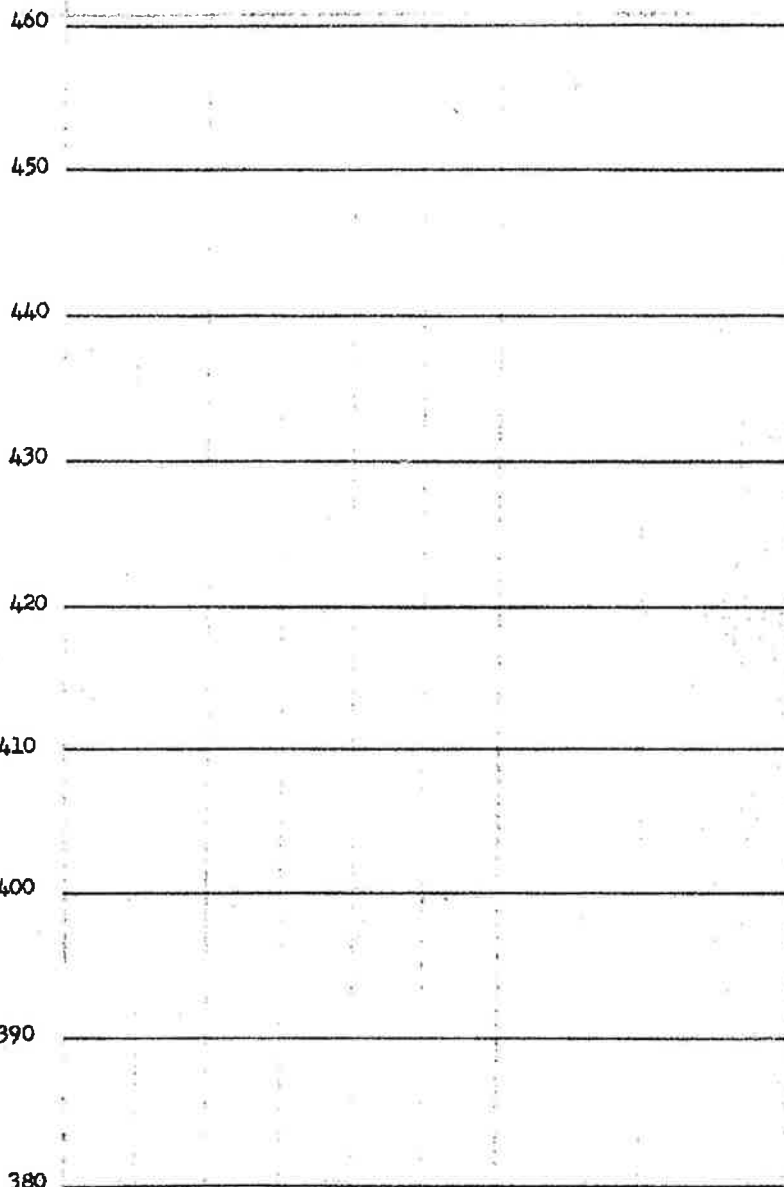
64-F-41  
W.D. 252-61-3  
G.S.C.

Stn. 129/73 and 135' Rt. of E, Hwy. 401  
May 29, 1964.  
Washboring using BX casing.

B.M.G.  
B.M.G.  
M.D.

461	Groundlevel
0.6	Topsoil Clayey silt with some sand and fine gravel. Traces of organics.
452	
9.0	Silt and fine sand.  Brown changing to grey at 23' depth.
429	
32.0	Silty clay with some fine sand.  Grey
393	
68.0	Heterogeneous mixt. of clayey silt, sand and trace of gravel. (Glacial Till) V. dense. Grey.
380	
81.0	End of borehole.

1	SS	52	390
2	SS	100	
		for 10"	
3	SS	100	380



W.L. at  
El. 447.0

64-F-41  
252-61-3  
G.S.C.

Stn. 130+75 and 130' Rt. of G. Hwy. 401  
June 2, 1964.  
Washboring using BX casing.

B.M.G.  
H.M.G.  
M.D.

459.5 Groundlevel

0.6  
Clayey silt with  
trace of sand.  
  
Brown.

460

450

445.5

14.0 Silt and fine sand.  
Brown changing to  
grey at 19'-6" depth.

440

434.5

25.0 Silty clay with  
some fine sand.  
  
Grey.

430

420

410

400

391.0

68.6 Heterogeneous mixt.  
of clayey silt, sand  
and trace of gravel.

(Glacial Till)

Dense to v. dense  
Grey

1 SS 41

2 SS 37

3 SS 100  
for 11"

4 SS 100  
for 6"

390

380

374.0

85.6 End of borehole.

370

W.L. a  
El. 444.2

DEPARTMENT OF THE ARMY  
ENGINEERING CENTER  
WASHINGTON, D. C.

# RECORD OF BOREHOLE NO. 4

JOB 64-F-41

Stn. 127-75 and 133! Lt. of g. Hwy. 401

B.M.G.

W.P. 252-61-3

June 3, 1964.

B.M.G.

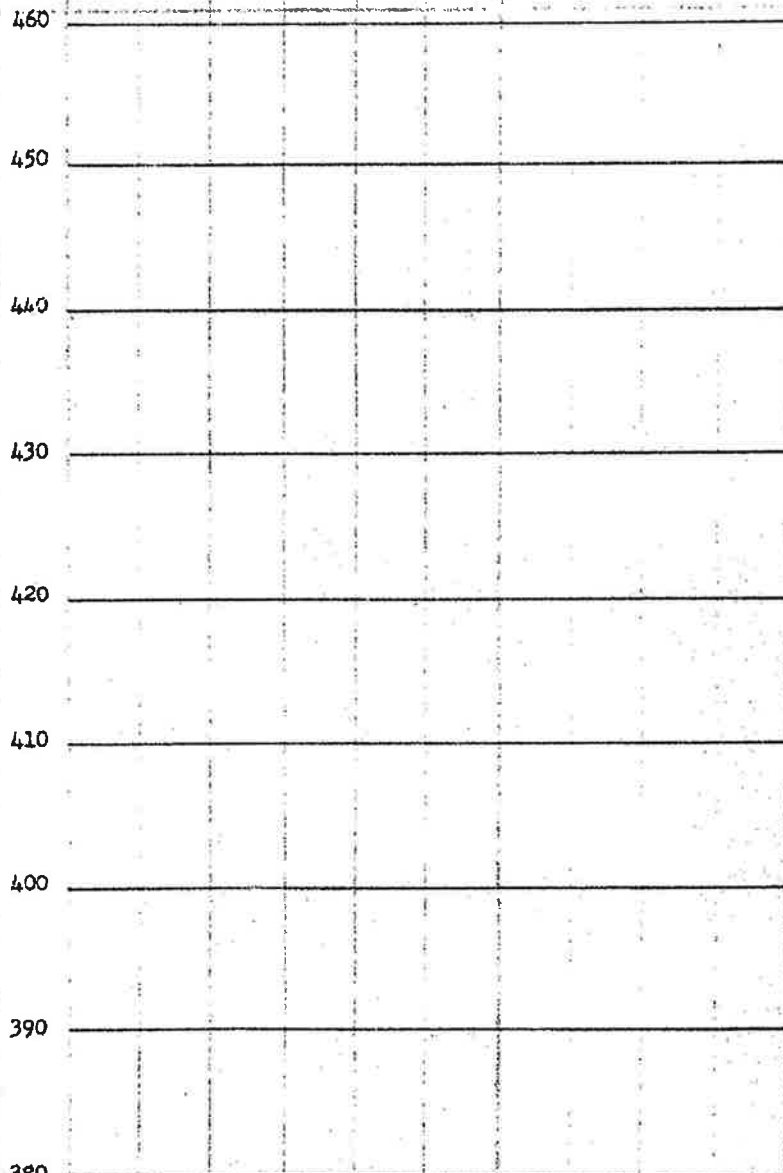
DATE G.S.C.

Washboring using BX casing.

M.D.

ELEV.  
DEPTH

461	Groundlevel topsoil	
0.6	Clay silt, sand and trace of fine gravel.	
452	Brown	
9.0	Silt and sand.	
	Brown	
440		
21.0	Silty clay with some fine sand.	
	Grey.	
393		
68.0	Heterogeneous mixt. of clayey silt, sand and gravel. V. dense Grey	1 SS 100 for 7" 390
		2 SS 100 for 6"
380		3 SS 100 380
81.0	End of borehole.	for 6"



W.L. at  
El. 449.8

FOUNDATION SECTION

CHECKED BY M.D.

SOIL PROFILE		SAMPLES		ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W		BULK DENSITY P.C.F.	REMARKS				
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F.				WATER CONTENT %			
							+ Field Vane Test o Unconf. Compr. Test							
						20	40	60	80	100	10	20	30	
						200	400	600	800	1000				
461	Groundlevel					460								
0.6	Silty sand with traces of fine gravel, clayey silt and organics to El. 445. Loose to compact. Brown changing to grey at El. 440.		1	SS	9									
			2	SS	13	450								
			3	SS	8									
			4	SS	8	440								
438			5	TW	22									
23.0	Silty clay with some sand and trace of fine gravel.		6	TW	P	430								
	Firm to stiff.		7	TW	P									
	Grey		8	TW	P	420								
			9	SS	5	410								
			10	TW	P									
399.5			11	SS	4	400								
61.6	Heterogeneous mixt. of sand, gravel up to 1"Ø and clayey silt. (Glacial Till) V. dense Grey.		12	SS	101									
			13	SS	100	390								
					for 7"									
			14	SS	100									
					for 6"									
380.7			15	SS	100	380								
80.4	End of borehole.				for 4"									
						370								



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 130+00 & 136' Lt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
 W.P. 252-61-3 BORING DATE June 4, 1964. COMPILED BY B.M.G.  
 DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES		ELEV SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE		BLOWS / FOOT	BLows / FOOT	PLASTIC LIMIT ——— WP	WATER CONTENT ——— W		
459	Groundlevel				460						
0.0	Clayey silt with some sand. Brown.				450						
448					440						
11.0	Silt and fine sand. Brown changing to grey at 21' depth.				430						
433					420						
26.0	Silty clay with some sand and fine gravel. Grey.				410						
396					400						
63.0	Heterogeneous mixt. of clayey silt, sand and some fine gravel. (Glacial Till) Dense to v. dense. Grey.		1	SS	4						
			2	SS	33						
			3	SS	66						
			4	SS	100						
					for 6"						
378.5			5	SS	100						
80.6	End of borehole.				for 6"						
					370						

W.L. at  
El. 445

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 7

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 131+00 and 141' Lt. of E. Hwy. 401 ORIGINATED BY B.H.G.  
 W P 252-61-3 BORING DATE June 8, 1954 COMPILED BY B.H.G.  
 DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	PLASTIC LIMIT ——— WP		
							WATER CONTENT ——— W		
458	Groundlevel					460	WATER CONTENT %	P.C.F.	
0.6	Topsoil								
	Clayey silt with sand and gravel.					450			W.L. at
	Brown.					440			El. 448.9
437									
21.0	Silt and fine sand with organic wood material around El. 433.					430			
424									
34.0	Silty clay with some sand.					420			
	Grey.					410			
						400			
391									
67.0	Heterogeneous mixt. of clayey silt, sand and gravel up to 1"Ø. (Glacial Till) V. dense Grey		1	SS	100				
				for 6"					
			2	SS	100				
				for 9"					
			3	SS	100				
				for 9"		380			
377			4	SS	100				
81.0	End of borehole.					370			

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 8

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 132+75 and 142' Lt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 8, 1964. COMPILED BY B.M.G.  
DATUM C.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— W <sub>L</sub>			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT	PLASTIC LIMIT ——— W <sub>P</sub>	WATER CONTENT ——— W	WATER CONTENT %			
											SHEAR STRENGTH P.S.F.		
471	Ground level					470							
0.6													
	Silty sand, trace of clayey silt in places.					460							
	Brown changing to grey at El. 434												
						450							
						440							
						430							
426						420							
45.0	Silty clay with some sand.												
	Grey.					410							
						400							
						390							
385						380							
86.0	Heterogeneous mixt. of clayey silt, sand & trace of gravel up to 1/2" Ø. V. dense Grey		1	SS	101								
			2	SS	80								
			3	SS	100								
					for 9"								
			4	SS	100								
					for 10"								
100.10	End of borehole.												

W. Lat

El. 445.2

W.L. at  
El. 445.2

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 9

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 127+95 and 218' Lt. of E ORIGINATED BY B.M.G.  
 W.P. 252-61-3 BORING DATE June 11, 1964. COMPILED BY B.M.G.  
 DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT ——— w <sub>L</sub> PLASTIC LIMIT ——— w <sub>p</sub> WATER CONTENT ——— w				BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT				w <sub>p</sub> ——— w ——— w <sub>L</sub> WATER CONTENT %					
466	Groundlevel														
	Clayey silt and some sand.				460										
	Brown.														
451					450										
15.0	Silt & fine sand.														
	Gray														
18.0															
	Silty clay with some sand.				440										
	Gray.														
					430										
					420										
					410										
407															
59'	Heterogeneous mixt. of sand, fine gravel and clayey silt. (Glacial Till) V. dense Gray		1	SS	81										
			2	SS	100	400									
					for 10"										
			3	SS	100										
					for 5"										
390.2			4	SS	100	390									
75.10	End of borehole.				for 4"										
					380										

W.L. at  
El. 451.7



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

# RECORD OF BOREHOLE NO. 10

FOUNDATION SECTION

JOB 64-P-41 LOCATION Stn. 126+43 and 175' Lt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 10, 1964. COMPILED BY B.M.G.  
DATUM C.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT - W.P.		BULK DENSITY	REMARKS
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	W.P.	W.P.		
460	Groundlevel				460				
	Clayey silt, sand and fine gravel. Brown.				450				
15.0	Silt. Br. grey				440				
17.6	Silty clay with some sand. Grey.				430				
					420				
					410				
400					400				
60.0	Heterogeneous mixt. of clayey silt, sand & gravel up to 1/2"Ø. (Glacial Till) V. dense Grey	1	SS	78					
		2	SS	100					
				for 4"					
		3	SS	100	390				
				for 4"					
384		4	SS	100					
76.0	End of borehole.			for 6"	380				

W.L. at  
El. 451.3

DEPARTMENT OF HIGHWAYS - DIVISION  
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 11

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 127+95 and 118' Rt. of E. Hwy. 401 ORIGINATED BY D.M.G.  
W.P. 252-61-3 BORING DATE June 12, 1964. COMPILED BY B.M.G.  
DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY K.D.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE	BLOWS / FOOT	ELEV SCALE	BLOWS / FOOT	PLASTIC LIMIT ——— WP		
							WATER CONTENT ——— W		
466	Groundlevel Topsoil						WP ——— WL		
0.6	Silty fine sand. Brown.				460				W.L. at El. 459.5
449					450				
17.0	Silty clay with some sand and gravel. Grey.				440				
					430				
					420				
			1 SS 18		410				
401.5					400				
64.6	Heterogeneous mixt. of clayey silt, silt, sand & trace of fine gravel. (Glacial till) V. dense Grey.		2 SS 100 for 6"						
			3 SS 12						
			4 SS 103						
			5 SS 100 for 10"		390				
385			6 SS 100						
81.0	End of borehole.		for 6"		380				

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 12

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 129/35 and 120' Rt. of G. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 15, 1964. COMPILED BY B.M.G.  
DATUM U.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT --- WL		BULK DENSITY X P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLCT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	BLOWS / FOOT	PLASTIC LIMIT --- WP		
								WATER CONTENT --- W		
460	Groundlevel					460		WL		
0.6	Clayey silt, some sand and fine gravel. Brown.					450		WP		
446.5										
13.6	Silt and fine sand. Brown changing to grey at El. 436.					440				
433										
27.0	Silty clay with some sand. Grey.					430				
						420				
						410				
						400				
392										
68.0	Heterogeneous mixt. of clayey silt, sand, & trace of gravel up to 3/4" (Glacial till) V. dense Grey.		1	SS	36	390				
			2	SS	82					
379.0			3	SS	100	380				
81.0	End of borehole.				for 6"					

W.L. at  
El. 447.5

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 13

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 131/32 and 173' Rt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 16, 1964. COMPILED BY B.M.G.  
DATUM U.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY H.D.

SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	PLASTIC LIMIT ——— WP	WATER CONTENT ——— W		
459	Groundlevel			460						
0.0	Clayey silt, with some sand and fine gravel. Brown.			450						
16.0	Silt and fine sand Grey			440						
19.0	Silty clay with some sand. Grey.			430						
				420						
				410						
				400						
				390						
387.6										
71.5	Heterogeneous mixt. of clayey silt, sand & trace of gravel up to 1"Ø. (Glacial till) V. dense Grey.	1	SS	100						
		2	SS	100	8"					
		3	SS	100	5"					
373.5		4	SS	100	6"					
85.6	End of borehole.			370						

W.L. a  
El. 445



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 14

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 126+66 and 150' Rt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 16, 1964. COMPILED BY B.M.G.  
DATUM G.S.C. BOREHOLE INFO: Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT - WL		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT	ELEV. SURF.	PLASTIC LIMIT - WP	WATER CONTENT - W		
				SHEAR STRENGTH P.S.F.		WATER CONTENT %			
461	Groundlevel				460				
0'-6"	Clayey silt and sand. Brown.				450				
446					440				
15.0	Silty clay with some sand. Grey				430				
					420				
					410				
401.7					400				
59.4	Heterogeneous mixt. of clayey silt, sand & trace of gravel up to 1"Ø. (Glacial till) V. dense Grey.	1	SS 100 for 6"						
		2	SS 100 for 4"						
		3	SS 100 for 4"		390				
385.5		4	SS 100 for 6"						
75.5	End of borehole.				380				

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 15

FOUNDATION SECTION

JOB 64-F-41LOCATION Stn. 132+50 & 148' Rt. of E. Hwy. 401ORIGINATED BY B.M.C.W.P. 252-61-3BORING DATE June 18, 1964.COMPILED BY B.M.C.DATUM G.S.C.BOREHOLE TYPE Washboring using BX casing.CHECKED BY M.D.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— W <sub>L</sub> PLASTIC LIMIT ——— W <sub>P</sub> WATER CONTENT ——— W <sub>c</sub>		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.			
470	Groundlevel				470				
0.0	Silt & fine sand. Traces of clay and fine gravel.  Brown changing to grey at El. 434				460				
					450				
					440				
431.5					430				
38.6	Silty clay with some sand.  Grey.				420				
					410				
					400				
389					390				
81.0	Heterogeneous mixt. of clayey silt, trace of sand & gravel up to 1"Ø. (Glacial till) V. dense.		1 SS 106						
			2 SS 100						
			for 11"						
379	Grey.		3 SS 100						
91.0	End of borehole.		for 6"						

W.L. at  
El. 429.5

 W.L. at  
El. 429.5

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

# RECORD OF BOREHOLE NO. 16

FOUNDATION SECTION

JOB 64-F-41 LOCATION Stn. 134/15 and 143' Rt. of E. Hwy. 401 ORIGINATED BY B.M.G.  
W.P. 252-61-3 BORING DATE June 18, 1964 COMPILED BY B.M.G.  
DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— WL			BULK DENSITY P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	BLOWS / FOOT	BLANK	PLASTIC LIMIT ——— WP	WATER CONTENT ——— W	WATER CONTENT %		
451	Groundlevel					450							
0'-6"	Silty fine sand, trace of clay and fine gravel.  Brown.					440							
17.0'	Silt and trace of fine sand. Grey					430							
22.0'	Silty clay with some sand.  Grey.					420							
						410							
						400							
						390							
386.2													
64.10	Heterogeneous mixt. of clayey silt, silt, sand & trace of gravel up to 3/4". (Glacial till) V. dense Grey		1	SS	63								
			2	SS	108								
			3	SS	100	380							
					for 11"								
			4	SS	64								
369.5													
31.6	End of borehole.		5	SS	81	370							

W.L. at  
El. 421.7

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 17

FOUNDATION SECTION

JOB 64-F-41

LOCATION Stn. 125.65 and 145' Rt. of B Hwy. 401

ORIGINATED BY B.M.G.

W P 252-61-3

SPRING DATE June 22, 1964.

COMPILED BY B.M.G.

DATUM C.S.C.

BORE HOLE TYPE Washboring using BX casing.

CHECKED BY \_\_\_\_\_ M.D.

SOIL PROFILE		SAMPLES				DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— W <sub>L</sub> PLASTIC LIMIT ——— W <sub>P</sub> WATER CONTENT ——— W <sub>c</sub>	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F.	WATER CONTENT %		
476	Groundlevel								
0'-6"	Topsoil								
	Clayey silt, sand and gravel.				470				
	Brown to br. grey.								
					460				
					450				
440.5					440				
35.6	Silty clay with some sand and gravel.								
	Grey.				430				
					420				
					410				
403					400				
73.0	Heterogeneous mixt. of clayey silt, sand & some gravel up to 1"Ø. (Glacial till) V. dense Grey.		1	SS	92				
			2	SS	87				
390			3	SS	100				
86.0	End of borehole.				for 9"				



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 18

FOUNDATION SECTION

JOB 64-P-41 LOCATION Stn. 124+80 and 194' It. of E Hwy. 401 ORIGINATED BY B.M.O.  
W.P. 252-61-3 BORING DATE June 23, 1964. COMPILED BY B.M.O.  
DATUM G.S.C. BOREHOLE TYPE Washboring using BX casing. CHECKED BY M.D.

SOIL PROFILE			SAMPLES		ELEV. SCA.	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT $W_L$		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	BLOWS / FOOT	PLASTIC LIMIT $W_P$	WATER CONTENT $W$		
461.5	Groundlevel										
0.0	Clayey silt and sand. Brown.				460						
					450						
446.5											
15.0	Silt Grey				440						
17.0	Grey silty clay with some sand. Grey.				430						
					420						
					410						
403.0											
58.6	Heterogeneous mixt. of clayey silt, sand and gravel up to 2" Ø, (Glacial till) Boulder at 66'-6" V. dense. Grey.		1	SS 100 for 6"	400						
395.0			2	SS 100 for 6"							
66.6	End of Bore Hole										

W.L.  
at El. 455



DEPARTMENT OF HIGHWAYS ONTARIO  
MEMORANDUM

CL: GEN. FILES

23-65-205.

Mr. A. M. Toye,  
Bridge Engineer,  
Bridge Division.

FROM: Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Attention: Mr. S. McCosbie

DATE: April 9, 1965

OUR FILE REF.

IN REPLY TO

SUBJECT:

REPORT ON VERTICAL AND LATERAL LOAD  
TESTS ON 30" Ø CONCRETE CAISSON AND  
STEEL H-PILE AT LESLIE STREET AND  
HWY. 401 INTERCHANGE, DISTRICT No. 6.

W.J. 63-F-129 -- W.P. 266-61

Attached, we are sending you the above-mentioned report for your use. We believe that it contains all information necessary for your future design work and that, also, adequate data for construction purposes is provided. However, should you feel that there are some additional problems that you would like to discuss, please feel free to call on our Office.

AGS/MdeF  
Attach.

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
H. D. McMillan  
G. K. Hunter (2)  
J. C. Thatcher  
T. J. Kovich  
A. Watt

*A. G. Stermac*  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

Foundations Office  
Gen. Files ✓

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 211

FOUNDATION SECTION

JOB 63-F-129

LOCATION Sta. 130+43 &amp; 181' left of E. Hwy. 401

ORIGINATED BY B.M.G.

W.P. 150-61

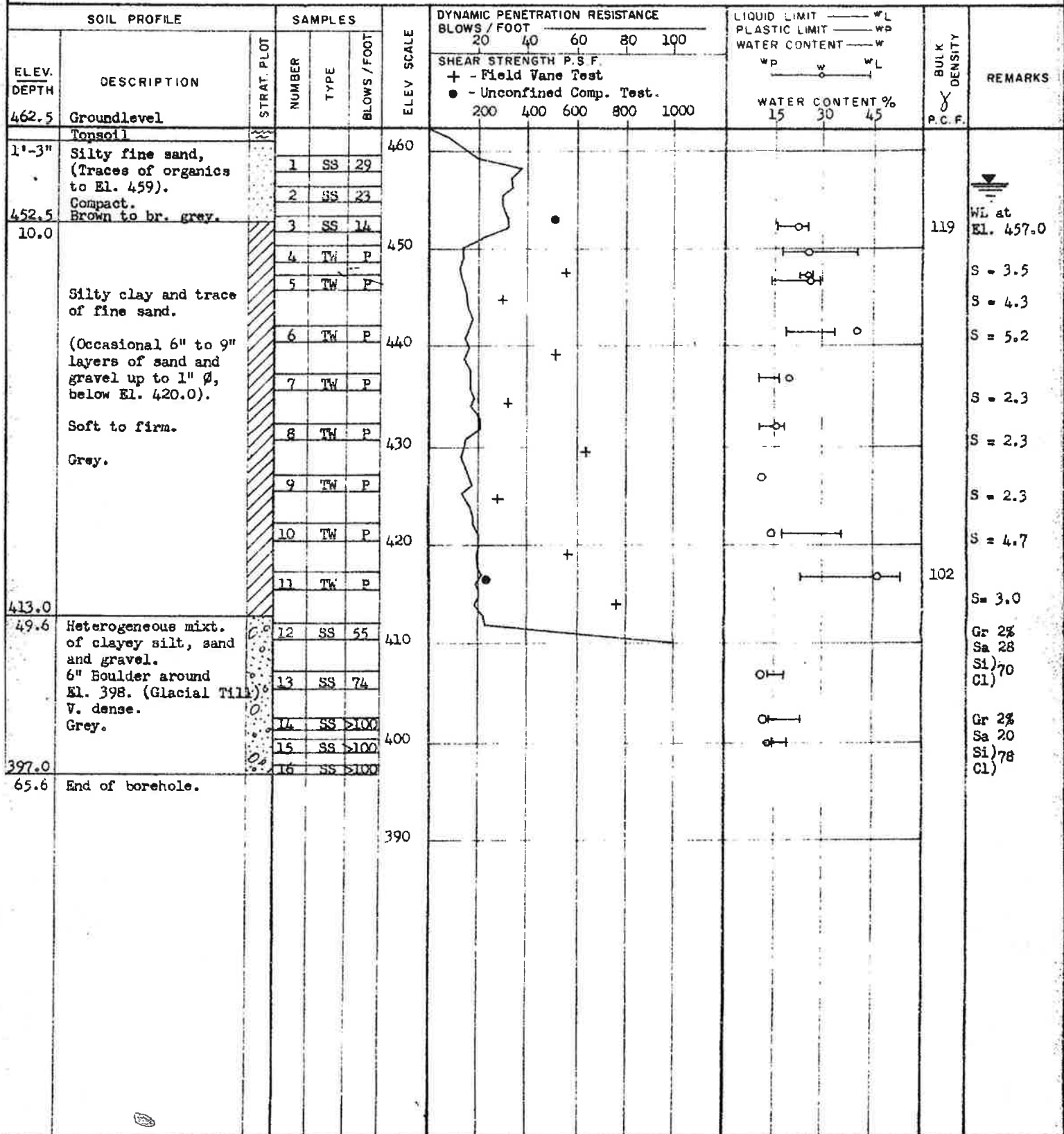
BORING DATE Nov. 28, 1963.

COMPILED BY B.M.G.

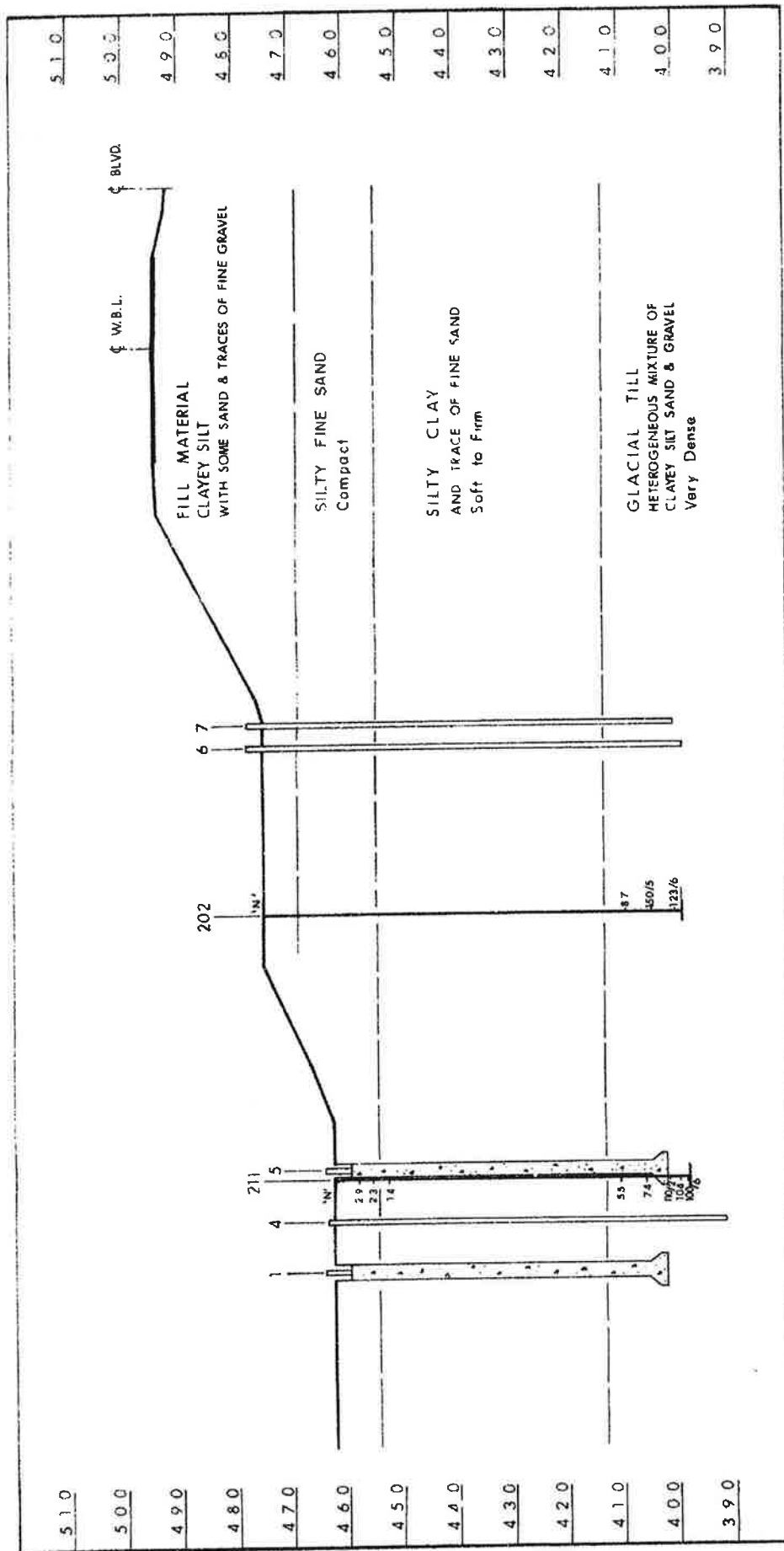
DATUM G.S.C.

BOREHOLE TYPE Washboring using HX and BX casings.

CHECKED BY M.D.





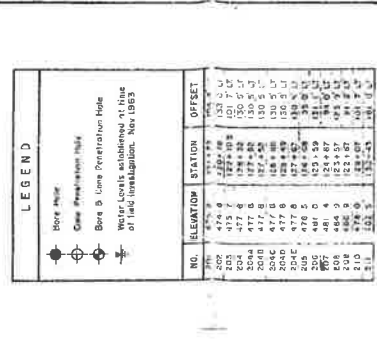
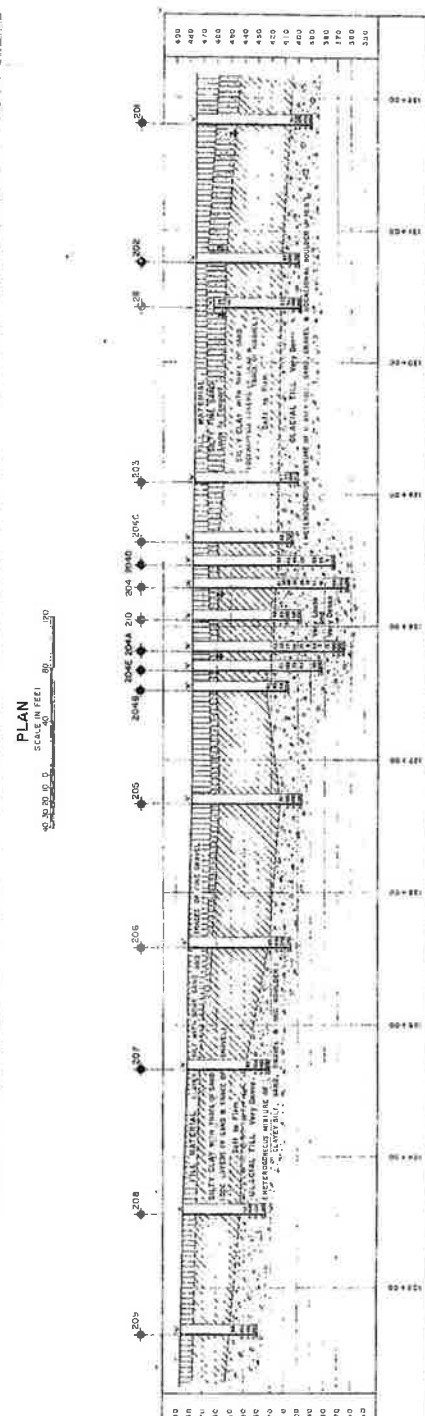


SCALE : 1 INCH = 20 FEET

BORE HOLES - 202 & 211  
 CONCRETE ANCHOR CAISSON - 1 & 5  
 14" BP a 73 STEEL 'H' PILES - 4, 6 & 7

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & TESTING DIVISION	SECTION THROUGH PILES	
	STATION 130+70± (OLD STATIONS)	
	W.P. 150-61	JOB. 63-F-129
DATE 26 FEB. 1964	APPROVED <i>[Signature]</i>	DRAWING N° 63-F-129 C

DEFECTS IN NEGATIVE DUE TO  
 CONDITION OF ORIGINAL DOCUMENT



**- NOTE -**

The boundaries between soil profiles have been established only at Elmer Hole locations. Between Elmer Holes, the boundaries are assumed from geological evidence and may be subject to considerable error.

Switzerland	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	296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[illegible]

SECTION 'A' - 'A'

SCALE IN FEET

0 20 40 60 80

[illegible]



MEMORANDUM

28-65-205  
Re: Caisson Installation

Mr. F. Allen,  
District Engineer,  
District #6 (Toronto),  
Central Bldg.

FROM: Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

Attention: Mr. G. Boggis

DATE: January 26, 1967

OUR FILE REF.

IN REPLY TO:

SUBJECT:

-- Caisson Installation --

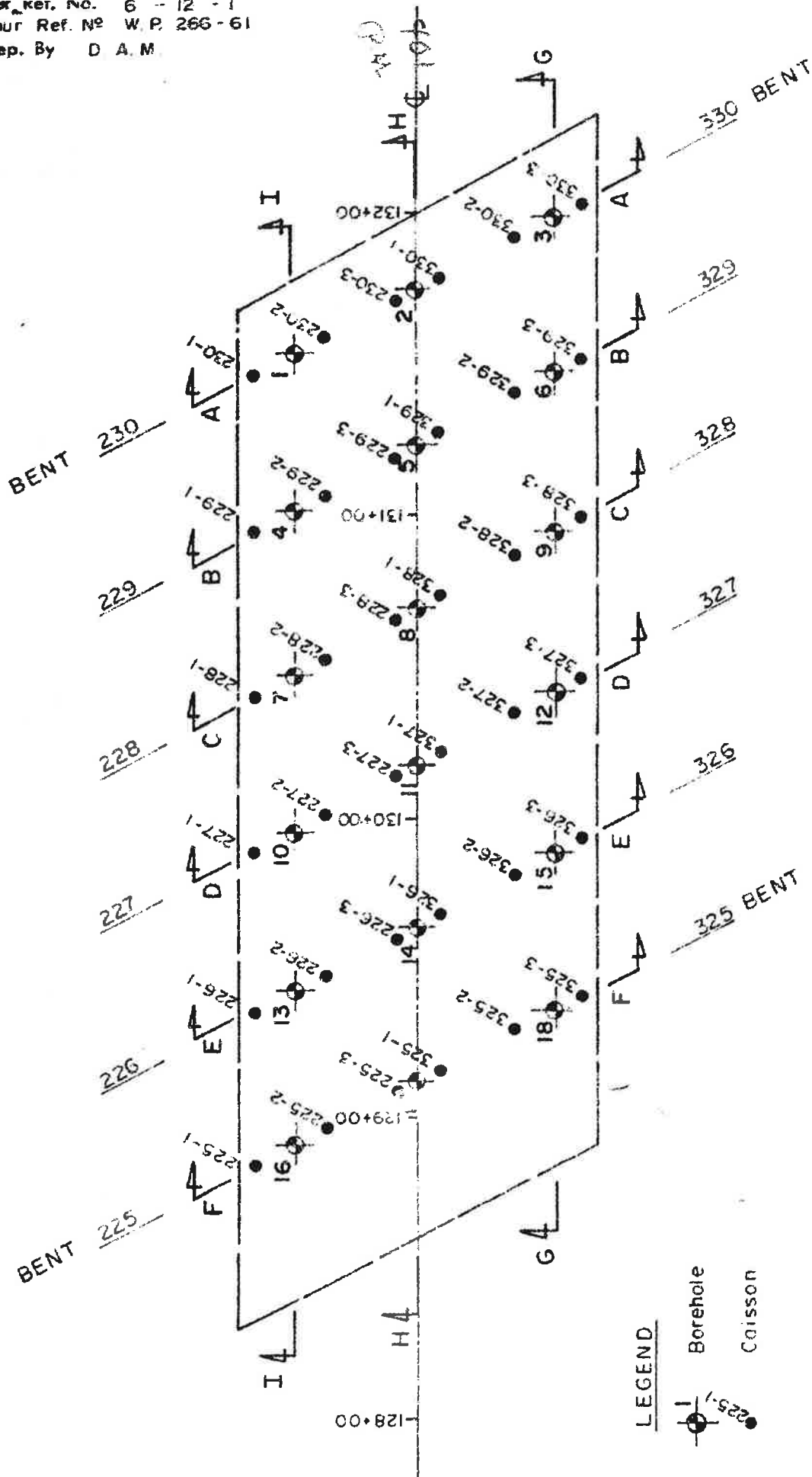
Structure on Leslie Street & Hwy. 401  
Interchange, District No. 6 (Toronto)  
W.P. 252-61-3 -- W.J. 64-F-41  
Contract 65-250  
205

During installation of Caisson #424-3 at the above mentioned site, a blow-out of the caisson base took place shortly after the commencement of concrete pouring operations during February 1966. In conjunction with this, several discussions took place between the members of the Foundation Section and District #6 personnel. Subsequently, additional borings were carried out by this Section in order to make specific recommendations for each individual caisson. These recommendations were given in a memo dated April 6, 1966, from the Foundation Section to Mr. J. C. Thatcher, former District Engineer, Toronto District.

At this stage, it was agreed that the Foundation Section would also carry out additional boreholes for the caissons for the main portion of the trestle (bents 225 to 230, incl. and 325 to 330, incl.) prior to the caisson construction. This Section was requested verbally by Mr. G. Boggis, Construction Supervisor, Toronto District, to carry out the required additional boreholes, and also to provide the recommendations for each individual caisson.

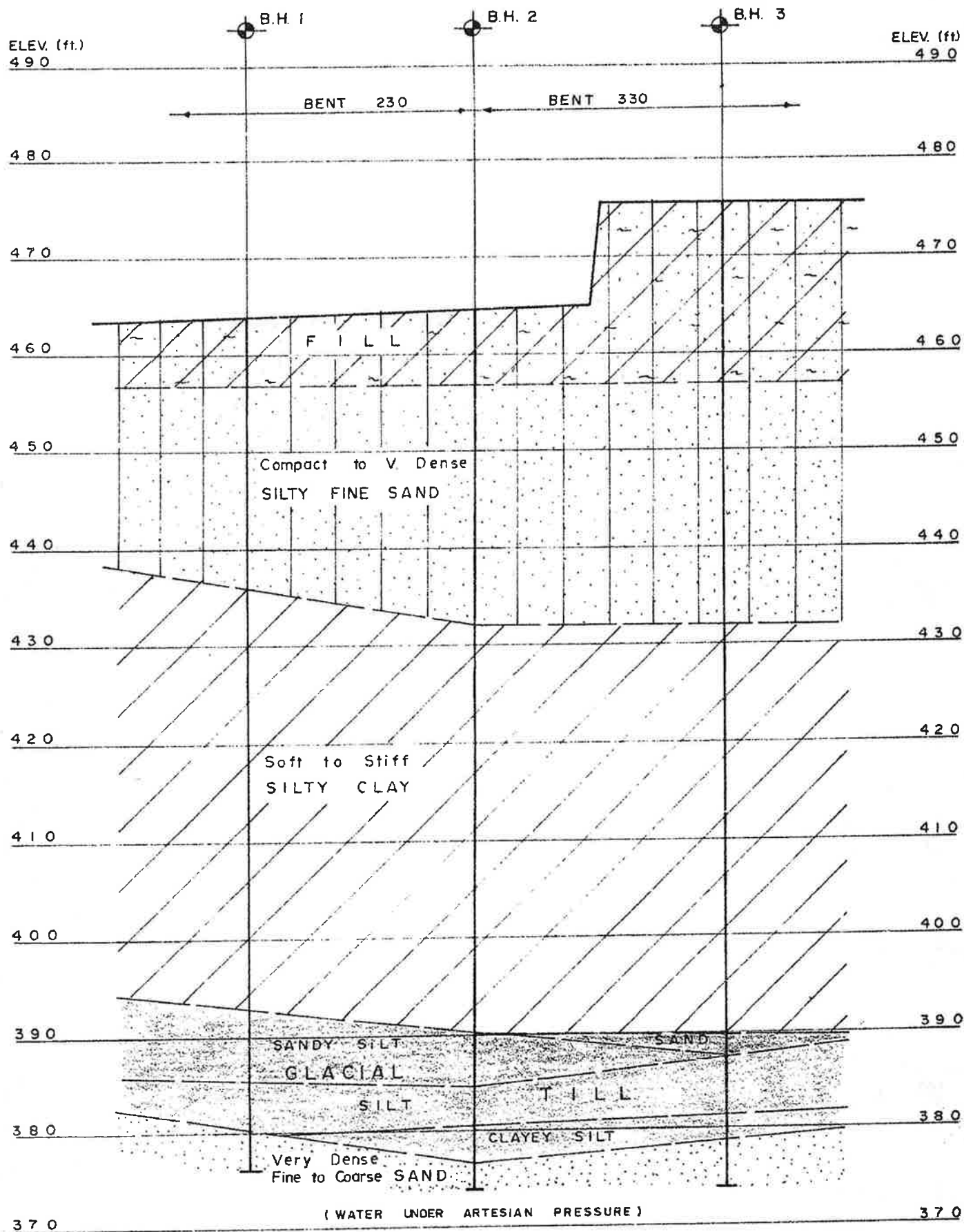
A total of 13 sampled boreholes was put down at this location by Soil Consultants, Dominion Soil Investigation Ltd., Toronto, under the general supervision of the Foundation Section. A brief review of subsoil conditions, together with our recommendations for each individual caisson, follows.





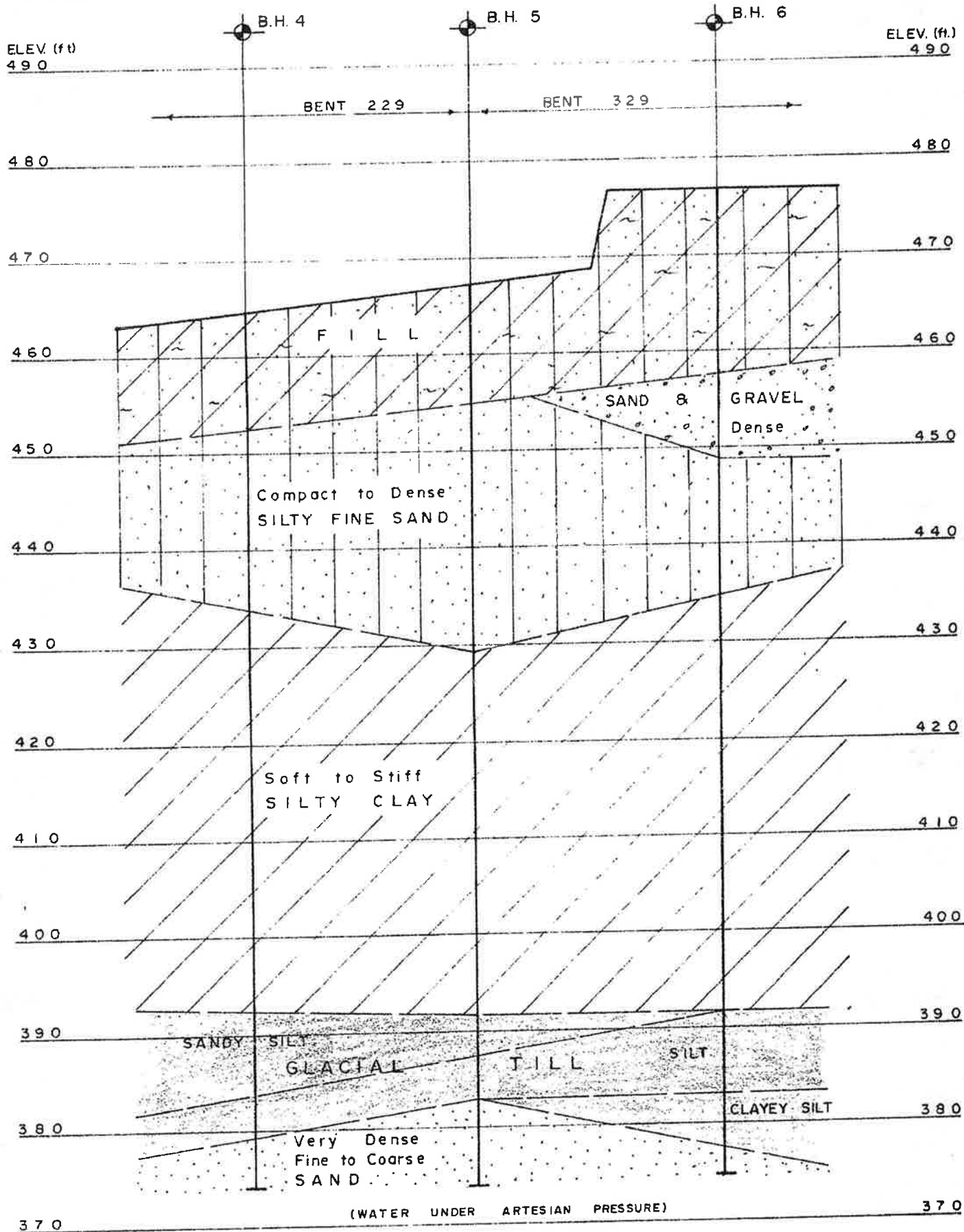
# BOREHOLE LOCATION PLAN

SCALE 1" = 50 Feet



A - A  
 SUBSURFACE PROFILE

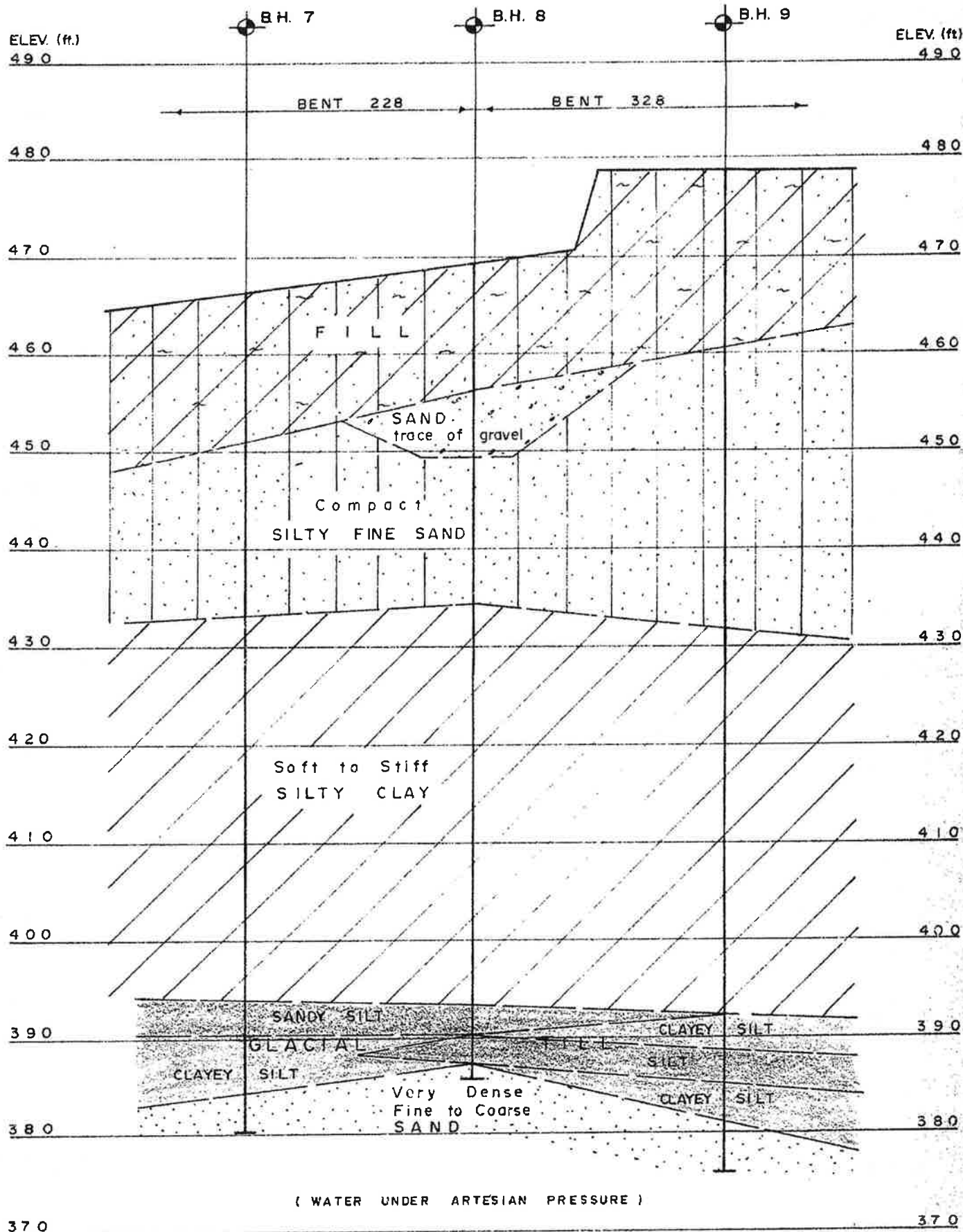
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**B - B**

**SUBSURFACE PROFILE**

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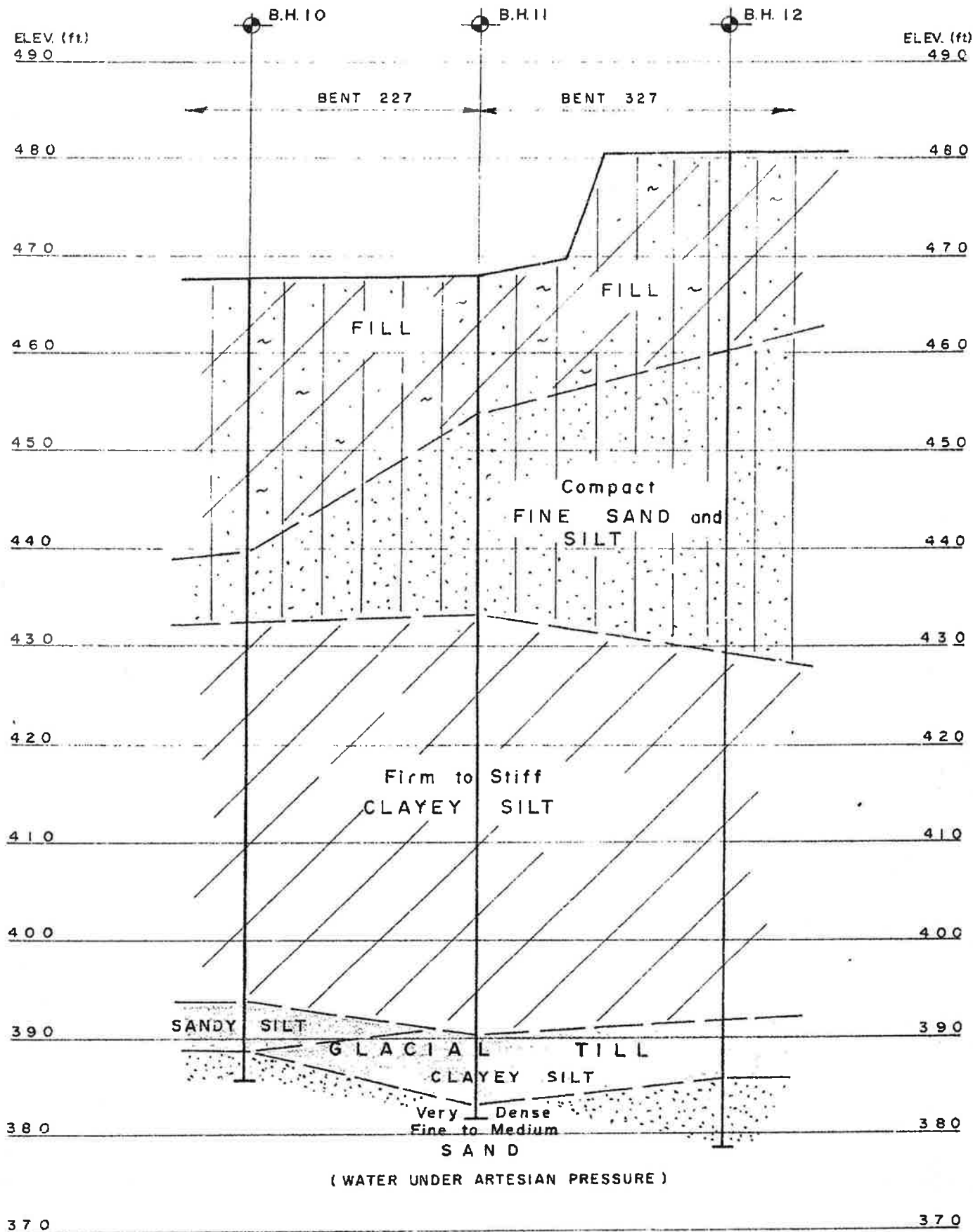


C - C

SUBSURFACE PROFILE

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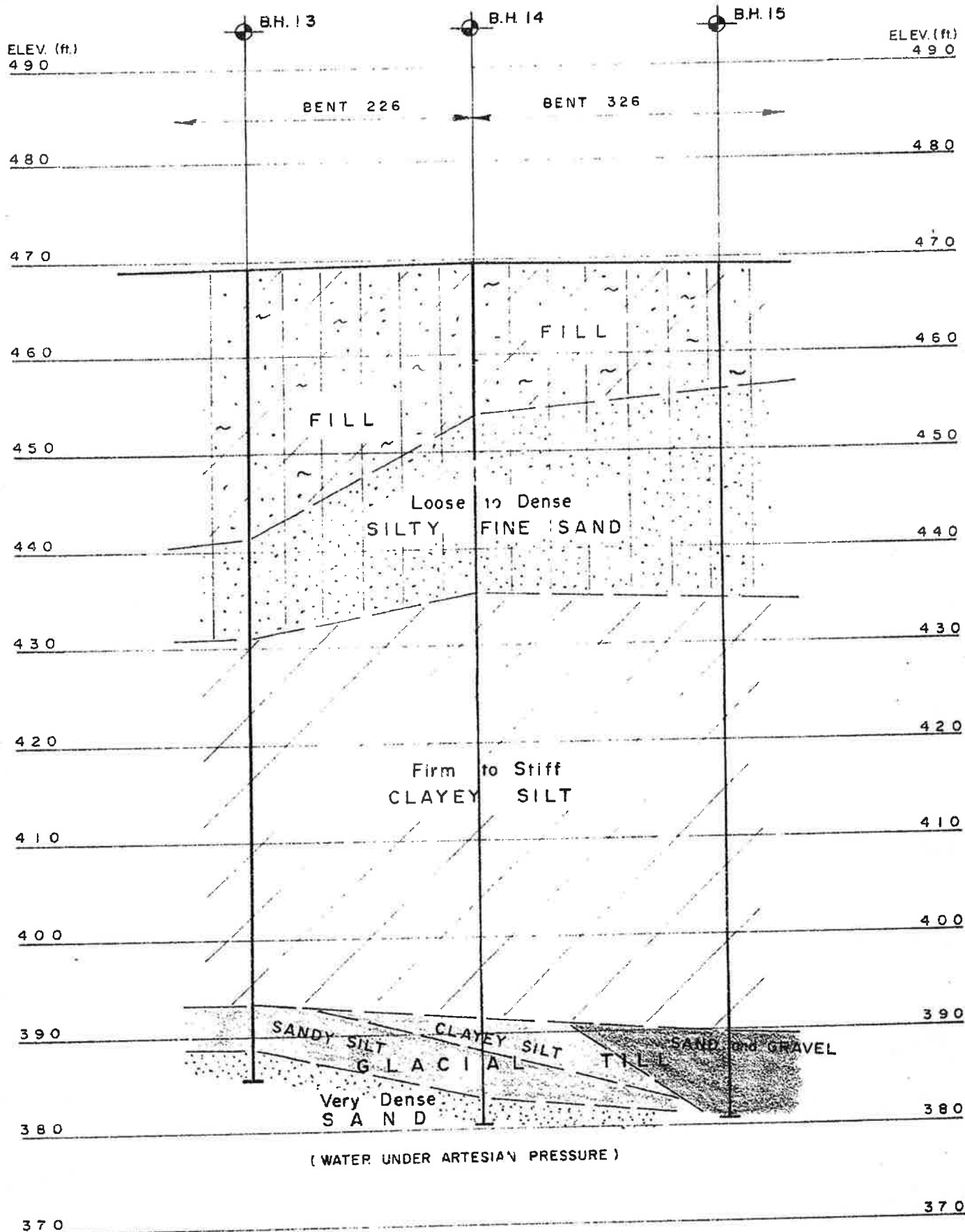




D - D

SUBSURFACE PROFILE

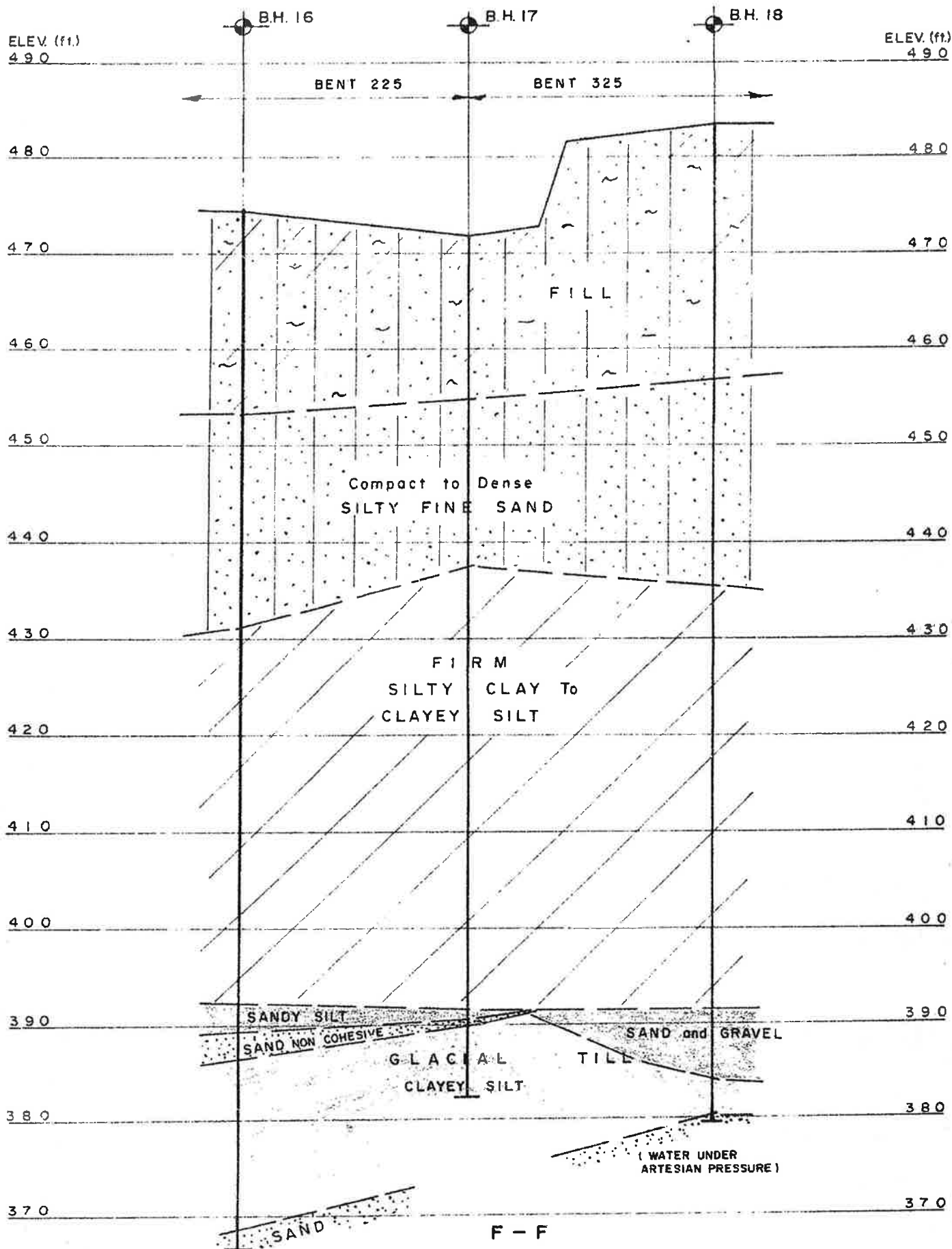
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E - E

SUBSURFACE PROFILE

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SCALE: Horizontal - 1" = 20 Feet  
Vertical - 1" = 10 Feet

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . .

OUR REFERENCE NO 6-12-1  
Your Ref No W.P. 266-61

CLIENT D.H.O.

PROJECT HWY NO 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 230-1 & 230-2  
DATUM ELEVATION G. S. C.

METHOD OF BORING WASHBORING  
DIAMETER OF BOREHOLE 2 3/8"  
DATE JAN. 3-5, 1967

ENCLOSURE NO

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	N or Advance ment of Sampler	2,0	4,0	6,0	8,0	10,0		
463.9	0	GROUND SURFACE											
460													
450	10	Compact to Dense Brown SILTY FINE SAND		1	S.S.	32							
440	20												
435.9	28.0	Soft to Firm Grey CLAYEY SILT to SILTY CLAY with some sand		2	S.S.	4							
430													
420	40			3	S.S.	4							
410	50												
400	60	Sandy below el. 410 ± ft		4	S.S.	11							
392.9	71.0			5	W.S.	—							
390				6	S.S.	13							
385.4	78.5	Very Dense, Grey SANDY SILT with a trace of clay and embedded gravel. (slightly cemented) to SILT with a trace to some clay. (GLACIAL TILL.)		7	S.S.	6.9							
380	83.5			8	S.S.	175/11							
87.4	87.4	Very Dense, Grey FINE to MED. SAND with a trace of fine grav.		9	S.S.	7.8							
				10	S.S.	11.0							
				11	S.S.	164/8							
				12	S.S.	100/6							
				13	W.S.	—							
				14	S.S.	200/6							
370	90	END OF BOREHOLE											

SLIGHT ARTESIAN PRESSURE BELOW EL. 379 ft.

VERTICAL SCALE: 1 IN. TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D.A.M. CH'D



# GEOTECHNICAL DATA SHEET FOR BOREHOLE ... 2 ...

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W.P. 266-61

CLIENT D.H.O.

PROJECT HWY NR 401 @ LESLIE ST.

LOCATION BETWEEN CAISSONS 230-3 & 330-1

DATUM ELEVATION G.S.C.

METHOD OF BORING WASH BORING

DIAMETER OF BOREHOLE 2 3/8"

DATE JAN 5-6, 1967

ENCLOSURE NO.

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot				CONSISTENCY - water content %		REMARKS
				NUMBER	TYPE	N Advancement of Sampler	20	40	60	80	100	PL	
484.7	0	GROUND SURFACE											
460	10	Brown SAND and SILT with some gravel, trace of clay and organic matter. (FILL)											
450	20	to FINE SAND		1	S.S.	69							
440	30	brown-grey											
432.2	32.5			2	S.S.	14							
430	40	FIRM to STIFF Grey SILTY CLAY											
420	50			3	S.S.	5							
410	60	Sandy below El. 410± ft											
400	70			4	S.S.	10							
390	74.5	VERY DENSE, Grey SANDY SILT with embedded gravel.		5	S.S.	63							
	80	to SILT with a trace of clay and gravel. (TILL)		6	S.S.	143							
	84.0			7	S.S.	100/3							
380.7	84.0	HARD, Grey CLAYEY SILT with embedded gravel. (TILL)		8	S.S.	100/4							
380				9	S.S.	100/6							
	88.0			9A	W.S.	-							
376.7	90	VERY DENSE Medium SAND		10	S.S.	100/5							
	90.8			11	W.S.	-							
		END OF BOREHOLE		12	S.S.	46/5							
370	100												

SLIGHT ARTESIAN PRESSURE BELOW EL. 376 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D. A. M. CH'D.

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 3 . . .

OUR REFERENCE NO G - 12 - 1

Your Ref. No W. P. 266-61

CLIENT F. H. O.

PROJECT I. WY. N<sup>o</sup> 401 & LESLIE ST

LOCATION BETWEEN CAISSONS 330-2 & 330-3

DATUM ELEVATION G.S.C.

METHOD OF BORING AUGERING & WASHBORING

DIAMETER OF BOREHOLE 3" 8 2 3/8" ENCLOSURE NO

DATE DEC. 19-23, 1966

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	N <sup>o</sup> or Advance of Sampler	2,0	4,0	6,0	8,0	10,0	PL	W	
475.6	0	GROUND SURFACE												
470		Brown SAND and SILT with some clay FILL												
460	14.0	DENSE, Greenish Brown SILTY FINE SAND with organic matter		1	S.S.	42								
450	18.5	VERY DENSE to COMPACT SILTY FINE SAND		2	S.S.	106								
440	30	Brown Grey (wet below El. 443 ft.)		3	S.S.	12								
430	43.5	FIRM to STIFF Grey SILTY CLAY with a trace of fine gravel and occasional fine sand seams.		4	S.S.	6								
420	50			5	S.S.	5								
410	60			5A	W.S.	—								
400	70			6	S.S.	7								
390	80			7	S.S.	7								
387.6	85.6	DENSE Fine to Coarse SAND		8	S.S.	13								
380	88.0	VERY DENSE, Grey SILT, trace of clay (slight to no cohesion and plasticity)		9A	W.S.	—								
379.1	94.0	HARD CLAYEY SILT (GLACIAL TILL)		9B	S.S.	29								
	96.5	VERY DENSE Medium to Coarse SAND		10	S.S.	72								
	100			11	S.S.	77/5								
	101.5	END OF BOREHOLE		12B	S.S.	110/9								
				13	S.S.	84								
				14A	S.S.	142								
				15	S.S.	137/10								
				16	S.S.	150								
				17	S.S.	—								
				18	S.S.	80/4								

SLIGHT ARTESIAN  
PRESSURE OBSERVED  
BELOW EL. 379.1 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: O. A. M. CH'D.

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 4 . . .

OUR REFERENCE NO. 6 - 12 - 1

Your Ref No. W.P. 266 - 61

CLIENT D. H. O.

PROJECT HWY. No 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 229-1 & 229-2

DATUM ELEVATION G. S. C

METHOD OF BORING WASH BORING

DIAMETER OF BOREHOLE 2 3/8"

DATE JAN. 3 - 4, 1967

ENCLOSURE NO

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N Advancement of Sampler	20	40	60	80	100	PI	W	LI	
464.8	0	GROUND SURFACE													
460		COMPACT to DENSE Brown SANDY SILT with a trace of clay (Possibly Fill)		1	S.S.	100/6"									
452.8	12.0	to													
450		Brown													
	20	FINE SAND with some silt		2	S.S.	35									
440				3	S.S.	24									
433.8	31.0														
430		FIRM to STIFF Grey													
	40	SILTY CLAY		4	S.S.	6									
420		occasional sand seams													
	50														
410															
	56.0	Sandy below el 408 ± ft.		5A B	S.S.	14									
400				6A B	S.S.	41									
	70														
392.3	72.5	VERY DENSE, Grey SANDY SILT with a trace of clay and embedded gravel. (slightly cemented)		7	S.S.	143									
390				8	S.S.	106/6"									
	80			8A	W.S.	—									
				9	S.S.	74									
383.8	81.0			10	S.S.	55									
380		SILT with some fine sand and trace of clay		11	S.S.	85									
379.3	85.5	VERY DENSE, Grey		12	S.S.	154									
	90	FINE to MEDIUM SAND		12A	W.S.	—									
	90.6			13	S.S.	50/7"									
370		END OF BOREHOLE													
	100														

SLIGHT ARTESIAN  
PRESSURE BELOW  
EL. 378 ft.

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 5 . . .

OUR REFERENCE NO 6-12-1  
Your Ref. No W.P. 266-61

CLIENT D. H. O.  
PROJECT HWY. No 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 229-3 & 329-1  
DATUM ELEVATION G. S. C.

METHOD OF BORING WASH BORING  
DIAMETER OF BOREHOLE 2 3/8"  
DATE JAN 5-6, 1967

ENCLOSURE NO

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N- or Advancement of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	LI	
467.3	0	GROUND SURFACE													
460	10	COMPACT to DENSE Brown SAND with some silt and gravel to SILTY FINE SAND		1	S.S.	60									
450	20														
440	30			2	S.S.	42									
430	38.0														
429.3	40	FIRM, Grey CLAYEY SILT to SILTY CLAY with traces of sand and gravel.		3	S.S.	6									
420	50														
410	60			4	S.S.	6									
400	70														
391.8	75.5	VERY DENSE, Grey SANDY SILT with some clay and embedded gravel to SILT with some clay (GLACIAL TILL)		5	S.S.	86									
390	80			6	S.S.	99/3									
				7	S.S.	73									
383.3	84.0			8	S.S.	51									
380	90	VERY DENSE Grey Fine to Medium SAND		9	S.S.	137									
				10	S.S.	175									
				11	W.S.	—									
93.3		END OF BOREHOLE		12	S.S.	100/3									
370	100														

SLIGHT ARTESIAN  
PRESSURE BELOW  
EL. 380± ft.



# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 6 . .

OUR REFERENCE NO. 6 - 12 - 1

Your Ref. No. W.P. 266-61

CLIENT D. H. O.

PROJECT HWY. No. 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 329-2 & 329-3

DATUM ELEVATION G.S.C.

METHOD OF BORING WASH BORING

DIAMETER OF BOREHOLE 2 3/8"

DATE DEC 19 - 23, 1966

ENCLOSURE NO.

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %	REMARKS
				NUMBER	TYPE	N - 2 - Advancement of Sampler	210	410	610	810	1010		
477.0	0	GROUND SURFACE											
470	10	Brown SANDY SILT FILL											
460	18.0	Dark Grey SILT some sand, organic matter		1	S.S.	28							
450	28.0	DENSE, Brown SAND and GRAVEL with some silt		2	S.S.	102							
440	30	COMPACT SILT with some fine sand		3	S.S.	13							
430	40	Brown Grey		4	S.S.	4							
420	50	SOFT to FIRM Grey CLAYEY SILT to SILTY CLAY		5	S.S.	3							
410	60	with occasional fine gravel		6	S.S.	6							
400	70			7	S.S.	4							
390	80			8	S.S.	10							
392.0	85.0	VERY DENSE Grey SILT		9	S.S.	44							
390	90	CLAYEY SILT SEAM with a trace of clay (little or no cohesion)		10	S.S.	77/6							
				11	S.S.	102							
				12	S.S.	95							
				13	S.S.	88							
				14	S.S.	205							
				15	S.S.	150/10							
				16	S.S.	73							
				17	S.S.	150/10							
				18	S.S.	192/10							
				19	S.S.	110/6							
380	93.5	HARD, Grey CLAYEY SILT with embedded gravel (GLACIAL TILL)											
378.0	99.0	VERY DENSE Medium to Coarse SAND											
370	102	END OF BOREHOLE											

SLIGHT ARTESIAN  
PRESSURE AT  
EL. 378 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D. A. M. CND

# GEOTECHNICAL DATA SHEET FOR BOREHOLE ... 7 ...

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W. J. 266-61

CLIENT D.H.O.

PROJECT HWY. No 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 228-1 & 228-2

DATUM ELEVATION G.S.C.

METHOD OF BORING WASHBORING

DIAMETER OF BOREHOLE 2 3/8"

ENCLOSURE NO.

DATE DEC 30, 1966 - JAN. 4, 1967

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N- 6" Advancement of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	LI	
466.3	0	GROUND SURFACE													
460	10	COMPACT Brown CLAYEY - SILTY FINE SAND (FILL)		1	SS	25									
451.3 450	15.0	COMPACT Brown SILTY FINE SAND		2	SS	17									
440	30														
433.3	33.0	SOFT to FIRM Grey SILTY CLAY with occasional brown fine sand seams.		3	SS	4									
430	40														
420	50			4	SS	5									
410	60			5	SS	4									
400	70	Sandy below El. 403 ± ft		6	S.S.	9									
393.8	72.5	VERY DENSE, Grey SANDY SILT with a trace of clay and gravel.		7	S.S.	100/5"									
390	76.0	HARD, Grey CLAYEY SILT with some embedded gravel (GLACIAL TILL)		8	S.S.	86									
	80			9	S.S.	78									
384.3	82.0	VERY DENSE, Grey FINE SAND with pockets of clayey silt.		10	S.S.	197									
380	86.0	END OF BOREHOLE		11	S.S.	150/6"									
				12	WS										
				13	S.S.	150/6"									
	90														BOULDER AT EL. 380 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D. A. M. CH'D

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 8 . . .

OUR REFERENCE NO. 6 - 12 - 1  
Your Ref No. W.P. 266-61

CLIENT D. H. O.

PROJECT HWY. No 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 228-3 & 328-1

DATUM ELEVATION G.S.C.

METHOD OF BORING WASHBORING

DIAMETER OF BOREHOLE 2 3/8"

DATE JAN. 6 - 7, 1967

ENCLOSURE NO

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N <sub>60</sub> or Advancement of Sampler	20	40	60	80	100	PL	W	LI	
							SHEAR STRENGTH      lbs sq ft								
469.1	0	GROUND SURFACE													
		Brown CLAYEY SILT and SAND  (FILL)													
460	10														
456.1	13.0	DENSE, Brown Medium to Fine SAND trace of gravel		1	S.S.	44									
450	20														
449.0		COMPACT, Brown Fine SAND with some silt  (wet)		2	S.S.	24									
440	30														
434.1	35.0														
430	40	FIRM to STIFF  Grey		3	S.S.	8									
420	50	CLAYEY SILT  with some sand													
410	60			4	S.S.	10									
400	70														
393.1	76.0	VERY DENSE, Grey SANDY SILT to		5	S.S.	36									
390	80	SILT with a trace of clay (GLACIAL TILL)		6	S.S.	158									
387.1	82.0	VERY DENSE - SAND		7	S.S.	84									
83.5		END OF BOREHOLE		8	S.S.	100/5									
380	90														
	100														

SLIGHT ARTESIAN  
PRESSURE OBSERVED  
BELOW EL. 387 ft.

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 9 . . .

OUR REFERENCE NO 6-12-1

Your Ref No W.P. 266-61

CLIENT D. H. O.

PROJECT HWY. NO 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 328-2 & 328-3

DATUM ELEVATION G. S. C.

METHOD OF BORING, AUGERING & WASHBORING

DIAMETER OF BOREHOLE 3" @ 2 3/8" ENCLOSURE NO

DATE DEC. 19 - 29, 1966

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot				CONSISTENCY water content $w_u$				REMARKS
				NUMBER	TYPE	N Advancement of Sampler	20	40	60	80	100	PL	W	LI	
478.6	0	GROUND SURFACE													
		Brown SILT and SAND with some gravel and clay.													
		FILL													
				1	S.S.	24									
470	10														
		COMPACT													
		SILTY		2	S.S.	27									
460	20														
		FINE													
		SAND													
450	30														
				3	S.S.										
440	40														
		Brown Grey		4	S.S.	29									
430	50														
		FIRM to STIFF		5	S.S.	6									
		Grey													
420	60														
		CLAYEY SILT		6	S.S.	7									
		with some sand and fine gravel													
410	70														
				7	S.S.	10									
400	80														
		occasional thin sand seams below elev. 404 ft.		8	W.S.	-									
				9	S.S.	16									
				10	S.S.	10									
392.3	86.3														
390	90														
		HARD, Grey CLAYEY SILT		11	S.S.	170/9"									
				12	S.S.	153									
		SILT SEAM (SLIGHTLY COHESIVE)		13	S.S.	130									
		with some embedded gravel		14	S.S.										
		(GLACIAL TILL)													
381.3	97.3														
380	100														
		VERY DENSE MEDIUM to FINE SAND some silt, gravel		15	S.S.	100/6"									
				16	S.S.	148/6"									
		END OF BOREHOLE													

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D.A.M. CH'D



# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 10 . .

OUR REFERENCE NO 6 - 12 - 1  
Your Ref. No 266 - 61

CLIENT D. H. O.

PROJECT: HWY. NO 401 & LESLIE ST

LOCATION: BETWEEN CAISSONS 227-1 & 227-2

DATUM ELEVATION: G. S. C.

METHOD OF BORING WASH BORING

DIAMETER OF BOREHOLE 2 3/8"

DATE JAN. 9, 1967

ENCLOSURE NO

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot				CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N- b Advancement of Sampler	2,0	4,0	6,0	8,0	100	PL	W	
467.5	0	GROUND SURFACE												
460	10	COMPACT Brown SANDY SILT with some clay ( F I L L )		1	S.S.	10								
450	20													
440	28.0	COMPACT, Brown SILTY FINE SAND wet		2	S.S.	21								
439.5	30													
432.5	35.0	FIRM, Grey CLAYEY SILT with some sand		3	S.S.	4								
430	40													
420	50			4	S.S.	8								
410	60													
400	70													
393.5	74.0	VERY DENSE, Grey SANDY SILT with some clay and gravel ( GLACIAL TILL )		5	S.S.	99								
390	79.0			6	S.S.	94								
388.5	80	VERY DENSE, Brown FINE to MEDIUM SAND		7	S.S.	110/3"								
81.9		END OF BOREHOLE		8	S.S.	118/4"								
380	90			9	S.S.									

SLIGHT ARTESIAN  
PRESSURE AT  
EL. 387.5'

VERTICAL SCALE: 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D. A. M. CHD

OUR REFERENCE NO 6-12-1  
Your Ref. N<sup>o</sup> W. P. 266-61

PROJECT: HWY. NO 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 227-3 & 327-1

DATUM ELEVATION G. S. C.

METHOD OF BORING      WASHBORING

DIAMETER OF BORE HOLE  $2\frac{3}{8}"$   
DATE JAN. 13 - 14, 1967

ENCLOSURE NO.

VERTICAL SCALE: 1 IN TO 10 FT

**DOMINION SOIL INVESTIGATION LIMITED**

MADE V. G. H. CHD

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 12 . .

OUR REFERENCE NO. 6-12-1

Your Ref. No. WP. 266-61

CLIENT D. H. O.

PROJECT HWY No 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 327-2 & 327-3

DATUM ELEVATION G. S. C.

METHOD OF BORING AUGERING & WASHBORING

DIAMETER OF BOREHOLE 3" & 2 3/8"

ENCLOSURE NO.

DATE DEC 20-29, 1966

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	N <sub>60</sub> Advancement of Sampler	20	40	60	80	100	PL	W	
180.6	0	GROUND SURFACE												
		Brown SAND and SILT with some gravel and clay.												
		FILL												
	10			1	S.S.	26								
	20	COMPACT FINE SAND and SILT		2	SS	18								
	30			3	SS	16								
	40			4	SS	10								
	50	Brown Grey		5	SS	5								
	60	FIRM to STIFF 9" BOULDER Grey CLAYEY SILT with some fine sand and gravel		6	RC									
	70			7	SS	7								
	80			8	SS	11								
				9	SS	12								
				10	SS	7								
	88.5			11	SS	100								
	90	HARD, Grey SILT with some clay to CLAYEY SILT (GLACIAL TILL)		12	SS	75/6"								
	94.5			13	SS	90/6"								
		VERY DENSE, Grey FINE to MEDIUM SAND with a trace of gravel		14	SS	100/6"								
				15	SS	100/6"								
				16	SS	100/6"								
				17	SS	100/6"								
				18	SS	100/6"								
				19	SS	100/6"								
				20	SS	125/6"								
				21	SS	135/6"								
		BOULDER		22	SS	150/6"								
	101.8	END OF BOREHOLE												

So. 16-W.S. - 95.5' to 96'  
So. 18-W.S. - 96.5' to 97'

So. 22-RC. - 101' to 101.5'

SLIGHT ARTESIAN  
PRESSURE BELOW  
EL 380 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D. A. M.

CH'D:

# GEOTECHNICAL DATA SHEET FOR BOREHOLE...13...

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W.P. 266-61

CLIENT: D. H. O.

PROJECT: HWY. No 401 @ LESLIE ST.

LOCATION: BETWEEN CAISSONS 226-1 @ 226-2

DATUM ELEVATION: G.S.C.

METHOD OF BORING WASHBORING

DIAMETER OF BOREHOLE 2 3/8"

DATE JAN. 9-10, 1967

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	Advance of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	LI	
469.2	0	GROUND SURFACE													
460	10	COMPACT Brown SANDY SILT with some clay (FILL)		1	S.S.	13									
450	20														
441.2 440	28.0 30	LOOSE Brown FINE SAND trace of silt.		2	S.S.	8									
431.2 430	38.0 40														
420	50	STIFF Grey CLAYEY SILT		3	S.S.	8									
410	60	Sandy below el. 413.2'		4	S.S.	17									
400	70			5	S.S.	8									
399.4	75.8			6	S.S.	30									
390	80	VERY DENSE, Grey SANDY SILT with some clay and gravel. (TILL) (cohesive)		7	S.S.	105									
388.7	80.5	VERY DENSE, FINE SAND with layers of HARD CLAYEY SILT		8	S.S.	90									
83.8		END OF BOREHOLE		9	S.S.	166/10									
				10	S.S.	120/4									
380	90														

SLIGHT ARTESIAN  
PRESSURE OBSERVED  
BELOW EL. 387.2'

VERTICAL SCALE: 1 IN. TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D.A.M. CHD:



# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 14 . .

OUR REFERENCE NO. 6-12-1  
 YOUR Ref. No. W. P. 266-61  
 CLIENT: D. H. O.  
 PROJECT: HWY. No. 401 & LESLIE ST.  
 LOCATION: BETWEEN CAISSONS 226-3 & 226-1  
 DATUM ELEVATION: G. S. C.

METHOD OF BORING: WASHBORING  
 DIAMETER OF BOREHOLE: 2 3/8"  
 DATE: JAN. 11 - 12, 1967

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	N <sub>60</sub> Advancement of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	
469.8	0	GROUND SURFACE												
460	10	Brown SAND, SILT some clay FILL												
454.3	15.5	Black, Organic SILTY SAND		1	S.S.	23								
450.8	19.0													
440	30	Loose, Grey SILTY FINE SAND		2	S.S.	7								
435.8	34.0													
430	40	FIRM Grey CLAYEY SILT		3	S.S.	4								
420	50													
410	60	SANDY below EL. 410 ft.		4	S.S.	6								
400	70			5	S.S.	11								
				6	S.S.	8								
391.8	78.0	HARD, Grey, CLAYEY SILT with embedded GRAVEL		7	S.S.	92								
388.3	81.5	VERY DENSE, Grey SILTY FINE SAND some gravel slightly cemented (GLACIAL TILL)		8	S.S.	105/6"								
				9	S.S.	100/4"								
				10	S.S.	125/9"								
383.3	86.5	VERY DENSE, Medium To Coarse SAND		11	S.S.	130/2"								
				12	S.S.	200/2"								
380	89.1	END OF BOREHOLE		13	S.S.	200/2"								
				14	S.S.	200/2"								
370	100													

SLIGHT ARTESIAN  
 PRESSURE OBSERVED  
 BELOW EL. 381 ft.

# GEOTECHNICAL DATA SHEET FOR BOREHOLE 15

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W. P. 266-61

CLIENT D. H. O.

PROJECT HWY. NO 401 & LESLIE ST.

LOCATION BETWEEN CAISSONS 326-2 & 326-3

DATUM ELEVATION G. S. C.

METHOD OF BORING WASHBORING  
DIAMETER OF BOREHOLE 2 3/8"  
DATE JAN. 14 - 17, 1967.

ENCLOSURE NO

DATUM ELEVATION		G. S. U.																	
ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS				
				NUMBER	TYPE	N- or Advancement of Sampler	20	40	60	80	100	PL	W	LI					
GROUND SURFACE																			
469.3	0	Dense, Brown SAND, SILT and GRAVEL FILL																	
460	10																		
456.3	13			1	SS	13													
450	20	Compact to Dense SILTY FINE SAND																	
440	29 30	Brown Grey		2	SS	57/6"													
434.8	34.5																		
430	40	Firm, Grey SILTY CLAY to CLAYEY SILT		3	SS	3													
420	50																		
410	59 60	SANDY below EL. 410 ft.		4	SS	9													
400	70			5	SS	6													
				6	SS	5													
390	79.2 80	Very Dense Grey SAND, GRAVEL and BOULDERS with CLAYEY SILT binder between coarse particles		7	SS	120													
				8	WS														
				9	SS	145													
				10	SS	114/2"													
				11-14	WS SS														
				15	SS	145/5/4													
381.1 380	88.2 90	END OF BOREHOLE		16	SS	100/2"													
370	100																		
CASING AT EL. 390 ft. BOREHOLE CAVING BETWEEN EL. 389 and 385 ft.																			
CASING AT EL. 385 ft. BOREHOLE CAVING BELOW EL. 382 ft.																			

CASING AT EL. 390 ft.  
BOREHOLE CAVING  
BETWEEN EL. 389 and  
385 ft.

CASING AT EL. 385 ft.  
BOREHOLE CAVING  
BELOW EL. 382 ft.

VERTICAL SCALE: 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE V. G. H. CHD

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . 16 .

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W.P. 266-61

CLIENT D.H.O.

PROJECT HWY No 401 & LESLIE ST

LOCATION BETWEEN CAISSONS 225-1 & 225-2

DATUM ELEVATION G.S.C.

METHOD OF BORING

WASHBORING

DIAMETER OF BOREHOLE

2 3/4"

DATE JAN

9-10, 1967

ENCLOSURE NO

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content % Pl W LI	REMARKS
				NUMBER	TYPE	N - b Advancement of Sampler	20	40	60	80	100		
474.6	0	GROUND SURFACE											
470	10	COMPACT Brown SILT with some clay, sand.  (FILL)		1	S.S.	16							
453.6	21.0	DENSE Brown FINE SAND with some silt		2	S.S.	44							
431.6	43.0	FIRM Grey CLAYEY SILT with some sand		3	S.S.	6							
420	50			4	S.S.	6							
410	60			5	S.S.	7							
400	70			6	S.S.	128							
392.6	82.0	VERY DENSE, Grey SANDY SILT with some clay (cohesive)		7	S.S.	100/4							
390	85.0	DENSE SILTY SAND		7A	W.S.	—							
389.6	85.0			7B	S.S.	—							
386.6	88.0	HARD, Grey CLAYEY SILT with embedded gravel and shale fragments		8	S.S.	125/5							
380	90			9	S.S.	100/4							
				10	S.S.	100/5							
				11	S.S.	130/6							
				12	S.S.	135/4							
		BOULDER (GLACIAL TILL)		13	R.C.	—							
				14	S.S.	—							
				15	S.S.	136/6							
				16	S.S.	126/6							
		SAND SEAM		17	S.S.	50/1							
				18	S.S.	102/6							
370		SAND											
108		END OF BOREHOLE											

BOREHOLE CAVES AT  
EL. 388 ft. AND  
SLIGHT ARTESIAN  
PRESSURE OBSERVED.  
DROVE CASING TO  
EL. 385 ft.

ARTESIAN PRESSURE  
OBSERVED BELOW  
EL. 368'

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D.A.M. CH'D

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 17 . . .

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W.P. 266-61

CLIENT D. H. O.  
PROJECT HWY. NR 401 & LESLIE ST.  
LOCATION BETWEEN CAISSONS 225-3 & 325-1  
DATUM ELEVATION G. S. C.

METHOD OF BORING WASHBORING  
DIAMETER OF BOREHOLE 2 3/8"  
DATE JAN. 11-12, 1967.

ENCLOSURE NO

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE		CONSISTENCY		REMARKS
				NUMBER	TYPE	N- Advancement of Sampler	20 lb/ft <sup>2</sup>	100 lb/ft <sup>2</sup>	PL	W	
471.9	0	GROUND SURFACE									
470		COMPACT Brown SILTY SAND with trace of clay and gravel FILL		1	SS	26					
460	10										
454.9	17										
450	20	Loose to Compact Brown SILTY FINE SAND									
440	30										
437.9	34			2	SS	24					
430	40	Firm to Stiff Grey CLAYEY SILT									
420	50										
410	60			3	SS	6					
		SANDY below EL. 412 ft.									
				4	SS	11					
	70			5	SS	9					
391.7	80.2	SANDY SILT TILL SAND		6	SS	87/6					
391.0	80.9			7	SS	73/6					
390.5		HARD, GREY CLAYEY SILT with some sand and embedded gravel and shale fragments (GLACIAL TILL)		8	SS	100/2					
390	81.4			9	SS	95/6					
				10	SS	64/4					
				11	SS	100/6					
382.9	89										
380	90	END OF BOREHOLE									
	100										

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE V. G. H. CHD



# GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 18 . .

OUR REFERENCE NO. 6-12-1  
Your Ref. No. W.P. 266-61

CLIENT D. H. O.

PROJECT HWY. NO 401 & LESLIE ST

LOCATION BETWEEN CAISSONS 325-2 & 325-3

DATUM ELEVATION G. S. C.

METHOD OF BORING AUGERING & WASHBORING

DIAMETER OF BOREHOLE 3" 8 2 3/8"

ENCLOSURE NO

DATE DEC 21 - 31, 1966

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N- b Advancement of Sampler	20	40	60	80	100	PL	W	LI	
483.4	0	GROUND SURFACE													
480		Brown SILTY SAND													
	10	with traces of clay, gravel and organic matter													
470		FILL		1	SS	24									
	20														
460				2	S.S.	79									
	26.5														
450	30	COMPACT to DENSE Brown to Grey FINE SAND with some silt		3	SS	40									
	40														
440															
	46.0			4	S.S.	5									
430	50	FIRM, Grey CLAYEY SILT with a trace of sand and fine gravel.		5	SS	4									
	60														
420															
	70														
410															
	80	Sandy below E' 406 ft.		6	S.S.	9									
				7	S.S.	10									
				8	S.S.	10									
				9	S.S.	9									
				10	S.S.	17									
391.4	92.0	VERY DENSE, Grey SAND, GRAVEL and SILT with some clay. (SLIGHTLY COHESIVE)		11	S.S.	98									
390				12	S.S.	100/6"									
				13	S.S.	100/4"									
384.4	99.0	HARD, Grey CLAYEY SILT (GLACIAL TILL)		14	S.S.	145									
	100														
380	103.0	FINE TO MEDIUM SAND END OF BOREHOLE		15	SS	136									
	103.5														
				</											

SLIGHT ARTESIAN  
PRESSURE OBSERVED  
AT EL. 380 ft.

VERTICAL SCALE 1 IN TO 10 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D.A.M. CHD



R  
CONT 89-106

ENGINEERING MATERIALS OFFICE  
FOUNDATION DESIGN SECTION

WP 260-86-01/A DIST 6  
HWY 401 STR SITE 37-206 R

Structure Widening  
Leslie Street & C.N.R. Overpass

DISTRIBUTION

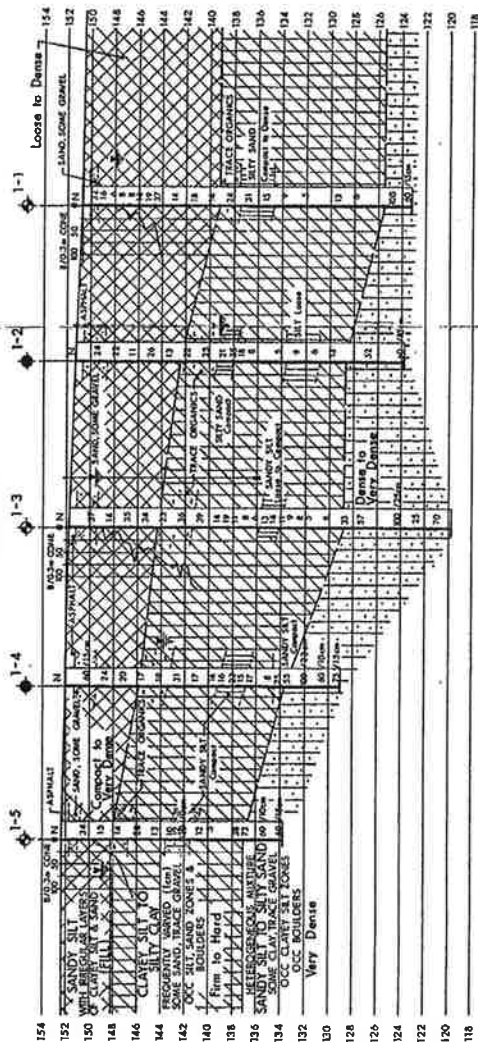
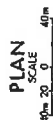
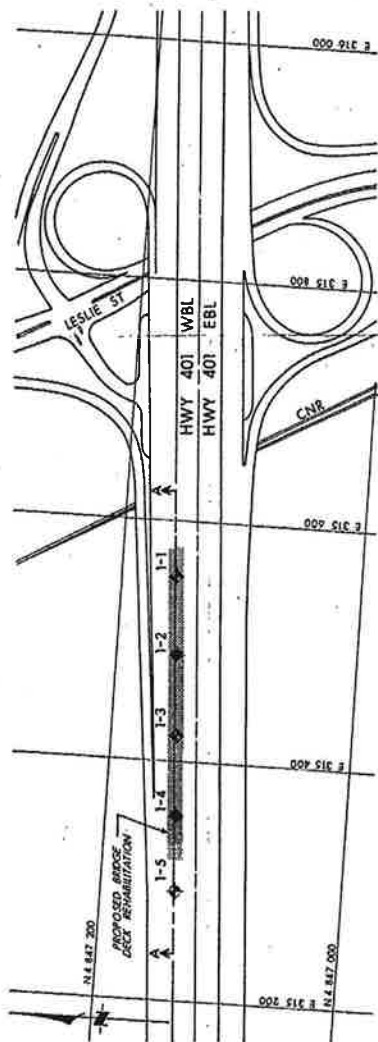
V.F. Boehnke (3)  
G. Cautillo  
J. Smrcka (2)  
A. Wittenberg  
K.G. Bassi  
S. Dunham  
G. Szekreny  
B. Steeves (Cover Only)  
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File

GEOCRES 30M14-191 A

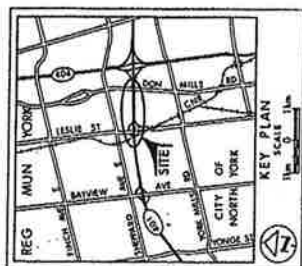
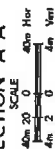
DATE FEB 21 1990

CONT No  
WP No 260-86-01/A









<p>LESLIE ST &amp; CNR OVERPASS HWY 401 WB COLLECTOR LANES</p>	<p>SHEET</p>
--	--------------



SECTION A-A



### LEGEND

- |   |  |
|---|--|
|  | Bore Hole                                      |
|  | Dynamic Cone Penetration Test (Cone)           |
|  | Bore Hole & Cone                               |
|  | Blow/30 cm [Std Pen Test, 475 J/blow]          |
|  | Blows/0.3m [60° Cone, 475 J/blow]              |
|  | WT at base of investigation<br>88 05 and 88 06 |
|  | WT in Piezometer                               |
|  | Piezometer                                     |

No	ELEVATION	CO-ORDINATES NORTH	CO-ORDINATES EAST
1-1	150.8	4 847 154.1	315 554.4
1-2	151.3	4 847 150.0	315 488.8
1-3	151.7	4 847 145.9	315 420.7
1-4	152.0	4 847 141.3	315 354.3
1-5	152.3	4 847 137.2	315 290.6

**-NOTE-**

NOTE—  
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

NOTE: The complete foundation investigation and design report for this project and other related documents may be examined at the Engineering Materials Office, Downview, information contained in this report and related documents is specifically excluded in accordance with the conditions of Section 107-2 of form 100

DATE	BY	DESCRIPTION
		Seacres No 30M14-191 A
		NAVY No. 401
SUBMIT	DO	CHECKED DATE 6-8-07 BY
REVIEW	DO	DATE 7-2-2008
APPROVE	DO	DATE 7-2-2008



# RECORD OF BOREHOLE No 1-1

1 OF 1

METRIC

W.P. 280-86-01/A LOCATION Co-ords. N 4 847 154.1; E 315 554.4 ORIGINATED BY MS  
DIST 5 HWY 401 BOREHOLE TYPE Solid Stem Auger, Cone Test COMPILED BY KA  
DATUM Geodetic DATE 88 05 26-27 CHECKED BY DD

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	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					
150.8	Ground Surface													
0.0	Asphalt													
	Sand, Some Gravel		1	SS	32									
			2	SS	16									
			3	SS	6									
			4	SS	8									
			5	TW	PH									
			6	SS	8									
			7	SS	14									
	Sandy Silt with Irregular Layers of Gloey Silt and Sand Loose to Dense (Fill)		8	SS	19									
			9	SS	37									
			10	SS	14									
			11	SS	16									
139.2			12	SS	14									
11.6	Trace Organics		13	SS	24									
	Silty Sand Compact to Dense		14	SS	31									
			15	SS	15									
			16	SS	9									
	Cloey Silt (CL) to Silty Clay (CI) Frequently Varved (1 cm) Some Sand, Trace Gravel Occ. Silt, Sand Zones and Boulders Firm to Very Stiff		17	SS	5									
			18	TW	PH									
			19	SS	13									
			20	SS	6									
125.5														
25.3	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Cloey Silt Zones Occ. Boulders Very Dense		21	SS	100									
123.1			22	SS	60	/15cm								
27.7	End of Borehole													
	• W.L. Recorded on 88-06-10													

+3, x5: Numbers refer to  
Sensitivity 20  
15-20 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 1-2 1 OF 1 METRIC

W.P. 260-86-01/A LOCATION Co-ords. N 4 847 150.0; E 315 488.8 ORIGINATED BY MS  
 DIST 5 HWY 401 BOREHOLE TYPE Hollow Stem Auger COMPILED BY KA  
 DATUM Geodetic DATE 86 05 30-31 CHECKED BY OD

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	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					
151.3	Ground Surface													
0.0	Asphalt													
	Sand, Some Gravel		1	SS	24		150							
			2	SS	22		148							1 40 50 9
	Sandy Silt with Irregular Layers of Clayey Silt and Sand Compact (Fill)		3	SS	11		146							
			4	SS	26		144							
			5	SS	13		142							
142.5			6	SS	22		142							2 34 43 21
8.8	Trace Organics		7	SS	25		140							
	Silty Sand Compact		8	SS	21		138							
			9	SS	35		136							1 7 33 59
	Clayey Silt (CL) to Silty Clay (CI) Frequently Varved (1 cm) Some Sand, Trace Gravel Occ. Silt, Sand Zones and Boulders Firm to Hard		10	SS	18		134							
			11	SS	8		132							
			12	TW	PH		130							
			13	TW	"		128							
			14	SS	5		126							
	Silt Loose		15	SS	9		124							3 36 46 15
			16	SS	6		122							20 32 36 12
			17	SS	13		120							0 8 25 67
120.7							118							
22.6							116							
	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Clayey Silt Zones Occ. Boulders Very Dense		18	SS	52		114							
							112							
							110							
123.6							108							10 44 32 14
27.7	End of Borehole W.L. on 86-06-10 * GROUND WATER CONDITIONS						106							
	PIEZO. NO.						104							
	GROUND WATER ELEVATION (Metres)						102							
	1						100							
							98							
							96							
							94							
							92							
							90							
							88							
							86							
							84							
							82							
							80							
							78							
							76							
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							22							
							20							
							18							
							16							
							14							
							12							
							10							
							8							
							6							
							4							
							2							
							0							

+3, x3: Numbers refer to  
Sensitivity

20  
15-25 (%) STRAIN AT FAILURE  
10

\* TW sank by its own weight

# RECORD OF BOREHOLE No 1-3 1 OF 2 METRIC

W.P. 280-86-Q1/A LOCATION Co-ords. N 4 847 145.8; E 315 420.7 ORIGINATED BY MS  
 DIST 5 HWY 401 BOREHOLE TYPE Hollow Stem Auger, Cone Test COMPILED BY KA  
 DATUM Geodetic DATE 88 06 01-02-03 CHECKED BY DD

SOIL PROFILE		SAMPLES			GROUND WATER # CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kn/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20 40 60 80 100					
151.7	Ground Surface												
0.0	Asphalt												
	Sand, Some Gravel		1	SS	37								0 18 45 37
			2	SS	14								
	Sandy Silt with Irregular Layers of Clayey Silt and Sand Compact to Dense (Fill)		3	SS	35								
			4	SS	34								
144.4			5	SS	23								0 32 43 25
7.3			6	SS	36								
	Trace Organics		7	SS	39								
	Clayey Silt (CL) to Silty Clay (CI) Frequently Varied (1 cm) Some Sand, Trace Gravel Occ. Silt, Sand Zones and Boulders		8	SS	14								2 31 45 22
			9	SS	19								3 33 40 24
			10	SS	11								
			11	SS	8								
	Sandy Silt Loose to Compact		12	SS	6								1 25 50 24
			13	SS	13								6 38 44 12
			14	SS	14								
			15	SS	11								
			16	SS	9								
			17	SS	6								
			18	SS	5								10 18 63 9
			19	SS	8								
128.8			20	TW	PH								1 32 53 14
22.9			21	SS	33								
			22	SS	57								
	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Clayey Silt Zones Occ. Boulders Dense to Very Dense		23	SS	100	/25cm							1 20 72 7
				SS	25								

Continued

+3 x3 Numbers refer to  
Sensitivity

20  
15-5 (%) STRAIN AT FAILURE  
10

Continued

RECORD OF BOREHOLE No 1-3 2 OF 2 METRIC

W.P. 280-86-01/A LOCATION Co-ords. N 4 847 145.9; E 315 420.7 ORIGINATED BY MS  
DIST 6 HWY 401 BOREHOLE TYPE Hollow Stem Auger, Cone Test COMPILED BY KA  
DATUM Geodetic DATE 88 08 01-02-03 CHECKED BY DD

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT 7 kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	SHEAR STRENGTH kPa								
30.5	Continued		25	SS	70											
119.7						120										
32.0	End of Borehole															
	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Clayey Silt Zones Occ. Boulders Very Dense															
	W.L. Recorded on 88-06-10															
	* GROUND WATER CONDITIONS															
	PIEZO. NO.		GROUND WATER ELEVATION (Metres)													
	1		149.6													



# RECORD OF BOREHOLE No 1-4 1 OF 1 METRIC

W.P. 280-86-01/A LOCATION Co-ords. N 4 847 141.3; E 315 354.3 ORIGINATED BY MS  
 DIST 6 HWY 401 BOREHOLE TYPE Hollow Stem Auger COMPILED BY KA  
 DATUM Geodetic DATE 88 06 06-08 CHECKED BY DD

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100		
152.0	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL * LAB VANE					WATER CONTENT (%) W <sub>p</sub> — W — W <sub>L</sub>	3 36 41 20
0.0	Asphalt						20	40	60	80	100		
	Sand, Some Gravel		1	SS	80	/15cm							
	Sandy Silt with Irregular Layers of Clayey Silt and Sand Compact to Very Dense (Fill)		2	SS	24								
			3	SS	20								
145.9			4	SS	17								
8.1	Trace Organics		5	SS	19								
	Clayey Silt (CL) to Silty Clay (CI) Frequently Varied (1 cm) Some Sand, Trace Gravel Occ. Silt, Sand Zones and Boulders Firm to Hard		6	SS	31								4 13 36 47
			7	SS	17								
			8	SS	14								
			9	SS	16								
	Sandy Silt, Compact		10	SS	23								6 36 44 11
			11	SS	15								
			12	SS	17								
			13	SS	8								
133.7	Sandy Silt, Compact		14	SS	25								
18.3			15	SS	55								
	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Clayey Silt Zones Occ. Boulders Very Dense		16	SS	100	/23cm							
			17	SS	60	/10cm							
129.0			18	SS	75	/15cm							
23.0	End of Borehole												

\* W.L. Recorded on 88-06-10

# RECORD OF BOREHOLE No 1-5

1 of 1

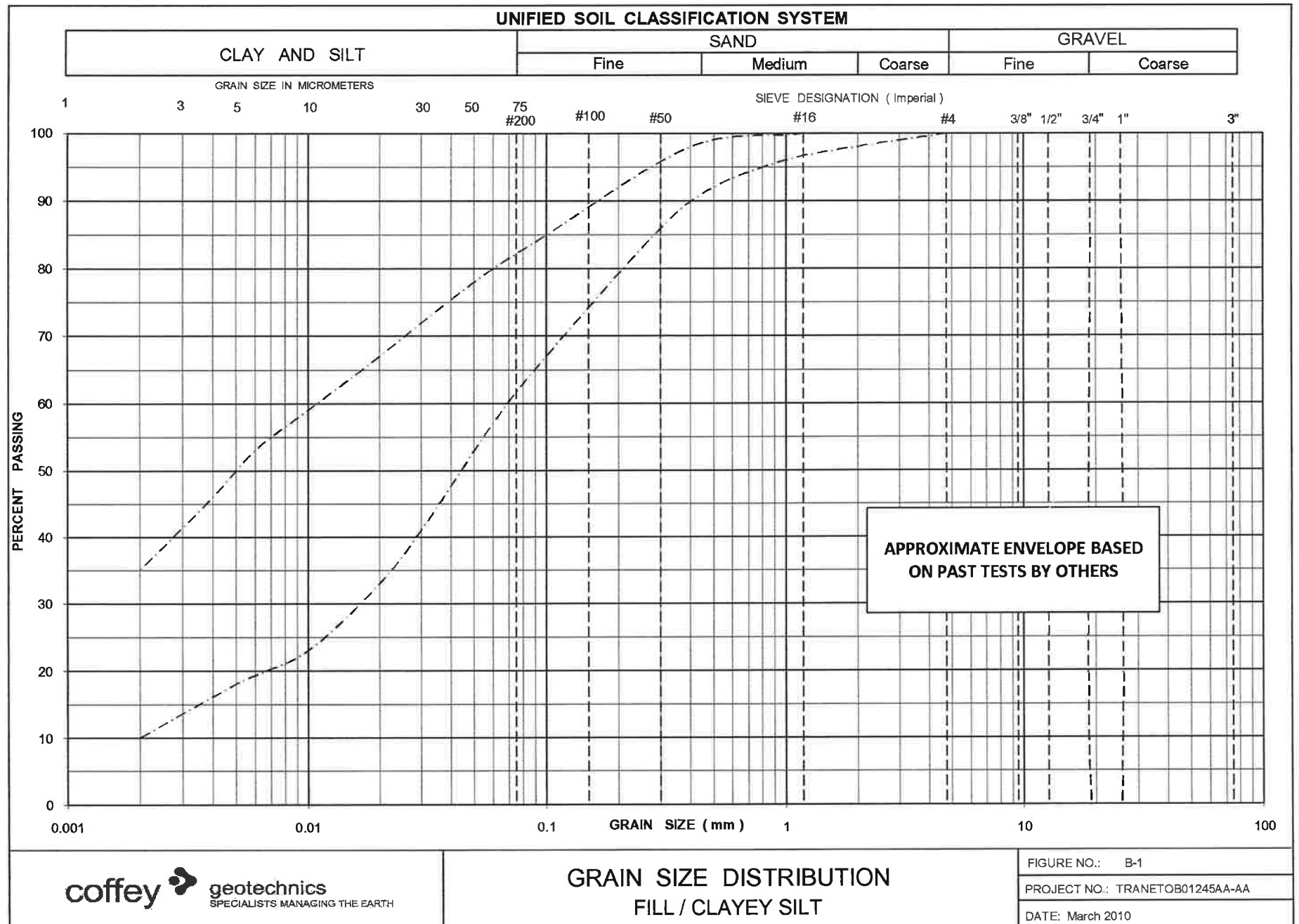
METRIC

W.P. 280-86-01/A LOCATION Co-ords. N 4 847 137.2; E 315 280.6 ORIGINATED BY MS  
 DIST 6 HWY 401 BOREHOLE TYPE Hollow Stem Auger, Cone Test COMPILED BY KA  
 DATUM Geodetic DATE 88 06 09 CHECKED BY DD

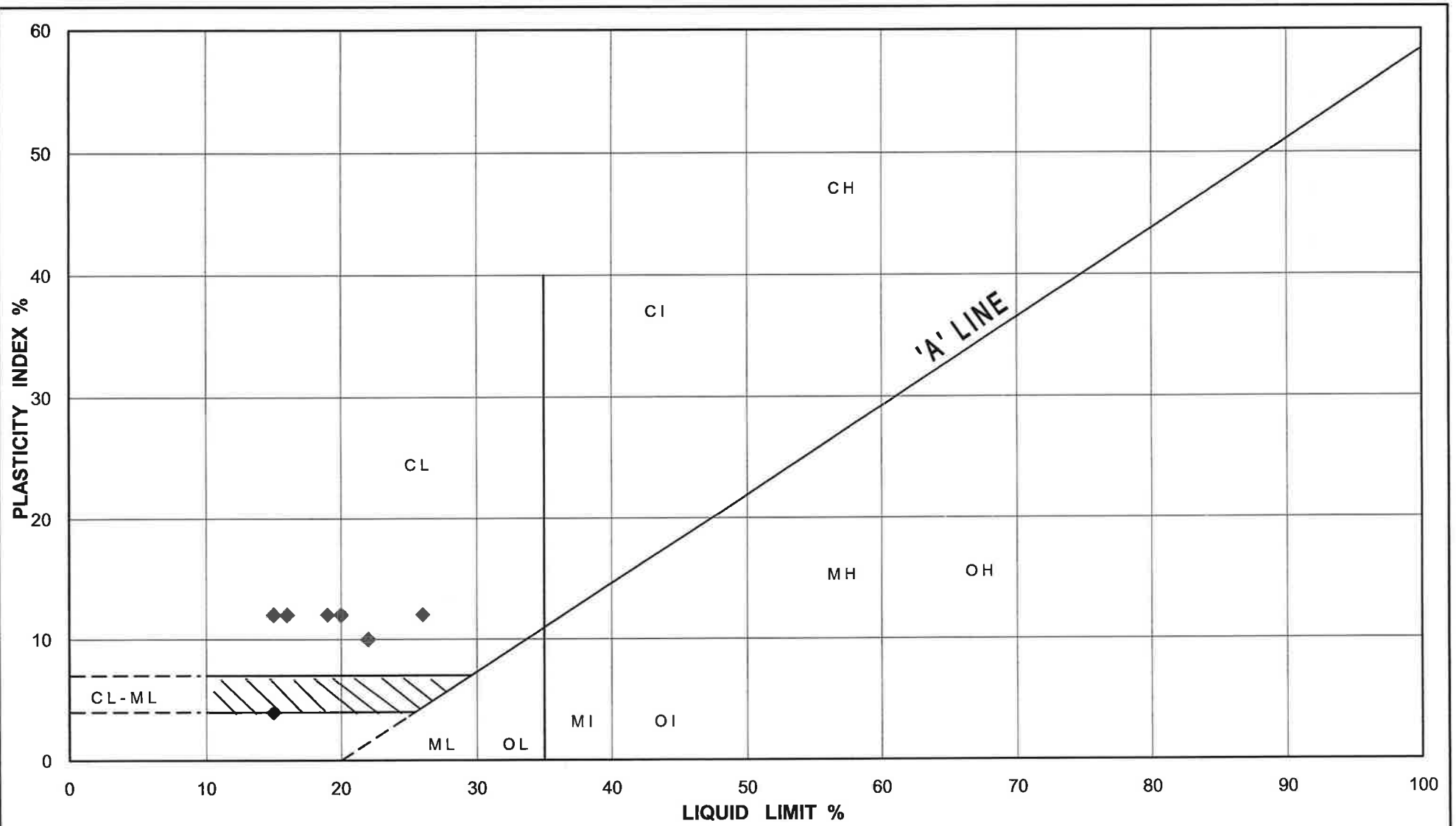
SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIMIT MOISTURE CONTENT		UNIT WEIGHT 7 kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT NUMBER	TYPE	'N' VALUES			20 40 60 80 100	100	W <sub>p</sub> W W <sub>L</sub>	WATER CONTENT (%)		
152.3	Ground Surface											
0.0	Asphalt											
	Sand, Some Gravel											
	Sandy Silt with Irregular Layers of Clayey Silt and Sand Compact (Fill)	1	SS	34								1 37 44 18
148.3		2	SS	15								
4.0	Trace Organics	3	SS	14								
		4	SS	28								5 29 45 21
		5	SS	13								
	Sandy Silt Compact	6	SS	10								
		7	SS	12								7 40 42 11
		8	SS	22								
		9	SS	12								
	Clayey Silt (CL) to Silty Clay (CI) Frequently Varved (1 cm) Some Sand, Trace Gravel Occ. Silt, Sand Zones and Boulders Stiff to Hard	10	SS	5								1 30 49 20
		11	TW	∞								
		12	TW	∞								
137.1		13	SS	38								
15.2	Heterogeneous Mixture Sandy Silt to Silty Sand Some Clay, Trace Gravel Occ. Clayey Silt Zones Occ. Boulders Very Dense	14	SS	73								7 13 63 17
		15	SS	60								
133.7		16	SS	60								
18.6	End of Borehole											
	* W.L. recorded on 88-06-10											
	** TW sank by its own weight											

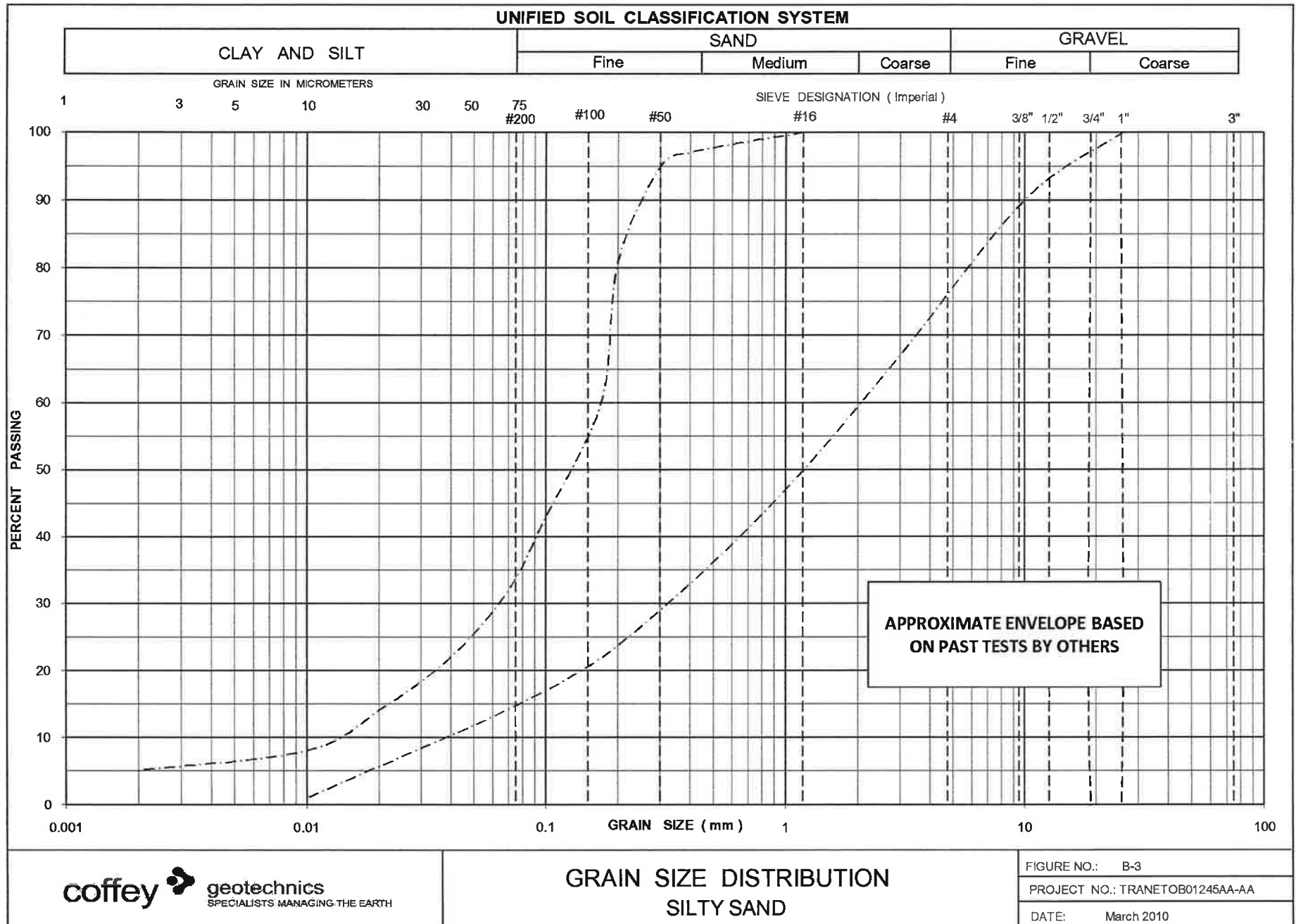
# Appendix B

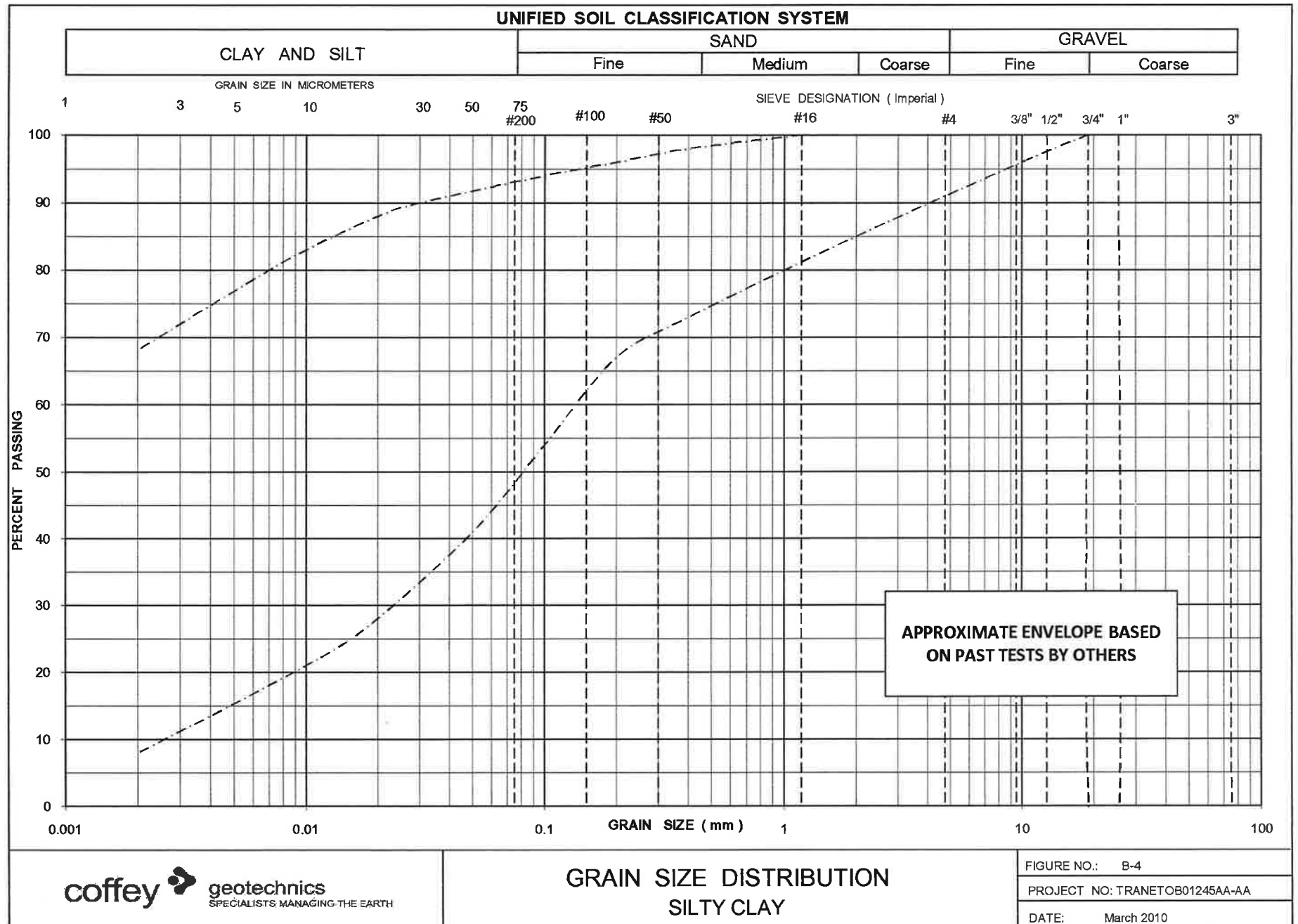
## Previous Laboratory Results

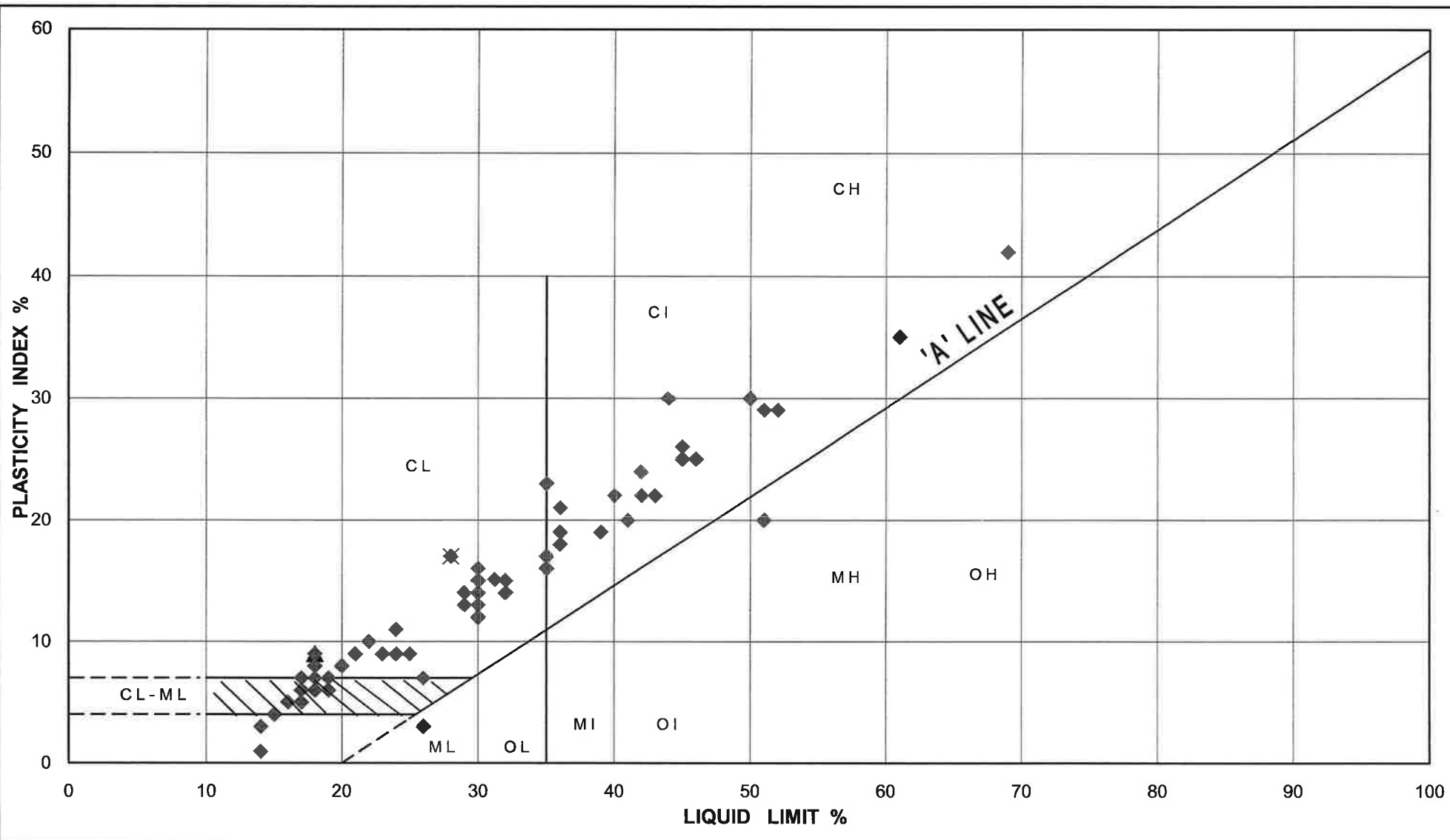




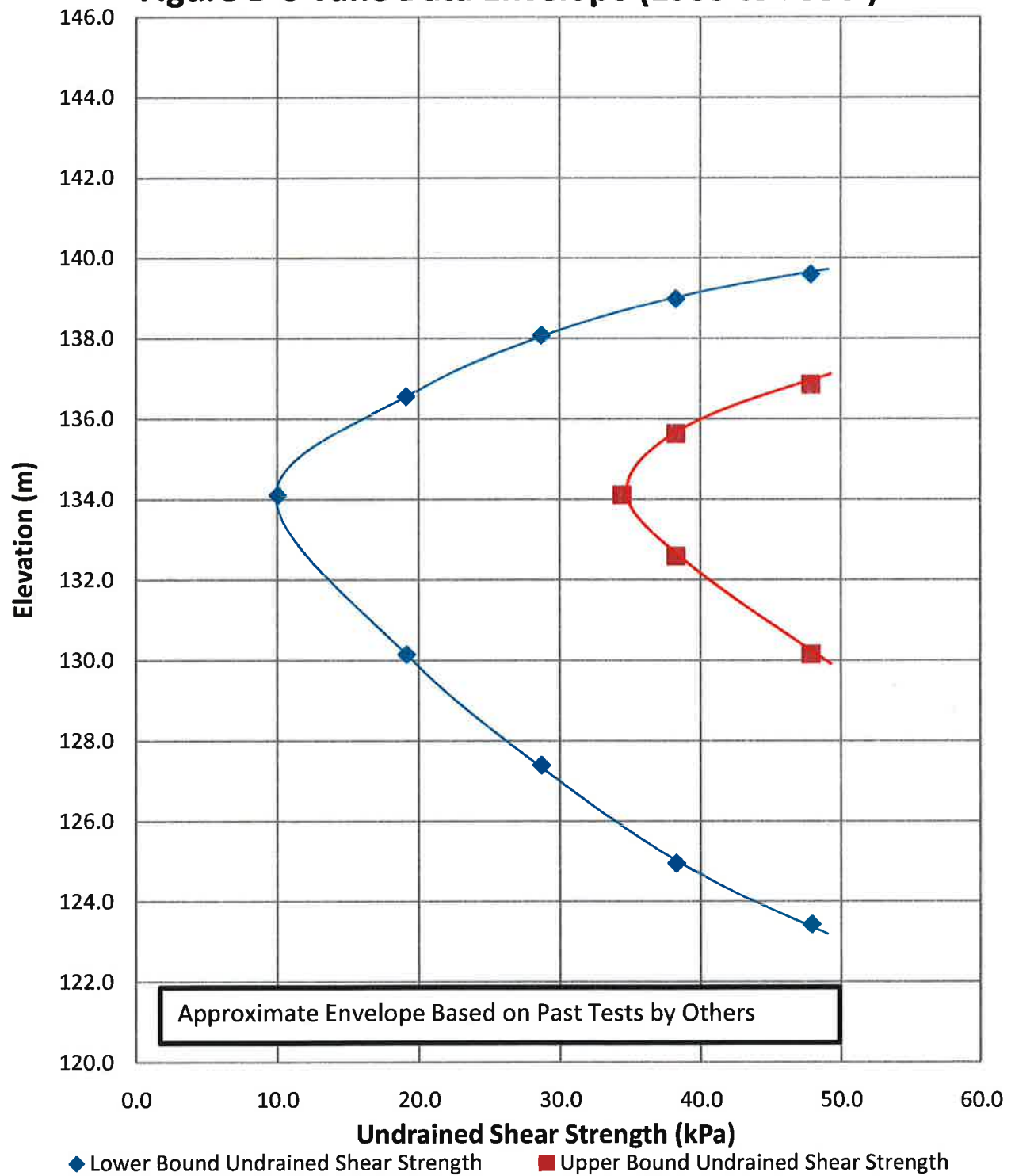








**Figure B-6 Vane Data Envelope (1953 to 1990 )**



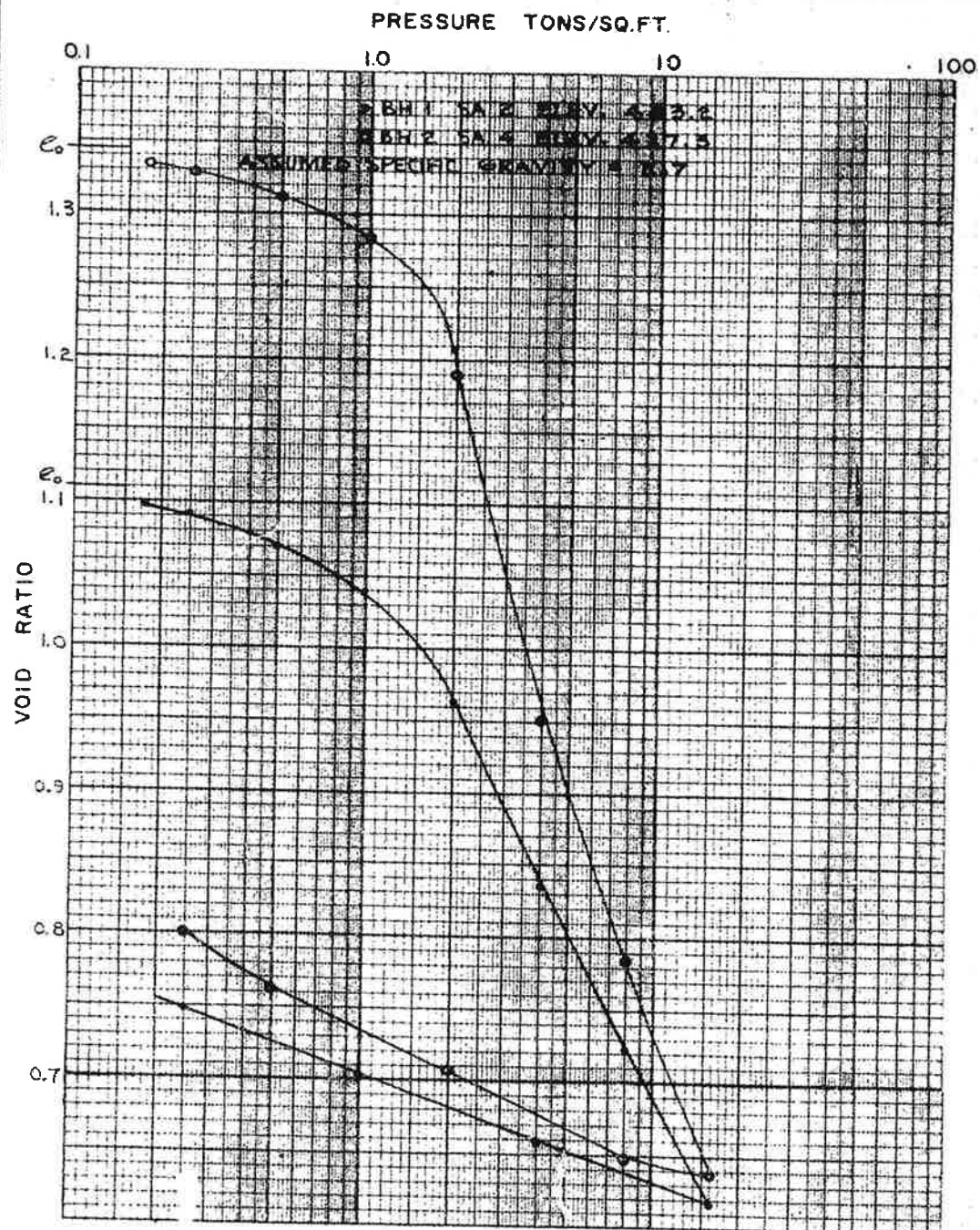


APPENDIX I  
FIGURE 4  
PROJECT C7142



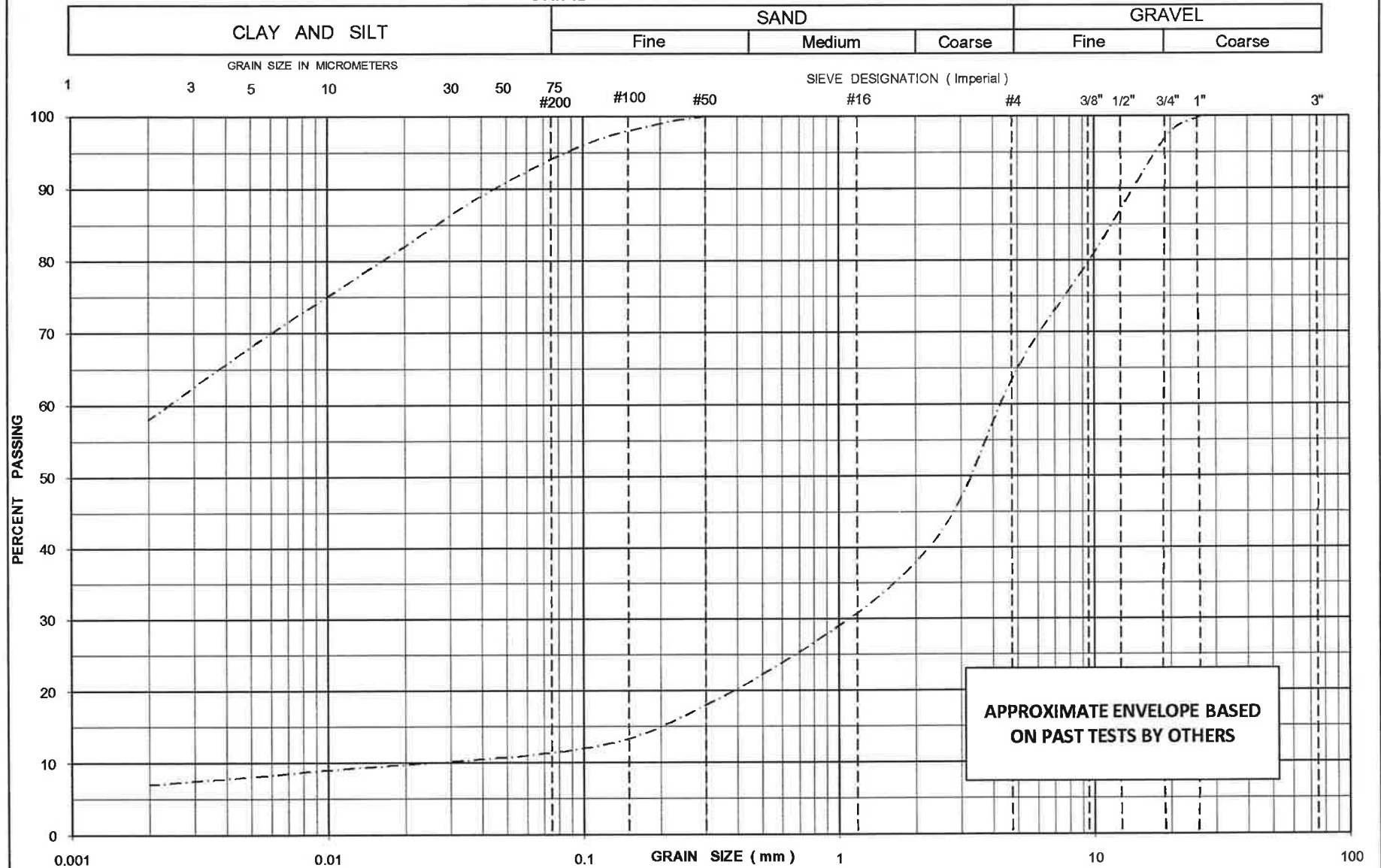
# VOID RATIO-PRESSURE CURVES CONSOLIDATION TEST

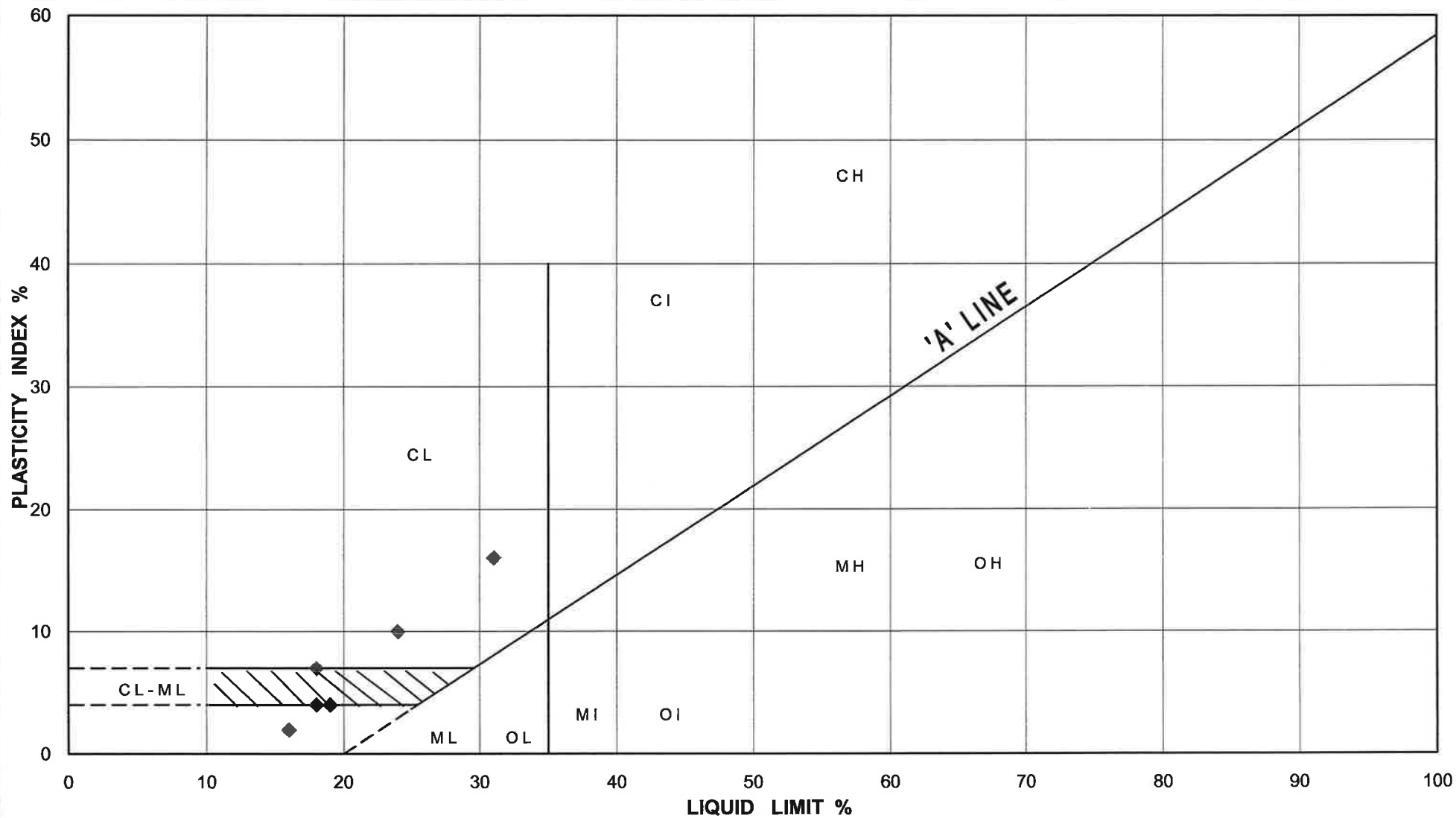
APPENDIX II  
FIGURE 3  
PROJECT S7002



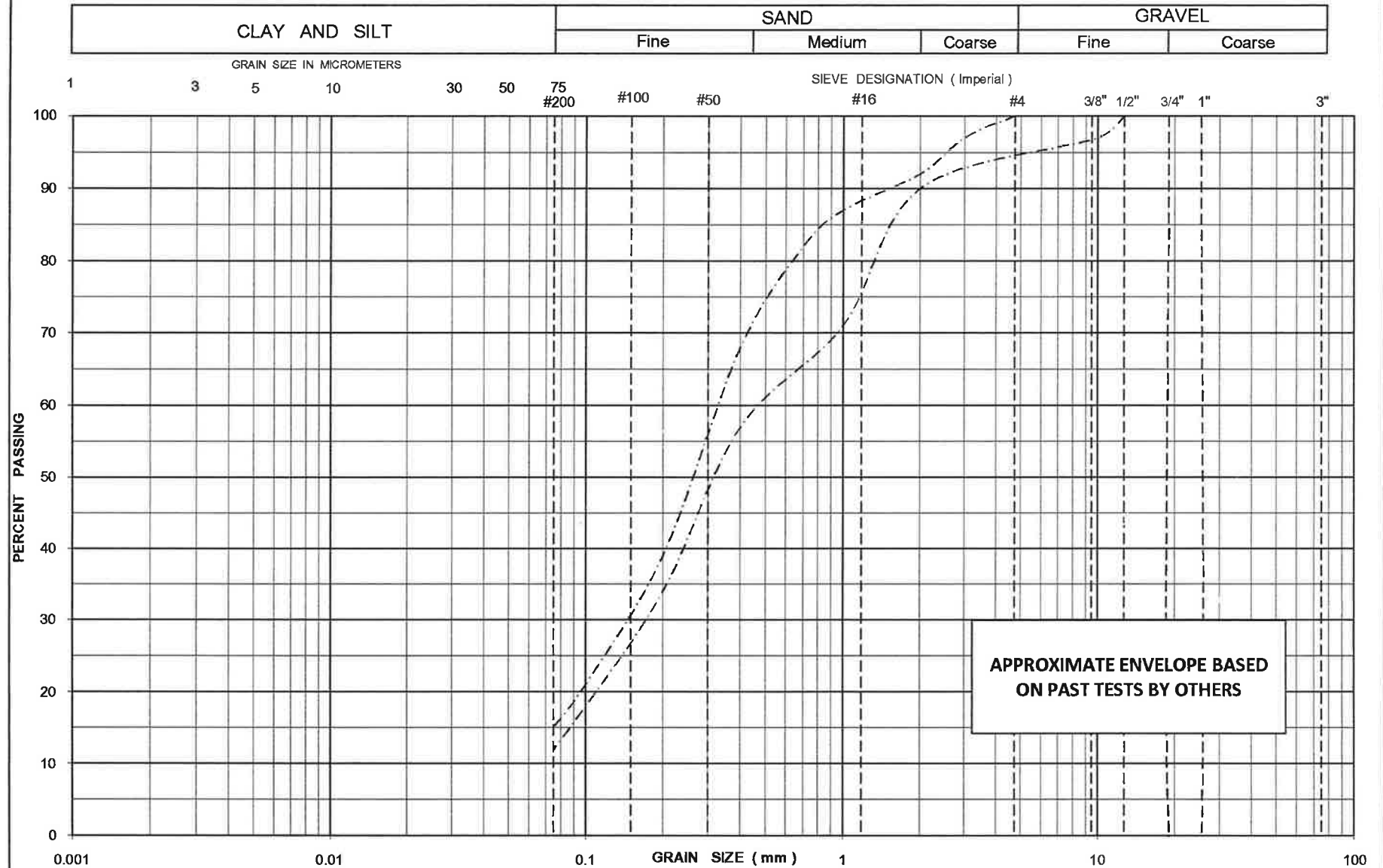
GEOCON

# UNIFIED SOIL CLASSIFICATION SYSTEM





# UNIFIED SOIL CLASSIFICATION SYSTEM



APPROXIMATE ENVELOPE BASED  
ON PAST TESTS BY OTHERS



# Appendix C

**Highway 401 and Leslie Street Interchange Design Drawings**

NOTE TO GENERAL CONTRACTOR

STRUCTURE TO BE BUILT IN ACCORDANCE WITH THE LATEST  
ISSUE OF D.H.O. FORM #9 AND THE SPECIAL PROVISIONS, EXTRA  
COPIES OF WHICH MAY BE OBTAINED FROM THE ENGINEER.

## CONCRETE

CONCRETE IN RAISONS, FOUNDATIONS, ABUTMENTS AND  
PIERS TO HAVE A MINIMUM STRENGTH OF 3000 P.S.I. AT 28 DAYS.  
CONCRETE IN DECK TO HAVE A MINIMUM STRENGTH OF 4000  
P.S.I. AT 28 DAYS. ADMIXTURES SUPPLIED BY THE CONTRACTOR  
TO BE ADDED TO THE CONCRETE AS DIRECTED BY THE ENGINEER.  
ALL EXPOSED EDGES TO HAVE A 1" CHAMFER, EXCEPT AS NOTED.  
ALL CONSTRUCTION JOINTS MUST BE APPROVED BY THE ENGINEER.  
COVER TO REINFORCING STEEL

PLEASE COVER TO REINFORCING STEEL TO BE AS FOLLOWS,  
EXCEPT AS NOTED: SURFACES IN CONTACT WITH EARTH OR  
FILL 3", DECK SLAB 1", PARAPETS 1 1/2" AND ALL OTHER  
SURFACES 2".

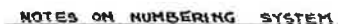
### BEARING SEATS

THE BRIDGE SEATS ARE TO BE FINISHED DEAD LEVEL TO THE SPECIFIED ELEVATION WITH A TOLERANCE OF  $2\frac{1}{8}$ ". NO CONCRETE IS TO BE PLACED ABOVE THE BRIDGE SEAT ELEVATION UNTIL AFTER THE CONCRETE IN THE DECK HAS BEEN PLACED. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE FINAL DECK ELEVATIONS ARE CORRECT.

### BOILING DATA

THE COMPLETE SOILS INVESTIGATION REPORTS  
MAY BE EXAMINED AT THE D.H.O. BRIDGE OFFICE,  
DOWNSVIEW. THE DEPARTMENT DOES NOT GUARANTEE THE  
ACCURACY OF THESE REPORTS, OR THE SOILS INFORMATION  
ON THESE DRAWINGS.

HOLES FOR ANCHOR BOLTS  
THE CONTRACTOR SHALL SEAL ALL HOLES FOR ANCHOR BOLTS  
AGAINST THE ENTRANCE OF WATER.



1. PIERS AND ABUTMENTS ARE NUMBERED CONSECUTIVELY FROM WEST TO EAST.
2. 100 SERIES NUMBERS ARE USED FOR W.B. COLLECTOR RD.  
200 SERIES NUMBERS ARE USED FOR HWY #401 WESTBOUND  
300 SERIES NUMBERS ARE USED FOR HWY #401 EASTBOUND  
400 SERIES NUMBERS ARE USED FOR E.B. COLLECTOR RD.  
500 SERIES NUMBERS ARE USED FOR RAMP 'N-V'.  
600 SERIES NUMBERS ARE USED FOR RAMP 'Y-N-S'.  
700 SERIES NUMBERS ARE USED FOR RAMP 'N-E'.
3. SPAN NUMBERS, AS USED ON THE STEELWORK AND DECK DRAWINGS, ARE DERIVED FROM THE PIER OR ABUTMENT NUMBER AT THE WEST END OF THE SPAN.

## GENERAL LAYOUT PLAN

SCALE 1" = 100'

DRAWING NUMBERS SHOWN ON PLAN ARE THE GENERAL ARRANGEMENT DRAWINGS FOR THE AREAS INDICATED.

	-73	REINFORCING STEEL SCHEDULE - PIERS 125 TO 126	-49	DECK DETAILS - SPANS 101 TO 117	-25	PIERS 620 & 621
	-72	REINFORCING STEEL SCHEDULE - PIERS 119 TO 124	-48	KEY PLAN & BOULEVARD DETAILS - SPANS 101 TO 117	-24	PIERS 520 & 521
	-71	REINFORCING STEEL SCHEDULE - PIERS 116 TO 118 & 518	-47	STEEL DETAILS - EXISTING C.N.R. BRIDGE	-23	PIERS 519, 522 & 523
	-70	REINFORCING STEEL SCHEDULE - PIERS 109 TO 115	-46	MISCELLANEOUS STEEL DETAILS	-22	PIERS 420 & 421
	-69	REINFORCING STEEL SCHEDULE - PIERS 102 TO 108	-45	STEEL DETAILS - CONTINUOUS SPANS	-21	PIERS 419 & 422 TO 429
	-68	REINFORCING STEEL SCHEDULE - ABUT. 134, 234, 334 & 434	-44	STEEL DETAILS - SIMPLE SPANS	-20	PIERS 120 & 121
	-67	REINFORCING STEEL SCHEDULE - ABUT. 524 & 624	-43	FRAMING PLAN - SPANS EAST OF PIERS 124, 224, 324 & 424	-19	PIERS 119 & 122 TO 126
	-66	REINFORCING STEEL SCHEDULE - ABUT. 218, 318, 418 & 618	-42	FRAMING PLAN - SPANS 418 TO 423 & 618 TO 623	-18	ABUTMENTS 418 & 618 - DETAILS
	-65	REINFORCING STEEL SCHEDULE - ABUT. 121 & 728	-41	FRAMING PLAN - SPANS 118 TO 123 & 518 TO 523	-17	ABUTMENTS 218 & 518 - DETAILS
	-64	CONCRETE SLOPE PAVING	-40	FRAMING PLAN - SPANS 101 TO 117	-16	PIERS 116 TO 118 & 516
	-63	DETAILS OF PARAPET RAILING	-39	ABUTMENT 434 - DETAILS	-15	PIERS 111 TO 115
	-62	PARAPET RAILING LAYOUT	-38	ABUTMENTS 234 & 334 - DETAILS	-14	PIERS 102 TO 110
	-61	DECK DETAILS - SCREED ELEVATIONS II	-37	ABUTMENT 134 -- DETAILS	-13	ABUTMENT 101 - DETAILS
	-60	DECK DETAILS - SCREED ELEVATIONS I	-36	PIERS 431 TO 433	-12	FOUNDATION LAYOUT - SHEET 4
	-59	DECK DETAILS - SPANS 430 TO 433, 726 & 729	-35	PIERS 231 TO 233 & 331 TO 333	-11	FOUNDATION LAYOUT - SHEET 3
	-58	DECK DETAILS - SPANS 424 TO 429	-34	PIERS 131 TO 133	-10	FOUNDATION LAYOUT - SHEET 2
	-57	DECK DETAILS - SPANS 324 TO 333	-33	PIERS 225 TO 230 & 325 TO 330	-9	FOUNDATION LAYOUT - SHEET 1
	-56	DECK DETAILS - SPANS 224 TO 233	-32	PIERS 430 & 723	-8	WIDENING OF EXISTING C.M.R. BRIDGE
	-55	DECK DETAILS - SPANS 124 TO 133	-31	ABUTMENT 728 - DETAILS	-7	GENERAL ARRANGEMENT - SHEET 6
	-54	DECK DETAILS - SPANS 618 TO 623	-30	PIERS 127 TO 130	-6	GENERAL ARRANGEMENT - SHEET 5
	-53	DECK DETAILS - SPANS 418 TO 423	-29	ABUTMENT 624 - DETAILS	-5	GENERAL ARRANGEMENT - SHEET 4
	-52	DECK DETAILS - SPANS 118 TO 123	-28	ABUTMENT 524 - DETAILS	-4	GENERAL ARRANGEMENT - SHEET 3
	-51	DECK DETAILS - SPANS 518 TO 523	-27	PIERS 224 & 324	-3	GENERAL ARRANGEMENT - SHEET 2
D 5522-74	-50	DECK DETAILS - SPANS 116 & 117	D 5522-26	PIERS 613, 622 & 623	D 5522-1	GENERAL ARRANGEMENT - SHEET 1
DWG. No.	TITLE	DWG. No.	TITLE	DWG. No.	TITLE	
	REFERENCE DRAWINGS (CONT.)		REFERENCE DRAWINGS (CONT.)		REFERENCE DRAWINGS	

REVISIONS

DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO  
BRIDGE DIVISION

FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED

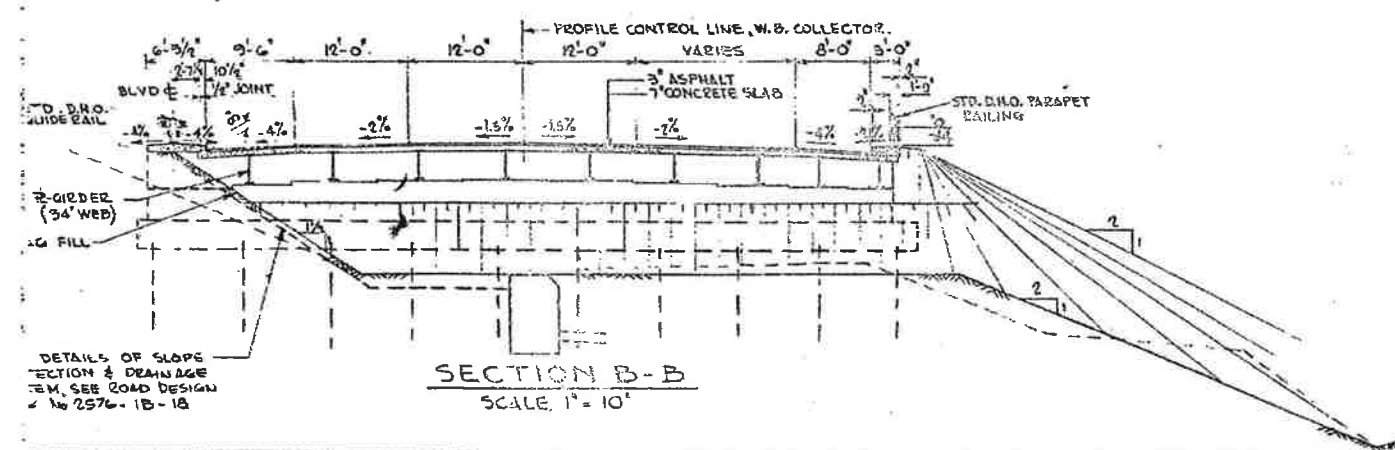
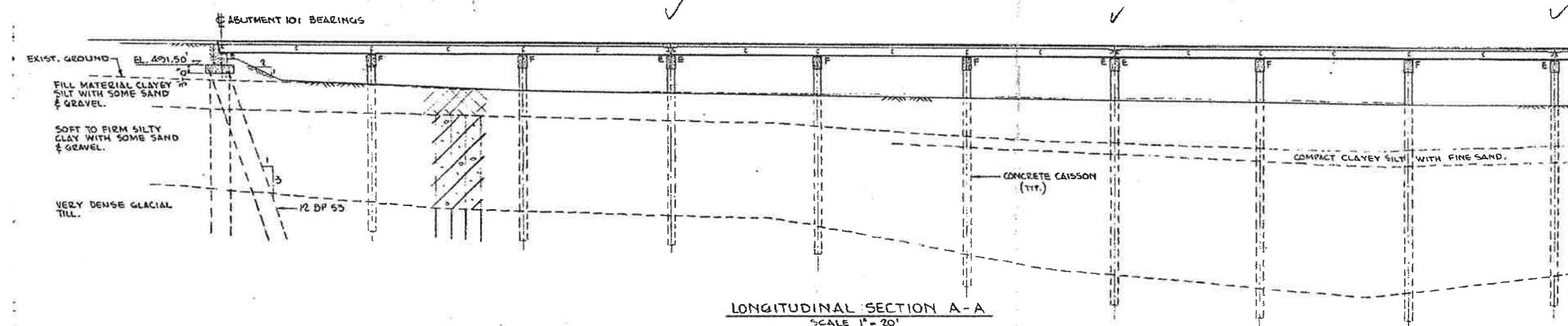
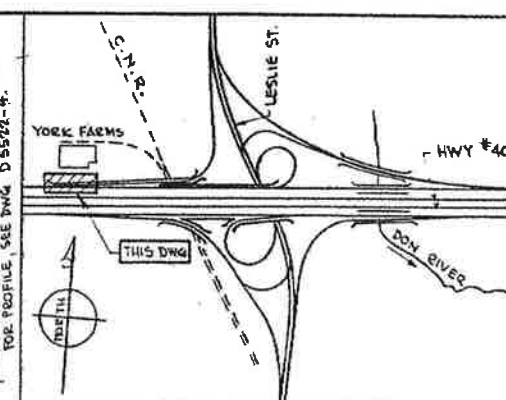
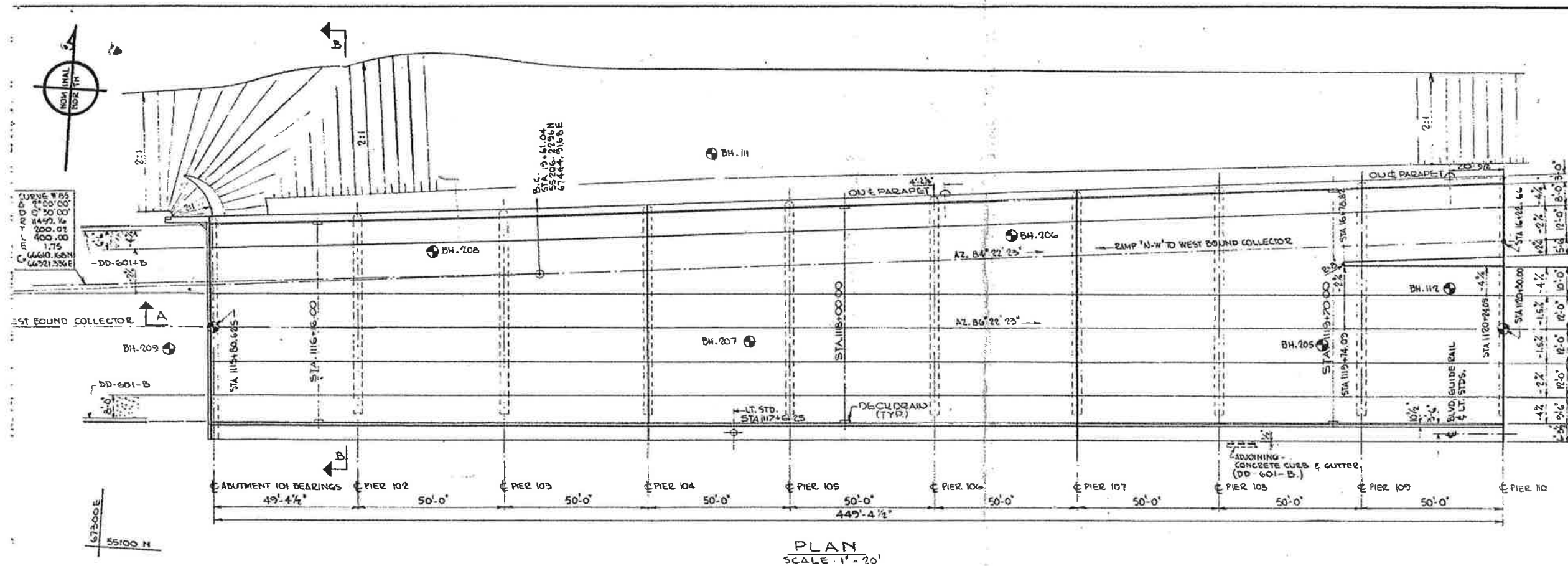
LESLIE ST. & C.N.R. TRESTLE

KING'S HIGHWAY No. 401 DIST. No. 6  
CO. YORK TORONTO BY-PASS  
TWP. NORTH YORK LOT CON.

GENERAL LAYOUT

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*[Stamp]*

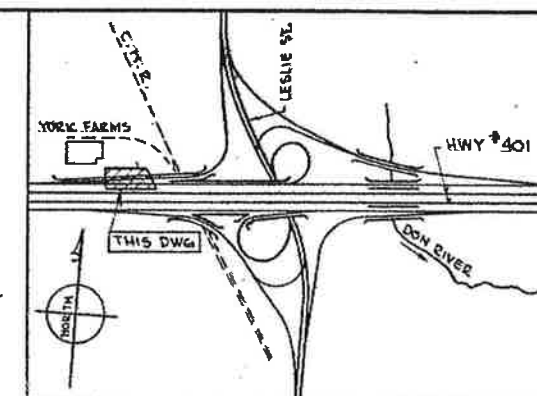
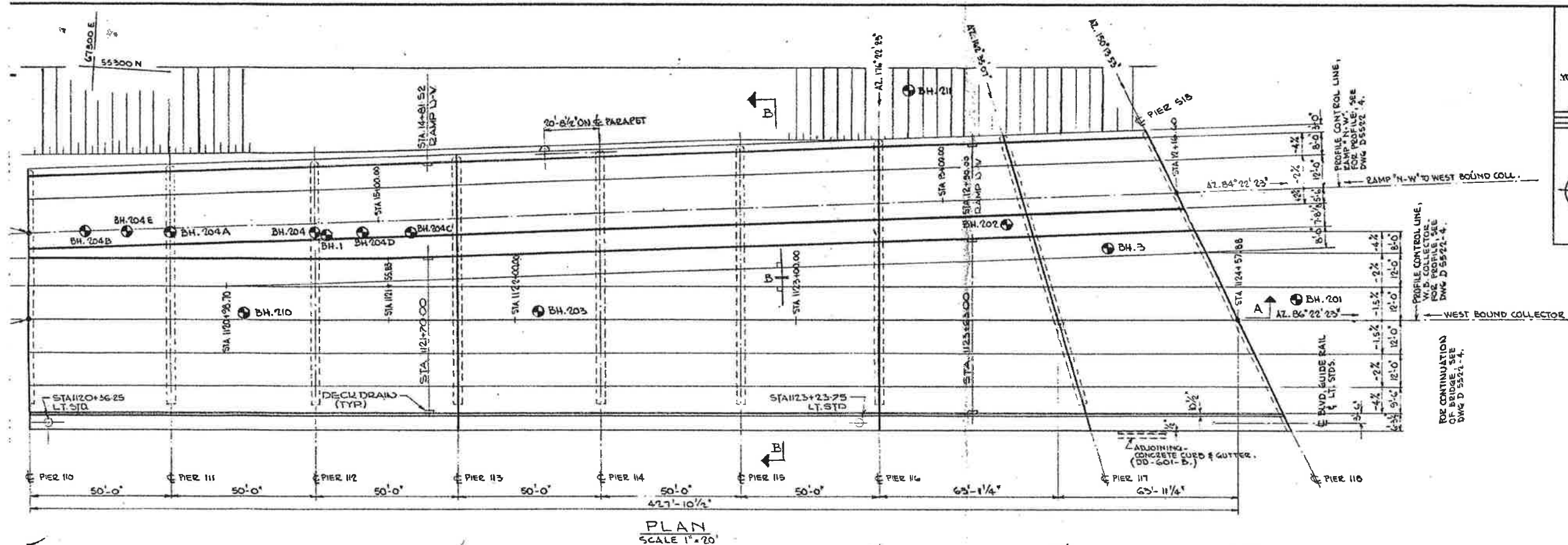
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DATE	JAN. 1965	LOADING	H.D.O.-SIL			



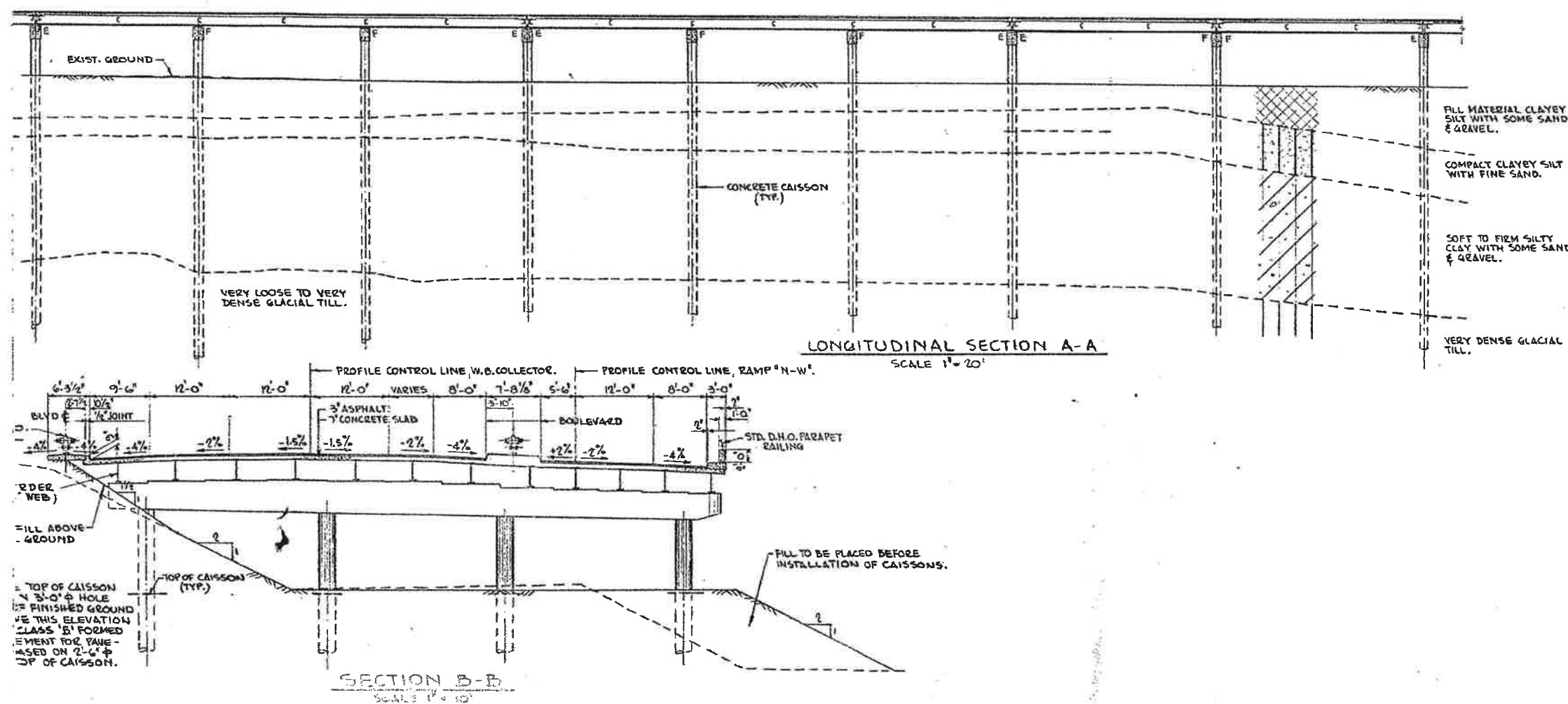
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	<b>DATE</b>	<b>BY</b>	<b>DESCRIPTION</b>

<b>DEPARTMENT OF HIGHWAYS ONTARIO</b>			
<b>BRIDGE DIVISION</b>			
<b>FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED</b>			
<b>LESLIE ST. &amp; C.N.R. TRESTLE</b>			
KING'S HIGHWAY No. <b>401</b>		DIST. No. <b>G</b>	
CO. <b>YORK</b>		TORONTO BY - <b>PASS</b>	
TWP. <b>NORTH YORK</b>		LOT	CON.
<b>GENERAL ARRANGEMENT - SHEET 1</b>			
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DATE	JAN. 1965	LOADING	H20-516
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280


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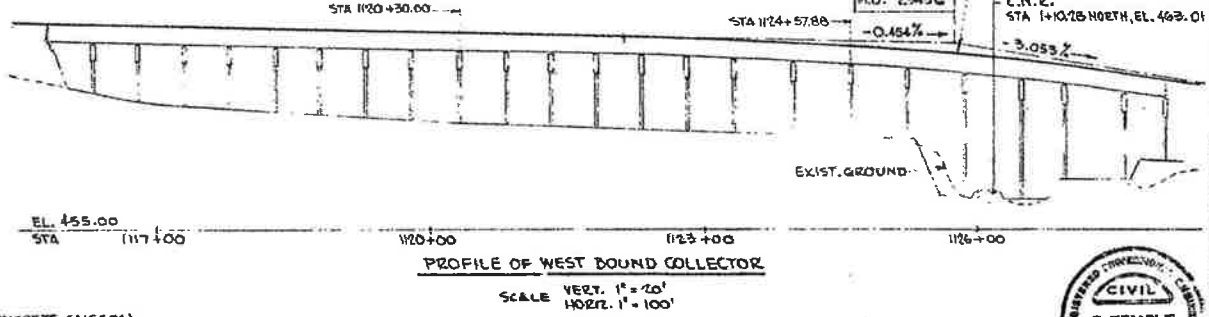
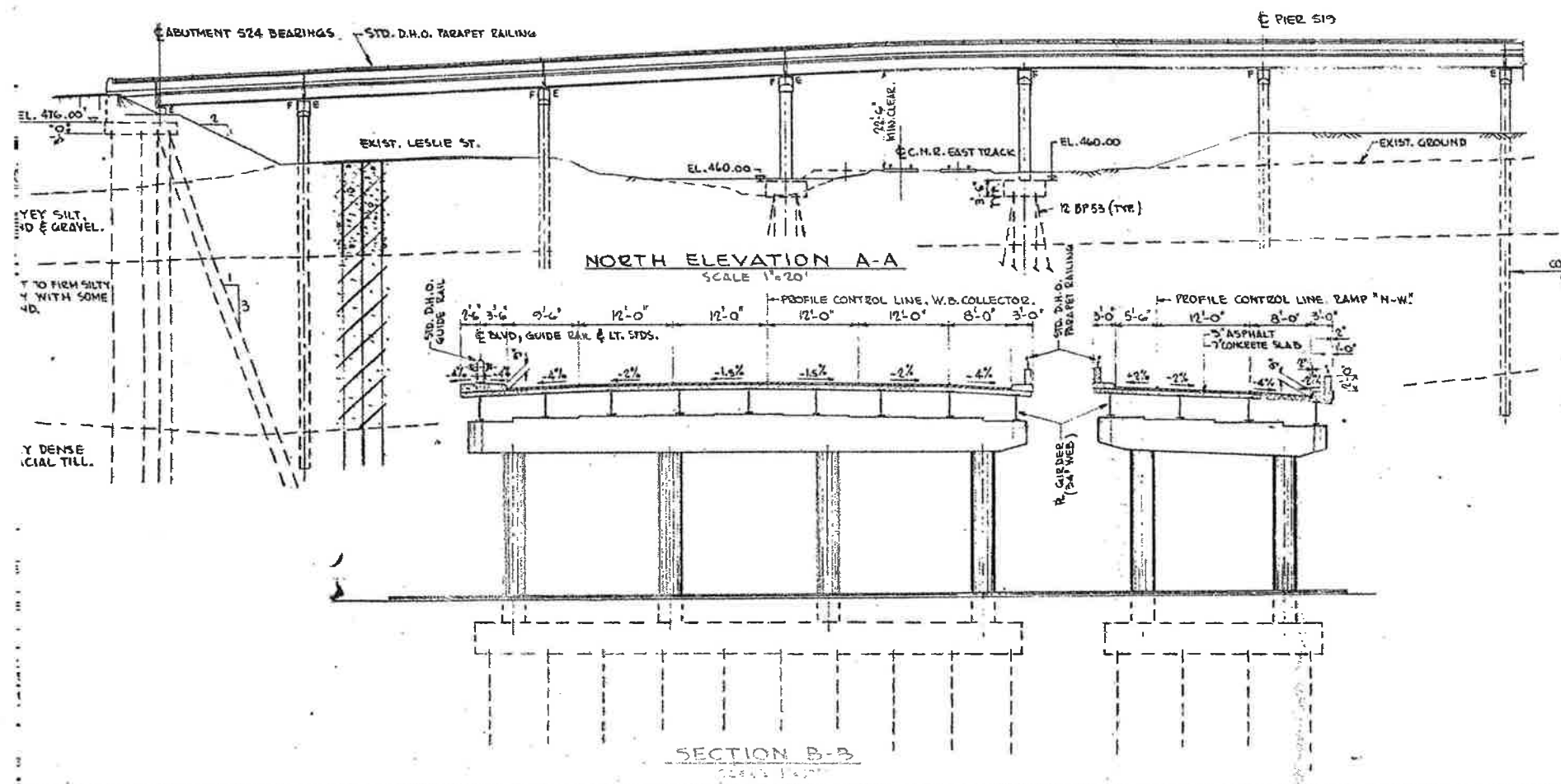
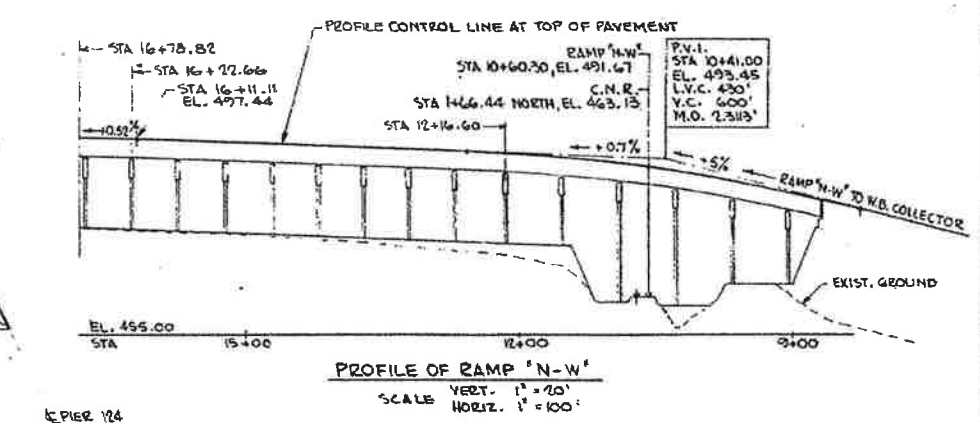
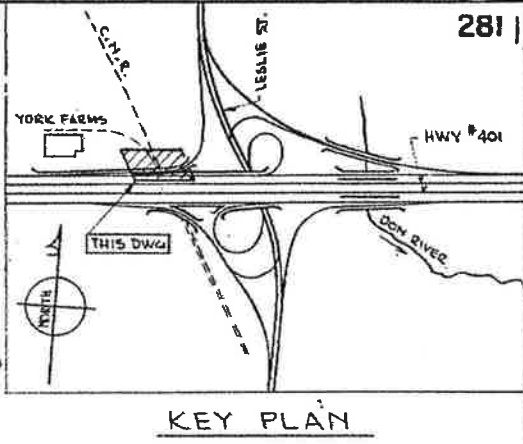
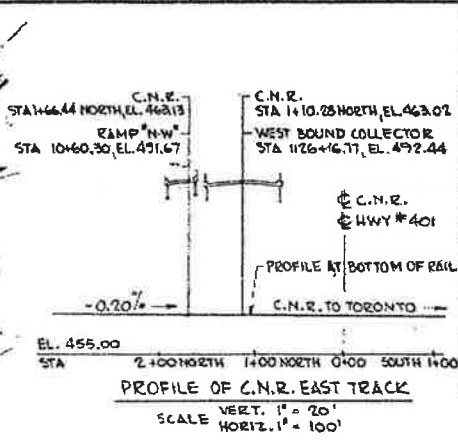
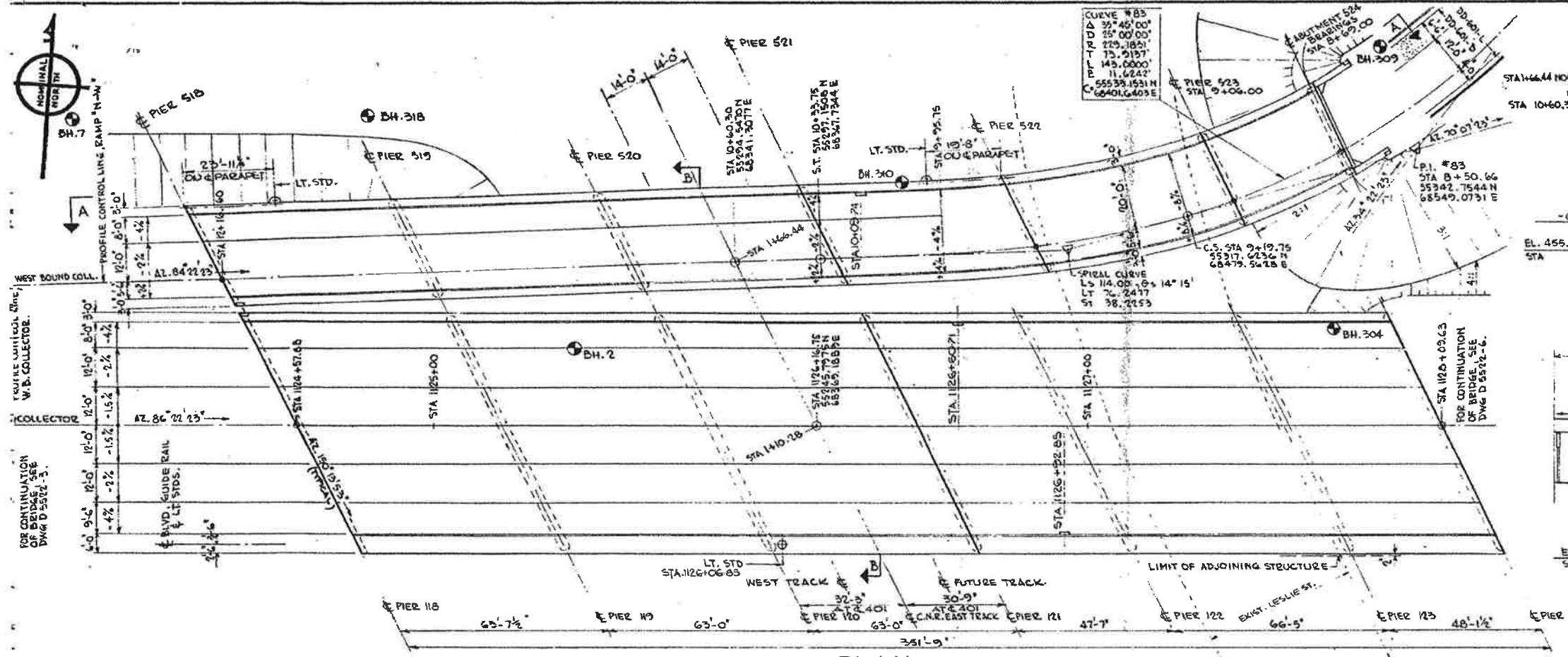
DEPARTMENT OF HIGHWAYS ONTARIO  
BRIDGE DIVISION  
FOUNDATION OF CANADA ENGINEERING  
CORPORATION LIMITED

LESLIE ST. & C.N.R. TRESTLE

KING'S HIGHWAY No. 401 DIST. No. 6  
CO. YORK TORONTO BY-PASS  
TWP. NORTH YORK LOT CON.

GENERAL ARRANGEMENT - SHEET 2

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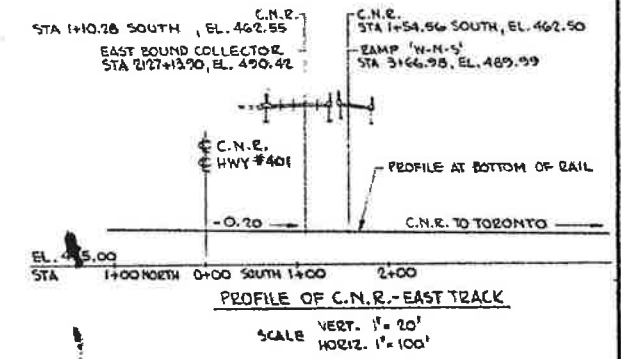
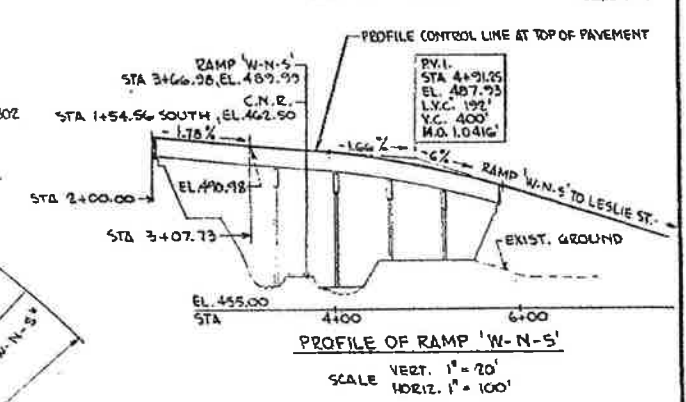
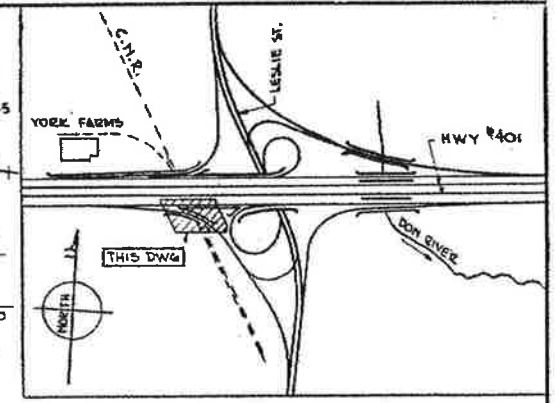
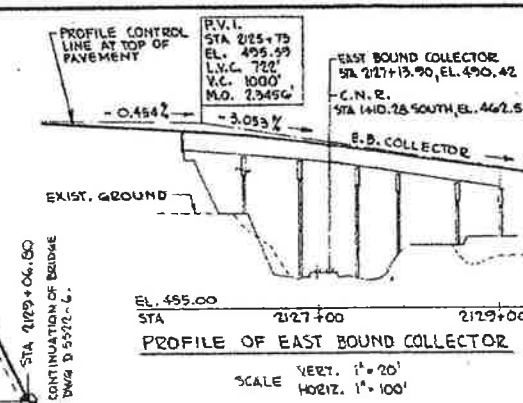
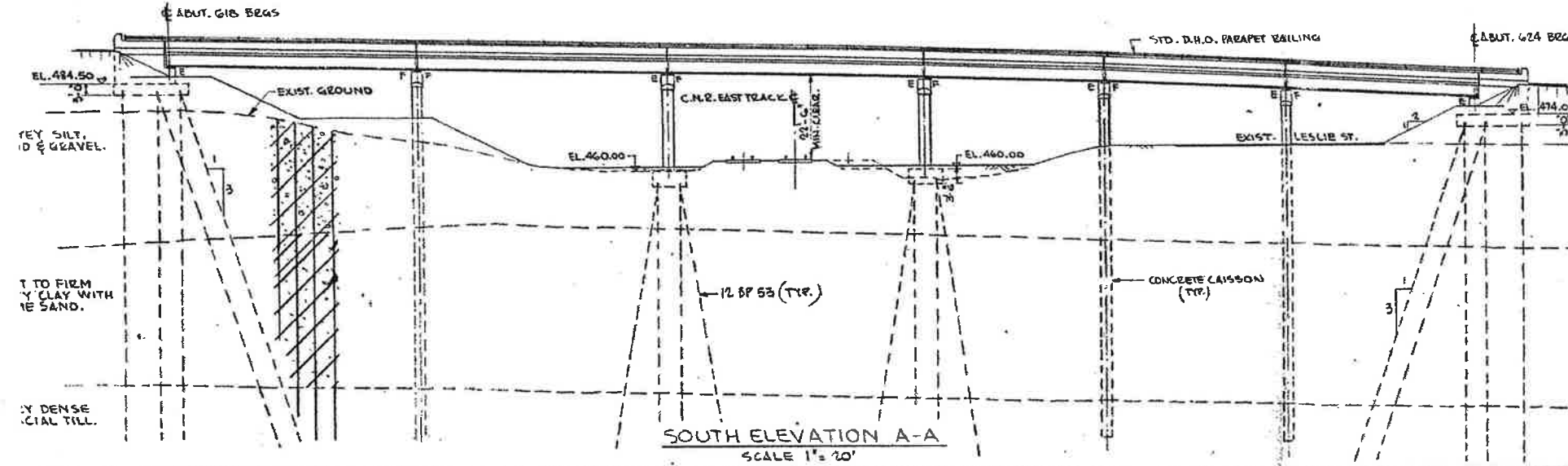
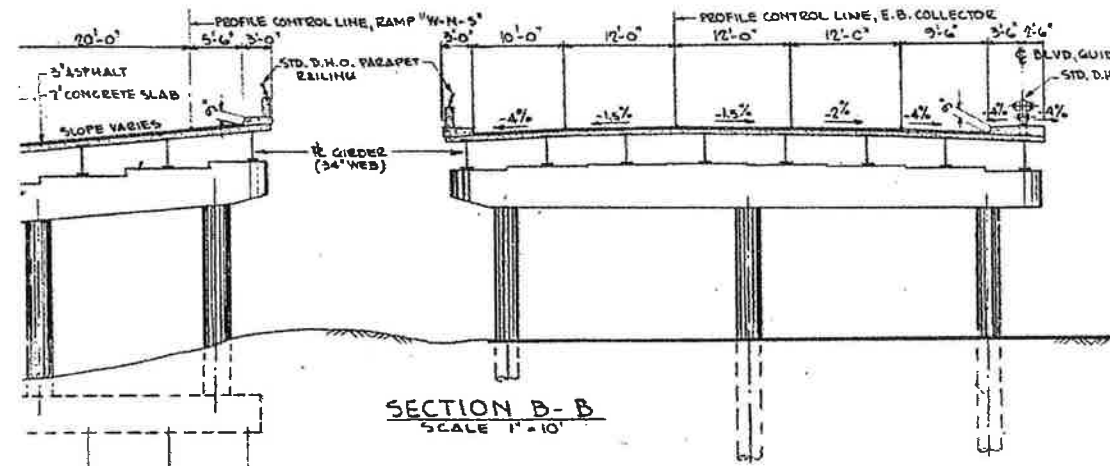
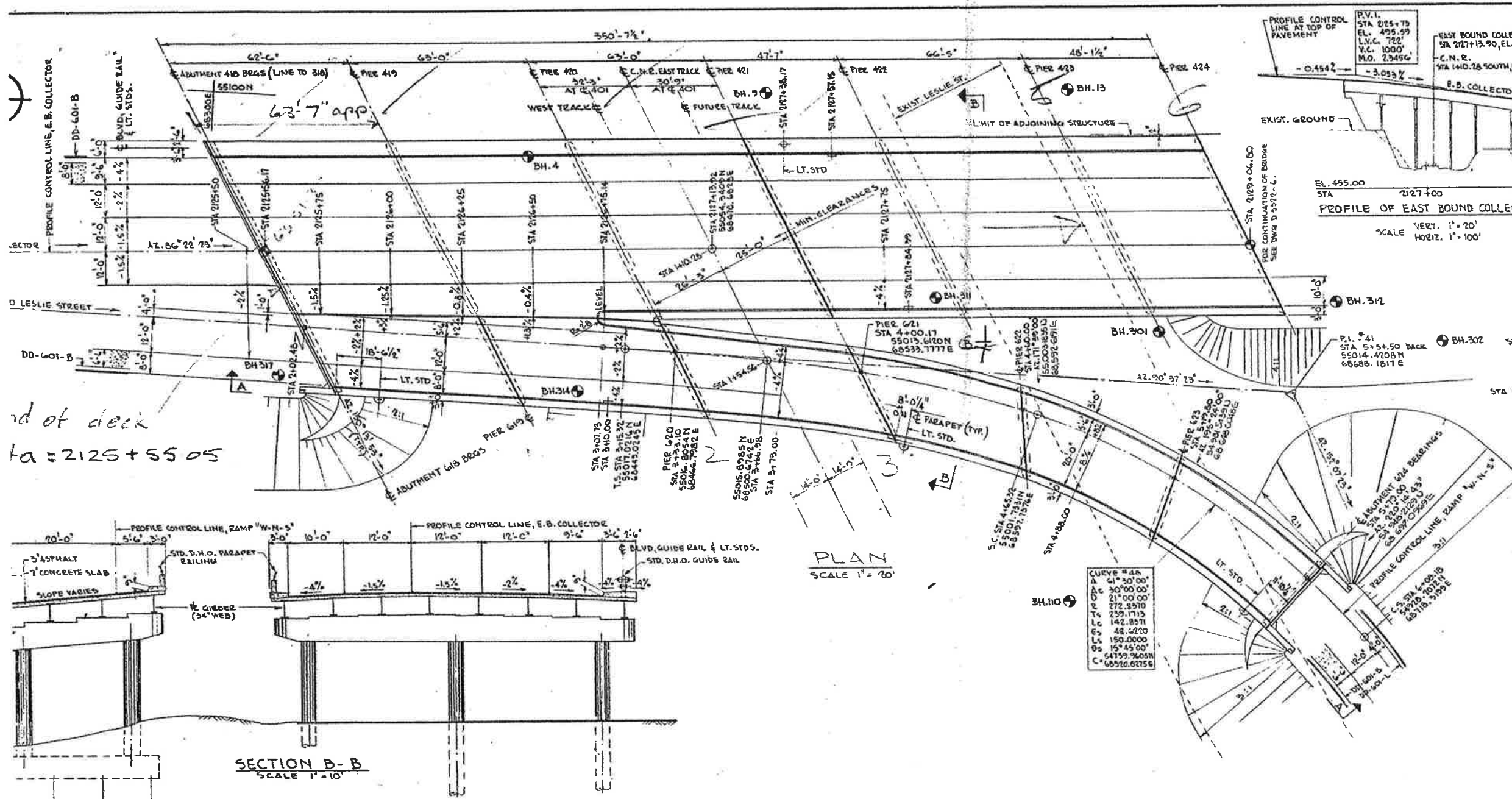


REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO		
FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED		
LESLIE ST. & C.N.R. TRESTLE		
KING'S HIGHWAY No. 401	DIST. No. 6	
CO. YORK	TORONTO BY-PASS	
TWP. NORTH YORK	LOT	CON.
GENERAL ARRANGEMENT - SHEET 3		
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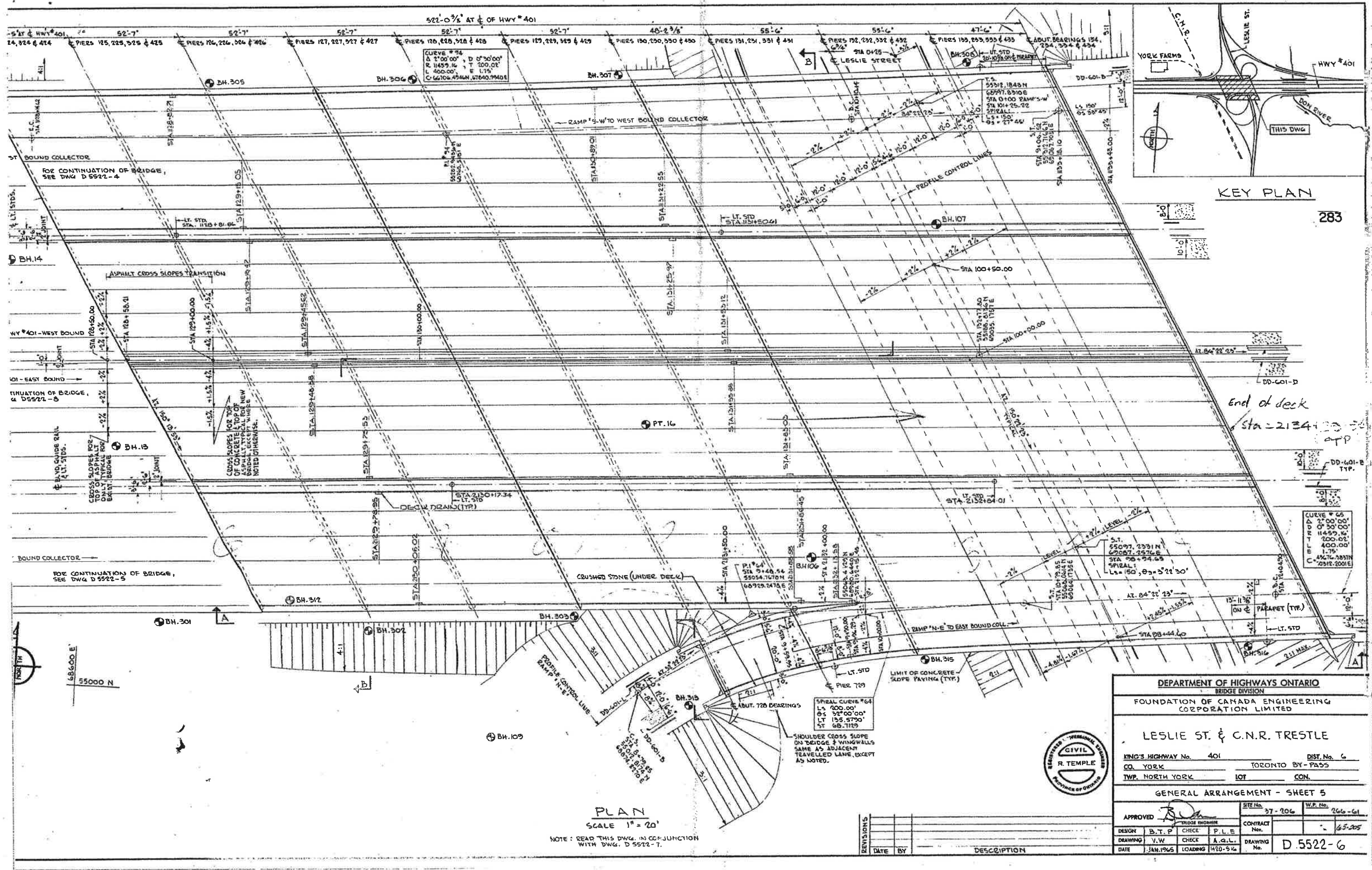




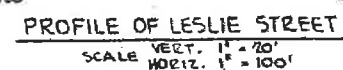
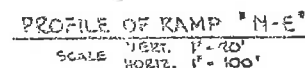
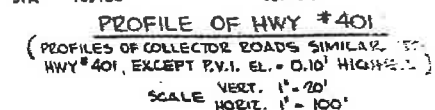
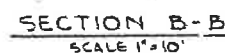
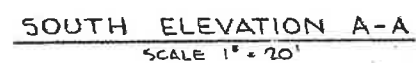
REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED			
LESLIE ST. & C.N.R. TRETTLE			
KING'S HIGHWAY No. 401	DIST. No. 6		
CO. YORK	TORONTO	BY-PASS	
TWP. NORTH YORK	LOT	CON.	
GENERAL ARRANGEMENT - SHEET 4			
APPROVED	SITE No. 37-206	W.P. No. 766-61	
DESIGN P.L.E.	CHECK B.T.P.	CONTRACT No.	65-205
DRAWING V.W.	CHECK A.G.L.	DRAWING No.	D 5522-5
DATE JAN. 1965	LOADING H-20-S16		



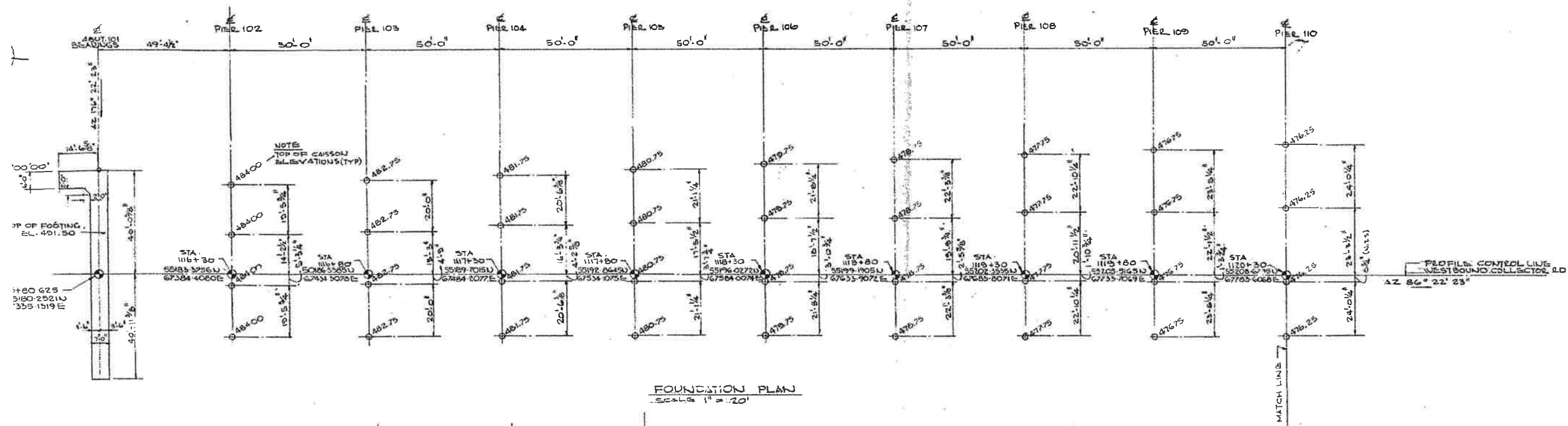




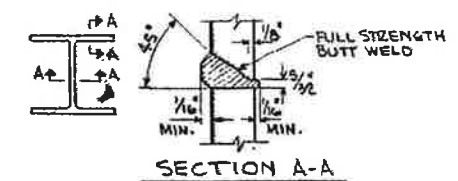
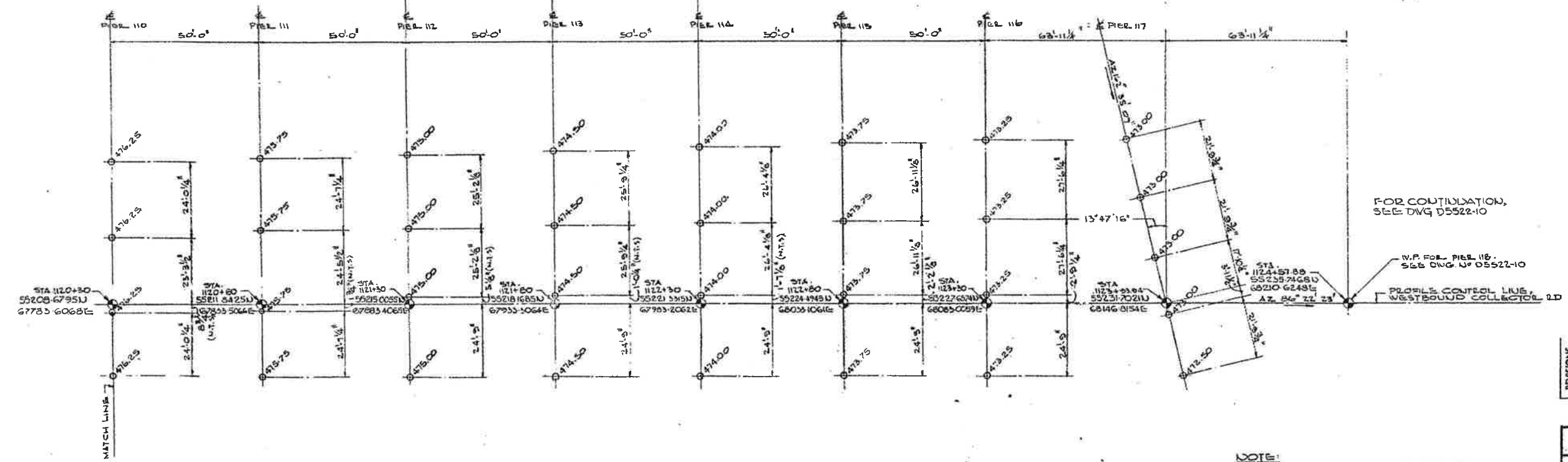
NOTE: READ THIS DWG. IN CONJUNCTION  
WITH DWG. D5522-6.

[illegible]

<p align="center"><b>DEPARTMENT OF HIGHWAYS ONTARIO</b>  <b>BRIDGE DIVISION</b></p>			
<p align="center"><b>FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED</b></p>			
<p align="center"><b>LESLIE ST. &amp; C.N.R. TRESTLE</b></p>			
<p><b>KING'S HIGHWAY No.</b> 401</p>		<p><b>DIST. No.</b> 6</p>	
<p><b>CO. YORK</b></p>		<p><b>TORONTO BY - PASS</b></p>	
<p><b>TWP. NORTH YORK</b></p>		<p><b>LOT CON.</b></p>	
<p align="center"><b>GENERAL ARRANGEMENT - SHEET 6</b></p>			
<p><b>APPROVED</b> <i>[Signature]</i></p>		<p><b>SITE No.</b> 37-206 <b>W.P. No.</b> 266-6</p>	
<p align="center"><b>BRIDGE ENGINEER</b></p>		<p><b>CONTRACT No.</b></p>	
<p><b>DESIGN</b> B.T.P</p>	<p><b>CHECK</b> P.L.E</p>	<p>65-20</p>	
<p><b>DRAWING</b> V.W</p>	<p><b>CHECK</b> A.G.L.</p>	<p><b>DRAWING No.</b> D 5522-7</p>	
<p><b>DATE</b> JAN 1965</p>	<p><b>CHGKED</b> 1965-5-16</p>		



FOUNDATION PLAN  
SCALE 1" = 20'



DETAIL OF H PILE SPLICE  
NOT TO SCALE

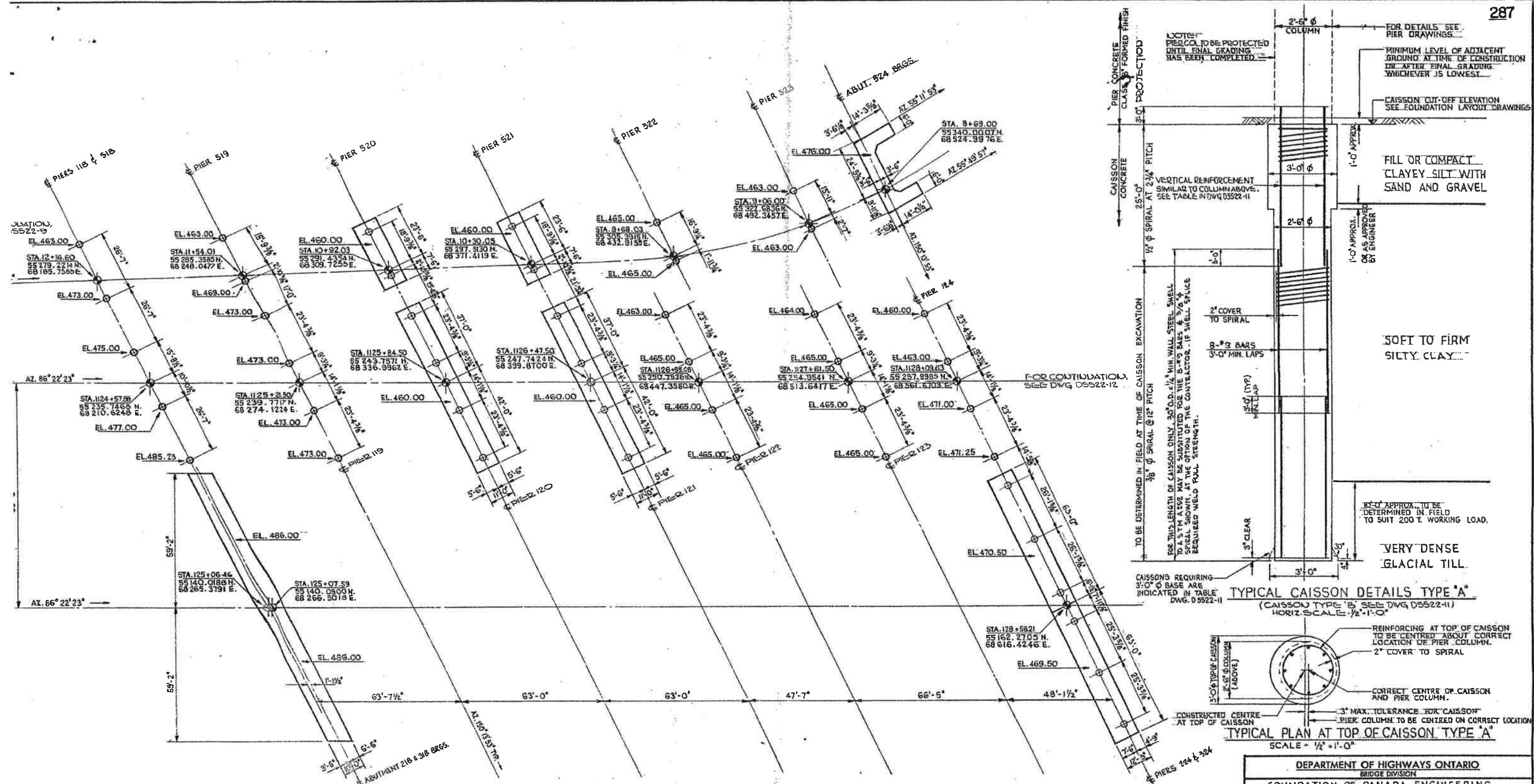
FOUNDATION PLAN  
SCALE 1" = 20'

NOTE:  
FOR GENERAL NOTES, SEE DWG. D5522-1  
DETAIL OF CAISSONS, SEE DWG. D5522-10

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION	
FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED	
LESLIE ST. & C.N.R. TRESTLE	
KING'S HIGHWAY No. 401	DIST. No. 6
CO. YORK	TORONTO BY-PASS
TWP. NORTH YORK	LOT CON.
FOUNDATION LAYOUT-SHEET 1	
APPROVED	SITE No. 37-206 W.P. No. 266-61
DESIGN J.C.H. CHECK A.G.L.	CONTRACT No. 65-205
DRAWING H.B.W./VAT CHECK V.W.	DRAWING No. D5522-9
DATE JAN. 1965	LOADING 1120-516

D5522-16 PILES 110 TO 115
D5522-15 PILES 116 TO 117
D5522-14 PILES 102 TO 110
D5522-13 ABUTMENT 101 - DETAILS
D5522-12 FOUNDATION LAYOUT-SHEET 2
D5522-11 GENERAL ARRANGEMENT-SHEET 2
D5522-10 GENERAL ARRANGEMENT-SHEET 1
D5522-9 GENERAL LAYOUT
DWG. NO. 1
REFERENCE DRAWINGS



FOUNDATION LAYOUT  
SCALE: 1" = 20'-0"

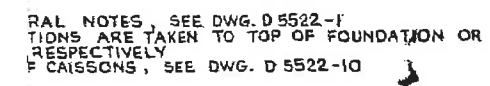
NOTES:  
FOR GENERAL NOTES, SEE DWG. D5522-1  
ALL ELEVATIONS ARE TAKEN TO TOP OF FOUNDATION OR CAISSON, RESPECTIVELY.

D5522-28	ABUTMENT 524 - DETAILS
D5522-27	PIERS 224 & 324
D5522-24	PIERS 520 & 521
D5522-23	PIERS 519, 522 & 523
D5522-20	PIERS 120 & 121
D5522-19	PIERS 115 & 122 TO 126
D5522-17	ABUTMENTS 218 & 318 - DETAILS
D5522-16	PIERS 110 TO 118 & 518
D5522-11	FOUNDATION LAYOUT - SHEET 3
D5522-4	GENERAL ARRANGEMENT - SHEET 3
D5522-1	GENERAL LAYOUT
DWG. No.	TITLE

REFERENCE DRAWINGS

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED			
LESLIE ST. & C.N.R. TRESTLE			
KING'S HIGHWAY No. 401		DIST. No. 6	
CO. YORK		TORONTO BY-PASS	
TWP. NORTH YORK		LOT CON.	
FOUNDATION LAYOUT - SHEET 2			
APPROVED <i>[Signature]</i>		SITE No. 37-206 W.P. No. 266-61	
DESIGN J.C.H.	CHECK J.C.L./S	CONTRACT No.	65-205
DRAWING S.A.	CHECK A.G.L./V.V.	DRAWING No.	D 5522-10
DATE JAN. 1965	LOADING H20-S16		





SCALE = 1" = 20'-0"

D 5522-39	ABUTMENT 434 - DETAILS
-38	ABUTMENTS 234 & 334 - DETAILS
-37	ABUTMENT 134 - DETAILS
-36	PIERS 431 TO 433
-35	PIERS 231 TO 233 & 331 TO 333
-34	PIERS 131 TO 133
-33	PIERS 225 TO 230 & 325 TO 330
-32	PIERS 430 & 429
-31	ABUTMENT 728-DETAILS
-30	PIERS 127 TO 130
-21	PIERS 419 & 422 TO 429
-19	PIERS 119 & 122 TO 126
-10	FOUNDATION LAYOUT - SHEET 2
-7	GENERAL ARRANGEMENT - SHEET 6
-6	GENERAL ARRANGEMENT - SHEET 5
D 5522-1	GENERAL LAYOUT
OWG. No.:	TITLE
	REFERENCE DRAWINGS

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
FOUNDATION OF CANADA ENGINEERING CORPORATION LIMITED			
LESLIE ST. & C.N.R. TRESTLE			
KING'S HIGHWAY No. 401		DIST. No. 6	
CO. YORK		TORONTO BY-PASS	
TWP. NORTH YORK		LOT CON.	
FOUNDATION LAYOUT - SHEET 4			
APPROVED <i>R.D.</i> <small>BRIDGE ENGINEER</small>		SITE No. 37-206 W.P. No. 266-61	
DESIGN J.C.H. CHECK A.G.L./S.T.		CONTRACT No. 65-205	
DRAWING S.A. CHECK A.G.L./V.W.		DRAWING No. D 5522-12	
DATE JAN. 1965		LOADING H20-S16	

# Appendix D

## Limitations of Report

## LIMITATIONS OF REPORT

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to Coffey Geotechnics Inc. at the time of preparation. Unless otherwise agreed in writing by Coffey Geotechnics Inc., it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the testhole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the testhole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Coffey Geotechnics Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time. Any user of this report specifically denies any right to claims against the Consultant, Sub-Consultants, their officers, agents and employees in excess of the fee paid for professional services.