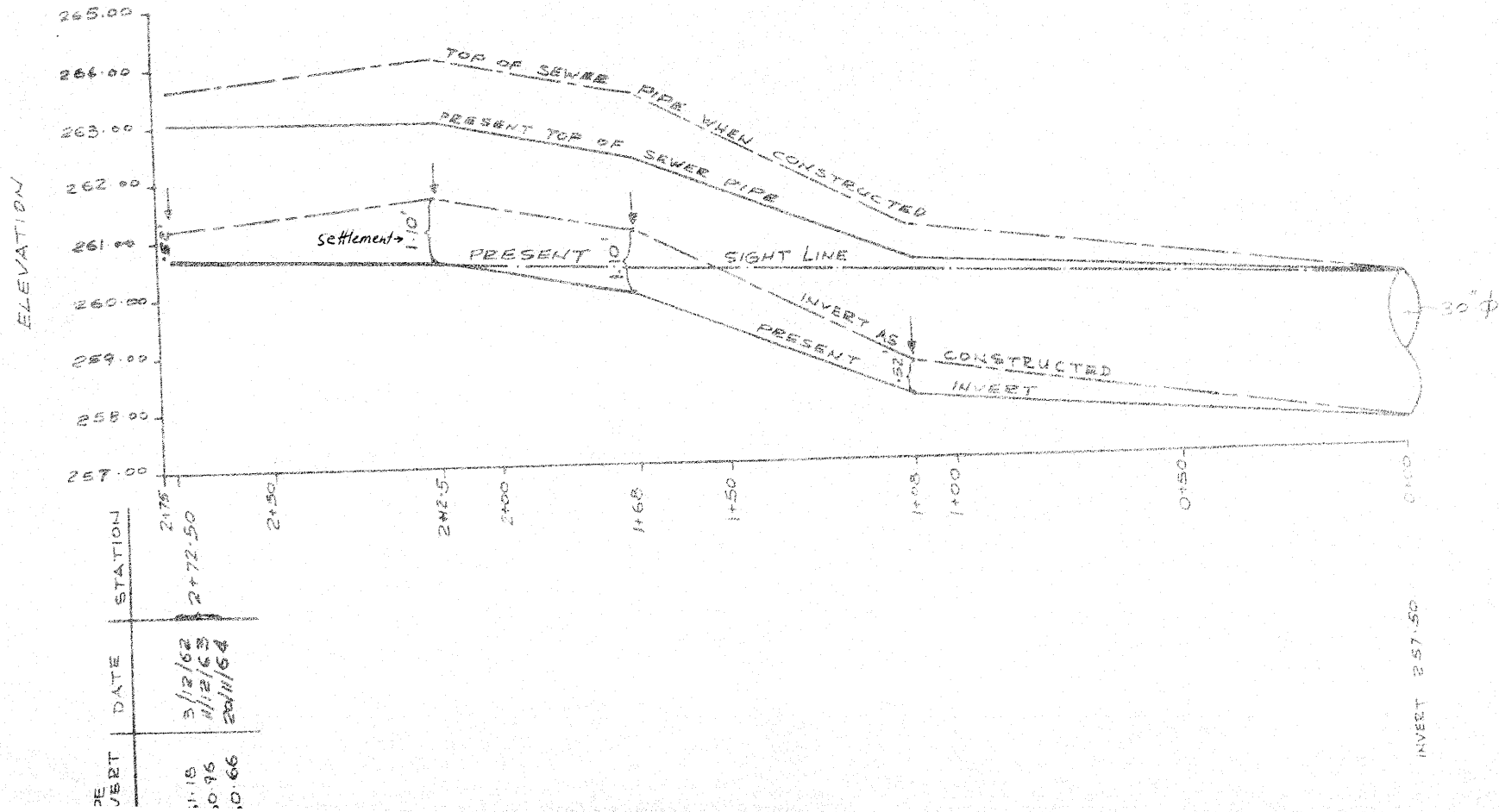


# INSPECTION OF TEMPORARY 30 INCH SANITARY SEWER UNDER RAMP "G" NOV 25 1964



59-45-125?

Noted: K. A. Gell  
Dec 7th '64

Phone: 248-3252

December 2nd, 1964.

G.C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Attention: Mr. H.C. Nixon.

Dear Sir: Re: Highway #403, Contract #64-222,  
30" dia. Sanitary Sewer under Ramp "G".

A sanitary sewer was constructed consisting of a 30" Concrete Pipe with G.B.C. Glass "A" haunches, laid inside a 48" C.I.P. The sewer was to replace an existing 30" dia. C.I.P. The permanent sewer was completed at the end of October, including the backfill of the 30 feet high embankment of Ramp "G".

Within a few days after the new sewer was put into operation, seepage was observed at the pumphouse end of the sewer, at the toe of the embankment. Remedial work was undertaken in the form of a concrete surround at the exposed concrete pipe joints. When the seepage from the sewer continued, the C.I.P. casing at the toe of the south embankment was partly removed and it became apparent that the concrete pipe joints had opened and the handling hole plugs had blown.

The failure of the sewer was attributed to stresses and movements set up in the freely resting concrete pipe by the pumped sewage which is intermittantly under a head of two to six feet or even greater. It seemed that the C.I.P. became flooded and the concrete pipe buoyant, causing further pipe separation. This explanation of the failure was confirmed by the exposure of the sewer under shallow fill in the median of the Expressway when it was found that the concrete pipe had moved upwards and rested now on top of the G.B.C. "A".

A meeting was held on November 23rd, 1964 at the Hamilton City Hall at which the following were present:

Mr. R.C. Monahan, Deputy City Engineer, City of Hamilton,  
 Mr. W. Phillips, Drainage Engineer, City of Hamilton,  
 Mr. L.M. Bull, C.C. Parker & Parsons, Brinckerhoff Ltd.,  
 Mr. H.C. Nixon, " " "  
 Mr. H. Greenland, Department of Highways,  
 Mr. B. Smith, " "  
 Mr. K. Selby, " "  
 Mr. R. Schonfeld, " "

It was agreed at the meeting that the concrete pipe and C.B.C. "A" would be removed from the 48" C.I.P. casing and replaced by a pressure concrete pipe in 8' lengths with flexible joints, permitting a joint opening of  $\frac{1}{4}$ ", and held fast inside the casing by struts or blocks.

It is considered appropriate to now review the past and the anticipated settlement under the Ramp "C" embankment insofar as it will affect the sewer. The following is a summary of settlement data:

- (1) The embankment has now been in place for one year, since November, 1963. From the amount of slag fill added in September 1964 to make up the embankment settlement during the preceding 10 months, the calculated settlement amounted to 9 inches,

$$\left( \frac{900 \text{ tons of slag}}{100 \text{ p.s.f.} \times 450' \text{ length} \times 55' \text{ width of embankment}} \right) = \frac{1,800.00}{100 \times 450 \times 55} = .73'$$

in addition to the unknown initial settlement during embankment construction.

- (2) The sewer manhole #16 at the toe of the north embankment slope was constructed in September 1962. The lower third of the 30' high embankment was placed in September and October, 1963. The upper twenty feet of the embankment, consisting of lightweight slag, was completed on November 18, 1963.

The manhole grating elevation on December 3rd, 1962, i.e. before fill was placed, was 266.66. On December 11th, 1963, when the embankment fill had just been completed, the elevation was 266.40. This amounts to an immediate settlement of .26' at the embankment toe.

The manhole elevation on November 20th, 1964, was 266.24. This amounts to .16' over the following 11 months.

- (3) The temporary sewer was inspected on November 25th, 1964. Although no elevations were taken inside the sewer during inspection, by comparison with the known original super-elevated sewer grade (see enclosed sketch) it appears that the maximum total settlement after a year's loading period cannot have been more than 1.1'.
- (4) The permanent sewer was also inspected on November 25th, 1964. A camber has formed, probably due to flotation of the carrier concrete pipe. Most of the pipe joints have opened at the top.
- (5) Surface elevations of Ramp "G" were taken on November 23rd, 1964. These were compared with those taken on September 22nd, 1964. While there appears to be a depression of between .2 to 1.1 (average .63) between Stations 14+00 and 17+00, there is also a rise in the adjacent area (Stations 17+00 to 20+00), where the excavated material had been stockpiled, of .1' and .7' (average .55'). Allowing for the difference in size of the low and high embankment areas, it would appear that the embankment settlement in the 2 months period in question was .16'. The accuracy of this settlement data, however, is of a low order because of the rough slag surface on which elevations were taken.
- (6) The calculated total settlement based on laboratory consolidation tests of the organic silt stratum below the ramp is 2.5', as against the actual settlement to-date of 1.1'.

#### Conclusion and Recommendations:

- (1) Whilst available settlement data indicate that the future settlement of the embankment will be small - of the order of 6" - laboratory consolidation tests of the underlying organic silt stratum admit the possibility of further settlements of 1 to 2 feet, especially in view of the further granular base course and asphalt pavement load.
- (2) It is recommended that:
  - (a) After removal of the concrete pipe the present invert elevations of the C.I.P. casing be ascertained, whereupon,
  - (b) The granular base course should be placed on Ramp "G", with invert elevations taken immediately before and after placing, and further elevations at weekly intervals for a period of 3 months,



- (d) Settlement data so obtained should be evaluated before the proposed concrete pressure pipe is installed inside the C.I.P. casing.

*R. Schonfeld*

RS/hd

c.c. H. Greenland,

D.T. Hopper,

D. Patterson, (C.C. Parker)

A. Stermac,

T.J. Kovich (2),

Files.

R. Schonfeld,

For: T.J. Kovich,  
Regional Materials Engineer.

October 15th, 1964.

C.C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Attention: Mr. H.C. Nixon.

Dear Sir:    Re:    Chedoke Expressway, Hwy. #403,  
                  Contract #64-222, 60" C.I.P. Sanitary  
                  Overflow crossing at Station 433+00.

It is understood that the City of Hamilton has requested that the Sanitary Overflow between Special Manholes #9, #10, #11 and the new Twin Box Storm Sewer be relaid because of some opened joints and minor pipe deformation.

The C.I.P. sewer rests on decomposed, mainly cindery garbage. This material, due to its high permeability, settles relatively quickly. The settlement induced by the present 6 feet of fill over the C.I.P., which has been in place approx. 8 months, may be considered as completed. However, additional differential settlement will be caused by further loading with 3 feet of granular base course and asphalt paving. For this reason, if the City of Hamilton insists on relaying the sewer, it is recommended that:

1. The C.I.P. be laid on a 4 feet thickness of G.B.C. "A" whose function it would be, by spreading the load, to minimize differential settlement.

In the course of discussions this afternoon the following alternatives to re-laying the sewer were also considered. Their adoption would depend on acceptance by the City of Hamilton:

2. Faulty joints of the C.I.P. to be excavated and repaired by means of large collars which are capable of absorbing anticipated further pipe deflections when the granular base course has been placed.

3. Since the C.I.P. between Special Manholes #9 and #10 is in fair condition, and since no further load will be placed over the section from Manhole #11 to the Twin Box Culvert, reconstruction to be confined to the section between Manhole #10 and #11.
4. It is recommended that, whichever of the above mentioned alternatives is adopted, a record of monthly observations of differential settlements be kept.

Yours truly,

*R. Schonfeld*

R. Schonfeld,

For: T.J. Kovich,  
Regional Materials Engineer.

RS/hd

c.c. H. Greenland,  
D. Patterson, (C.C. Parkers),  
A. Stermac,  
D.T. Hopper,  
T.J. Kovich,  
Files.

October 2nd, 1962.

G.C. Parker & Parsons, Brinckerhoff Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Attention: Mr. Moulson.

Dear Sir:

Re: Hwy. #403, Cont. #62-109,  
Track Protection of C.P.R. at  
Church Access and King Street.

Further to our memo in this matter of September 10, 1962, and subsequent discussion, please note:

If the Contractor chooses to use Bracing at the top of the sheetpiles,

- (a) At a distance of the sheetpiles from the ties of 5 feet, the struts should be capable of supporting a load of 1276 lbs./ft. lin.
- (b) At a distance of the sheetpiles from the ties of 2 feet, the struts should be capable of supporting a load of 2313 lbs./ft. lin.

A safety factor of 1.5 is recommended.

- (c) With bracing, a sheetpile penetration of 6'0" is considered to be adequate.

Yours truly,

RS/h1

c.c. K. Selby,  
T.J. Kovich (2),  
Files.

*R. Schonfeld*  
R. Schonfeld,  
For: T.J. Kovich,  
Regional Soils Engineer.

*Noted K. L. Selby*

Materials and Research Division

August 10, 1962.

Mr. D. C. Cramm, P. Eng.,  
C. C. Parker & Parsons, Brinckerhoff, Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Re: Chedoke Expressway  
King-Main Interchange  
Contract #62-109.

Dear Sir:-

In reply to your letter of July 31, 1962, we are herewith, submitting our comments for your consideration:

We have no objection to the use of the Delmag D-22 hammer provided:

- a) it is used for driving of the piles to within 2 - 3 feet of bedrock;
- b) that the seismic control measurements indicate that no detrimental vibrations are caused to the cathedral.

It is also our opinion that the District Engineer should be advised of this and asked to approve the use of this particular hammer.

Yours very truly,

AGS/Mdef

cc: Mr. F. I. Hewson  
Foundations Office ✓  
Gen. Files.

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

C. C. PARKER & PARSONS, BRINCKERHOFF LTD.  
CONSULTING ENGINEERS  
225 MAIN STREET WEST  
HAMILTON, ONTARIO  
CANADA

July 31, 1962.

Mr. A. Stermac,  
Principal Foundations Engineer,  
Department of Highways, Ontario,  
Parliament Buildings,  
Toronto, Ontario.

Dear Sir:

Re: Chedoke Expressway  
King Main Interchange  
Contract #62-109

We are enclosing copy of letter dated July 19, 1962 from Dundurn Construction Company Limited requesting approval of Delmag D12 hammer for driving steel tube piles. The Special Provision covering Supplying Equipment for Driving the Tube Piles reads in part as follows:

"The steam and diesel hammers shall be capable of delivering a blow at normal speed with an energy of not more than 22,000 ft. -lbs. and not less than 18,000 ft. -lbs."

The Delmag D22 hammer is rated by the manufacturer as delivering blows of around 39,000 ft. -lbs. and thus would not be permitted by the Special Provisions.

We have been given to understand verbally by Bermingham Construction, sub-contractor for the pile driving that they wish to use a D22 hammer to drive to within a short distance of bedrock and then to drive the remaining distance to rock with the D12 hammer. Could you please give us your comments.

Yours very truly,

C. C. Parker & Parsons, Brinckerhoff Ltd

D. C. Graham, P. Eng.,

for:

H. C. Nixon, P. Eng.,

Project Manager.

DCC:un  
Encl.

# Dundurn Construction Company Limited

215 Superior Street

P.O. Box 157, Postal Station C

Hamilton, Ontario

July 19th, 1962.

C. C. Parker & Parsons, Brinckerhoff Ltd.,  
795 Main Street West,  
Hamilton, Ontario.

Attention: Mr. H. C. Nixon.

Dear Sirs:

Re: Contract 62-109

It is our intention to use the Delmag Hammer of  
the size range D-12 to D-22, for driving the steel tubular  
piling.

As per Special Provision 122, we hereby request  
your approval of this equipment.

Yours very truly,

Dundurn Construction Company Ltd.

Wm. E/df

Wm. Edgerley.

Dave

Pls reply with copy  
to Patterson

d.c.x

C. C. PARKER AND ASSOCIATES LIMITED	
REC'D	July 20/62
READ BY	2062
COPY TO	200
REP'D BY	
DATE	
D.C.C.	

59-F-125

Materials and Research Division

May 4, 1962.

C. C. Parker & Parsons, Brinckerhoff, Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Attn: Mr. D. C. Cramm, P.Eng.

Re: Pipe Piling  
Bridges in King-Main Interchange  
Chedoke Expressway

Dear Sir:-

Thank you for your letter dated April 25, 1962 concerning the question of corrosion of the steel tube piles driven partly through organic fill at the bridges of the King-Main Streets Interchange.

We took this matter up with our Bridge Design Section, and it is their opinion that corrosion is not a serious problem because of the following reasons:

1. A wall thickness of 0.25" is used, although 0.203" would have been adequate. The increase in wall thickness was made because of driving damages to the thinner sections.

2. A design load of only 60 T per pile has been chosen, although pile loading tests gave values of 200 tons without failure.

3. If all the steel would have been corroded away the remaining concrete would be stressed with 1,020 p.s.i.

We also investigated the possibility of corrosion protection using locally produced products. It is possible to obtain the same kind of protection as with Sika-Epoxy or Tarsel by using a coating of Ferromede 200 and a coating of Ferromede C 105. The cost of these two coatings would be less than 2 cents per sq. ft. plus application. A more complete corrosion protection could be obtained by using cathodic protection in addition to the coatings. This would increase the cost to about 12 cents/sq.ft.

cont'd. /2 ..



C. C. Parker & Assoc., Ltd.  
Attn: Mr. D. C. Cramm, P.Eng.

May 4, 1962.

However, in the light of the arguments put forward by the Bridge Design Section, we feel that corrosion protection is not necessary.

If you consider that this question needs further exploration or discussion, please feel free to contact our Office.

AGS/MdeF

Yours sincerely,

cc: Mr. F. I. Hewson

Foundations Office  
Gen. Files.

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

(All correspondence pertaining  
to this letter may be found in  
General Files)

March 17, 1961.

C. C. Parker & Parsons, Brinckerhoff, Ltd.,  
Consulting Engineers,  
795 Main Street West,  
Hamilton, Ontario.

Attention: Mr. J. W. Fisher.

Re: Ramps C, J, H, & K, King-Hain Interchange  
-- Chedoke Expressway --  
M.F. 59-F-125 District No. 4 M.F. 431-50-1.

Dear Sir:-

Attached, we are sending to you four (4) copies of  
the Foundation Investigation Report for the above mentioned  
location.

We believe the conclusions and recommendations con-  
tained in this report, are self-explanatory and adequate for  
your future design work; however, should any queries arise in  
connection with this project, please do not hesitate to call  
on our Office.

MLL/MLL  
attach.

Yours very truly,

L. C. Rodeman,  
PRINCIPAL FOUNDATION ENGINEER.  
Per:

cc: Messrs. -

C. C. Parker & Assoc. (4)  
A. H. Toye (2)  
H. A. Tregaskes  
H. D. McMillan  
J. C. Campbell  
J. C. Thatcher  
T. J. Kovach  
A. Galt

Foundations Office  
Gen. Files.

*afternoon*  
(L. C. Rodeman,  
SUPERVISING FOUNDATION ENGINEER.)

COPIES OF REVISED  
DRAWING 59-F-125B  
MAILED JULY 24/61

At

Ramps G, J, H, &amp; K, King-Main Interchange

-- Chedoke Expressway --

W.J. 59-F-125 District No. 4 W.P. 231-98-3.

1. INTRODUCTION.
2. SUMMARY OF RECOMMENDATIONS.
3. DESCRIPTION OF SITE AND GEOLOGY.
4. SOIL CONDITIONS -
  - 4.1) General.
  - 4.2) Ramp 'G'
  - 4.3) Ramp 'J'
  - 4.4) Ramp 'H'
  - 4.5) Ramp 'K'
5. WATER CONDITIONS.
6. CONCLUSIONS AND RECOMMENDATIONS -
  - 6.1) Ramp 'G'
  - 6.2) Ramp 'J'
  - 6.3) Ramp 'H'
  - 6.4) Ramp 'K'

APPENDICES -- Report to Department of Highways Ontario on  
site investigation, Ramp 'G', Proposed  
Chedoke Expressway.

## DRAWINGS IN THE FOLDER --

- 59-F-125A Chedoke Expressway -  
Plan showing boreholes at King-Main  
Interchange.
- 59-F-125B Chedoke Expressway -  
Profiles showing soil conditions below  
ramps at King-Main Interchange.
- 59-F-125C Chedoke Expressway -  
Plan, profile & sections showing treatment  
of Ramp 'G'.
- 59-F-125D Chedoke Expressway -  
Plan & Sections showing treatment of  
Ramp 'J'.

## 1. INTRODUCTION:

The interchange between the Chedoke Expressway and King and Main Streets in the City of Hamilton comprises the following:-

Two high-level structures

Two ramp structures

Four ramp embankments.

The two high-level structures carry King Street and Main Street across the Chedoke Expressway. The foundation conditions at these structures have been discussed in two separate reports: 59-F-115 and 59-F-116.

The two ramp structures carry ramps 'J' and 'H' across the expressway and the foundation conditions at these structures are discussed in this report. The four ramp embankments are also discussed in this report.

## 2. SUMMARY OF RECOMMENDATIONS:

The strength of the base material in the floor of the Chedoke Creek Valley requires that the following procedures be adopted:-

Ramp 'G' - (See Drawing 59-F-1250)

Road of King Street to Chainage 13 + 00:

Conventional earth fill.

Chainage 13 + 00 to Chainage 18 + 40:

Air-cooled blast furnace slag fill, with a berm on its East side to Chainage 18 + 00 approx.

Chainage 18 + 40 to main lanes:

Conventional earth fill.

2. SUMMARY OF RECOMMENDATIONS: (cont'd.) ...

Ramp 'J' - (See Drawing 59-F-125D)

Main Street End:

The embankment can be constructed using conventional techniques. The structure length is governed by functional considerations.

West-bound lane end:

Structure must be carried to Chainage 433 + 00. From this point, the embankment may be constructed as follows:-

Chainage 433 + 00 to 431 + 00:

The embankment-plus-berm section may be constructed to the elevation of the top of the berm at any section, i.e., to elevation of ramp minus twelve feet. From this height on, the embankment should be completed using air-cooled blast furnace slag.

Chainage 431 + 00 to 427 + 00:

The embankment-plus-berm section may be constructed using conventional fill material.

Chainage 427 + 00 to M.E.L.:

Conventional embankment section may be used.

The Ramp 'J' structure must be supported on steel 'H'-piles or equivalent, driven to bedrock.

2. SUMMARY OF RECOMMENDATIONS: (cont'd.) ...

Ramp 'H' -

Embankment construction at the South end of the ramp may start at Station 13 + 00.

The structure, which is to be carried to King Street, must be supported on steel 'H'-piles or equivalent, driven to bedrock.

Ramp 'K' -

Conventional embankment construction procedures may be used.

3. DESCRIPTION OF SITE AND GEOLOGY:

The Chedoke Expressway, at this interchange, follows the Chedoke Creek Valley. This is a U-shaped valley which has a bottom width of about 1,000 feet in this area. This valley has been used from time to time as a disposal area for industrial and domestic waste from the City of Hamilton, and this material was found during the investigation for this interchange.

The Chedoke Creek follows a meandering course through this valley, and has contributed to some of the deposits encountered at this site.

For a detailed geology of the Hamilton Map-Area, reference is made to Geological Circular No. 9 of the Ontario Department of Mines, by Dr. P. F. Harrow.

#### 4. SOIL CONDITIONS:

##### 4.1) General:

In general, four distinct layers can be observed over the whole northern part of the area investigated. These are a heterogeneous surface layer; a layer of silty clay with organic matter; a layer of till found widely distributed in this general area; and the shale bedrock. The part of the area to the South of Main Street where Ramp 'K' and the southern part of Ramp 'H' lie, has a slightly different profile.

##### Upper Heterogeneous Layer

This layer was described in Report 59-F-115 as a "very variable mixture of sand, gravel, rubble and refuse - locally clayey". This description applies to it over the whole area of the investigation. No unique properties are attributable to it, and for calculation purposes, it was assumed to have the same properties as the layer of silty clay below it. It consists of material which has been disposed of in this area: ashes and slag, building rubble, domestic waste, natural organic matter, all mixed with varying amounts of silty clay and sand. Its distribution and any unusual features are described below, under the various ramp subheadings.

##### Brown Silty Clay with Organic Matter

This material has been laid down by the Chedoke Creek and is of recent origin. It is a normally consolidated silty clay material with very variable amounts of organic matter. Reference to the plasticity chart in the Appendix will show that the organic

4. SOIL CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

Brown Silty Clay with Organic Matter: (cont'd.) ...

content is reflected in the occasional very high liquid limits and the variability of the results; however, it will be noticed that a large number of the points lie in the CI and CL subdivisions. A large number of shear strength determinations were made in this layer and the results of these and other tests, showed the following:-

Average Water Content .....	37%
Average Unit Weight .....	118 lb./cu.ft.
Shear Strength Parameters	
(Geccon) : (a) Total Stress .....	600 lb./sq.ft.
(b) Effective Stress .....	$C' = 0 \quad \phi = 29^\circ$
(D.H.O.) (a) Total Stress -	
From Compression Tests ..	725 lb./sq.ft.
From Field Vane Tests ...	950 lb./sq.ft.

Considerable doubt was felt about the results of the shear strength determinations in this material. Great difficulty was encountered in obtaining samples and not much reliance was placed on the results of the field vane test in this rather stoney and organic material. Laboratory compression tests gave a range of results of 194 lb./sq.ft. to 1900 lb./sq.ft., and all preliminary calculations were made using very conservative values of the shear strength. The value that was chosen was 400 lb./sq.ft. This was revised on the basis of the more refined sampling methods used by Geccon in carrying out this hole on Sapp 'G'.

cont'd. /6 ...



4. SOIL CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

Gray Silty Clay

This material is found widely distributed over this and adjoining areas in the West end of the City of Hamilton. It was found to overlie the bedrock over the whole of the King-Main interchange site.

Geologically, this material is a clay till. It has random fine-gravel size particles distributed through it, as can be seen in its particle size distribution in the Appendix. Reference to the plasticity chart shows that it most commonly falls in the CL or CI ranges with, occasionally, a sample in the MI range.

The following properties have been established for this material:-

Average Unit Weight .....	127 lb./cu.ft.
Average Water Content .....	23%
Average Shear Strength .....	1600 lb./sq.ft.

Shale Bedrock

Underlying the gray silty clay at this site is the Queenston shale bedrock. Several cores were taken from the upper surface of this material and indicated that the surface was not much weathered.

4. SOIL CONDITIONS: (cont'd.) ...

4.2) Ramp 'B':

At this ramp the three layers described above, were encountered from where the ramp joined the main lanes to where it climbed over the edge of the valley between Chainage 14 + 50 and 13 + 50. To the East of this point, the material changes, and on the side of the valley, more granular materials were encountered (see B.M. 3). The upper heterogeneous layer at this ramp is very variable in distribution. It has been shown on the drawing as having a more or less consistent depth of about five to ten feet. In some locations the division of the upper materials into two layers was arbitrary and, in fact, the brown silty clay with organic matter was found almost to the surface. Towards the lower B.S.L. end of this ramp, the surface layer increases in depth to about fifteen feet, although again, the limits are not absolute. The brown silty clay at this ramp has a lower limit which is reasonably uniform at elevation 225 ft. until it reaches the edge of the valley where it rises towards the East. As no structure was proposed on this ramp, the elevation of the bedrock was not established.

The materials at the East end of the ramp are as follows:-

Light Brown Silty Clay

This material was found to be about ten feet thick and contains many sand and gravel size particles along with roots and other organic matter.

cont'd. /8 ...

4. SOIL CONDITIONS: (cont'd.) ...

4.2) Ramp 'G': (cont'd.) ...

Brown Fine to Medium Grain Sand

This material was found to overlie the grey silty clay till. Interspersed through the layer, there are random thin layers of silty clay. The relative density of this layer was found to lie in the 'medium to dense' ranges. The contact between this layer and the grey silty clay was established in Borehole 8, to be at elevation 250 ft.

4.3) Ramp 'J':

Because Ramp 'J', over most of its length, lies in the bottom of the valley, the materials which underlie it are basically those described in the "General" soil conditions. At its north end, the materials under the line of the ramp are exactly as described above. Here, the upper heterogeneous layer was found to have a more or less level lower surface at elevation 230 ft. The brown silty clay with organic matter, also has an approximately level contact with the grey silty clay. This contact is at elevation 230 feet. At the south-east end of Ramp 'J', conditions are slightly different. Here, the upper layer varies in depth as shown in Drawing 59-7-125B, reaching a maximum depth of a little over 20 feet in Boreholes 13. Its lower limit here, is still at about the same elevation as at the north end of the ramp, however. In one place, at Boreholes 12, the material becomes wholly granular. The contact between the brown silty clay and the grey silty clay

4. SOIL CONDITIONS: (cont'd.) ...

4.3) Ramp 'I': (cont'd.) ...

risks towards the south-east end of the ramp, reaching elevation 240 ft. in Borehole 13. This means that the brown silty clay layer gets progressively thinner towards the upper end of the ramp. At the same time, the layer changes in character after it crosses the main lanes, becoming drier and more granular.

Bedrock was encountered in Boreholes 10 and 12. From the elevations at these two points, the depths encountered in Ramp 'H' and King Street, it is apparent that bedrock slopes towards the west or the north-west. In Borehole 10, the elevation of the bedrock surface was 190 feet.

4.4) Ramp 'H':

The eastern end of Ramp 'H' is underlain by the three materials described above. Here, the lower limit of the upper heterogeneous material slopes downward towards the west following the ground level and maintaining a more or less uniform thickness of fifteen feet. Below this, the brown silty clay thins out towards the upper end of the ramp. The contact between this and the grey silty clay slopes downward towards the west until it reaches Borehole 10, where it levels out at elevation 230 ft. Towards the south end of the ramp, conditions change as follows: In Borehole 3, no upper heterogeneous layer was encountered. In Boreholes 4 and 5, the upper heterogeneous layer reappears and at the same time, the middle layer becomes significantly more granular. After Boring 5, the ground rises over a filled area in which sand and gravel are

4. SOIL CONDITIONS: (cont'd.) ...

4.4) Ramp 'H': (cont'd.) ...

widely distributed. At this end of the ramp the grey silty clay, after appearing in Boreholes 9, 10 and 1, at elevation 230 ft., rises in Borehole 4 to elevation 236 ft. and continues at this elevation to the end of the ramp. Bedrock at this ramp varies rather erratically in elevation and has a median position at elevation 195 ft.

4.5) Ramp 'K':

Ramp 'K' differs from the other three ramps in that the layer of heterogeneous fill was completely absent. Here, the upper layer is a rather variable silty clay material having basically the same particle size distribution and position on the plasticity chart as the brown silty clay with organic matter found elsewhere on the site. The indications are, however, that the shear strength of this material is higher than the brown silty clay at, for example, Ramps 'J' and 'C'. Here, it is believed that a shear strength of at least 800 lb./sq.ft. can be assumed for the upper material.

Below this material, lies the grey silty clay till. This was found at elevation 240 ft. in Boreholes 1 and 2, at elevation 260 ft. in Boreholes 3 and 4, and again at elevation 240 ft. in Borehole 5.

5. WATER CONDITIONS:

In general, the ground water table was found to be near elevation 255 ft. in the valley. As most of the materials in the upper layer are free draining, the water table shown is probably reliable.

6. CONCLUSIONS AND RECOMMENDATIONS:

6.1) Ramp 'G':

The brown silty clay which forms the middle layer here and which appears in places in the upper heterogeneous layer, is not capable of supporting the proposed embankment when conventional materials are used in the construction. Using conventional materials, it is estimated that an embankment sixteen feet high, can safely be constructed at this location. In order to build the proposed embankment, the following construction procedure is recommended:-

From the nose of King street to Chainage 13 + 00, there are granular and competent materials beneath the ramp. Here, conventional embankment construction procedures can be followed to construct an embankment section without any berm.

From 13 + 00 to 18 + 30 the proposed embankment has a height considerably in excess of sixteen feet. Here, the main lanes must be carried all the way over to the toe of the ramp-embankment slope and a berm must be constructed on the east side of the embankment. This berm should follow the profile of the ramp at an elevation eighteen feet below grade at any section.

At approximately Chainage 18 + 00, the ramp reaches an elevation eighteen feet above original ground. Here, the berm may be discontinued. From this point to the east-bound lake, a conventional embankment section can be adopted.

cont'd. /12 ...

6. CONCLUSIONS AND RECOMMENDATIONS: (cont'd.) ...

6.2) Ramp 'J':

In the construction of Ramp 'J', the governing factor is the strength of the brown silty clay. Upon this depends the height of embankment which can be built at this location; thus the length of structure which is required. Because of the variability of the results and the number of extremely low strengths encountered during the investigation, it was decided to limit the height of the embankment to twelve feet without any berm. Using a berm on the west side and the main lanes as a berm on the east side, the embankment could be built to a height of approximately twenty-four feet which would allow it to be extended to Chainage 431 + 00. If special light-weight fill is used, the embankment may be further extended to 433 + 00. Suitable light-weight fill in the form of blast furnace slag is available in the Hamilton area. This material has a reported compacted weight of 92 lb./cu.ft. Details of these schemes are shown in Drawing 59-F-125D.

The structure carrying Ramp 'J' over the main lanes must be supported on steel 'H'-piles or equivalent, carried to the shale bedrock. The greatest depth to bedrock was found to be 75 feet.

6.3) Ramp 'H':

The eastern end of Ramp 'H' is to be carried on a structure which joins the King Street structure. This structure must be supported on steel 'H'-piles or equivalent, carried down to the shale bedrock.

Conditions at Beresford 5 have improved enough to allow the proposed embankment to be built at this point. Thus, the structure can be ended at approximately Chainage 18 + 00.

6. CONCLUSIONS AND RECOMMENDATIONS: (cont'd.) ...

6.4) Loop 'K':

Loop 'K' presents no special difficulties. Throughout its length, conditions are considered to be sufficiently good that the proposed embankment can be built using conventional fill and construction methods.

March 1961

REPORT PREPARED BY:

*John Brown*  
.....  
John Brown,  
PROJECT FOUNDATION ENGINEER.

REPORT APPROVED BY:

*A. G. Sternac*  
.....  
A. G. Sternac,  
SUPERVISING FOUNDATION ENGINEER.



APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

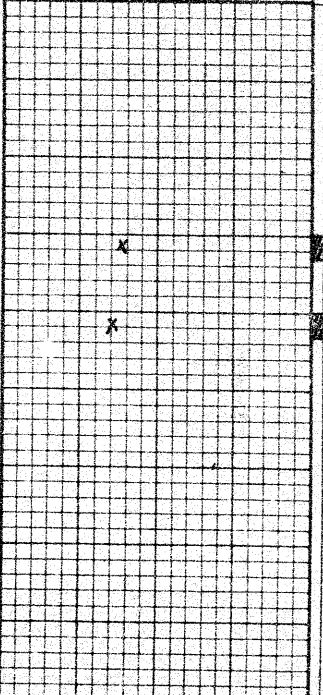
W.P. 231-58-3 BORE HOLE NO. 1  
 JOB 59-F-125 STATION 24+00 to Ramp G.  
 DATUM G.S.C. COMPILED BY H.K.  
 BORING DATE Dec. 23/59 CHECKED BY J.B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
 LIQUID LIMIT \_\_\_\_\_ X  
 PLASTIC LIMIT \_\_\_\_\_

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLOWS/FT.
	↓ Groundlevel	259.0	0	10 20 30 40	
	Organic matter, sand, refuse.				
	W.L. =	253.0			
		249.0	10		
	Brown sandy clay				
		2375	20		
	End of borehole		30		
			40		

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.		
MOIST. CONTENT- % DRY WT.					
20	40	60	80		
				S1	-
				S2	-

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 2  
JOB 59-F-125 STATION 23+00 4 Ramp G  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATED Dec. 23/59 CHECKED BY J.B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	---	O
VANE TEST (C) AND SENSITIVITY (S)	---	+ <sup>s</sup>
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	LI
LIQUID LIMIT	---	X
PLASTIC LIMIT	---	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				P.S.F.			
				10	20	30	40
	↓ Groundlevel	255.0					
	Organic matter, refuse, sand						
		W.L. $\nabla$ 247.0					
		241.0					
	Brown sandy clay						
		233.5					
	End of borehole						

CONSISTENCY				SAMPLE	NATURAL UNIT WT.
MOIST. CONTENT - % DRY WT.					P.C.F.
20	40	60	80		
	</				

## DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

W.P. 231-58-3

BORE HOLE NO. 3 A

JOB 59-F-125

STATION 19+00 &amp; Ramp G.

DATUM G.S.C.

COMPILED BY B.K.

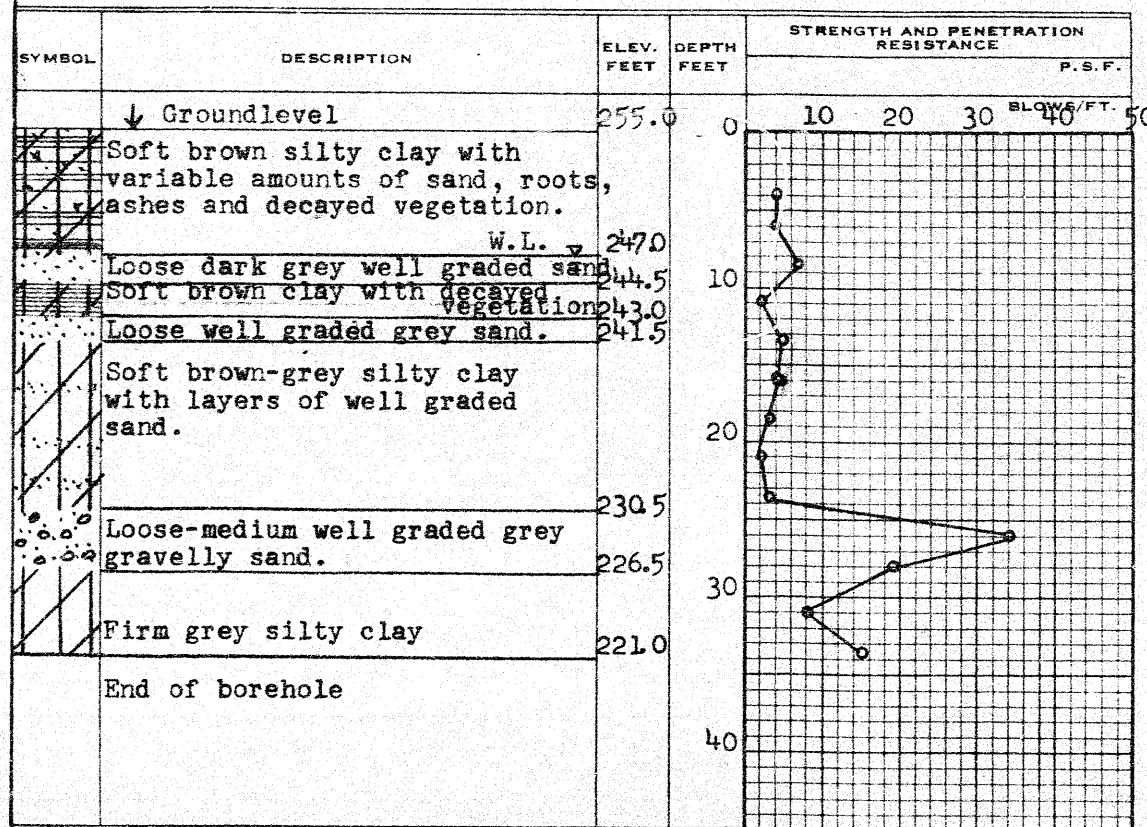
BORING DATE Mar. 9/60

CHECKED BY J.B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
 LIQUID LIMIT \_\_\_\_\_ X  
 PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
20 40 60			
	X	S1	-
	X	S2	-
		S3	-
	X	S4	-
	X	S5	-
	X	S6	-
	X	S7	-
	X	S8	-
	X	S9	-
X		S10	-
X		S11	-
X		S12	-
X		S13	-

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION




W.P. 231-58-3 BORE HOLE NO. 3 B  
 JOB 52-F-125 STATION 19+00 & Ramp G.  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Mar. 9/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) O  
 VANE TEST (C) AND SENSITIVITY (S) +  
 NATURAL MOISTURE AND LIQUIDITY INDEX LI  
 LIQUID LIMIT X  
 PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500	1000	1500	2000 P.S.F.
	↓ Ground level	225.0	0				
	Soft brown silty clay with variable amounts of sand, roots ashes and decayed vegetation.						
	W.L. 247.0						
	Loose dark grey well graded sand.	244.5	10				
	Soft brown silty clay with decayed veg.	243.0					
	Loose well graded grey sand.	241.5					
	Soft grey-brown silty clay with layers of well graded sand.		20				
		230.5					
	Loose - medium well graded grey gravelly sand.	226.5	30				
	Firm grey silty clay						
		221.0	40				
	End of borehole						

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.				
20	40	60		
			T1	118.0
			T2	120.0
			T3	115.0
			T4	120.0
			T5	-
			T6	-



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 3 C

JOB 59-F-125 STATION 19.00 & Ramp G

DATUM G.S.C. \_\_\_\_\_ COMPILED BY B.K.

BORING DATE Mar. 10/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) ———— O  
VANE TEST (C) AND SENSITIVITY (S). ———— +  
NATURAL MOISTURE AND LIQUIDITY INDEX ———— LI  
LIQUID LIMIT ———— X  
PLASTIC LIMIT ————

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE				
				P.S.F.				
				500	1000	1500	2000	
	↓ Ground level	255.0	0					
	Soft brown silty clay with variable amounts of sand, roots ashes and decayed vegetation.							
	W.L. 247.0							
	Loose dark grey well graded sand	247.0						
	Soft brown silty clay with decayed vegetation	244.5	10					
	Loose well graded grey sand.	243.0						
		241.5						
	Soft grey-brown silty clay with layers of well graded sand.		20					
		230.5						
	Loose-Medium well graded grey gravelly sand.	226.5						
	Firm Grey silty clay.		30					
		221.0						
	End of borehole		40					

[illegible]

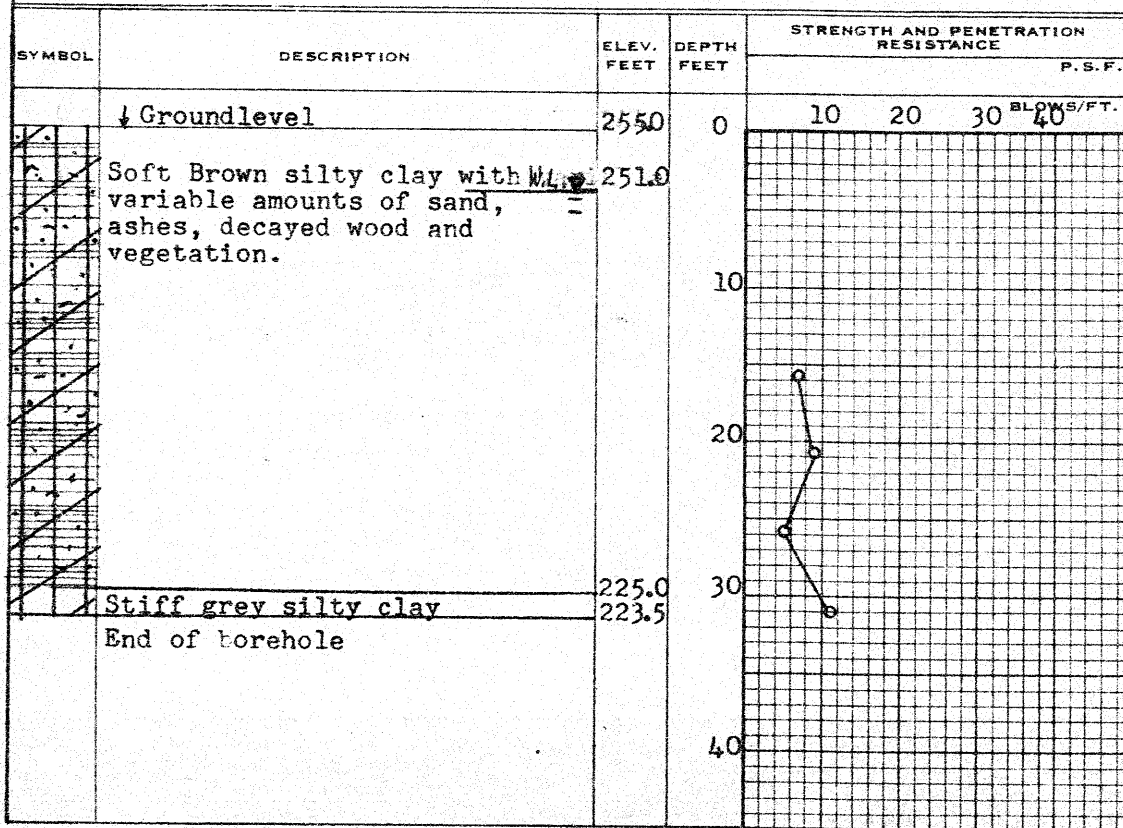
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 4  
JOB 59-F-125 STATION 18+00 A Ramp G  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATE Dec. 23/59 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
VANE TEST (C) AND SENSITIVITY (S)  
NATURAL MOISTURE AND LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
20 40 60 80		
	S1	-
	S2	-
	S3	-
	S4	-

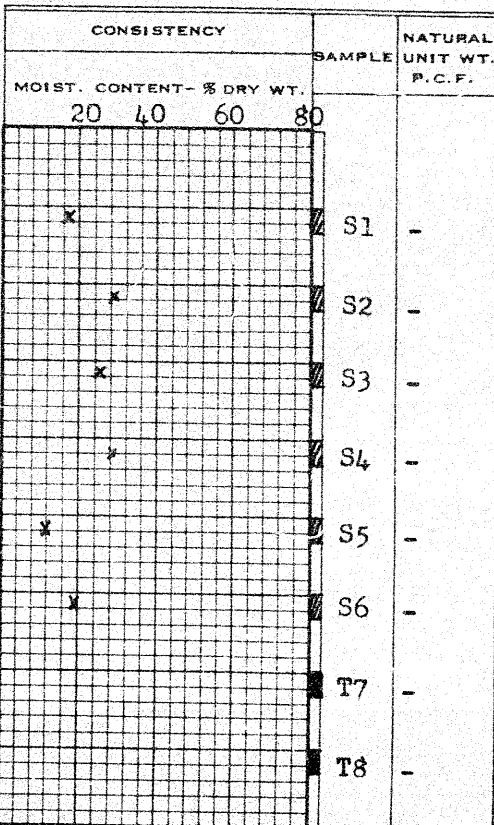
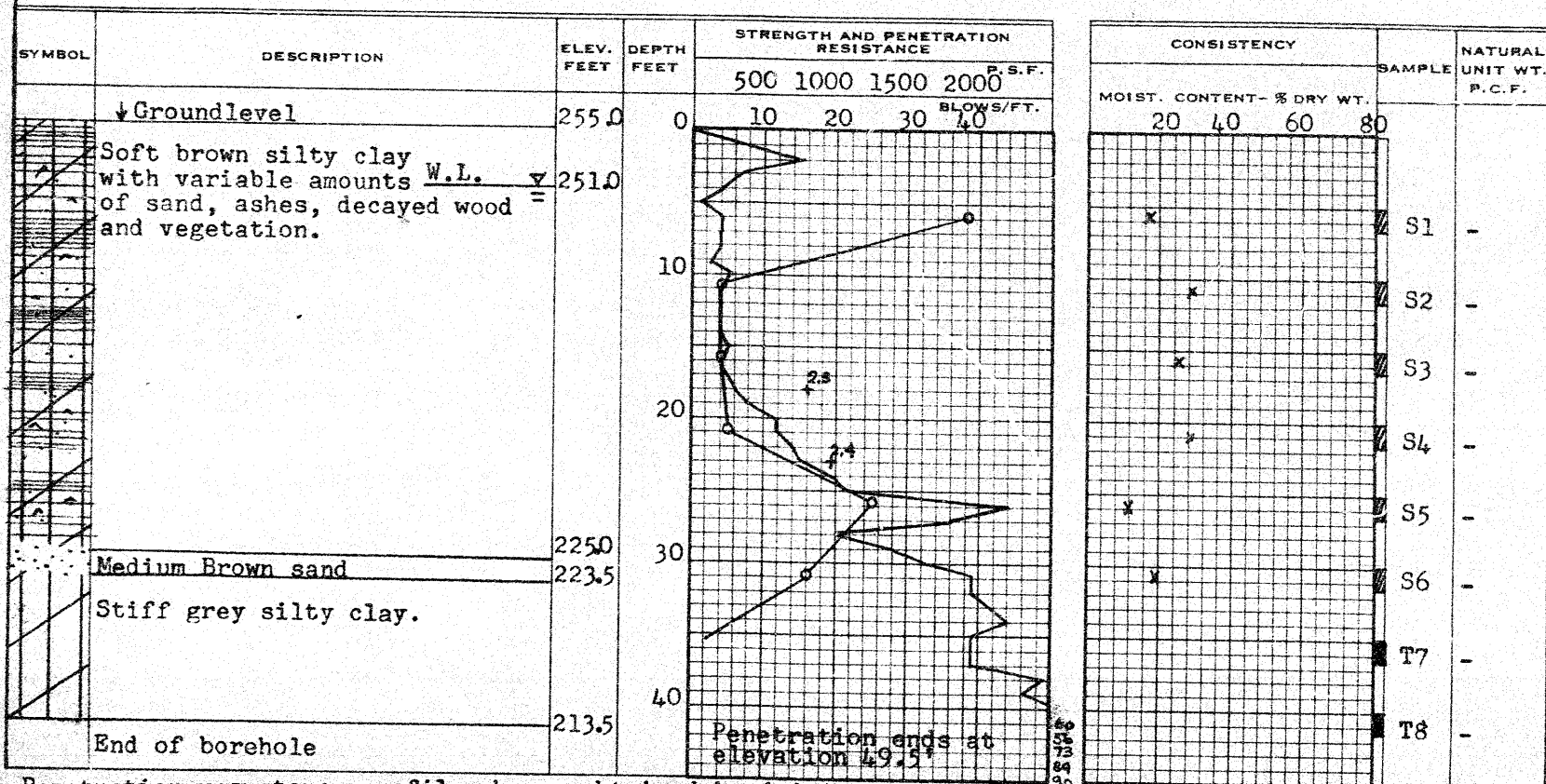
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 5  
 JOB 59-F-125 STATION 18+00 30' Lt.  
 DATUM C.S.C. COMPILED BY B.K.  
 BORING DATE Dec. 31/59 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT





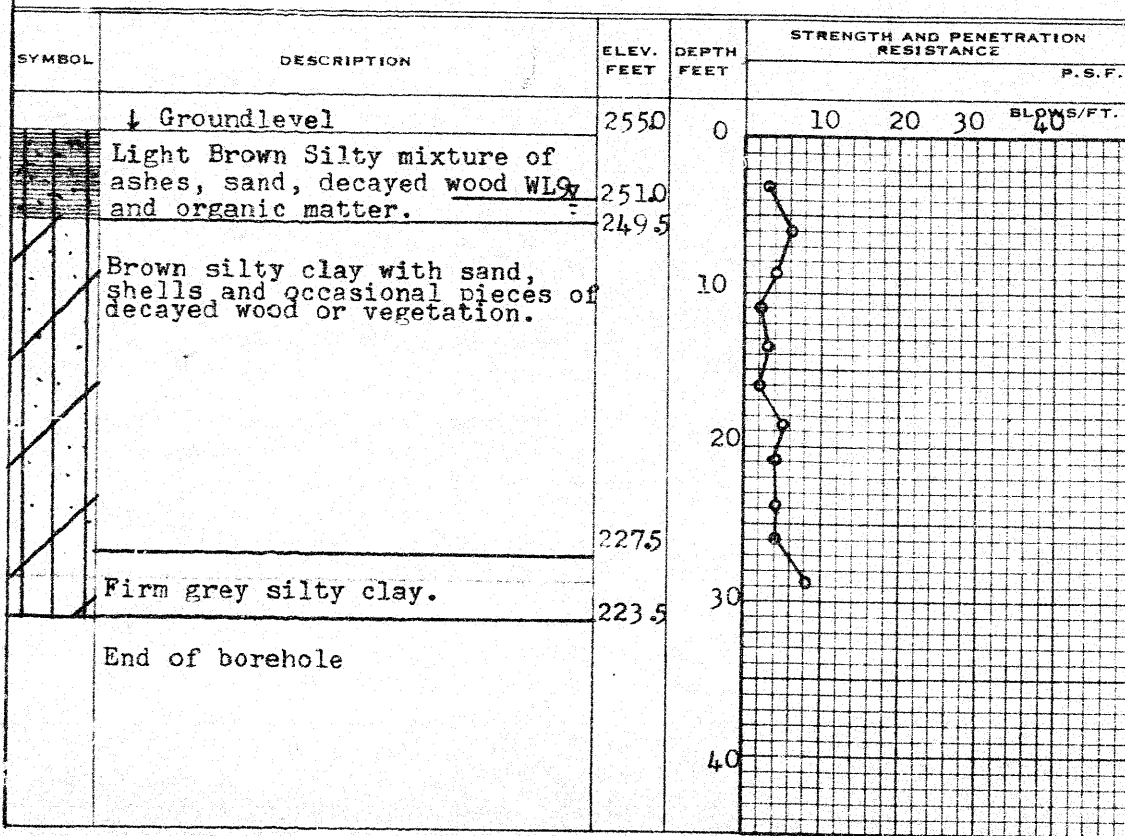
**DEPARTMENT OF HIGHWAYS - ONTARIO**  
**MATERIALS AND RESEARCH SECTION**

W.P. 231-58-1 BORE HOLE NO. 6A  
 JOB 59-F-125 STATION 17+00 to Ramp G  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE March 10/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

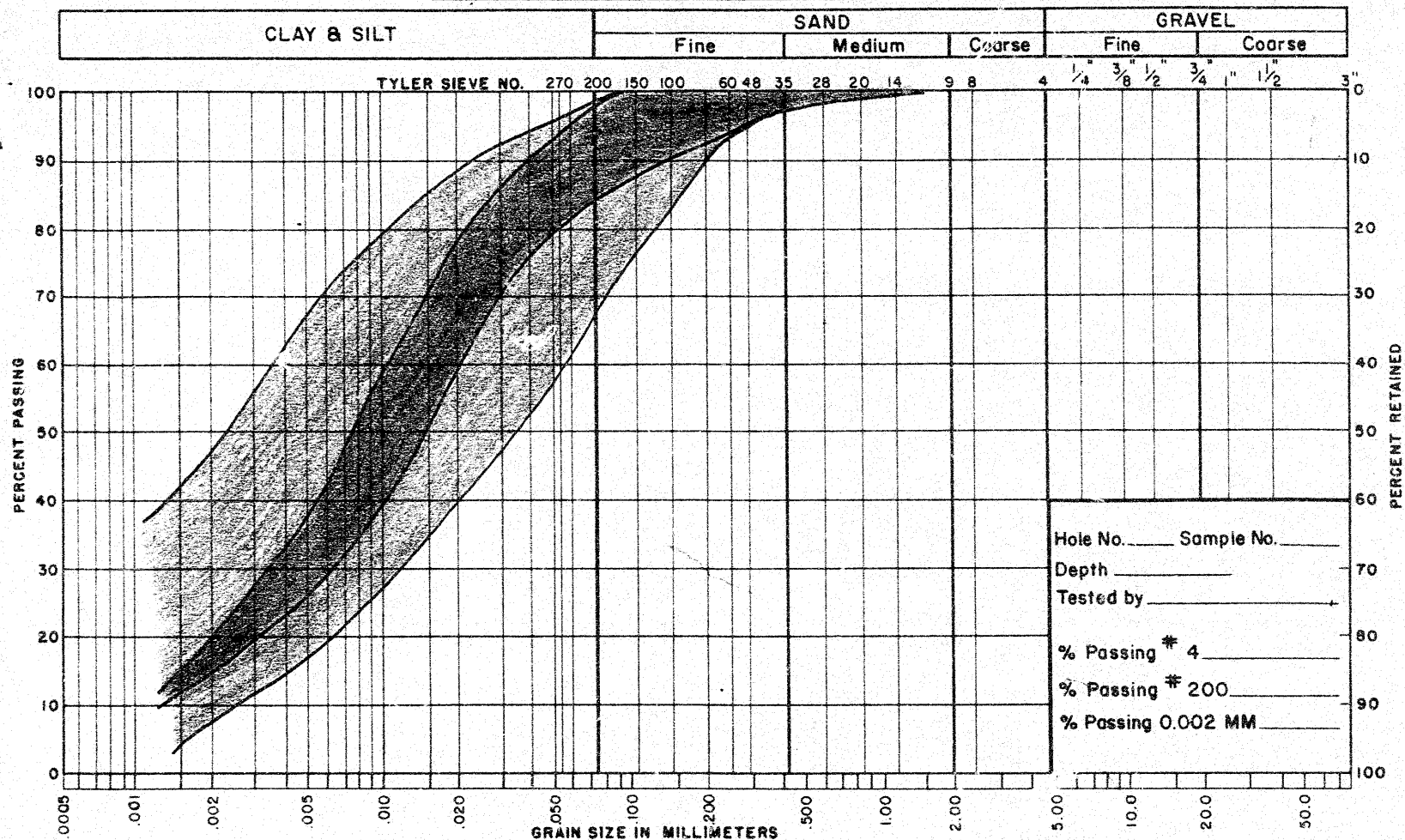
**LEGEND**

1/2 UNCONFINED COMPRESSION (Qu) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +S  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
 LIQUID LIMIT \_\_\_\_\_ X  
 PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY			SAMPLE	NATURAL UNIT WT P. C. F.
MOIST. CONTENT - % DRY WT.				
20	40	60		
			S1	-
			S2	-
			S3	-
			S4	-
			S5	-
			S6	-
			S7	-
			S8	-
			S9	-
			S10	-
			S11	-

# UNIFIED SOIL CLASSIFICATION SYSTEM

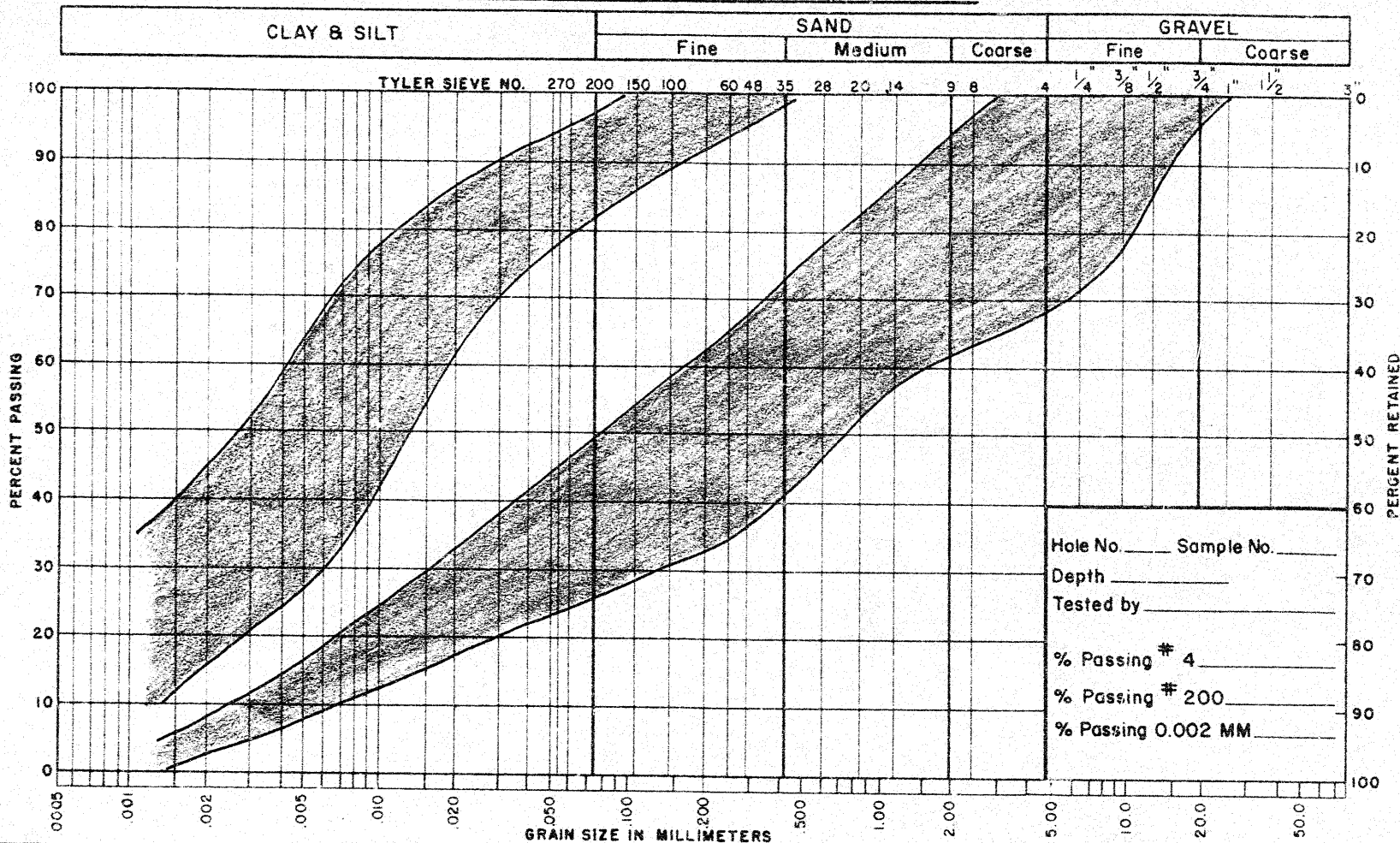


NOTES Composite Curves for Brown Silty Clay  
with Organic Matter.

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION  
**GRAIN SIZE DISTRIBUTION**

Job No. 59-F-125 W.P. No. 231-58-3  
Location CHEDOKE EXPRESSWAY - HAMILTON

# UNIFIED SOIL CLASSIFICATION SYSTEM



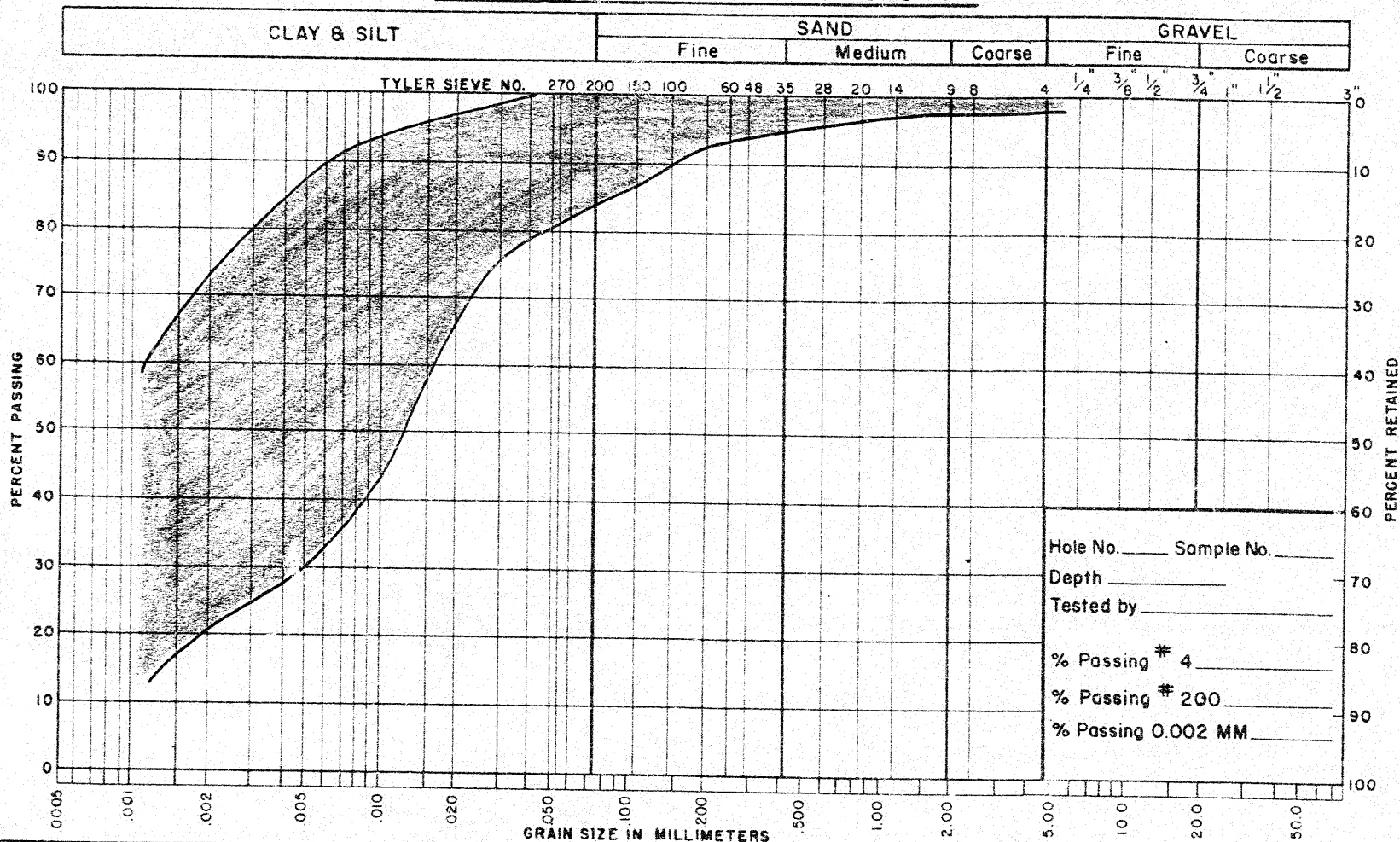
NOTES Composite Curves for Heterogeneous Upper Layer

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION  
**GRAIN SIZE DISTRIBUTION**

Job No. 59-F-125 W.P. No. 231-58-3

Location CHEDOKE EXPRESSWAY - HAMILTON

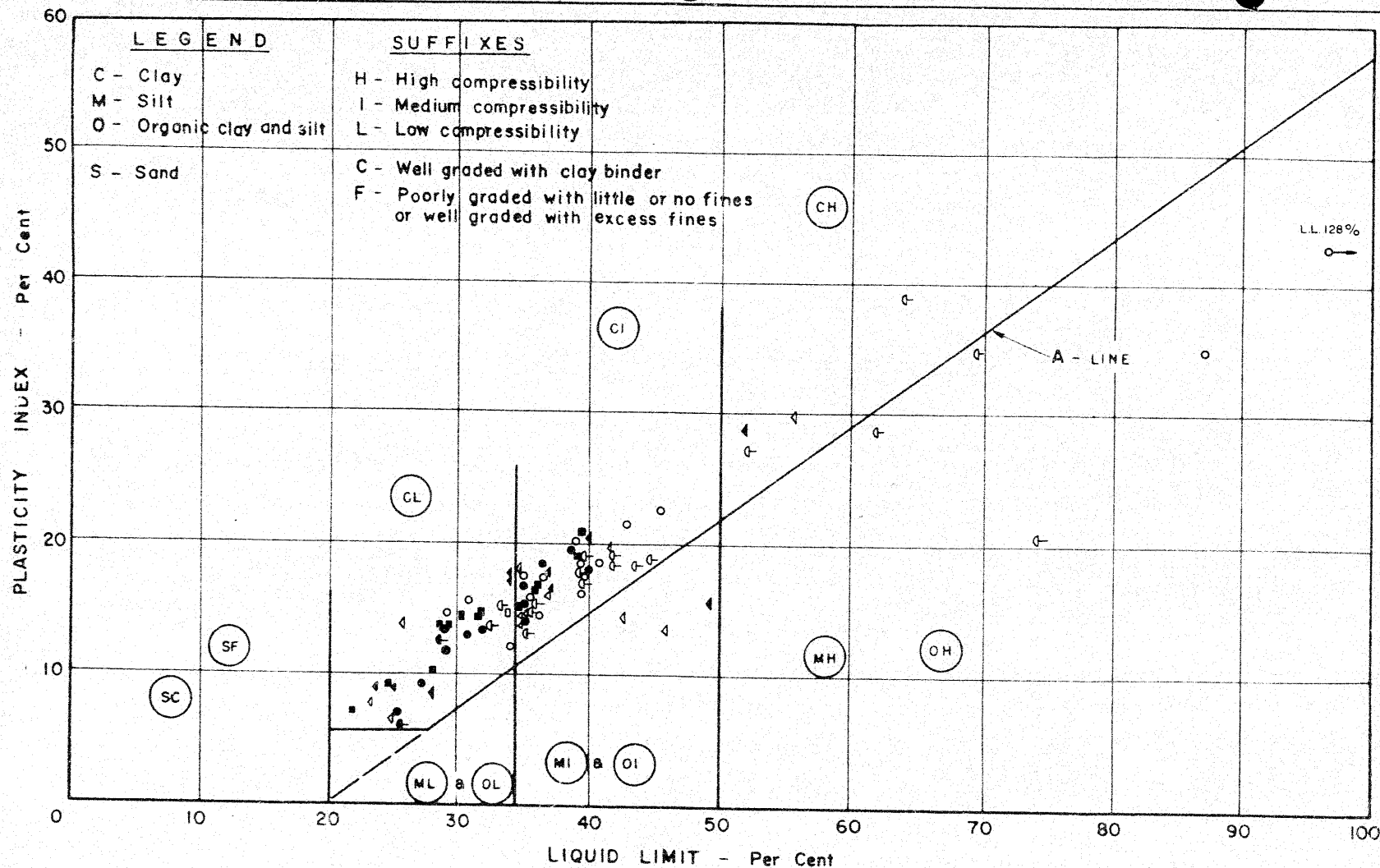
## UNIFIED SOIL CLASSIFICATION SYSTEM


 NOTES Composite Curves for Grey Silty Clay (Till)

 DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH SECTION  
**GRAIN SIZE DISTRIBUTION**

 Job No. 59-F-125 W.P. No. 231-58-3

 Location CHEDOKE EXPRESSWAY - HAMILTON



**NOTES**

RAMP G	◀	} GRAY SILTY CLAY	◊	} BROWN SILTY CLAY WITH ORGANIC MATTER
RAMP J	●		○	
RAMP H	■		□	
RAMP K	◀		◊	

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION  
PLASTICITY CHART

Job No. 59 - F - 125

W.P. No. 231 - 58 - 3

Location CHEDOKE EXPRESSWAY HAMILTON

# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 6 B

JOB 59-F-125 STATION 17+00 Ramp G

DATUM G.S.C. COMPILED BY B.K.








BORING DATE March 11/60 CHECKED BY J.R.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — O  
 VANE TEST (C) AND SENSITIVITY (S) — +<sup>S</sup>  
 NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
 LIQUID LIMIT — X  
 PLASTIC LIMIT —

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500	1000	1500	2000
	↓ Groundlevel	255.0	0				
	Light brown silty mixture of ashes, sand, decayed wood and organic matter.	251.0					
		249.5					
	Brown silty clay with sand, shells and occasional pieces of decayed wood or vegetation.		10				
			20				
		227.5					
	Firm grey silty clay		30				
	End of borehole	223.5	40				

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.				
20	40	60		
			T1	123.0
			T2	-
			T3	-
			T4	117.0
			T5	121.0
			T6	123.0
			T7	126.0



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3

BORE HOLE NO. 6C

**JOB 59-F-125**

STATION Ramp G 17400 E

DATUM G. S. C.

COMPILED BY B. K.

**BORING DATE** Mar. 14/60

CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) --- O  
VANE TEST (C) AND SENSITIVITY (S). --- +  
NATURAL MOISTURE AND LIQUIDITY INDEX --- LI  
LIQUID LIMIT --- X  
PLASTIC LIMIT ---

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500 P.S.F.	1000 P.S.F.	1500 P.S.F.	2000 P.S.F.
	↓ Groundlevel	255.0	0	10	20	30	40
	Light brown silty mixture of ashes, sand, decayed wood W L and organic matter.	251.0 249.5					
	Brown silty clay with sand, shells and occasional pieces of decayed wood or vegetation.		10				
		227.5					
	Firm grey silty clay	223.5	30				
	End of borehole		40				

[illegible]

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 7A

JOB 59-F-125 STATION Ramp G 15+00 E

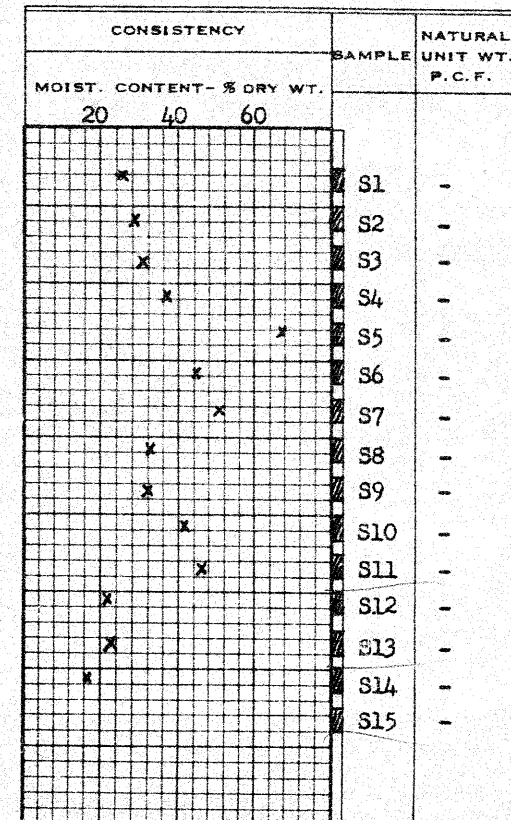
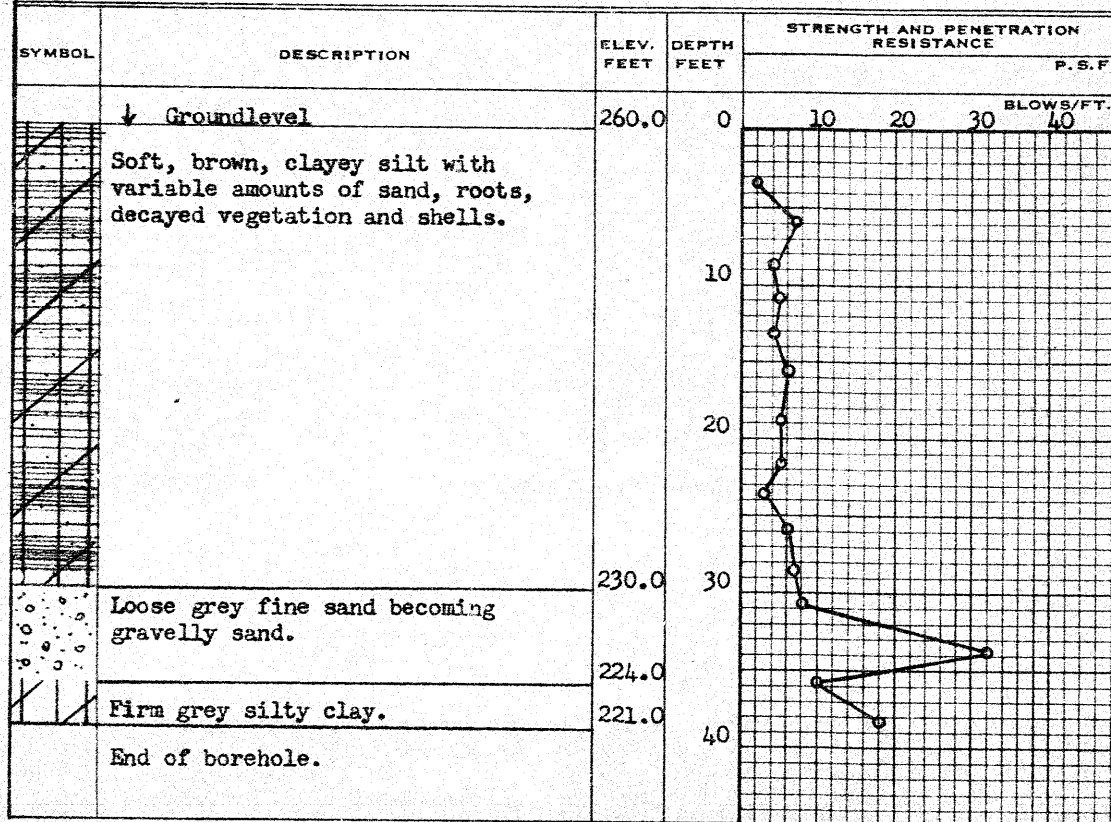
DATUM G. S. C. COMPILED BY B. K.

BORING DATE Mar. 15/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
 LIQUID LIMIT \_\_\_\_\_  
 PLASTIC LIMIT \_\_\_\_\_





# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 7B












JOB 59-F-125 STATION Ramp G 15+00 EDATUM G. S. C. COMPILED BY B. K.BORING DATE Mar. 16/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) —  $\bigcirc$   
VANE TEST (C) AND SENSITIVITY (S) —  $+$   
NATURAL MOISTURE AND LIQUIDITY INDEX —  $\times$   
LIQUID LIMIT —  $\times$   
PLASTIC LIMIT —  $\times$

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500	1000	1500	2000
	↓ Groundlevel	260.0	0				
	Soft, brown, clayey silt with variable amounts of sand, roots, decayed vegetation and shells.						
		230.0	30				
	Loose grey fine sand becoming gravelly sand.	224.0					
	Firm grey silty clay.	221.0					
	End of borehole.		40				

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.			
20	40	60	80
		T1	124.0
		T2	118.4
		T3	119.0
		T4	117.0
		T5	105.0
		T6	-
		T7	109.0
		T8	149.0
		T9	121.0
		T10	125.0
		T11	131.8

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 \_\_\_\_\_ BORE HOLE NO. 7C \_\_\_\_\_

JOB 59-F-125 STATION Ramp G 15:00 E

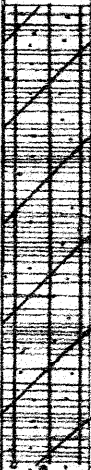


DATUM G. S. C. COMPILED BY B. K.

BORING DATE Mar. 15/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	---	O
VANE TEST (C) AND SENSITIVITY (S)	---	+S
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	LI
LIQUID LIMIT	---	X
PLASTIC LIMIT	---	o

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500	1000	1500	2000 P.S.F. BLOWS/FT.
	↓ Groundlevel	260.0	0				
	Soft, Brown, Clayey Silt with variable amounts of sand, roots, decayed vegetation & shells.						
		230.0	30				
	Loose grey fine sand becoming gravelly sand.	224.0					
	Firm grey silty clay.	221.0					
	End of borehole.		40				

[illegible]

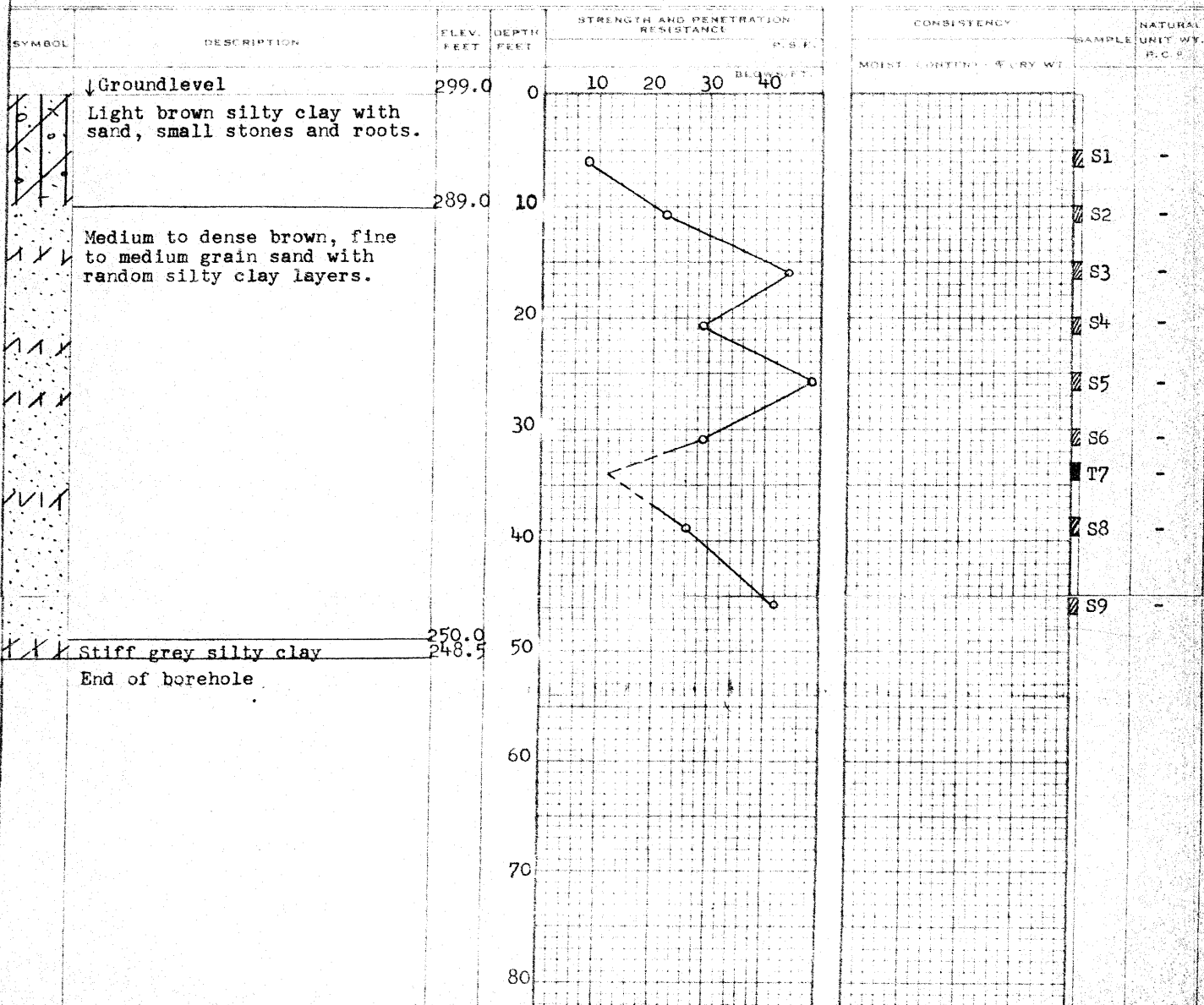
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 8  
JOB 59-F-125 STATION 13+00 & Ramp G.  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATE Mar. 22/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) O  
VANE TEST ( $C$ ) AND SENSITIVITY ( $S$ ) +  
NATURAL MOISTURE AND LIQUIDITY INDEX LI  
LIQUID LIMIT X  
PLASTIC LIMIT



## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	15'-16.5'	Brown Sandy Clay.	9	30.4	-	-	-	-	
	S2	20'-21.5'	Brown Sandy Clay with Decayed wood.	13	29.6	-	-	-	-	
2	S1	20'-21.5'	Brown Silty Clay.	10	16.8	-	-	-	-	
3A	S1	2.5' - 4'	Dark brown silty clay with sand, ashes and roots.	4	29.6	-	-	-	-	
	S2	5' - 6.5'	Dark brown silty clay with sand and decayed vegetation.	4	28.0	-	-	-	-	
	S3	7.5' - 9'	(Brown silty clay (Well graded sand.	7	-	-	-	-	-	
	S4	10'-11.5'	(Well graded grey-brown sand (Brown silty with decayed vegetation and wood.	2	51.3	-	-	-	-	
	S5	12.5'-14'	(Well graded grey sand (Brown silty clay with decayed vegetation and wood.	5	28.2	-	-	-	-	
	S6	15'-16.5'	(Well graded dk. grey sand (dark brown silty clay.	4	28.0	-	-	-	-	
	S7	17.5'-19'	Grey-brown silty clay with roots.	3	38.0	-	-	-	-	
	S8	20'-21.5'	Grey-brown silty clay with sand and roots.	2	30.8	-	-	-	-	

## SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

[illegible]

## SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

[illegible]

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6A	S1	2.5'-4'	Brown sand with ashes and wood.	3	32.9	-	-	-	-	
	S2	5'-6.5'	Black silty peat, Brown silty clay with organic matter.	6	28.9	-	-	-	-	
	S3	7.5'-9'	Brown silty clay with roots	4	36.7	-	-	-	-	
	S4	10'-11.5'	Brown silty clay with organic matter and shells.	2	35.5	-	-	-	-	
	S5	12.5'-14'	Grey brown silty clay with sand.	3	29.7	-	-	-	-	
	S6	15'-16.5'	Grey brown silty clay with sand.	2	27.1	-	-	-	-	
	S7	17.5'-19'	Grey brown silty clay with sand and decayed wood.	5	31.5	-	-	-	-	
	S8	20'-21.5'	Grey brown silty clay with sand and decayed wood.	4	21.5	-	-	-	-	
	S9	22.5'-24'	Brown silty clay with sand.	4	-	-	-	-	-	
	S10	25'-26.5'	Brown silty clay with sand.	4	-	-	-	-	-	
	S11	27.5'-29'	Grey silty clay	8	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6B	T1	5.5'-7'	Brown silty clay with organic matter	P	29.6	22.5	36.6	2100	123.0	
	T2	7.5'-9.0'	Brown silty clay with sand and decayed wood.	P	-	-	-	-	-	
	T3	10'-11.5'	Brown silty clay with organic matter	P	30.8	24.8	43.4	-	-	
	T4	12.5'-14'	Brown silty clay with some fine sand	P	32.2	25.5	52.7	506	117.0	
	T5	15'-16.5'	Brown silty clay with some fine sand	P	25.8	18.4	33.2	440	121.0	
	T6	20'-21.5'	Brown silty clay with some fine sand	P	27.3	17.9	32.3	402	123.0	
	T7	25'-26.5'	Brown silty clay with some fine sand	P	26.4	18.9	35.1	194	126.0	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
60	VANE	7'		-	-	-	-	1280	-	Sens: 1.8
	VANE	9'		-	-	-	-	1280	-	" 2.3
	VANE	11.5'		-	-	-	-	720	-	" 6.0
	VANE	14'		-	-	-	-	640	-	" 2.3
	VANE	16.5'		-	-	-	-	560	-	" 2.3
	VANE	21.5'		-	-	-	-	880	-	" 2.5
	VANE	26.5'		-	-	-	-	1040	-	" 2.9
	VANE	29'		-	-	-	-	1280	-	" 2.0
	VANE	31.5'		-	-	-	-	1280	-	" 1.6

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7A	S1	2.5'-4'	Light brown clayey silt with sand.	2	25.4	-	-	-	-	
	S2	5'-6.5'	Light brown sandy silt with ashes and roots.	7	29.0	-	-	-	-	
	S3	7.5'-9'	Light brown sandy silt with roots.	4	30.7	-	-	-	-	
	S4	10'-11.5'	Brown silt with decaying vegetation and shells.	5	37.5	-	-	-	-	
	S5	12.5'-14'	Dark brown clayey silt with fine sand decaying vegetation and shells.	4	67.0	-	-	-	-	
	S6	15'-16.5'	Dark brown clayey silt with shells and decayed wood.	6	44.8	-	-	-	-	
	S7	17.5'-19'	Dark brown clayey silt with sand and decayed wood.	5	50.8	-	-	-	-	
	S8	20'-21.5'	Grey brown clayey silt with sand, shells and decayed wood.	5	33.2	-	-	-	-	
	S9	22.5'-24'	Brown clayey silt with sand and shells.	3	32.3	-	-	-	-	
	S10	25'-26.5'	Sandy silt with shells and decayed wood.	6	41.5	-	-	-	-	
	S11	27.5'-29'	Grey brown sandy silt with shells and decayed fibrous roots.	7	46.0	-	-	-	-	
	S12	30'-31.5'	Well graded grey silty sand with clay, shells and decayed wood.	8	22.8	-	-	-	-	
	S13	32.5'-34'	Grey sandy clay.	32	23.0	-	-	-	-	
	S14	35'-36.5'	Grey gravelly sand with silt.	10	18.1	-	-	-	-	
	S15	37.5'-39'	Grey silty clay.	18	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7B	T1	2.5'-4'	Brown clayey silt with sand & roots.	P	23.9	21.4	36.5	1555	124.0	
	T2	5'-6.5'	Brown clayey silt with ashes & sand.	P	22.8	-	-	925	118.4	
	T3	7.5'-9'	Brown clayey silt with decayed wood.	P	31.5	21.7	35.5	308	119.0	
	T4	10'-11.5'	Brown sandy silt with decayed vegetation and shells.	P	34.0	25.8	44.1	445	117.0	
	T5	12.5'-14'	Brown clayey silt with sand and decayed vegetation.	P	90.3 32.6	34.4	68.7	482	105.0	
	T6	15'-16.5'	Brown clayey silt with sand and decayed wood.	P	-	27.9	66.4	-	-	
	T7	17.5'-19'	Brown clayey silt with sand and decayed wood.	P	37.7	33.2	62.4	634	109.0	
	T8	20'-21.5'	Brown clayey silt with sand and organic matter.	P	30.1	31.1	52.2	517	149.0	
	T9	22.5'-24'	Brown clayey silt with shells and organic matter.	P	28.6 46.0	20.1	39.9	754	121.0	
	T10	27.5'-29'	Brown clayey silt with Organic matter Grey silty sand.	P	18.9	55.8	76.6	3510	125.0	
	T11	37.5'-39'	Grey silty clay with fine sand.	P	21.5	14.6	28.0	505	131.8	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7C	VANE	4'		-	-	-	-	>2000	-	Sens: >3.6
	VANE	6.5'		-	-	-	-	1520	-	" 3.8
	VANE	9'		-	-	-	-	1120	-	" 3.1
	VANE	11.5'		-	-	-	-	1120	-	" 3.5
	VANE	14'		-	-	-	-	1280	-	" 4.0
	VANE	16.5'		-	-	-	-	1120	-	" 3.5
	VANE	19'		-	-	-	-	800	-	" 2.0
	VANE	21.5'		-	-	-	-	1200	-	" 2.5
	VANE	24'		-	-	-	-	1200	-	" 1.9
	VANE	29'		-	-	-	-	>2000	-	" -
	VANE	39'		-	-	-	-	1440	-	" 2.6

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
8	S1	5'-6.5'	Light brown silty clay with small stones and roots.	8	-	-	-	-	-	
	VANE	8'		-	-	-	-	>2000	-	Sens: -
	S2	10'-11.5'	Light brown silty sand	22	-	-	-	-	-	
	S3	15.5'-17'	Brown fine-medium sand	44	-	-	-	-	-	
	S4	20'-21.5'	Brown fine-medium sand	29	-	-	-	-	-	
	S5	25'-26.5'	Brown fine-medium sand	48	-	-	-	-	-	
	S6	30'-31.5'	Brown fine sand with silty clay layer	29	-	-	-	-	-	
	T7	33'-34.5'	Brown fine-medium sand	12	-	-	-	-	-	
	S8	38'-39.5'	Brown fine-medium sand	26	-	-	-	-	-	
	S9	44'-45.5'	Brown fine-medium sand with clay layer	42	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
G19 B	T1	3'-4.5'	Brown silty clay with decayed wood and roots.	P	34.2	22.6	41.6	835	118.0	sample lost
	T2	5'-6.5'	Brown silty clay with decayed wood and roots.	P	27.6	23.2	42.2	549	120.0	
	T3	17.5'-19'	Brown silty clay with a trace of sand.	P	37.2	21.0	40.1	229	115.0	
	T4	20'-21.5'	Brown silty clay with a trace of sand.	P	32.0	19.2	35.5	489	120.0	
	T5	30'-31.5'	—	P	-	-	-	-	-	
	T6	32.5'-34'	Grey clayey silt	P	24.0	18.4	25.1	-	-	
G19 C	VANE	4.5'		-	-	-	-	1040	-	Sens: 5.2
	VANE	6.5'		-	-	-	-	1120	-	Sens: 3.1
	VANE	19'		-	-	-	-	1040	-	Sens: 4.3
	VANE	21.5'		-	-	-	-	1120	-	Sens: 4.0
	VANE	34'		-	-	-	-	1440	-	Sens: 2.0
			S denotes split spoon sample T denotes shelly tube sample							

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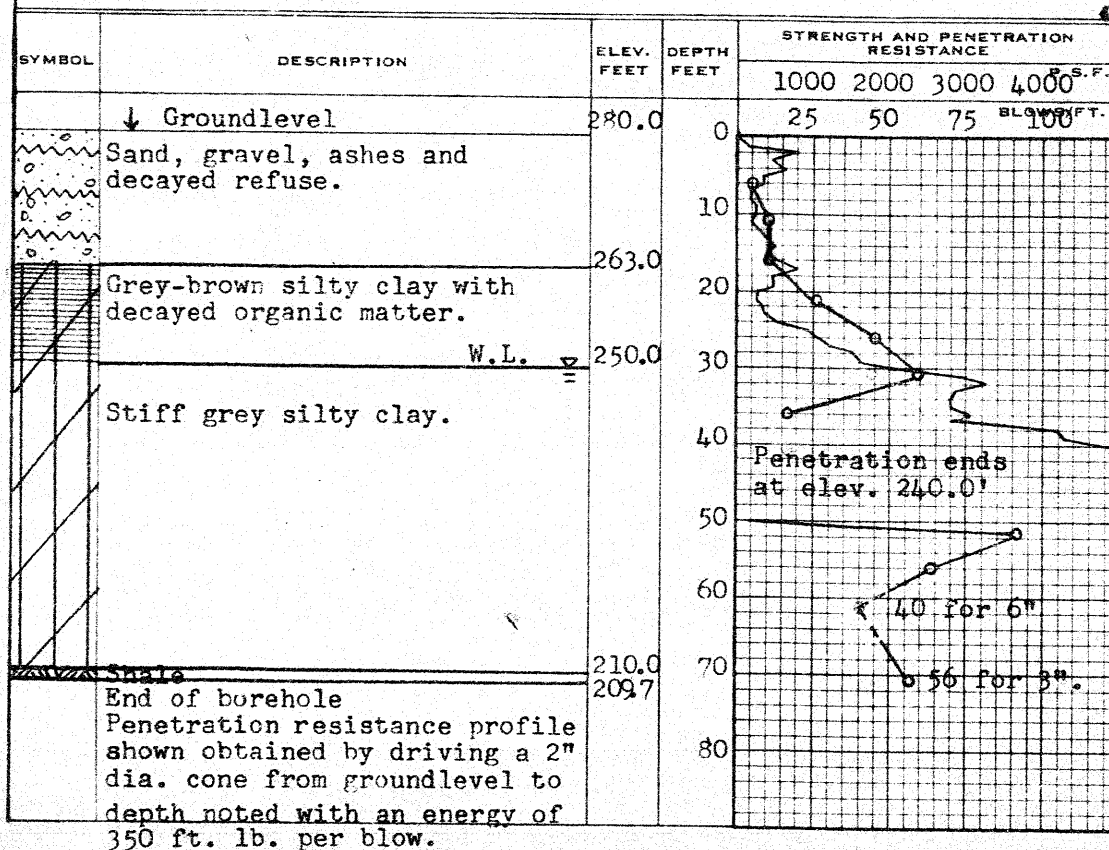
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 1  
 JOB 59-F-125 STATION 11400 Ramp H.  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Jan. 25/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE -----  
 2" SHELBY TUBE -----  
 2" SPLIT TUBE -----  
 2" DIA. CONE -----  
 2" SHELBY -----  
 CASING -----

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ----- O  
 VANE TEST (C) AND SENSITIVITY (S) ----- +  
 NATURAL MOISTURE AND LIQUIDITY INDEX ----- LI  
 LIQUID LIMIT ----- X  
 PLASTIC LIMIT -----



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	-
		S7	-
		T8	-
		T9	test
		T10	-
		T11	-
		S12	-
		S13	-
		T14	-
		S15	-

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 2

JOB 59-F-125 STATION 12+00 @ Ramp H.

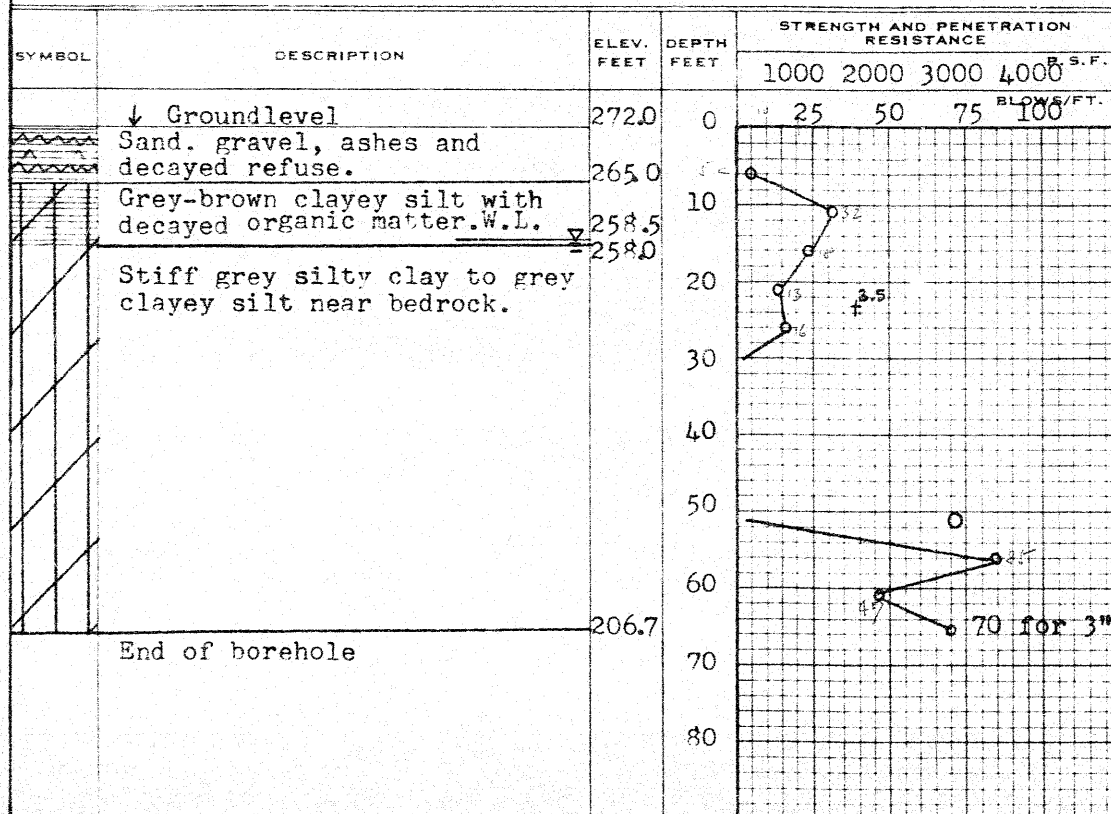
DATUM G.S.C. COMPILED BY B.K.

BORING DATE Jan. 7/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE \_\_\_\_\_ ☒  
 2" SHELBY TUBE \_\_\_\_\_ ☒  
 2" SPLIT TUBE \_\_\_\_\_ ☐  
 2" DIA. CONE \_\_\_\_\_ ☐  
 2" SHELBY \_\_\_\_\_ ☐  
 CASING \_\_\_\_\_ ☒ ☒

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) \_\_\_\_\_ ☐  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ ☒  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ ☒  
 LIQUID LIMIT \_\_\_\_\_ ☐  
 PLASTIC LIMIT \_\_\_\_\_ ☐



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	lost
		T7	-
		T8	-
		T9	137.2
		S10	-
		S11	-
		S12	-



W.P. 231-58-3 ----- BORE HOLE NO. 3 -----  
JOB 59-F-125 ----- STATION 17+00 & Ramp H. -----  
DATUM G.S.C. ----- COMPILED BY B.K. -----  
BORING DATE Jan. 25/60 CHECKED BY J.B. -----

2" DIA. SPLIT TUBE \_\_\_\_\_  
2" SHELBY TUBE \_\_\_\_\_  
2" SPLIT TUBE \_\_\_\_\_  
2" DIA. CONE \_\_\_\_\_  
2" SHELBY \_\_\_\_\_  
CASING \_\_\_\_\_

1/2 UNCONFINED COMPRESSION (Qu)	---	0
VANE TEST (G) AND SENSITIVITY (S)	---	+ <sup>6</sup>
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	X
LIQUID LIMIT	---	
PLASTIC LIMIT	---	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				P.S.F.			
				1000	2000	3000	4000
	↓ Groundlevel	262.0	0	25	50	75	100
	W.L. = 257.0						
	Grey-brown silty clay with decayed organic matter.		10				
		232.0	20				
	Grey silty clay with layers of sand and gravel.	227.0	30				
	Stiff grey silty clay.		40				
		201.0	50				
	Shale, weathered at surface.	195.0	60				
	End of borehole		70				
	Penetration resistance profile obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350 ft. lb. per blow.		80				

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT- % DRY WT.			UNIT WT.
15	30	45	P. C. F.
		S1	-
		S2	-
		S3	-
		S4	-
		S5	-
		S6	-
		S7	-
		T8	93.5
		T9	-
		S10	-
		S11	-
		S12	-

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 4

JOB 59-F-125 STATION 17-50 & Ramp H.

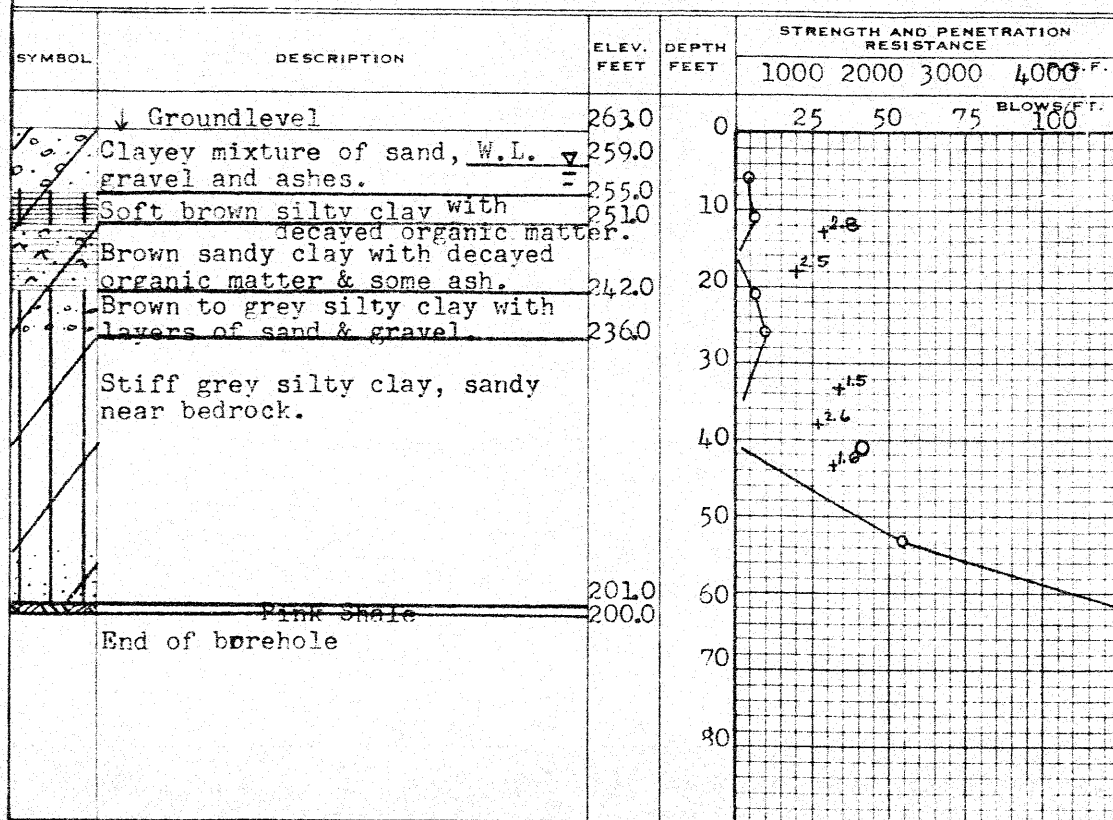
DATUM G.S.C. COMPILED BY B.K.

BORING DATE Feb. 8/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
2" SHELBY TUBE \_\_\_\_\_  
2" SPLIT TUBE \_\_\_\_\_  
2" DIA. CONE \_\_\_\_\_  
2" SHELBY \_\_\_\_\_  
CASING \_\_\_\_\_

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) \_\_\_\_\_ O  
VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ + S  
NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
LIQUID LIMIT \_\_\_\_\_ X  
PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
	X	S1	-
	X	S2	-
	X	S3	-
	X	S4	-
	X	S5	-
	X	S6	-
	X	S7	-
	X	S8	124.0
	X	S9	-
	X	S10	-

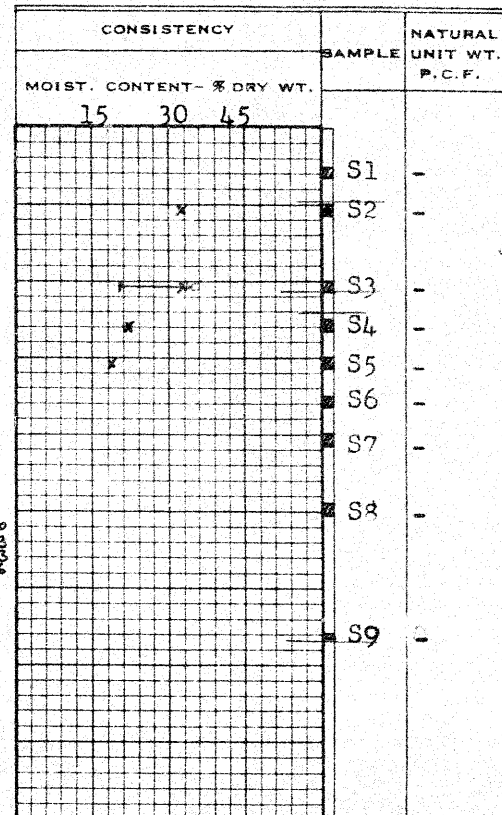
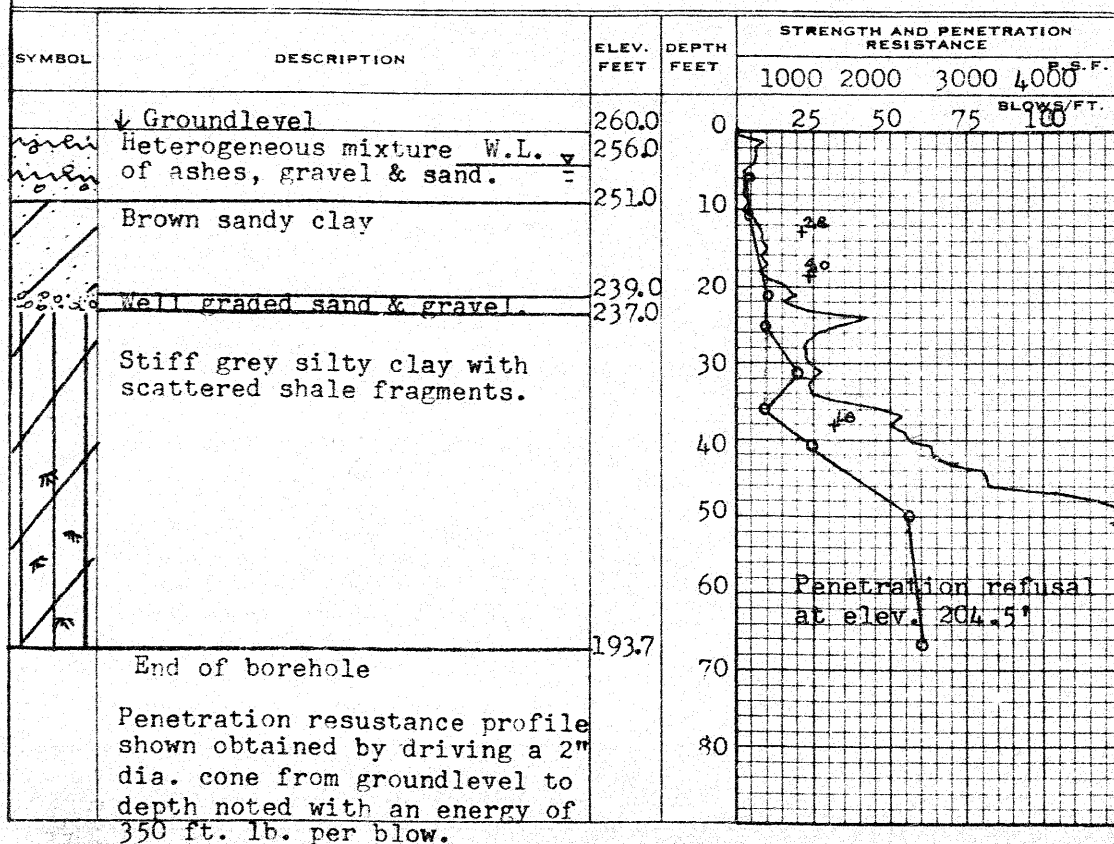
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 5  
 JOB 59-F-125 STATION 18+00 @ Ramp H.  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Jan. 28/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE ☒  
 2" SHELBY TUBE ☒  
 2" SPLIT TUBE ☐  
 2" DIA. CONE ☐  
 2" SHELBY ☐  
 CASING ☒ ☒

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ☐  
 VANE TEST (C) AND SENSITIVITY (S) ☒  
 NATURAL MOISTURE AND LIQUIDITY INDEX ☒  
 LIQUID LIMIT ☐  
 PLASTIC LIMIT ☐



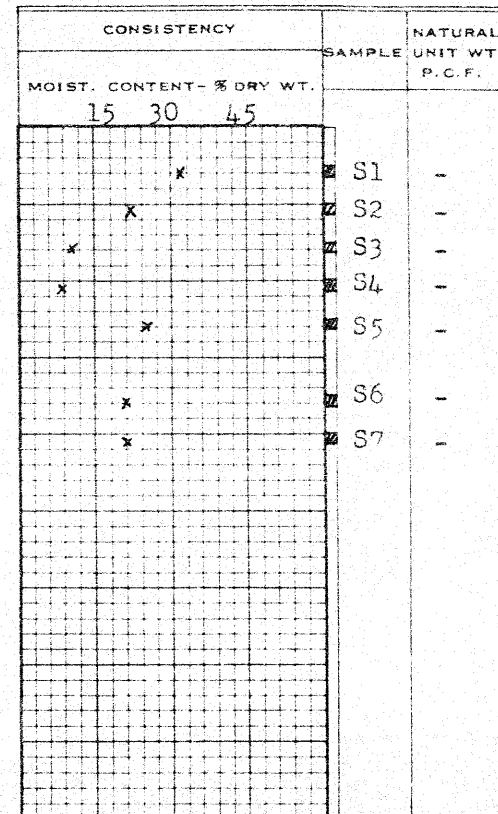
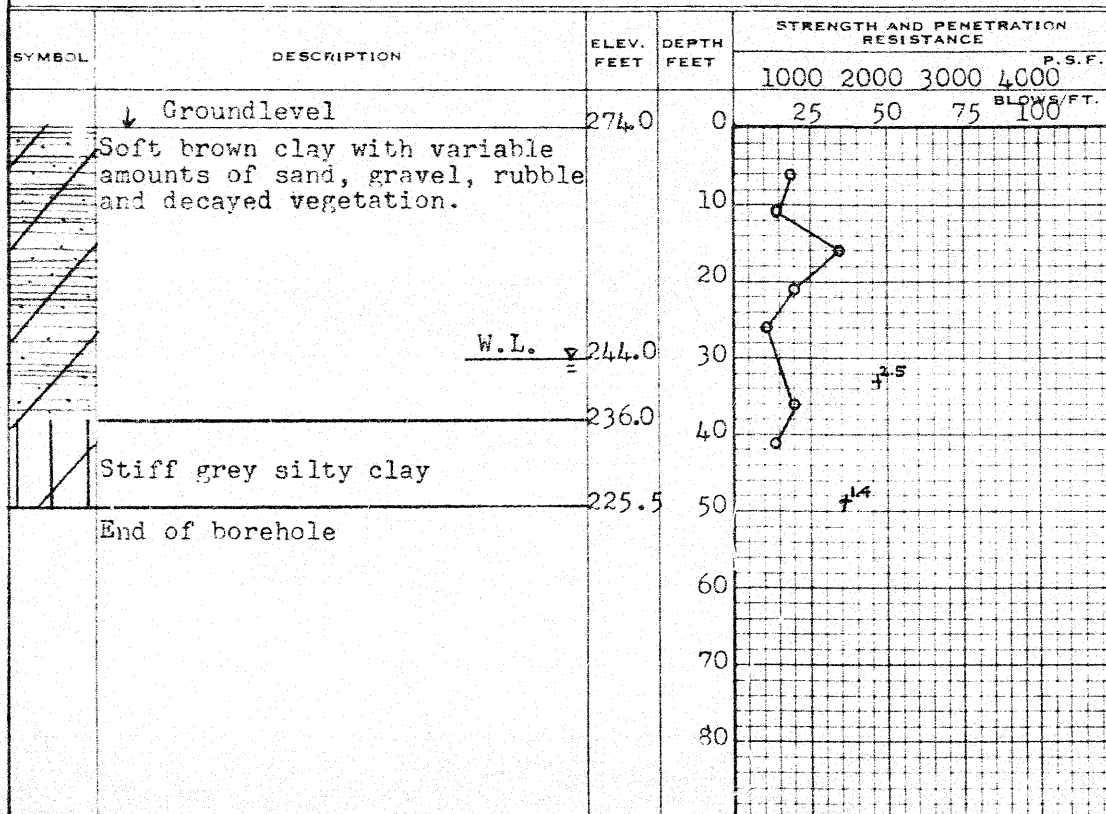
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 6  
JOB 59-F-125 STATION 19+08 & Ramp H.  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATE Feb. 10/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
VANE TEST (C) AND SENSITIVITY (S)  
NATURAL MOISTURE AND LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT



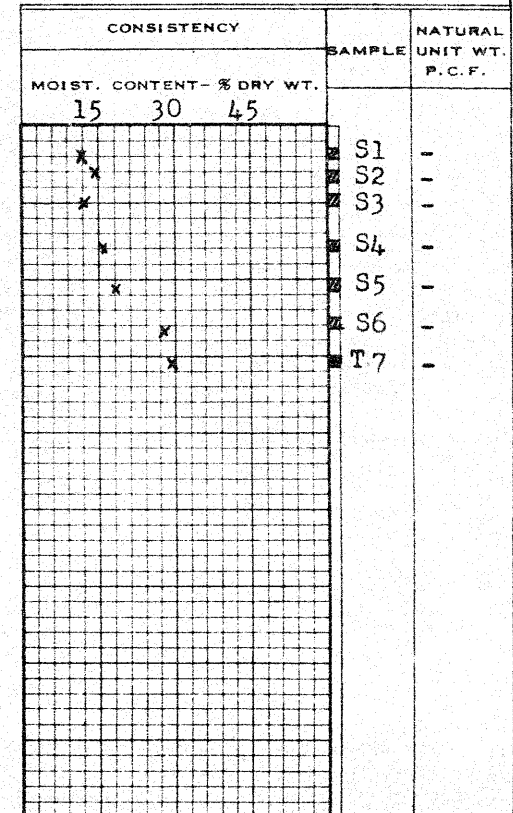
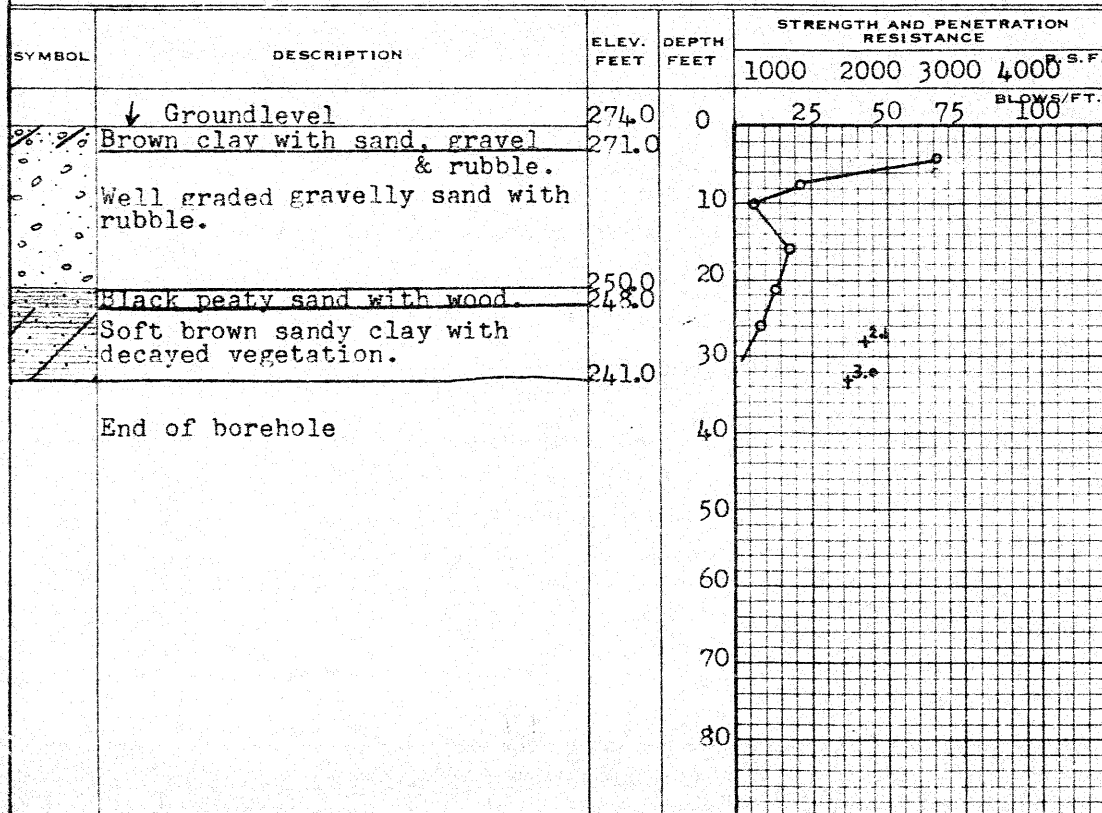
DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 7  
 JOB 59-F-125 STATION 20+00 @ Ramp H.  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Feb. 11/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE ----- ☒  
 2" SHELBY TUBE ----- ☒  
 2" SPLIT TUBE ----- ☐  
 2" DIA. CONE ----- ☐  
 2" SHELBY ----- ☐  
 CASING ----- ☒ ☒

LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ----- ☐ O  
 VANE TEST (C) AND SENSITIVITY (S) ----- ☐ +<sup>S</sup>  
 NATURAL MOISTURE AND LIQUIDITY INDEX ----- ☐ LI  
 LIQUID LIMIT ----- ☐ X  
 PLASTIC LIMIT ----- ☐ —



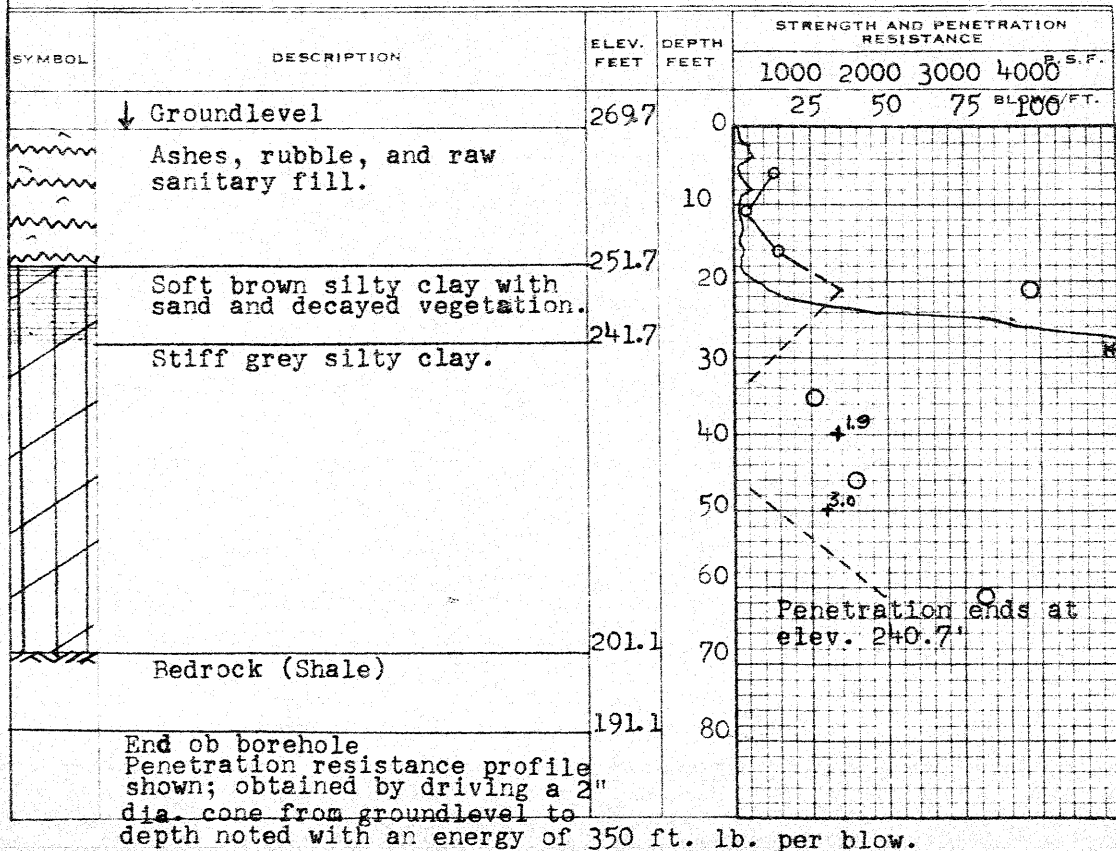
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 8  
 JOB F59-125 STATION 436+19 48' Lt.  
& Chedoke  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Dec. 3/59 CHECKED BY J.B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND  
 LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
15	30	45		
			S1	-
			S2	-
			S3	-
			T4	129.0
			T5	126.5
			T6	117.0
			T7	131.5
			RC8	-
			RC9	-



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

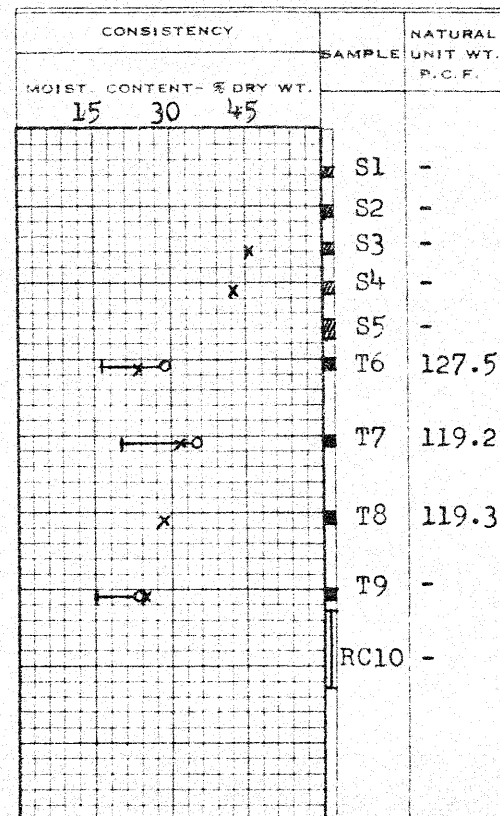
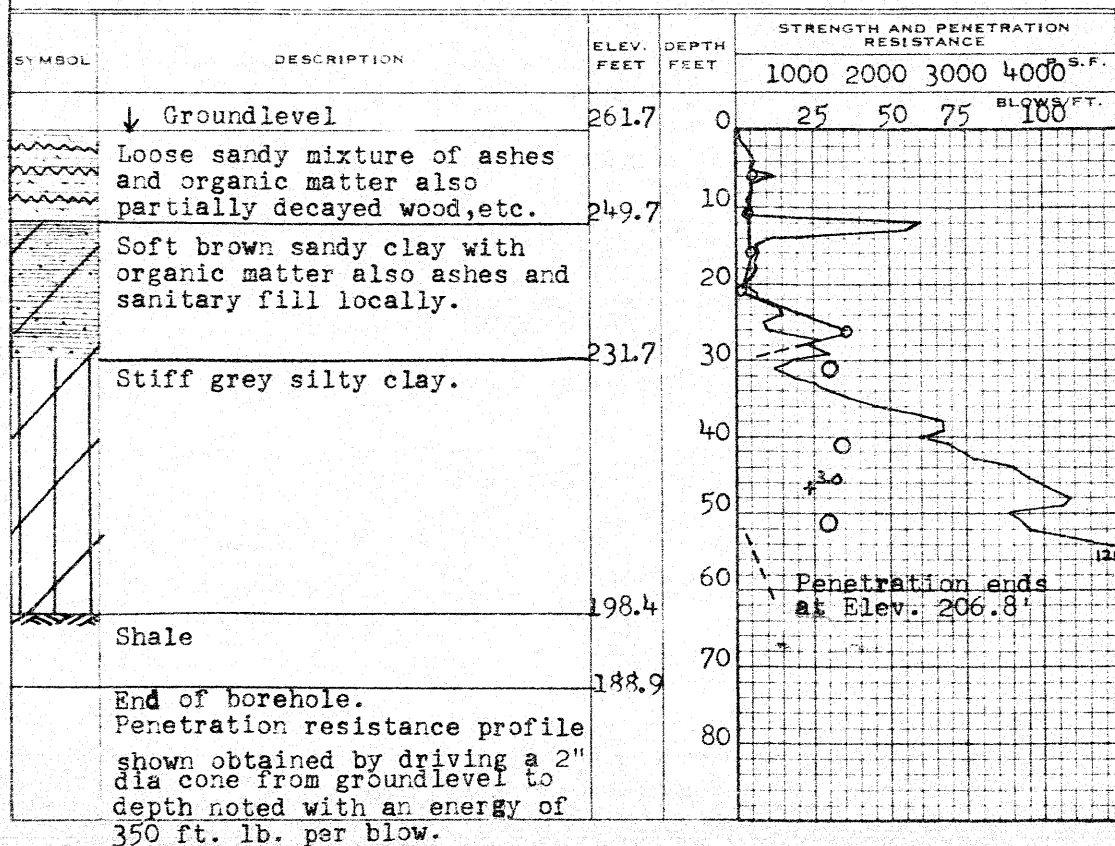
W.P. 231-58-3 BORE HOLE NO. 9  
JOB F 59-125 STATION 436+59-18 Rt.  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATE Dec. 3/59 CHECKED BY J.B.

Ramp H.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — O  
VANE TEST (C) AND SENSITIVITY (S) — +  
NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
LIQUID LIMIT — X  
PLASTIC LIMIT —



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

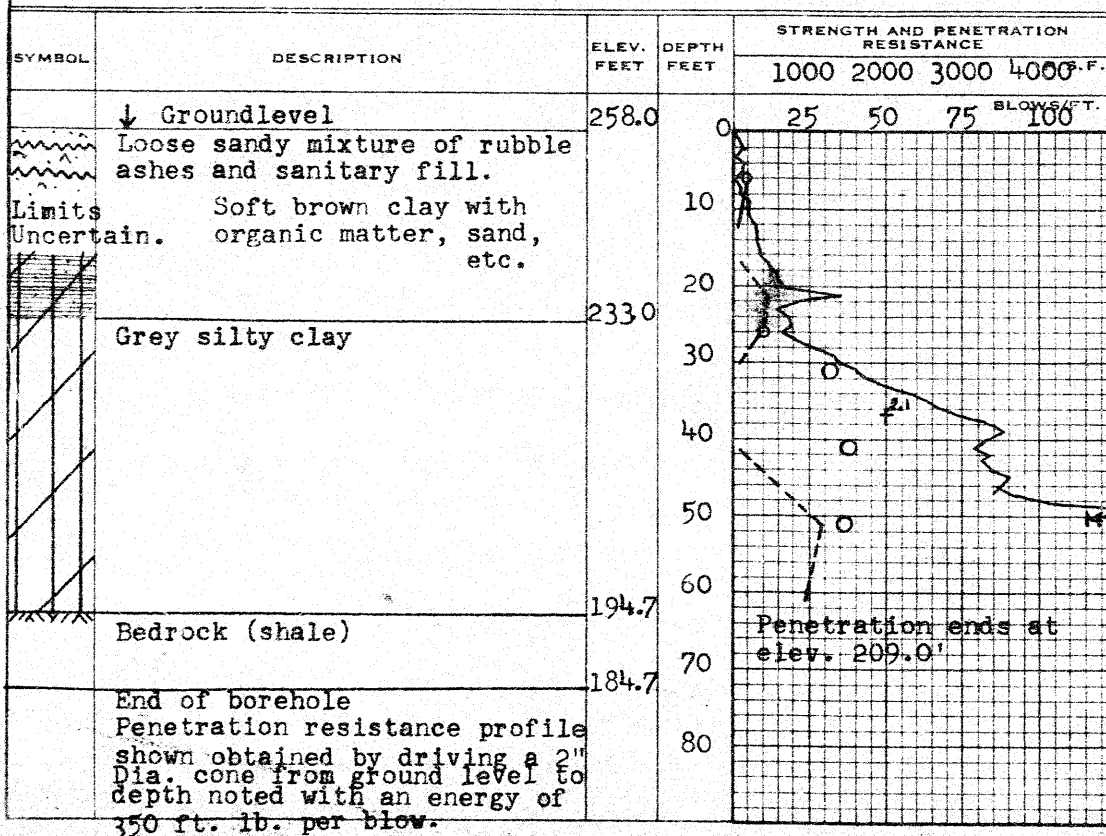
W.P. 231-58-3 BORE HOLE NO. 10  
JOB F59-125 STATION 437+19.90' RT.  
DATUM 258.0' COMPILED BY B.K.  
BORING DATE Nov. 28/59 CHECKED BY V.K.

Ramp H.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
VANE TEST (C) AND SENSITIVITY (S)  
NATURAL MOISTURE AND LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.				
15	30	45		
			S1	-
			T2	-
			T3	-
			S4	-
			T5	-
			T6	-
			T7	-
			T8	-
			RC 9	-



## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	15'-16.5'	Brown Sandy Clay.	9	30.4	-	-	-	-	
	S2	20'-21.5'	Brown Sandy Clay with Decayed wood.	13	29.6	-	-	-	-	
2	S1	20'-21.5'	Brown Silty Clay.	10	16.8	-	-	-	-	
3A	S1	2.5' - 4'	Dark brown silty clay with sand, ashes and roots.	4	29.6	-	-	-	-	
	S2	5' - 6.5'	Dark brown silty clay with sand and decayed vegetation.	4	28.0	-	-	-	-	
	S3	7.5' - 9'	(Brown silty clay (Well graded sand.	7	-	-	-	-	-	
	S4	10'-11.5'	(Well graded grey-brown sand (Brown silty with decayed vegetation and wood.	2	51.3	-	-	-	-	
	S5	12.5'-14'	(Well graded grey sand (Brown silty clay with decayed vegetation and wood.	5	28.2	-	-	-	-	
	S6	15'-16.5'	(Well graded dk. grey sand (dark brown silty clay.	4	28.0	-	-	-	-	
	S7	17.5'-19'	Grey-brown silty clay with roots.	3	38.0	-	-	-	-	
	S8	20'-21.5'	Grey-brown silty clay with sand and roots.	2	30.8	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
G19 3B	T1	3'-4.5'	Brown silty clay with decayed wood and roots.	P	34.2	22.6	41.6	835	118.0	P1 120
	T2	5'-6.5'	Brown silty clay with decayed wood and roots.	P	27.6	23.2	42.2	549	120.0	120 42 2 23 2 9
	T3	17.5'-19'	Brown silty clay with a trace of sand.	P	37.2	21.0	40.1	229	115.0	18.2 35 5
	T4	20'-21.5'	Brown silty clay with a trace of sand.	P	32.0	19.2	35.5	489	120.0	16.3 12 6 16 3
	T5	30'-31.5'	-	P	-	-	-	-	-	sample lost
	T6	32.5'-34'	Grey clayey silt	P	24.0	18.4	25.1	-	-	16.7
G19 3C	VANE	4.5'		-	-	-	-	1040	-	Sens: 5.2
	VANE	6.5'		-	-	-	-	1120	-	Sens: 3.1
	VANE	19'		-	-	-	-	1040	-	Sens: 4.3
	VANE	21.5'		-	-	-	-	1120	-	Sens: 4.0
	VANE	34'		-	-	-	-	1440	-	Sens: 2.0
			S denotes split spoon sample T denotes shelly tube sample							

## SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

[illegible]

## SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

[illegible]

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6A	S1	2.5'-4'	Brown sand with ashes and wood.	3	32.9	-	-	-	-	
	S2	5'-6.5'	Black silty peat, Brown silty clay with organic matter.	6	28.9	-	-	-	-	
	S3	7.5'-9'	Brown silty clay with roots	4	36.7	-	-	-	-	
	S4	10'-11.5'	Brown silty clay with organic matter and shells.	2	35.5	-	-	-	-	
	S5	12.5'-14'	Grey brown silty clay with sand.	3	29.7	-	-	-	-	
	S6	15'-16.5'	Grey brown silty clay with sand.	2	27.1	-	-	-	-	
	S7	17.5'-19'	Grey brown silty clay with sand and decayed wood.	5	31.5	-	-	-	-	
	S8	20'-21.5'	Grey brown silty clay with sand and decayed wood.	4	21.5	-	-	-	-	
	S9	22.5'-24'	Brown silty clay with sand.	4	-	-	-	-	-	
	S10	25'-26.5'	Brown silty clay with sand.	4	-	-	-	-	-	
	S11	27.5'-29'	Grey silty clay	8	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6B	T1	5.5'-7'	Brown silty clay with organic matter	P	29.6	22.5	36.6	2100	123.0	PI 14.1
	T2	7.5'-9.0'	Brown silty clay with sand and decayed wood.	P	-	-	-	-	-	
	T3	10'-11.5'	Brown silty clay with organic matter	P	30.8	24.8	43.4	-	-	18.6
	T4	12.5'-14'	Brown silty clay with some fine sand	P	32.2	25.5	52.7	506	117.0	27.2
	T5	15'-16.5'	Brown silty clay with some fine sand	P	25.8	18.4	33.2	440	121.0	14.8
	T6	20'-21.5'	Brown silty clay with some fine sand	P	27.3	17.9	32.3	402	123.0	14.4
	T7	25'-26.5'	Brown silty clay with some fine sand	P	26.4	18.9	35.1	194	126.0	16.2

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6C	VANE	7'		-	-	-	-	1280	-	Sens: 1.8
	VANE	9'		-	-	-	-	1280	-	" 2.3
	VANE	11.5'		-	-	-	-	720	-	" 6.0
	VANE	14'		-	-	-	-	640	-	" 2.3
	VANE	16.5'		-	-	-	-	560	-	" 2.3
	VANE	21.5'		-	-	-	-	880	-	" 2.5
	VANE	26.5'		-	-	-	-	1040	-	" 2.9
	VANE	29'		-	-	-	-	1280	-	" 2.0
	VANE	31.5'		-	-	-	-	1280	-	" 1.6

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7A	S1	2.5'-4'	Light brown clayey silt with sand.	2	25.4	-	-	-	-	
	S2	5'-6.5'	Light brown sandy silt with ashes and roots.	7	29.0	-	-	-	-	
	S3	7.5'-9'	Light brown sandy silt with roots.	4	30.7	-	-	-	-	
	S4	10'-11.5'	Brown silt with decaying vegetation and shells.	5	37.5	-	-	-	-	
	S5	12.5'-14'	Dark brown clayey silt with fine sand decaying vegetation and shells.	4	67.0	-	-	-	-	
	S6	15'-16.5'	Dark brown clayey silt with shells and decayed wood.	6	44.8	-	-	-	-	
	S7	17.5'-19'	Dark brown clayey silt with sand and decayed wood.	5	50.8	-	-	-	-	
	S8	20'-21.5'	Grey brown clayey silt with sand, shells and decayed wood.	5	33.2	-	-	-	-	
	S9	22.5'-24'	Brown clayey silt with sand and shells.	3	32.3	-	-	-	-	
	S10	25'-26.5'	Sandy silt with shells and decayed wood.	6	41.5	-	-	-	-	
	S11	27.5'-29'	Grey brown sandy silt with shells and decayed fibrous roots.	7	46.0	-	-	-	-	
	S12	30'-31.5'	Well graded grey silty sand with clay, shells and decayed wood.	8	22.8	-	-	-	-	
	S13	32.5'-34'	Grey sandy clay.	32	23.0	-	-	-	-	
	S14	35'-36.5'	Grey gravelly sand with silt.	10	18.1	-	-	-	-	
	S15	37.5'-39'	Grey silty clay.	18	-	-	-	-	-	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
										PI
7B	T1	2.5'-4'	Brown clayey silt with sand & roots.	P	23.9	21.4	36.5	1555	124.0	15.1
	T2	5'-6.5'	Brown clayey silt with ashes & sand.	P	22.8	-	-	925	118.4	
	T3	7.5'-9'	Brown clayey silt with decayed wood.	P	31.5	21.7	35.5	308	119.0	13.8
	T4	10'-11.5'	Brown sandy silt with decayed vegetation and shells.	P	34.0	25.8	44.1	445	117.0	18.3
	T5	12.5'-14'	Brown clayey silt with sand and decayed vegetation.	P	90.3 32.6	34.4	68.7	482	105.0	34.3
	T6	15'-16.5'	Brown clayey silt with sand and decayed wood.	P	-	27.9	66.4	-	-	38.5
	T7	17.5'-19'	Brown clayey silt with sand and decayed wood.	P	37.7	33.2	62.4	634	109.0	29.2
	T8	20'-21.5'	Brown clayey silt with sand and organic matter.	P	30.1	31.1	52.2	517	149.0	21.1
	T9	22.5'-24'	Brown clayey silt with shells and organic matter.	P	28.6 46.0	20.1	39.9	754	121.0	19.8
	T10	27.5'-29'	Brown clayey silt with Organic matter Grey silty sand.	P	18.9	55.8	76.6	3510	125.0	20.8
	T11	37.5'-39'	Grey silty clay with fine sand.	P	21.5	14.6	28.0	505	131.8	13.4

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-P-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7C	VANE	4'		-	-	-	-	>2000	-	Sens: >3.6
	VANE	6.5'		-	-	-	-	1520	-	" 3.8
	VANE	9'		-	-	-	-	1120	-	" 3.1
	VANE	11.5'		-	-	-	-	1120	-	" 3.5
	VANE	14'		-	-	-	-	1280	-	" 4.0
	VANE	16.5'		-	-	-	-	1120	-	" 3.5
	VANE	19'		-	-	-	-	800	-	" 2.0
	VANE	21.5'		-	-	-	-	1200	-	" 2.5
	VANE	24'		-	-	-	-	1200	-	" 1.9
	VANE	29'		-	-	-	-	>2000	-	" -
	VANE	39'		-	-	-	-	1440	-	" 2.6

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
8	S1	5'-6.5'	Light brown silty clay with small stones and roots.	8	-	-	-	-	-	
	VANE	8'		-	-	-	-	>2000	-	Sens: -
	S2	10'-11.5'	Light brown silty sand	22	-	-	-	-	-	
	S3	15.5'-17'	Brown fine-medium sand	44	-	-	-	-	-	
	S4	20'-21.5'	Brown fine-medium sand	29	-	-	-	-	-	
	S5	25'-26.5'	Brown fine-medium sand	48	-	-	-	-	-	
	S6	30'-31.5'	Brown fine sand with silty clay layer	29	-	-	-	-	-	
	T7	33'-34.5'	Brown fine-medium sand	12	-	-	-	-	-	
	S8	38'-39.5'	Brown fine-medium sand	26	-	-	-	-	-	
	S9	44'-45.5'	Brown fine-medium sand with clay layer	42	-	-	-	-	-	

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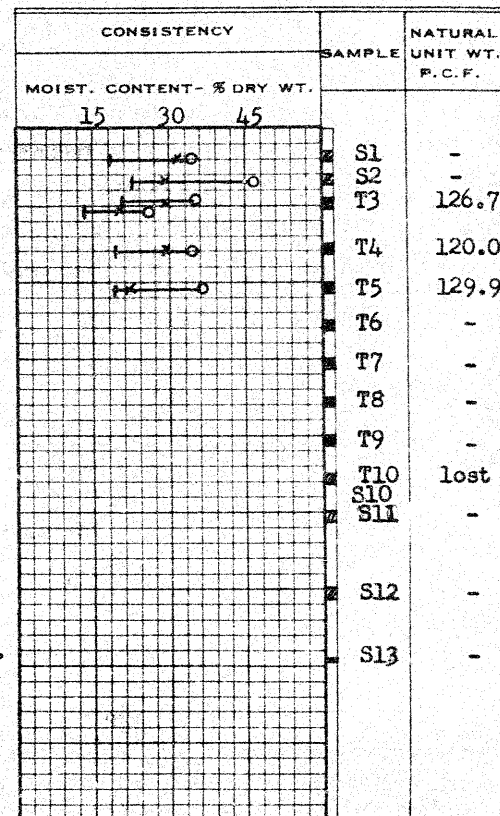
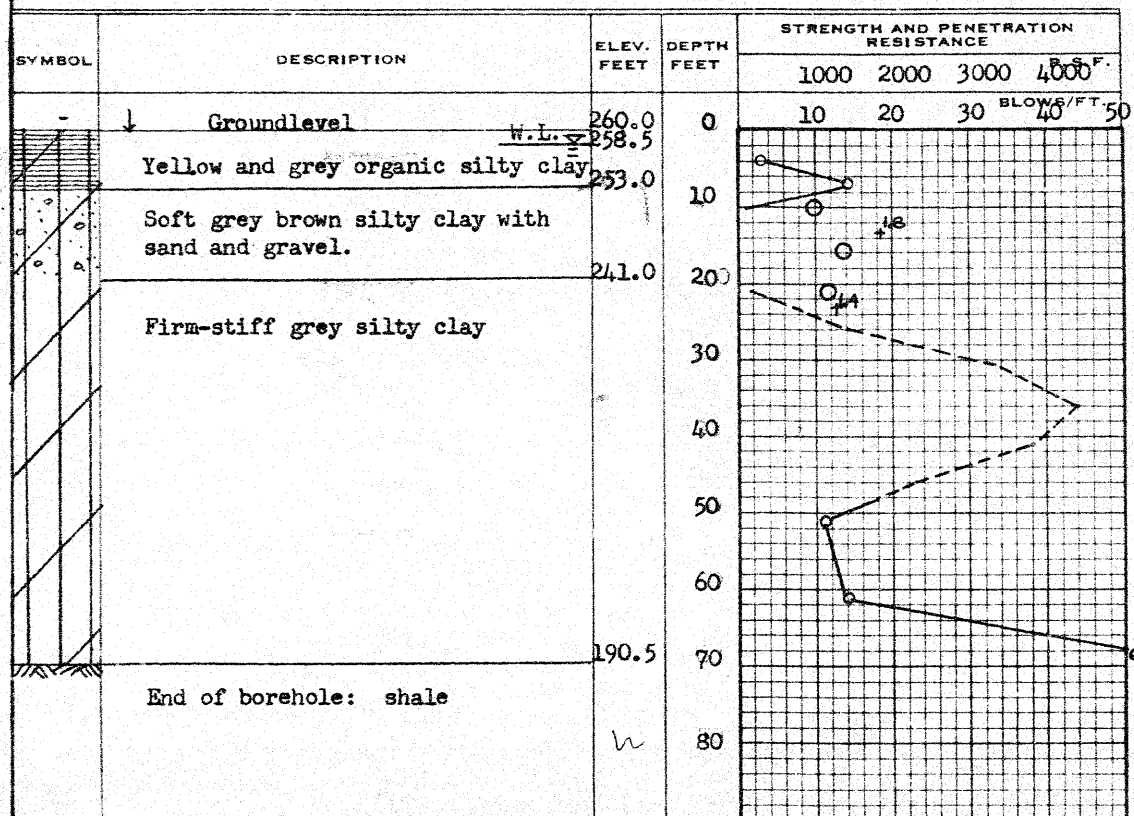
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 ----- BORE HOLE NO. 1 -----  
 JOB 59-E-125 ----- STATION Ramp K. 13+25 CL. -----  
 DATUM G.S.C. ----- COMPILED BY B.K. -----  
 BORING DATE Feb. 8/60 CHECKED BY J.B. -----

2" DIA. SPLIT TUBE -----  
 2" SHELBY TUBE -----  
 2" SPLIT TUBE -----  
 2" DIA. CONE -----  
 2" SHELBY -----  
 CASING -----

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) -----  
 VANE TEST (C) AND SENSITIVITY (S) -----  
 NATURAL MOISTURE AND LIQUIDITY INDEX -----  
 LIQUID LIMIT -----  
 PLASTIC LIMIT -----



W.P. 231-58-3 BORE HOLE NO. 2  
JOB 59-F-125 STATION Ramp K. 15400 CL.  
DATUM G.S.C. COMPILED BY B.K.  
BORING DATE Feb. 10/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

1/2 UNCONFINED COMPRESSION (Qu) --- 0  
VANE TEST (C) AND SENSITIVITY (S) --- +  
NATURAL MOISTURE AND LIQUIDITY INDEX --- X  
LIQUID LIMIT ---  
PLASTIC LIMIT ---







SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	4000
↓	Groundlevel	W.L. 259.5	0	10	20	30	40
	Soft grey brown silty clay with sand and gravel and organic matter.	239.5	10				
	Firm to stiff grey silty clay with scattered gravel and sand seams.	211.5	20				
	End of borehole.		30				

Graph showing blow counts (S.F.) versus depth (feet) for a borehole. The vertical axis represents depth in feet, ranging from 0 to 80. The horizontal axis represents blow counts in S.F., ranging from 0 to 50. The data points are connected by a solid line, showing a general increase in blow count with depth. A dashed line is also plotted, showing a different trend. The blow count starts at approximately 10 S.F. at 0 feet depth, increases to about 20 S.F. at 10 feet, then to about 30 S.F. at 20 feet, and continues to rise to about 40 S.F. at 30 feet. The dashed line starts at about 15 S.F. at 0 feet, peaks at about 25 S.F. at 10 feet, and then decreases to about 10 S.F. at 20 feet.






CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
x	—	o	S1
x	—	o	T2
x	—	o	T3
x	—	o	T4
x	—	o	S5
x	—	o	T6
x	—	o	S6
x	—	o	T7
x	—	o	T8
x	—	o	S9
x	—	o	T10

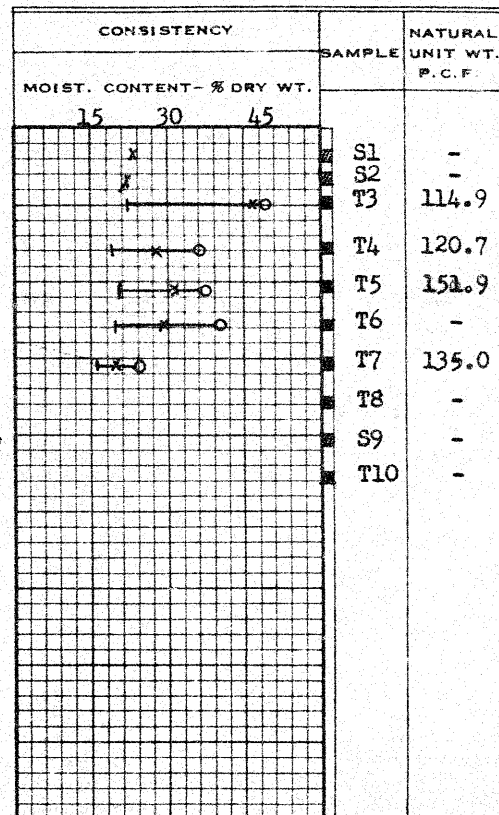
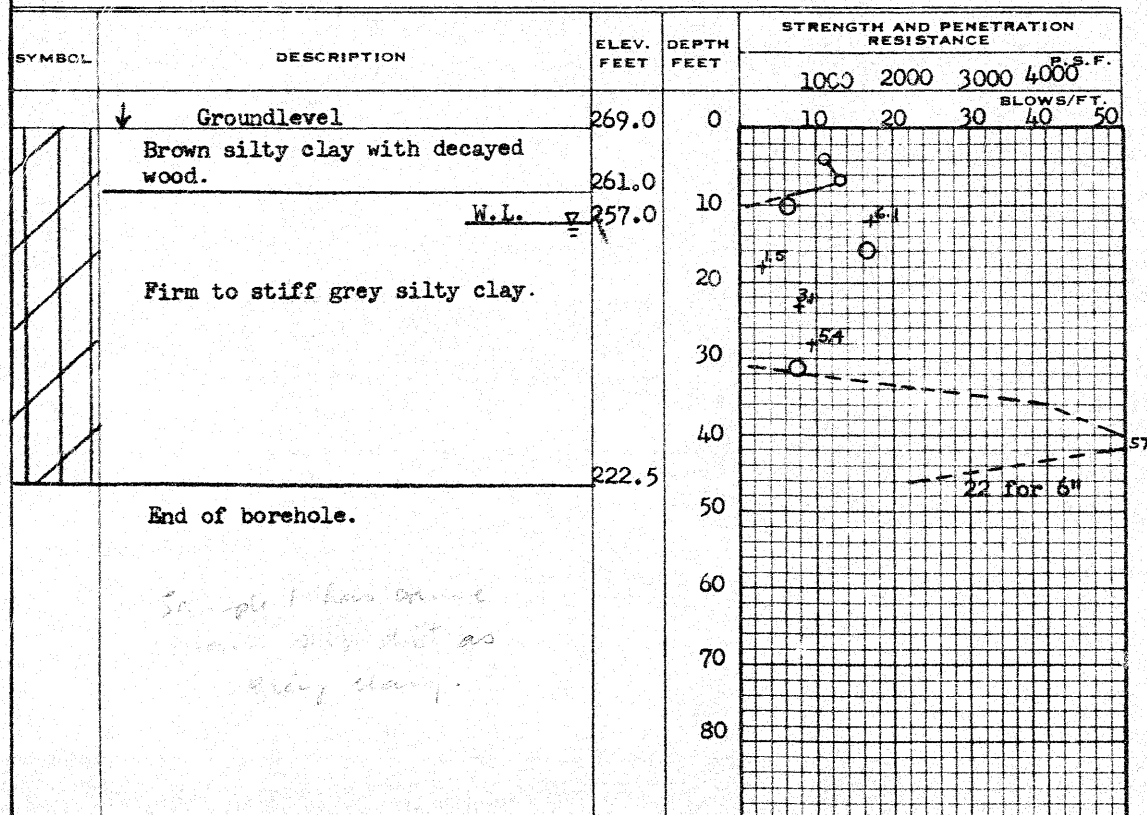
**DEPARTMENT OF HIGHWAYS - ONTARIO**  
**MATERIALS AND RESEARCH SECTION**

W.P. 231-58-3 BORE HOLE NO. 3  
 JOB 59-F-125 STATION Ramp K. 16400  
 DATUM G.S.C. COMPILED BY B.K.  
 BORING DATE Feb. 12/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE   
 2" SHELBY TUBE   
 2" SPLIT TUBE   
 2" DIA. CONE   
 2" SHELBY   
 CASING 

**LEGEND**

1/2 UNCONFINED COMPRESSION (Qu)   
 VANE TEST (C) AND SENSITIVITY (S)   
 NATURAL MOISTURE AND LIQUIDITY INDEX   
 LIQUID LIMIT   
 PLASTIC LIMIT 



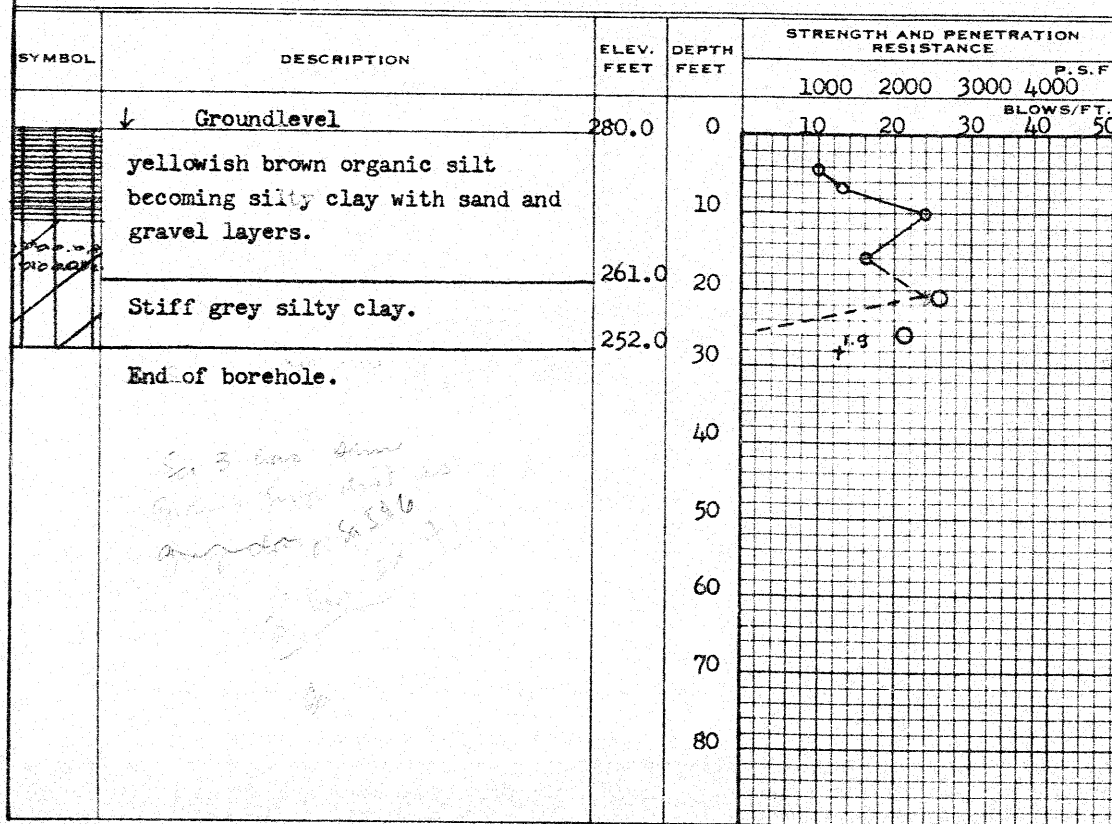
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 4JOB 59-E-125 STATION Ramp K. 19450 CL.DATUM G.S.C. COMPILED BY B.K.BORING DATE Feb. 15/60. CHECKED BY J.B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — O  
VANE TEST (C) AND SENSITIVITY (S) — +  
NATURAL MOISTURE AND LIQUIDITY INDEX — X  
LIQUID LIMIT —  
PLASTIC LIMIT —



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
15 30 45		
	S1	-
	S2	-
	S3	-
	S4	-
	T5	134.5
	T6	128.8



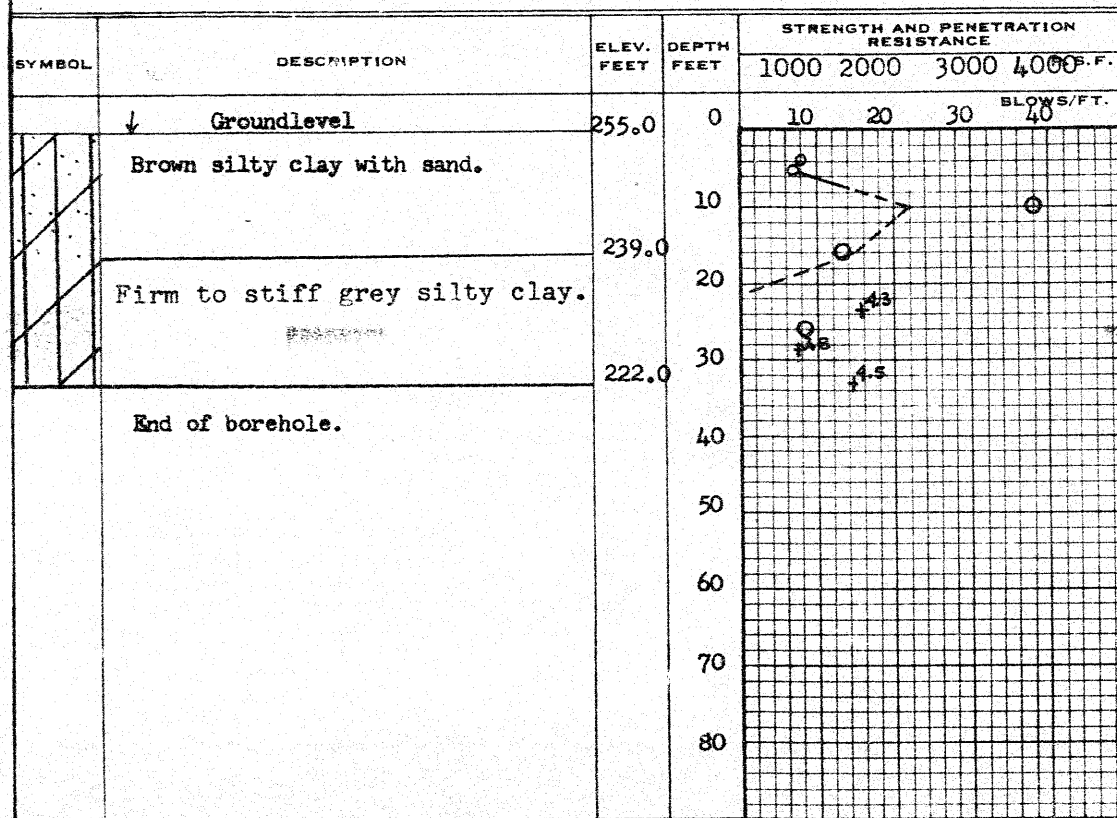
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 5JOB 59-F-125 STATION Ramp K. 20/80DATUM G.S.C. COMPILED BY B.K.BORING DATE Feb. 17/60 CHECKED BY J.B.

2" DIA. SPLIT TUBE -----  
 2" SHELBY TUBE -----  
 2" SPLIT TUBE -----  
 2" DIA. CONE -----  
 2" SHELBY -----  
 CASING -----

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ----- O  
 VANE TEST (C) AND SENSITIVITY (S) ----- +  
 NATURAL MOISTURE AND LIQUIDITY INDEX ----- LI  
 LIQUID LIMIT ----- X  
 PLASTIC LIMIT -----



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
15 30 45	S1	-
	S2	-
	T3	127.0
	T4	127.1
	T5	-
	T6	114.2
	T7	-



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP. NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	3'-4.5'	Silty clay with fine sand and organic matter.	3	32.0	18.9	34.9	-	-	14.0
	S2	6'-7.5'	Grey brown silty clay with a trace of gravel.	14	29.5	22.6	46.4	-	-	13.8
	T3	9'-10.5'	"	P	29.8 20.0	20.7 12.0	35.5 26.2	972	126.7	14.8 14.2
	vane	13.5'	"	-	-	-	-	1840	-	Sens: 1.8
	T4	15'-16.5'	"	P	29.4	18.9	34.8	1338	120.0	15.2
	T5	20'-21.5'	Grey silty clay.	P	22.4	18.9	36.2	1140	129.9	17.3
	vane	23'	"	-	-	-	-	1280	-	Sens: 1.4
	T6	25'-26.5'	"	14-6"	-	-	-	-	-	
	T7	30'-31.5'	"	34	-	-	-	-	-	
	T8	35'-36.5'	"	44	-	-	-	-	-	
	T9	40'-41.5'	"	38	-	-	-	-	-	
	T10	45'-46.5'	"	23	-	-	-	-	-	Lost sample.
	S10	45'-46.5'	"	17	-	-	-	-	-	
	S11	50'-51.5'	Grey silty clay.	11	-	-	-	-	-	
	Vane	53	"	-	-	-	-	2000	-	Sens: -
	S12	60-61.5'	"	14	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S13	69'-69.5'	Grey silty clay Red and grey shale.	60-6"	-	-	-	-	-	PI
2	S1	3'-4.5'	Grey-brown silty clay.	10	30.3	28.3	43.5	-	-	15.2
	T2	4.5'-6'	Grey-brown silty clay with some stones.	15	14.5 38.7	- 25.7	- 55.7	1310	132.4	30.0
	T3	9'-10.5'	Grey-brown silty clay with sand and gravel.	P	20.7	14.6	22.9	862	128.2	8.3
	vane	12'		-	-	-	-	440	-	Sens: 7.3
	T4	15'-16.5'	Grey-brown silty clay with sand and gravel.	19	7.8	17.6	24.5	-	-	6.2
	S5	20'-21.5'	Grey silty clay with gravel.	10	11.7			-	-	
	T6	25'-26.5'		33	-	-	-	-	-	Sample lost.
	S6	25'-26.5'	"	16	15.1	14.3	23.0	-	-	8.7
	T7	30'-31.5'	"	45	17.2	18.8	27.5	-	-	8.7
	T8	35'-36.5'	"	P	-	-	-	-	-	
	vane	38'		-	-	-	-	>2000	-	Sens: 3.3
	S9	40'-41.5'	Grey silty clay with traces of red shale.	15	-	-	-	-	-	
	vane	43'		-	-	-	-	1200	-	Sens: 3.3
	T10	45'-46.5'	"	P	-	-	-	-	-	
	Vane	48'		-	-	-	-	1440	-	Sens: 3.3

JOB 59-F-125

W.P. 231-58-3

# SUMMARY OF FIELD & LABORATORY TESTS

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
3	S1	3'-4.5'	Brown silty clay with decayed wood.	11	23.3	-	-	-	-	
	S2	6'-7.5'	"	13	22.9	-	-	-	-	
	T3	9'-10.5'	Grey brown silty clay with sand seams.	P	46.6	22.8	49.0	615	114.9	16.2
	vane	12'		-	-	-	-	1700	-	Sens: 6.1
	T4	15'-16.5'	Grey silty clay.	P	28.7	18.1	36.5	1638	120.7	18.4
	vane	18'		-	-	-	-	300	-	Sens: 1.5
	T5	20'-21.5'	"	P	31.2	20.9	37.4	633	151.9	16.5
	vane	23'		-	-	-	-	800	-	Sens: 3.1
	T6	25'-26.5'	"	P	29.5	19.3	40.5	-	-	21.2
	vane	28'		-	-	-	-	920	-	Sens: 5.4
4	T7	30'-31.5'	"	P	19.2	16.1	24.9	714	135.0	8.8
	T8	35'-36.5'	"	40	-	-	-	-	-	
	S9	40'-41.5'	"	57	-	-	-	-	-	
	T10	45'-46.5'	"	22-6"	-	-	-	-	-	
	S1	3'-4.5'	Yellow-brown organic silt.	10	-	-	-	-	-	
	S2	6'-7.5'	"	13	20.8	-	-	-	-	
4	S3	9'-10.5'	Brown sand and gravel	24	-	-	-	-	-	
	S4	15'-16.5'	Grey-brown clay and sand.	16	11.3	-	-	-	-	

JOB 59-F-125

W.P. 231-58-3

## SUMMARY OF FIELD & LABORATORY TESTS

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4	T5	20'-21.5'	Grey silty clay with gravel.	24	18.2	16.0	33.4	2561	134.5	PI 174 170 Sens: 1.9
	T6	25'-26.5'	"	P	22.3	16.7	33.7	2109	128.8	
	vane	28'		-	-	-	-	1240	-	
5	S1	3'-4.5'	Brown silty clay with sand.	8	22.2	-	-	-	-	20.5 16.2 Sens: 4.3 22.2 Sens: 3.8 Sens: 4.5  T denotes Shelby Tube sample. S denotes Split Spoon sample.
	S2	4.5'-6'	"	7	21.0	-	-	-	-	
	T3	9'-10.5'	Grey brown silty clay.	22	23.9	21.4	41.9	3775	127.0	
	T4	15-16.5'	Grey silty clay.	15	24.1	20.4	37.3	1310	127.1	
	T5	20'-22'	"	P	-	-	-	-	-	
	vane	23.5'		-	-	-	-	1560	-	
	T6	25'-27'	"	P	39.5	23.2	52.4	822	114.2	
	Vane	28.5'		-	-	-	-	760	-	
	T7	30'-31.5'	"	P	-	-	-	-	-	Sens: 4.5
	vane	33'		-	-	-	-	1440	-	

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 1

JOB 59-F-125 STATION Ramp J 429-00 C

DATUM G. S. C. \_\_\_\_\_ COMPILED BY B. K. \_\_\_\_\_

BORING DATE Jan. 25/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
2" SHELBY TUBE \_\_\_\_\_  
2" SPLIT TUBE \_\_\_\_\_  
2" DIA. CONE \_\_\_\_\_  
2" SHELBY \_\_\_\_\_  
CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) ———— O  
VANE TEST (C) AND SENSITIVITY (S) ———— + S  
NATURAL MOISTURE AND ———— LI  
LIQUIDITY INDEX ———— X  
LIQUID LIMIT ———— ————  
PLASTIC LIMIT ———— ————

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE		CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
				P.S.F.				
	↓ Groundlevel	257.7	0	BLOWS/FT.		MOIST. CONTENT - % DRY WT.		
	Ashes gravel and rubble loose with some decayed vegetation	246.2	10			15 30 45	S1	-
	Black peaty silty clay with stones and fragments of rubble and also some shells	235.7	20				S2	-
	Brown clayey sand.	230.7	30				S3	-
	Clean coarse sand.	228.2	40				S4	-
	Stiff grey clayey silt.	214.7	50				S5	-
	End of borehole.		60				S6	-
			70				S7	-
			80				S8	-

Penetration resistance profile shown; obtained by driving a 2" dia. cone from groundlevel to depth noted with an energy of 350 ft. lb. per. blow.

Penetration ends at elev. 224.7'

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION





W.P. 231-58-3 BORE HOLE NO. 2A  
 JOB 59-F-125 STATION Ramp J 429/50 G  
 DATUM G. S. C. COMPILED BY B. K.  
 BORING DATE Feb. 12/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST ( $C$ ) AND SENSITIVITY ( $S$ )  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	P.S.F. 4000
	↓ Groundlevel	257.8	0	25	50	75	BLOWS/FT. 100
	Sand with roots.	252.8					
	Grey-brown silt with wood and decayed organic matter.	238.8	10				
	Dark grey-brown peaty silt becoming black fibrous peat.	230.8	20				
	Grey-brown sandy silt.	227.8	30				
	Grey clayey silt.	225.8					
	End of borehole.		40				
			50				
			60				
			70				
			80				

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
15	30	45		
			T1	120.5
			T2	91.0
			T3	-
			T4	136.3

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 2B

JOB 59-F-125 STATION Ramp J 429,50 C

DATUM G. S. C. \_\_\_\_\_ COMPILED BY B. K.

BORING DATE Feb. 16/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) \_\_\_\_\_ O  
VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ + S  
NATURAL MOISTURE AND \_\_\_\_\_ LI  
LIQUIDITY INDEX \_\_\_\_\_ X  
LIQUID LIMIT \_\_\_\_\_  
PLASTIC LIMIT \_\_\_\_\_

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	4000 P.S.F. BLOWS/FT.
	↓ Groundlevel	257.8	0				
	Sand with roots.	252.8	10				
	Grey-brown silt with wood and decayed organic matter.	238.8	20				
	Dark grey-brown peaty silt becoming black fibrous peat.	233.3	30				
	End of borehole.		40				
			50				
			60				
			70				
			80				

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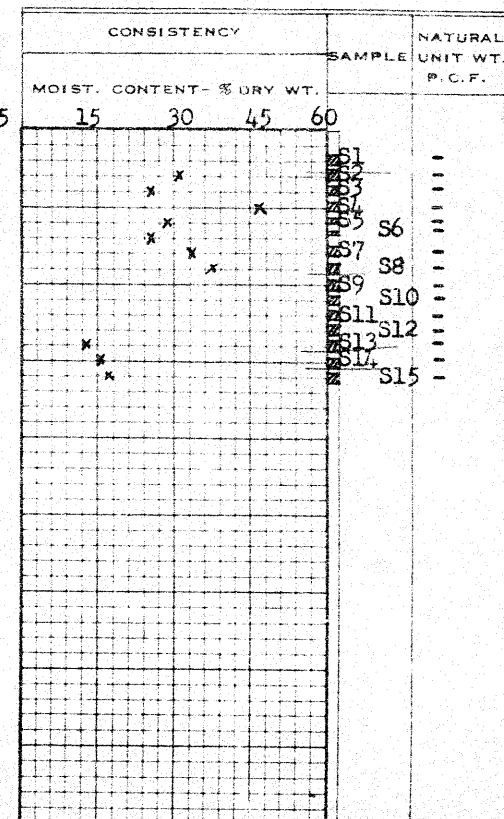
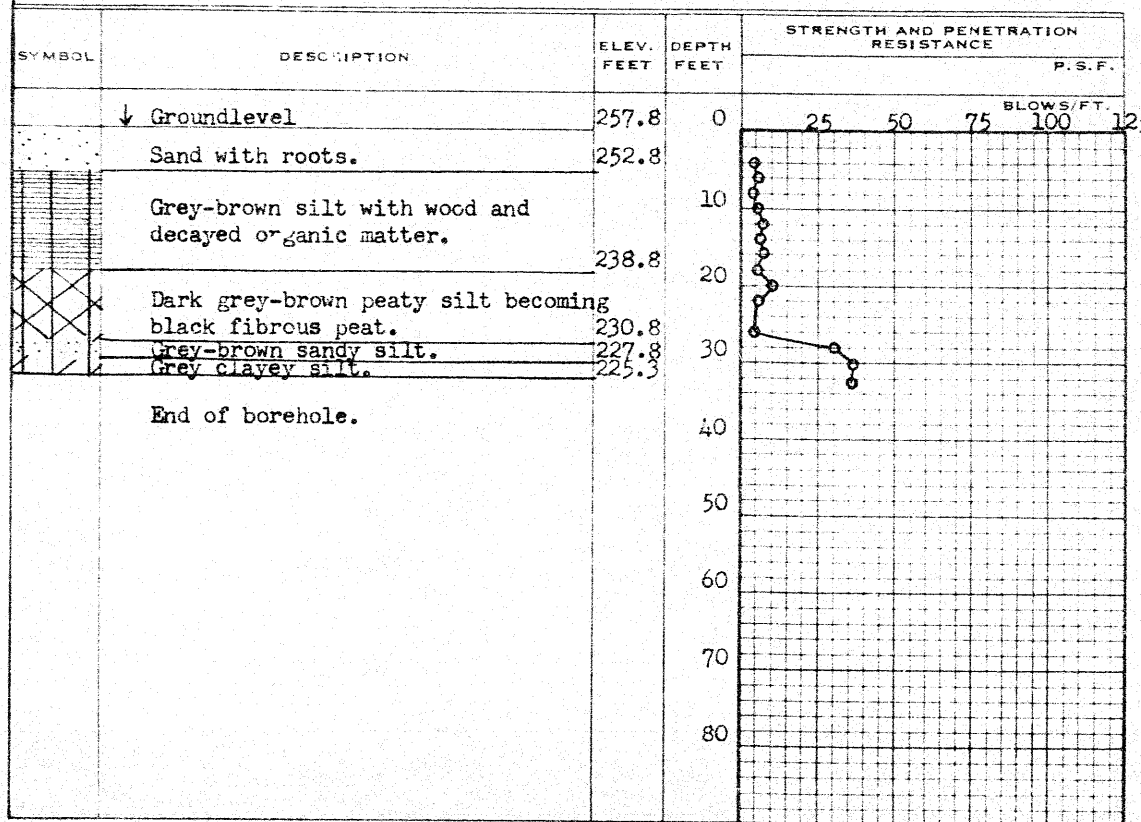
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 2C  
JOB 59-F-125 STATION Ramp 429/50 E  
DATUM G. S. C. COMPILED BY B. K.  
BORING DATE Feb. 12/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
VANE TEST (C) AND SENSITIVITY (S)  
NATURAL MOISTURE AND LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT





# DEPARTMENT OF HIGHWAYS - ONTARIO

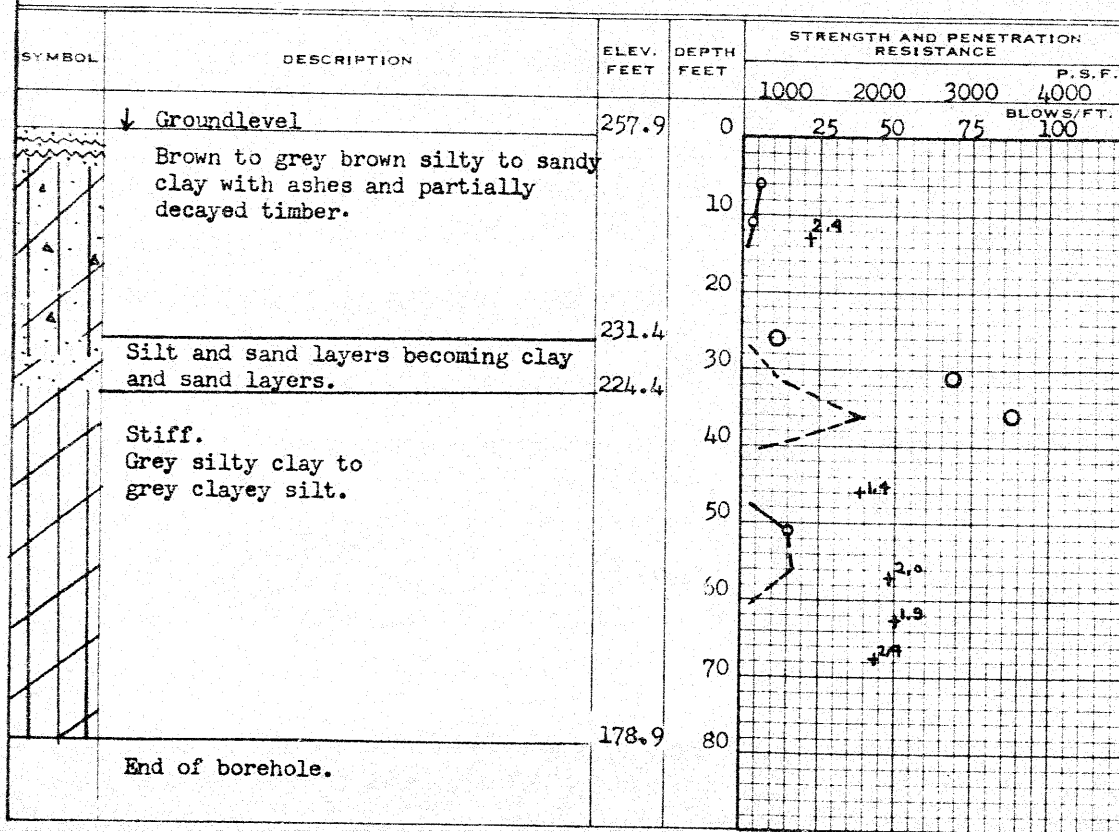
## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 3  
 JOB 59-F-125 STATION Ramp J 430+00 E  
 DATUM G. S. C. COMPILED BY B. K.  
 BORING DATE Jan. 14/59 CHECKED BY J. B.

2" DIA. SPLIT TUBE -----  
 2" SHELBY TUBE -----  
 2" SPLIT TUBE -----  
 2" DIA. CONE -----  
 2" SHELBY -----  
 CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) --- O  
 VANE TEST (C) AND SENSITIVITY (S) --- +  
 NATURAL MOISTURE AND LIQUIDITY INDEX --- LI  
 LIQUID LIMIT --- X  
 PLASTIC LIMIT ---



CONSISTENCY				SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.					
15	30	45	60		
				S1	-
				S2	-
				T3	-
				T4	-
				S5	-
				T6	115.3
				T7	139.2
				T8	132.8
				T9	-
				T10	-
				S11	-
				T12	-
				T13	-
				T14	-
				T15	-
				T16	-

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 4A  
JOB 59-F-125 STATION Ramp J 430+50 E  
DATUM G. S. C. COMPILED BY B. K.  
BORING DATE Feb. 18/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) O  
VANE TEST (C) AND SENSITIVITY (S) +  
NATURAL MOISTURE AND LIQUIDITY INDEX LI  
LIQUID LIMIT X  
PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	
	↓ Groundlevel	258.0	0	BLOWS/FT.	
	Clayey mixture of ash, stones brick, grass etc. with sand layers.	250.5	10	25 50 75 100	
	Soft grey brown silty or sandy clay with variable amounts of organic matter distributed throughout it also some decaying wood.	240.0	20		
	Grey and brown sand and silty sand.	237.0	30		
	Dark grey-brown silty & silty clay with sand, stones & shells, very peaty in places.	227.5	40		
	Stiff grey silty clay.	226.5	50		
	End of borehole.		60		
			70		
			80		

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
			S1 -
			S2 -
			S3 -
			S4 -
			S5 -
			S6 -
			S7 -
			S8 -
			S9 -
			S10 -
			S11 -
			S12 -
			S13 -
			S14 -

# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3

BORE HOLE NO. 4B

JOB 59-F-125

STATION Ramp J 430+50 E

DATUM G. S. C.

COMPILED BY B. K.

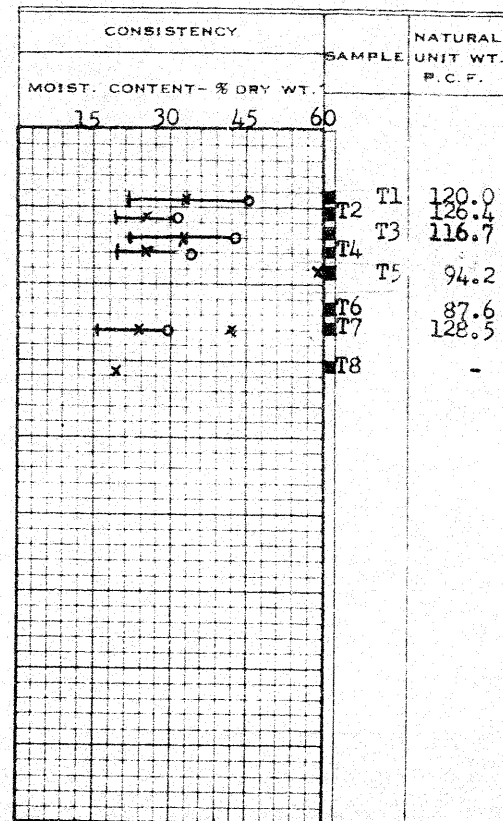
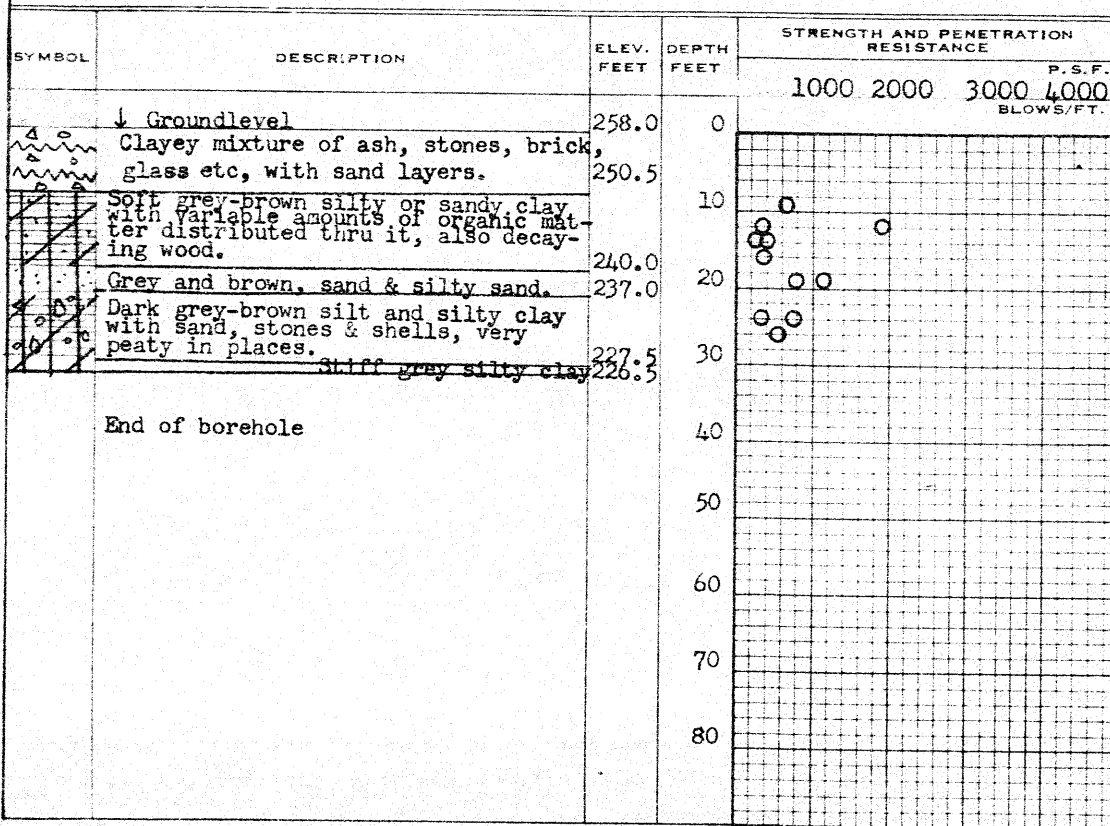
BORING DATE Feb. 24/60

CHECKED BY J. B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — O  
 VANE TEST (C) AND SENSITIVITY (S) — +  
 NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
 LIQUID LIMIT — X  
 PLASTIC LIMIT —



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 4C (Vane Tests)

JOB 59-F-125 STATION Ramp J 430/50 E

DATUM G. S. C. COMPILED BY B. K.

BORING DATE Mar. 8/60 CHECKED BY J. B.

 2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

 1/2 UNCONFINED COMPRESSION (Qu) O  
 VANE TEST (C) AND SENSITIVITY (S) +  
 NATURAL MOISTURE AND LIQUIDITY INDEX LI  
 LIQUID LIMIT X  
 PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	P. S. F. 4000
	↓ Groundlevel	258.0	0				BLOWS/FT.
	Clayey mixture of ash, stones, brick, glass etc, with sand layers.	250.5					
	Soft grey brown silty or sandy clay with variable amounts of organic mat- ter distributed through it, also decaying wood.	240.0	10				
	Grey & brown sand and silty sand.	237.0	20				
	Dark grey brown silt and silty clay with sand stones and shells very peaty in places.	227.5	30				

CONSISTENCY	SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT - % DRY WT.		

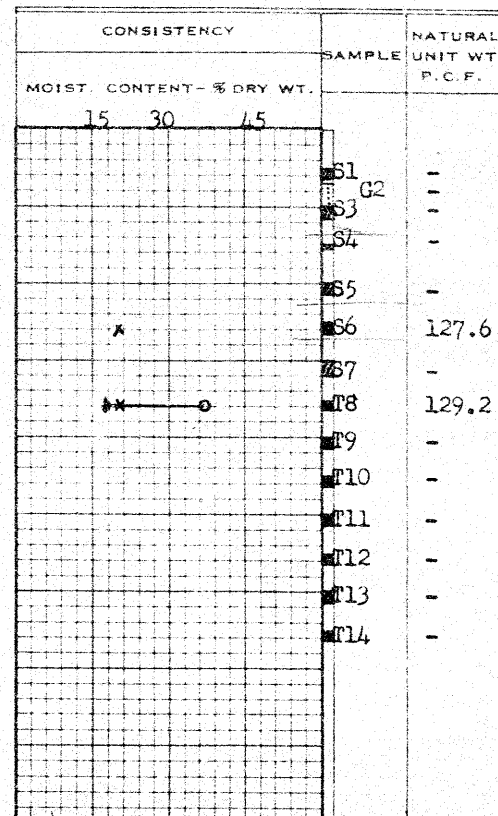
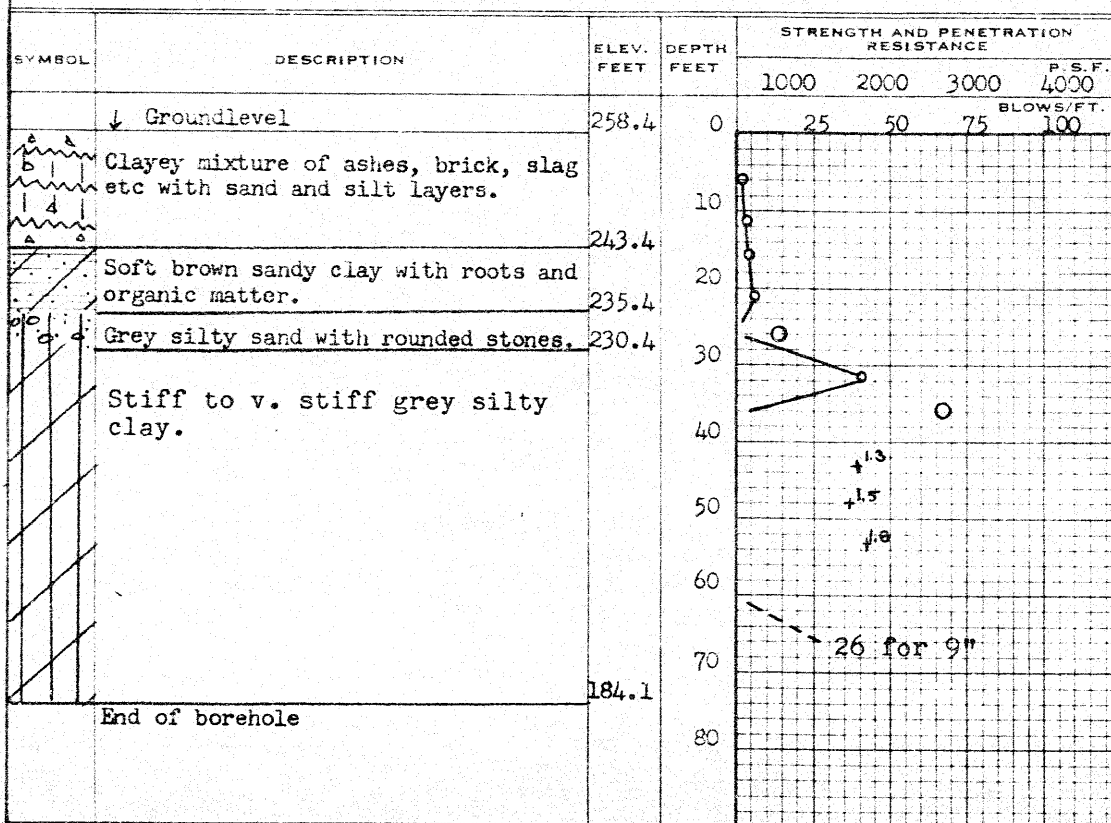
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 5  
JOB 59-F-125 STATION Ramp J 431+00 E  
DATUM G. S. C. COMPILED BY B. K.  
BORING DATE Jan. 13/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) O  
VANE TEST (C) AND SENSITIVITY (S) +  
NATURAL MOISTURE AND LIQUIDITY INDEX LI  
LIQUID LIMIT X  
PLASTIC LIMIT



# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 6A  
 JOB 59-F-125 STATION Ramp J 431/50 C  
 DATUM G. S. C. COMPILED BY B. K.  
 BORING DATE Feb. 19/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE
				P. S. F.
	↓ Groundlevel	259.0	0	BLOWS/FT.
	W.L.V. 258.0			
	Slightly clayey mixture of rubble, glass, decaying vegetation with layers of brown sand and silty sand.	244.0	10	
	Soft brown clayey silt with layers of brown clay. Sandy in places and with organic matter.	233.5	20	
	Brown to grey sand and silty sand.	230.5	30	
	Stiff grey silty clay.	227.5	40	
	End of borehole.		80	

CONSISTENCY	NATURAL
MOIST. CONTENT - % DRY WT.	UNIT WT. P.C.F.
15 30 45	
	S1
	S2
	S3
	S4
	S5
	S6
	S7
	S8
	S9
	S10
	S11
	S12

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W. P. 231-58-3

BORE HOLE NO. 6B (Vane Tests)

JOB 59-F-125

STATION Ramp J 431/50 E

DATUM G. S. C.

COMPILED BY\_ B. K.

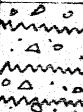

BORING DATE Feb. 22/60

CHECKED BY            J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	---	O
VANE TEST (C) AND SENSITIVITY (S)	---	+ S
NATURAL MOISTURE AND		
LIQUIDITY INDEX	---	LI
LIQUID LIMIT	---	X
PLASTIC LIMIT	---	o

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				P.S.F. 1000 2000 3000 4000			
	↓Groundlevel	259.0	0				
	W.L. =	258.0					
	Slightly clayey mixture of rubble = glass, decaying vegetation with layers of brown sand and silty clay.		10				
		244.0					
	Soft brown clayey silt with layers of brown clay. Sandy in places and with organic matter.	233.5	20	12.5 2.8 12.8 4.0			
	Brown to grey sand and silty sand.	230.5	30				
	Stiff grey silty clay.	227.5		12.0			
	End of borehole.		40				
			50				
			60				
			70				
			80				

[illegible]



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 60

JOB 59-F-125 STATION Ramp J 431+50.0

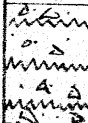



DATUM G. S. C. COMPILED BY B. K.

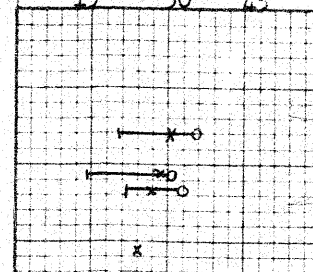
BORING DATE Feb. 22/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE ☒  
 2" SHELBY TUBE ☒  
 2" SPLIT TUBE ☐  
 2" DIA. CONE ☐  
 2" SHELBY ☐  
 CASING ☒ ☒

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ☐  
 VANE TEST (C) AND SENSITIVITY (S) ☒  
 NATURAL MOISTURE AND LIQUIDITY INDEX ☒  
 LIQUID LIMIT ☒  
 PLASTIC LIMIT ☒

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	4000
	↓ Groundlevel	259.0	0				
	Slightly clayey mixture of rubble, glass, decaying vegetation with layers of brown sand and silty clay.	238.0	10				
	Soft brown clayey silt with layers of brown clay, sandy in places and with organic matter.	244.0	20				
	Brown to grey sand and silty sand.	233.5	30				
	Stiff grey silty clay.	230.5	30				
	End of borehole.	227.5	40				
			50				
			60				
			70				
			80				

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
15	30	45	
		T1 T2 T3 T4  T5	119.4 - 123.0 120.7  -



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 8A  
JOB 59-F-125 STATION Ramp J 432/50 C  
DATUM G. S. C. COMPILED BY B. K.  
BORING DATE Feb. 29/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE ----- ☒  
2" SHELBY TUBE ----- ☒  
2" SPLIT TUBE ----- ☐  
2" DIA. CONE ----- ☐  
2" SHELBY ----- ☐  
CASING ----- x x

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) ----- O  
VANE TEST (C) AND SENSITIVITY (S) ----- +  
NATURAL MOISTURE AND LIQUIDITY INDEX ----- LI  
LIQUID LIMIT ----- X  
PLASTIC LIMIT -----

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P. S. F.	
				BLOWS/FT.	
	↓ Groundlevel	260.5	0	50	100
	Sand, ashes, brick glass etc, clayey below 5'-0"	251.5	10		
	Soft brown silty clay with some fine sand and decayed vegetation.	239.3	20		
	Grey silty sand with layers medium sand.	233.5	30		
	Firm grey silty clay.	226.5	40		
	End of borehole.		50		
			60		
			70		
			80		

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT - % DRY WT.			
15	30	45	

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3

BORE HOLE NO. 8B

JOB 59-F-125

STATION Ramp J 432+50.6

DATUM G. S. C.

COMPILED BY B. K.

BORING DATE Feb. 29/60

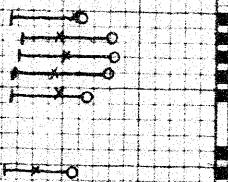
CHECKED BY J. B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) — O  
 VANE TEST (C) AND SENSITIVITY (S) — +  
 NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
 LIQUID LIMIT — X  
 PLASTIC LIMIT —

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	P. S. F. 4000 BLOWS/FT.
	↓ Groundlevel	260.5	0				
<i>indurin 4° 4'</i>	Sand, ashes, brick glass etc., clayey below 5'-0"	251.5	10				
	Soft brown silty clay with some fine sand and decayed vegetation.	239.3	20				
	Grey silty sand with layers of medium sand.	231.5	30				
	Firm grey silty clay.	226.5	40				
	End of borehole.		50				
			60				
			70				
			80				

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT - % DRY WT.			
25	30	45	
		T1 T2 T3 T4 T5  T6 T7	- - 48.0 117.5 -  - 124.3

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 \_\_\_\_\_ BORE HOLE NO. 8C \_\_\_\_\_

JOB 59-F-125 STATION Ramp J 432450 E

DATUM G. S. C. \_\_\_\_\_ COMPILED BY B. K.

BORING DATE Feb. 29/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE -----  
2" SHELBY TUBE -----  
2" SPLIT TUBE -----  
2" DIA. CONE -----  
2" SHELBY -----  
CASING -----

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) ———— O  
VANE TEST (C) AND SENSITIVITY (S) ———— + S  
NATURAL MOISTURE AND LIQUIDITY INDEX ———— LI  
LIQUID LIMIT ———— X  
PLASTIC LIMIT ————

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	P.S.F. 4000 BLOWS/FT.
	↓ Groundlevel	260.5	0				
	Sand, ashes, brick glass etc., clayey below 5'-0".	251.5	10				
	Soft brown silty clay with some fine sand and decayed vegetation.	239.3	20				
	Grey Silty sand with layers of medium sand.	231.5	30				
	Firm grey silty clay.	226.5	40				
	End of borehole.		50				
			60				
			70				
			80				

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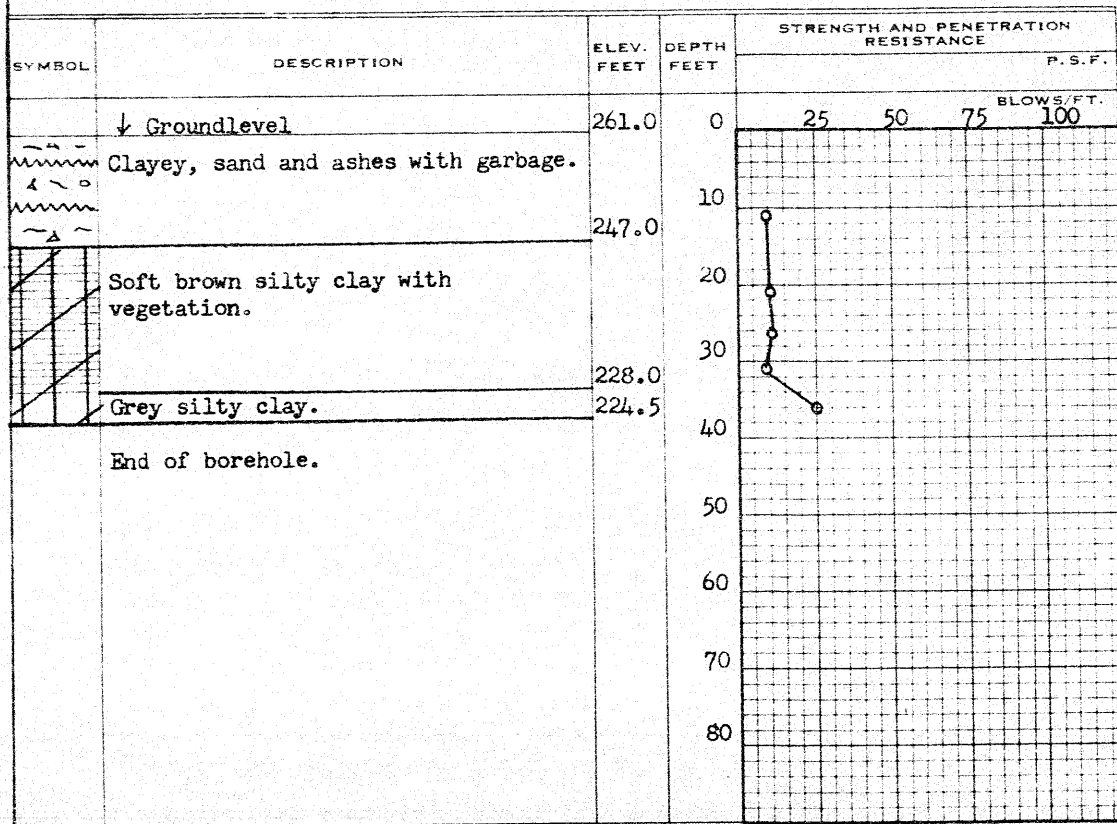
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 \_\_\_\_\_ BORE HOLE NO. 2 \_\_\_\_\_  
 JOB 59-F-125 \_\_\_\_\_ STATION Ramp J 433+00.6 \_\_\_\_\_  
 DATUM G. S. C. \_\_\_\_\_ COMPILED BY B. K. \_\_\_\_\_  
 BORING DATE Dec. 21/59 \_\_\_\_\_ CHECKED BY J. B. \_\_\_\_\_

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +S  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
 LIQUID LIMIT \_\_\_\_\_ X  
 PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P. C. F.
MOIST. CONTENT- % DRY WT.		
	S1	-
	S2	-
	S3	-
	S4	-
	S5	-

# DEPARTMENT OF HIGHWAYS - ONTARIO

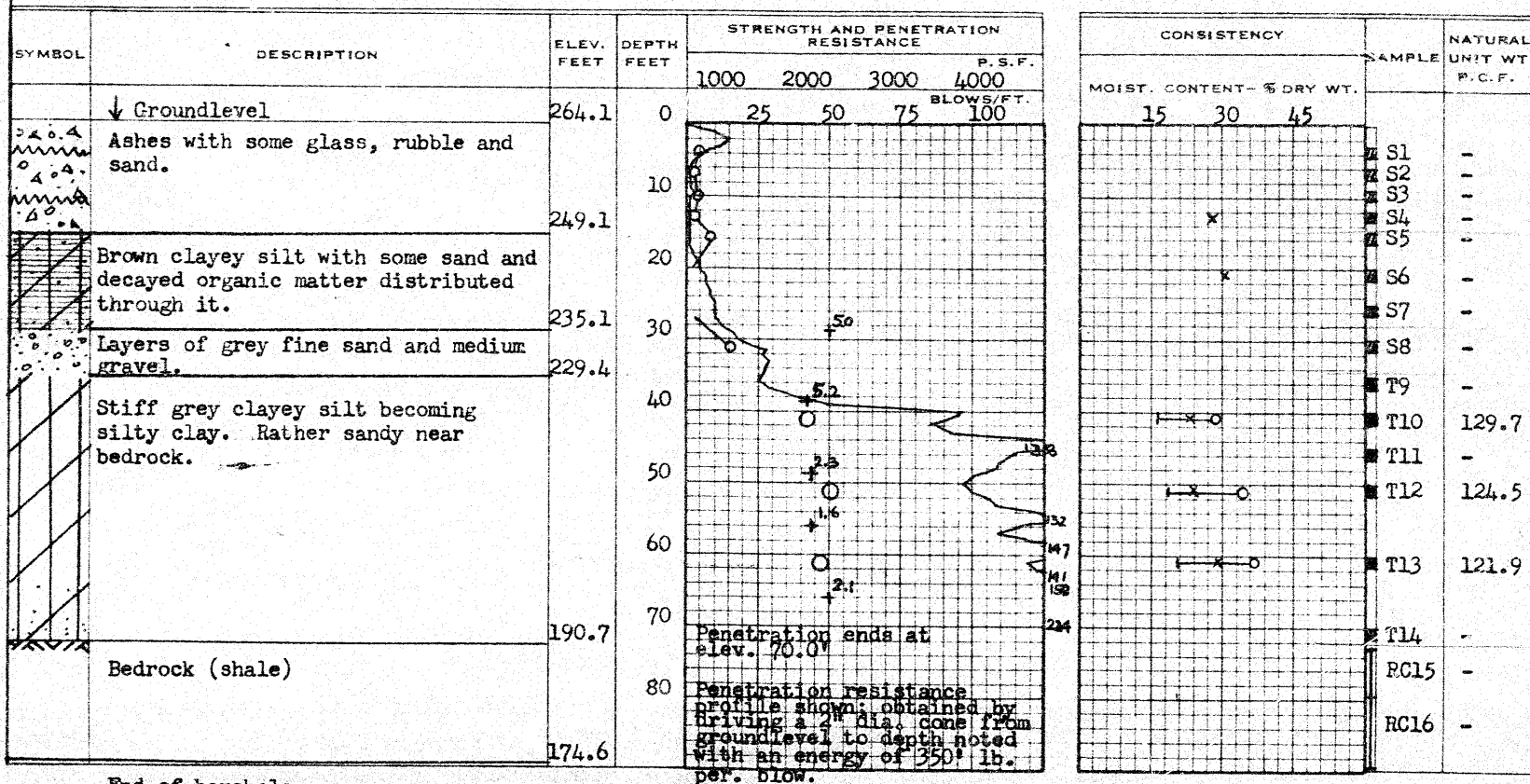
## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 10  
 JOB F-59-125 STATION 433+75 61' Rt.  
 DATUM 264.1' COMPILED BY B. K.  
 BORING DATE Nov. 18/59 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT



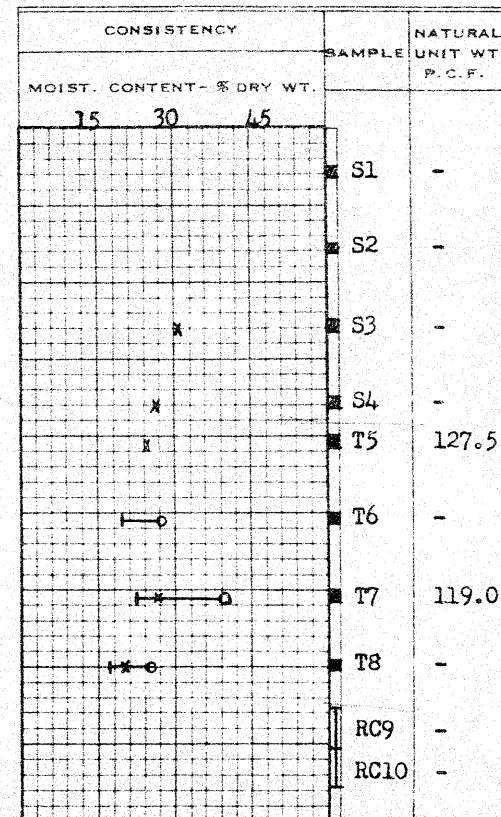
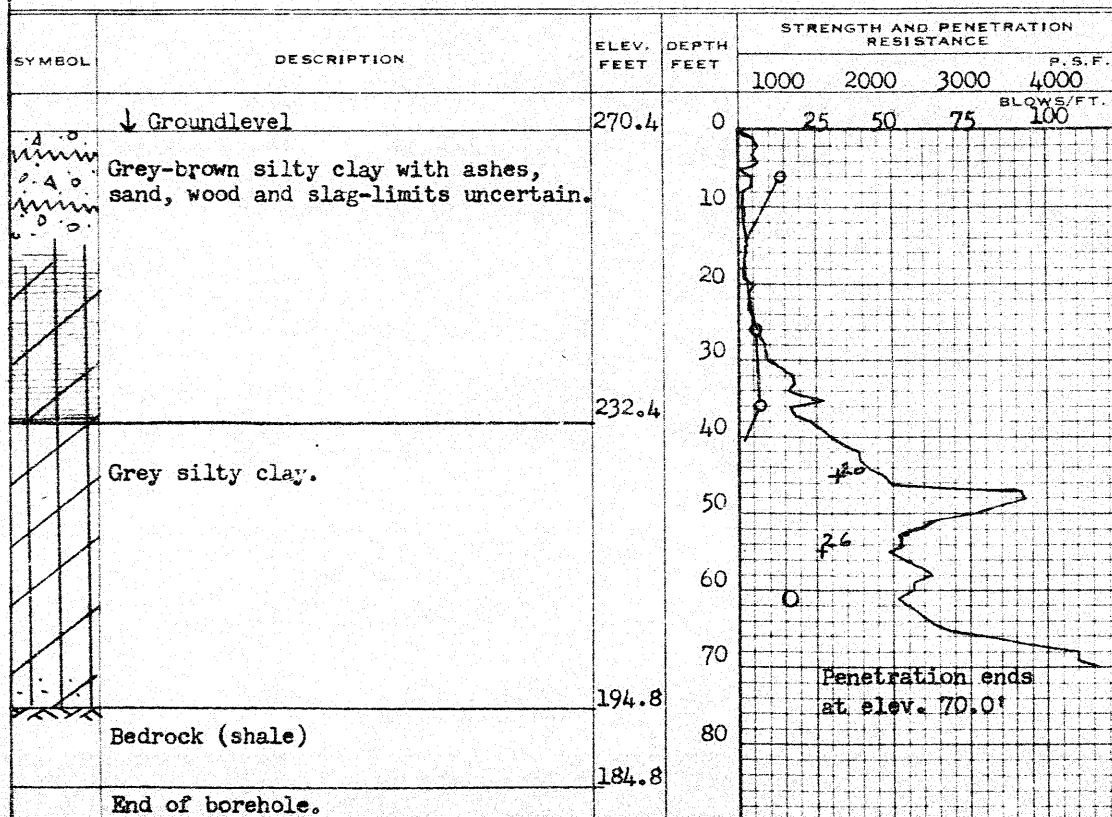
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 11  
JOB F-59-125 STATION 434+65 2' Rt.  
DUM 270.4' COMPILED BY B. K.  
BORING DATE Nov. 25/59 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu) — O  
VANE TEST (C) AND SENSITIVITY (S) — +  
NATURAL MOISTURE AND LIQUIDITY INDEX — LI  
LIQUID LIMIT — X  
PLASTIC LIMIT —





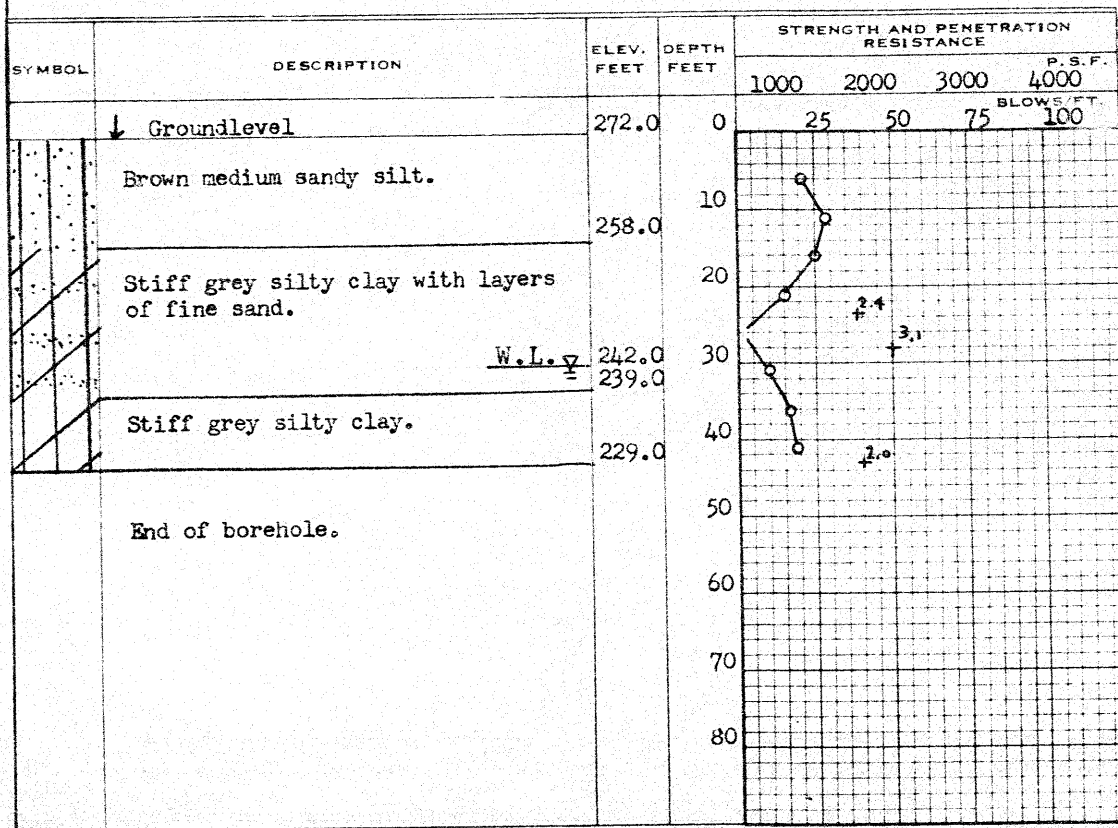
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 12A  
JOB 59-F-125 STATION Ramp J 4374 E  
DATUM G. S. C. COMPILED BY B. K.  
BORING DATE Jan. 5/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
2" SHELBY TUBE \_\_\_\_\_  
2" SPLIT TUBE \_\_\_\_\_  
2" DIA. CONE \_\_\_\_\_  
2" SHELBY \_\_\_\_\_  
CASING \_\_\_\_\_

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +  
NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ LI  
LIQUID LIMIT \_\_\_\_\_ X  
PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.				
15	30	45		
			S1	-
			S2	-
			S3	-
			S4	-
			S5	-
			S6	-
			S7	-
			S8	-

# DEPARTMENT OF HIGHWAYS - ONTARIO

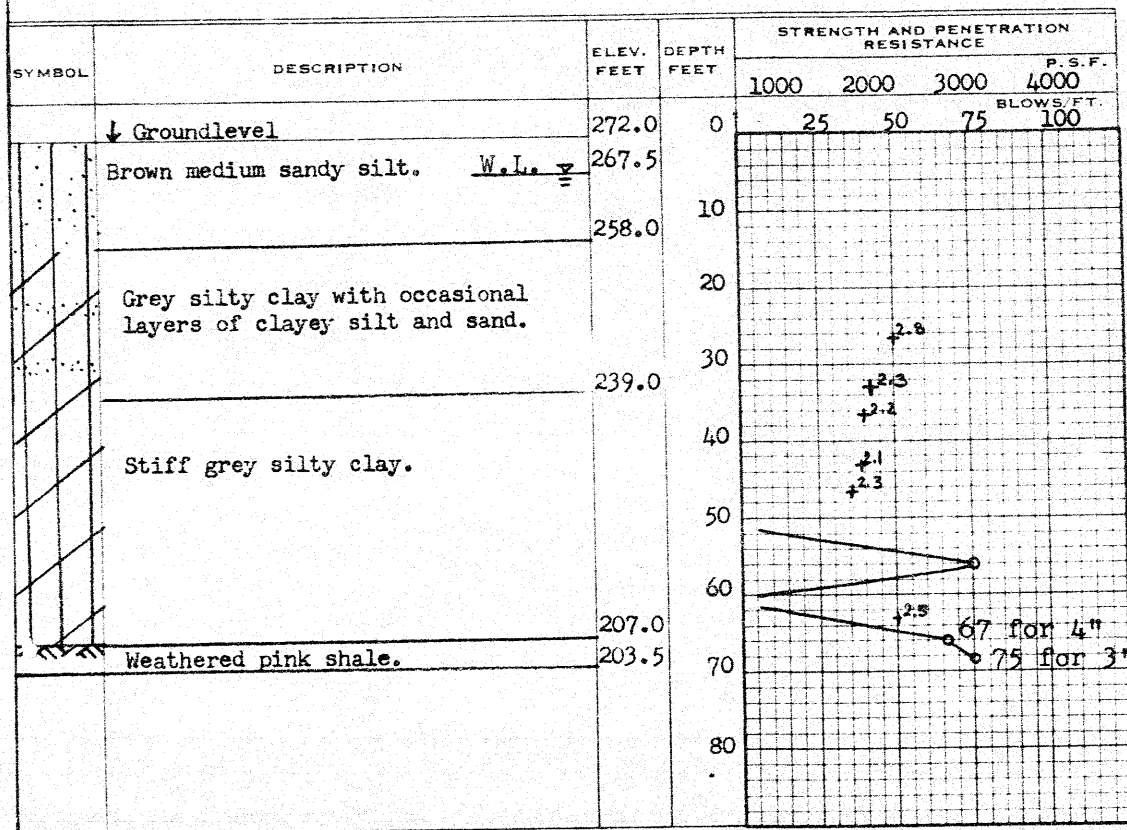
## MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 12B  
 JOB 59-F-125 STATION 437+00 E  
 DATUM G. S. C. COMPILED BY B. K.  
 BORING DATE Jan. 18/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_  
 LIQUID LIMIT \_\_\_\_\_  
 PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
	T1	-
	T2	-
	T3	-
	T4	-
	S5	-
	T6	-
	S7	-
	S8	-



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 13A  
 JOB 59-F-125 STATION Ramp J 439+00 E  
 DATUM G. S.C. COMPILED BY B. K.  
 BORING DATE Jan. 21/59 CHECKED BY J. B.

2" DIA. SPLIT TUBE \_\_\_\_\_ ☒  
 2" SHELBY TUBE \_\_\_\_\_ ☒  
 2" SPLIT TUBE \_\_\_\_\_ ☐  
 2" DIA. CONE \_\_\_\_\_ ☐  
 2" SHELBY \_\_\_\_\_ ☐  
 CASING \_\_\_\_\_ ☒ ☒

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ ☐  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ ☒  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ ☒  
 LIQUID LIMIT \_\_\_\_\_ ☐  
 PLASTIC LIMIT \_\_\_\_\_ ☐

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				1000	2000	3000	P.S.F. 4000
	↓ Groundlevel	273.5	0	25	50	75	100
	Sand, gravel ashes, refuse and rubble - limits uncertain.						
	Sand, gravel, ashes & decayed refuse.						
	W.L. = 253.5	253.5	20				
	250.0	250.0					
	Grey brown silty clay with decayed vegetation and shells.	244.5	30				
	Grey silt and sand with clay layers.	240.5	35				
			40		2.2		
			45		2.2		
			50		1.5		
	Stiff grey silty clay.	216.5	60				
	End of borehole.		80				

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
15	30	45		
			S1	-
			S2	-
			S3	-
			S4	-
			T5	-
			T6	-
			T7	-
			S8	-

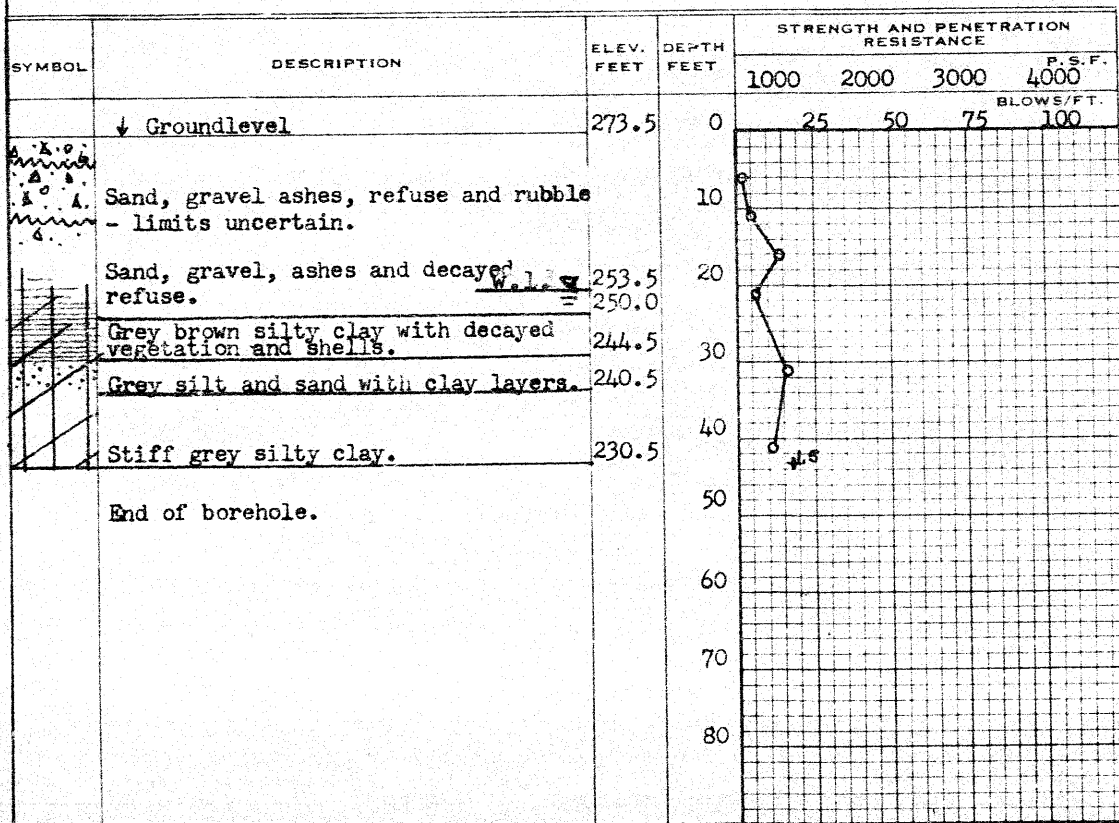
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 231-58-3 BORE HOLE NO. 13B  
JOB 59-F-125 STATION 439+00 E Ramp J  
DATUM G. S.C. COMPILED BY B. K.  
BORING DATE Jan. 5/60 CHECKED BY J. B.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

## LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
VANE TEST (C) AND SENSITIVITY (S)  
NATURAL MOISTURE AND LIQUIDITY INDEX  
LIQUID LIMIT  
PLASTIC LIMIT



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
15 30 45		
	S1	-
	S2	-
	S3	-
	S4	-
	S5	-
	S6	-

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psf	UNIT WEIGHT pcf	REMARKS
1	S1	5'-6.5'	Ashes & stones.	3	-	-	-	-	-	
	S2	10'-12'	Ashes etc. gray-brown sandy clay.	P	47.2	-	-	-	-	
	S3	15'-16.5'	"	2	88.1	-	-	-	-	
	S4	20'-21.5'	"	3	67.1	-	-	-	-	
	S5	25'-26.5'	Sand & gravel with some silty clay.	31	18.0	-	-	-	-	
	S6	30'-31.5'	Grey silty clay with stones.	55	-	-	-	-	-	
	S7	35'-36.5'	"	P	-	-	-	-	-	
	S8	40'-41.5'	"	P	-	-	-	-	-	
2A	T1	9'-10.5'	Brown silt with roots.	P	27.6	22.7	39.5	584	120.5	
	T2	19'-20.5'	Brown silt & sand with organic matter.	P	63.8	52.2	87.0	-	91.0	
	T3	21'-22.5'	Brown clayey peat.	P	14.0	-	-	-	-	
	T4	30.5'-32'	Grey silty clay.	P	17.8	16.3	29.3	2580	136.3	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
2B	VANE	6.5'		-	-	-	-	1280	-	Sens: 10.7
	VANE	10.5'		-	-	-	-	480	-	Sens: 3.0
	VANE	12.5'		-	-	-	-	960	-	Sens: 2.4
	VANE	14.5'		-	-	-	-	880	-	Sens: 2.2
	VANE	16.5'		-	-	-	-	720	-	Sens: 2.3
	VANE	18.5'		-	-	-	-	960	-	Sens: 2.4
	VANE	20.5'		-	-	-	-	480	-	Sens: 3.0
	VANE	22.5'		-	-	-	-	1040	-	Sens: 2.6
	VANE	24.5'		-	-	-	-	1360	-	Sens: 2.8

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
20	S1	3'-4.5'	Fine-medium sand with roots.	4	-	-	-	-	-	
	S2	5'-6.5'	Gray-brown silty clay with fine gravel & organic matter.	5	30.8	-	-	-	-	
	S3	7'-8.5'	Brown clayey silt with fine gravel & organic matter.	3	25.4	-	-	-	-	
	S4	9'-10.5'	Brown clayey silt with wood & organic matter.	5	46.7	-	-	-	-	
	S5	11'-11.5'	"	6	29.0	-	-	-	-	
	S6	13'-13.5'	Brown clayey silt with fine sand.	6	25.9	-	-	-	-	
	S7	15'-16.5'	Brown clayey silt with vegetation.	6	33.8	-	-	-	-	
	S8	17'-18.5'	"	5	39.5	-	-	-	-	
	S9	19'-20.5'	"	10	86.8	-	-	-	-	
	S10	21'-22.5'	"	7	132.2	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
20	S11	23'-24.5'	Dark brown fibrous peaty material, some sand.	5	120.0	-	-	-	-	
	S12	25'-26.5'	"	4	207.5	-	-	-	-	
	S13	27'-28.5'	V. fine gray brown silty sand.	30	13.4	-	-	-	-	
	S14	29'-30.5'	Layered sand.	37	15.3	-	-	-	-	
	S15	29'-31'	Grey silty clay.	36	17.2	-	-	-	-	
3	S1	5'-6'	Ashes & clay.	6	-	-	-	-	-	
	S2	10'-11.5'	"	4	28.1	-	-	-	-	
	VANE	13'		-	-	-	-	880	-	Sens: 2.5
	T3	15'-16.5'	Clayey fine sand.	P	49.5	-	-	-	-	
	T4	20'-21.5'	Brown clay with wood.	P	-	-	-	-	-	Lost
	S5	21.5'-23'	"	P	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHFAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
3	T6	25'-26.0'	Clay with sand & organic matter.	P	35.5	-	-	459	115.3	
	T7	30'-31.5'	Fine brown sand clay layers.	P	14.1	-	-	2761	139.2	
	T8	35'-36.5'	Grey silty clay with fine-med. gravel.	P	20.1	18.3	38.0	3510	132.8	
	T9	40'-41.5'	"	P	-	-	-	-	-	
	T10	46'-47.5'	"	P	-	-	-	-	-	
	S11	50'-51.5'	"	13	-	-	-	-	-	
	T12	55'-56.5'	"	P	-	-	-	-	-	
	T13	60'-61.5'	"	P	-	-	-	-	-	
	T14	65'-66.5'	"	P	-	-	-	-	-	
	T15	70'-71.5'	"	P	-	-	-	-	-	
	T16	75'-76.5'	"	P	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4A	S1	2'-3.5'	Brick, stones, concrete glass & clay.	6	-	-	-	-	-	
	S2	4'-5.5'	Fine-med. brown sand with stones and roots.	5	-	-	-	-	-	
	S3	6'-7.5'	Fine-med. brown sand with rubble.	3	-	-	-	-	-	
	S4	8'-9.5'	Brown silty clay with sand.	3	26.2	-	-	-	-	
	S5	10'-11.5'	Brown silty clay with organic matter	5	30.4	-	-	-	-	
	S6	12'-13.5'	"	4	30.3	-	-	-	-	
	S7	14'-15.5'	"	3	24.8	-	-	-	-	
	S8	16'-17.5'	"	7	26.0	-	-	-	-	
	S9	18'-19.5'	Sand & clay layers.	5	42.9	-	-	-	-	
	S10	20'-21.5'	Sand & clay layers.	4	-	-	-	-	-	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4A	S11	22.5'-24'	Dark brown silty clay with sand & small stones, vegetation & roots.	7	-	-	-	-	-	
	S12	25.0'-26.5'	Dark brown silty clay with sand & gravel layer.	31	49.3	-	-	-	-	
	S13	27.5'-29'	Sand & clay layers.	16	-	-	-	-	-	
	S14	30'-31.5'	Grey silty clay.	17	-	-	-	-	-	
4B	T1	8'-9.5'	Brown silty clay with sand.	P	34.4	22.5	45.7	U=675 V=410	120.0	
	T2	10'-11.5'	Brown silty clay with organic matter.	P	25.2	18.4	31.5	U=320 TR=1900 V=137	133.0 122.7	
	T3	12.5'-14'	"	P	32.6	21.3	43.4	TR=234 V=410 U=396	118.0 115.4	
	T4	15'-16.5'	"	P	24.8 27.7	18.3	35.0	U=355 V=480	120.8	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4B	T5	17.5'-19'	Brown silty clay with organic matter & wood.	P	62.5 59.7	-	-	TR=783 1 TR=1130 2	90.3 98.8	
	T6	22.5'-24'	"	P	97.3	85.8	128.6	TR=750 U=320 V=385 1 V=264 2	90.0 85.1	
	T7	25'-26.5'	"	P	22.8 42.9 75.7	15.6	29.4	V=413 TR=529	128.5	
	T8	30'-31.5'	Grey silty clay.	P	18.1	-	-	-	-	
4C	VANE	9'		-	-	-	-	1040	-	Sens: 5.2
	VANE	11.5'		-	-	-	-	1120	-	Sens: 2.8
	VANE	14'		-	-	-	-	720	-	Sens: 3.0
	VANE	16.5'		-	-	-	-	960	-	Sens: 3.4

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4C	VANE	19'		-	-	-	-	1440	-	Sens: 3.0
	VANE	21.5'		-	-	-	-	1440	-	Sens: 2.6
	VANE	24'		-	-	-	-	1120	-	Sens: 2.8
	VANE	26.5'		-	-	-	-	1840	-	Sens: 2.9
5	S1	5'-6.5'	Sand with organic matter.	2	-	-	-	-	-	
	C2	6.5'-10'		-	-	-	-	-	-	
	S3	10'-11.5'		3	-	-	-	-	-	
	S4	15'-16.5'	Brown clay & sand with organic matter & wood.	4	-	-	-	-	-	
	S5	20'-21.5'	"	6	-	-	-	-	-	
	T6	25'-26.5'	Fine to medium sand.	P	21.2	-	-	579	127.6	
	S7	30'-32'	Silty clay.	40	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
5	T8	35'-36.5'	Dark gray silty clay.	P	21.4	18.0	36.8	2680	129.2	Sens: 1.3
	T9	40'-41.5'	"	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1560	-	
	T10	50'-51.5'	"	P	-	-	-	-	-	
	T11	55'-56.5'	"	P	-	-	-	-	-	
	T12	60'-61.5'	"	P	-	-	-	-	-	
	T13	65'-66.5'	"	P	-	-	-	-	-	
6A	S1	2.5'-4'	Sand, gravel, glass, brick.	4	31.1	-	-	-	-	Lost.
	S2	5'-6.5'		2	-	-	-	-	-	
	S3	7.5'-9'	Brown medium to coarse silty sand.	2	34.5	-	-	-	-	
	S4	10'-11.5'	Grey coarse sand & grey clay.	5	32.8	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6A	S5	12.5'-16'	Grey brown sand to 13'-6" clayey mixture of ashes, small stones & wood.	4	32.8	-	-	-	-	
	S6	15'-16.5'	Brown clayey silt with roots.	2	31.5	-	-	-	-	
	S7	17.5'-19'	Brown clayey silt with shells.	2	28.9	-	-	-	-	
	S8	20'-21.5'	Brown clayey silt with sand.	4	29.7	-	-	-	-	
	S9	22.5'-24'	"	8	21.9	-	-	-	-	
	S10	25'-26.5'	Clayey silt to 25'-6" med.-coarse sand to 26' coarse gravel.	19	20.3	-	-	-	-	
	S11	27.5'-29'	Coarse sand to 28'-6" grey silty clay.	23	16.2 21.1	-	-	-	-	
	S12	30'-31.5'	Grey silty clay.	30	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
6B	VANE	16.5'		-	-	-	-	800	-	Sens: 2.5
	VANE	19'		-	-	-	-	960	-	Sens: 2.8
	VANE	21.5'		-	-	-	-	880	-	Sens: 2.8
	VANE	24'		-	-	-	-	960	-	Sens: 4.0
	VANE	31.5'		-	-	-	-	1440	-	Sens: 2.0
6C	T1	15'-16.5'	Brown silty clay with decayed roots.	P	30.3	19.1	36.8	406	119.4	
	T2	17.5'-19'	Brown silty clay with organic matter.	P	-	-	-	-	-	
	T3	20'-21.5'	"	P	28.8	14.7	30.1	382	123.0	
	T4	22.5'-24'	Brown clayey silt with sand.	P	27.1	21.2	33.5	354	120.7	
	T5	30'-31.5'	Grey silty clay.	P	24.3	-	-	-	-	
7		Omitted								

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psf.	UNIT WEIGHT pcf.	REMARKS
8A	S1	5'-6.5'	Medium sand with ashes, rubble etc.	4	-	-	-	-	-	
	S2	7.5'-9'	Silty clay with ash wood.	2	33.8	-	-	-	-	
	S3	10'-11.5'	Brown silty clay with organic matter.	3	38.2	22.0	37.0	-	-	
	S4	12.5'-14'	Silty clay with sand and organic matter.	4	18.0	-	-	-	-	
	S5	15'-16.5'	"	3	49.5	19.4	39.1	-	-	
	S6	17.5'-19'	"	P	32.8	-	-	-	-	
	S7	20'-21.5'	Brown silty clay to 21'-3" fine to med. gray sand.	2	31.9	-	-	-	-	
	S8	22.5'-24'	Gray sand with silty clay binder.	4	27.9	-	-	-	-	
	S9	25'-26.5'	Gray sand.	8	29.6	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
8A	S10	27.5'-29'	Grey silty clay.	9	23.2	-	-	-	-	
	S11	30'-31.5'	"	13	21.1	-	-	-	-	
	S12	32.5'-34'	"	14	25.8	-	-	-	-	
8B	T1	10'-11.5'	Brown silty clay with fine sand.	P	32.2	19.3	34.6	-	-	
	T2	12.5'-14'	"	P	29.5	22.9	40.0	-	-	
	T3	15'-16.5'	"	P	30.7	22.5	40.9	1180	-	
	T4	17.5'-19'	"	P	28.1	19.9	39.0	1900	117.5	
	T5	20'-21.5'	"	P	29.4	19.4	35.8	-	-	
	T6	27.5'-29'	"	P	15.3	-	-	-	-	
	T7	30'-31.5'	Grey silty clay.	P	24.1	18.5	32.0	-	124.3	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
8C	VANE	11.5'		-	-	-	-	1040	-	Sens: 2.2
	VANE	14'		-	-	-	-	1040	-	Sens: 5.2
	VANE	16.5'		-	-	-	-	640	-	Sens: 1.6
	VANE	19'		-	-	-	-	800	-	Sens: 1.8
	VANE	21.5'		-	-	-	-	1200	-	Sens: 2.3
	VANE	29'		-	-	-	-	1280	-	Sens: 1.5
	VANE	31.5'		-	-	-	-	1600	-	Sens: 2.0
	VANE	34'		-	-	-	-	1760	-	Sens: 2.4

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
9	S1	10'-11.5'	Sand and refuse.	9	-	-	-	-	-	
	S2	20'-21.5'	Brown sandy clay & refuse.	10	-	-	-	-	-	
	S3	25'-26.5'	"	11	-	-	-	-	-	
	S4	30'-31.5'	"	9	-	-	-	-	-	
	S5	35'-36.5'	Grey silty clay.	25	-	-	-	-	-	
10	S1	3'-4.5'	Ashes	4	-	-	-	-	-	
	S2	6'-7.5'	Ashes	3	-	-	-	-	-	
	S3	9'-10.5'	"	4	-	-	-	-	-	
	S4	12'-13.5'	"	3	27.0	-	-	-	-	
	S5	15'-16.5'	Dark brown sandy clay.	8	-	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH D.S.F.	UNIT WEIGHT P.C.F.	REMARKS
10	S6	20'-21.5'	Dark brown sandy clay.	P	30.6	-	-	-	-	
	S7	25.7'-26.5'	Dark brown sandy clay with organic matter.	P	-	-	-	-	-	
	VANE	28.5'		-	-	-	-	2000	-	Sens: 5.0
	S8	30'-31.5'	Layered grey sandy gravel.	15	-	-	-	-	-	
	T9	35'-36.5'	Grey silty clay.	P	-	-	-	-	-	
	VANE	38.5'		-	-	-	-	1680	-	Sens: 5.0
	T10	40'-41.5'	"	P	23.0	16.3	29.2	1685	129.7	
	T11	45'-46.5'	"	P	-	-	-	-	-	
	VANE	48.5'		-	-	-	-	1760	-	Sens: 2.3
	T12	50'-51.5'	"	P	23.6	17.9	34.8	2000	124.5	
	VANE	56'		-	-	-	-	1760	-	Sens: 1.6
	T13	60'-61.5'	"	P	29.2	20.9	37.2	1859	121.9	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
10	VANE	66'		-	-	-	-	2000	-	Sens: 2.1
	T14	70'-71.5'	Grey silty clay.	P	-	-	-	-	-	
11	S1	5'-6.5'	Clay and ashes.	13	-	-	-	-	-	
	S2	15'-16.5'	"	P	-	-	-	-	-	Lost.
	S3	25'-26.5'	"	6	30.7	-	-	-	-	
	S4	35'-36.5'	Clay and ashes with sand and gravel.	7	26.5	-	-	-	-	
	T5	40'-41.5'	Grey silty clay.	P	25.1	-	-	-	127.5	
	VANE	45'		-	-	-	-	1280	-	Sens: 2.0
	T6	50'-51.5'	"	P	-	18.2	27.2	-	-	
	VANE	55'		-	-	-	-	1040	-	Sens: 2.6

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
11	T7	60'-61.5'	Grey silty clay.	P	27.8	22.6	40.4	645	119.0	
	T8	69'-70.5'	"	P	19.4	17.3	24.8	-	-	
	RC9	75.6'-80.5'	Shale.	-	-	-	-	-	-	
	RC10	80.5'-85.5'	Shale.	-	-	-	-	-	-	
12A	S1	5'-6.5'	Brown silty sand.	16	17.0	-	-	-	-	
	S2	10'-11.5'	"	28	10.9	-	-	-	-	
	S3	15'-16.5'	Grey silty clay with sand layers.	25	-	-	-	-	-	
	S4	20'-21.5'	Grey silty clay.	15	-	-	-	-	-	
	VANE	23.5'		-	-	-	-	1520	-	Sens: 2.4
	T5	25'-26.5'	"	P	-	-	-	-	-	
	VANE	28'		-	-	-	-	2000	-	Sens: 3.1

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
12A	S6	30'-31.5'	Grey silty clay.	10	-	-	-	-	-	
	S7	35'-36.5'	"	17	-	-	-	-	-	
	S8	40'-41.5'	"	18	-	-	-	-	-	
	VANE	43'		-	-	-	-	1600	-	Sens: 2.0
12B	T1	20'-21.5'	Grey silty clay.	P	-	-	-	-	-	
	VANE	26.5'		-	-	-	-	2000	-	Sens: 2.8
	T2	30'-31.5'	"	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1680	-	Sens: 2.3
	VANE	36.5'		-	-	-	-	1600	-	Sens: 2.2
	T3	40'-41.5'	"	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1520	-	Sens: 2.1
	VANE	46.5'		-	-	-	-	1440	-	Sens: 2.3

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST. BLOWS/FT	MOIST CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
12B	T4	50'-51.5'	Grey silty clay.	P	-	-	-	-	-	Sens: -
	VANE	53'		-	-	-	-	>2000	-	
	S5	55'-56.5'	Grey silty clay with shale fragments.	75	-	-	-	-	-	Sens: 2.5
	T6	60'-61.5'	"	P	-	-	-	-	-	
	VANE	63'		-	-	-	-	2000	-	
	S7	65'-66.5'	Red shale.	67-4"	-	-	-	-	-	
	S8	68'-68.3'	"	75-3"	-	-	-	-	-	
13A	S1	15'-16.5'	Sand, gravel, ashes & refuse.	5	-	-	-	-	-	Sens: >2.1
	S2	20'-21.5'	"	5	-	-	-	-	-	
	S3	25'-26.5'	Gravel & sand with some clay to 26' clay with decayed vegetation.	7	30.2	-	-	-	-	
	VANE	28.5'		-	-	-	-	>2000	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
13A	S4	30'-31.5'	Grey sandy silt with gravel & organic matter.	15	-	-	-	-	-	
	T5	35'-36.5'	Grey silty clay.	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	1760	-	Sens: 2.2
	VANE	41.5'		-	-	-	-	1640	-	Sens: 2.2
	T6	45'-46.5'	"	P	-	-	-	-	-	
	VANE	48'		-	-	-	-	1680	-	Sens: 1.6
	VANE	51.5'		-	-	-	-	>2000	-	Sens: 1.8
	T7	55'-55.5'	"	P	-	-	-	-	-	
	S8	55.5'-57'	Red shale.	61	-	-	-	-	-	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125 Ramp "J"

W.P. 231-58-3

TEST NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
13B	S1	5'-6.5'	Sand ashes, gravel & refuse.	2	-	-	-	-	-	
	S2	10'-11.2'	"	5	-	-	-	-	-	
	S3	15'-16.5'	"	14	-	-	-	-	-	
	S4	20'-21.5'	"	6	-	-	-	-	-	
	S5	30'-31.5'	Brown silty clay with fine sand and organic matter.	16	23.4	-	-	-	-	
	S6	40'-41.5'	Grey silty clay.	11	-	-	-	-	-	
	VANE	43'		-	-	-	-	720	-	Sens: 1.5

U denotes unconfined compression test

V denotes laboratory vane test

TR denotes triaxial compression test

S denotes split spoon sample

T denotes shelby tube sample

C denotes casing sample

RC denotes rock core

S7087  
REPORT  
TO  
DEPARTMENT OF HIGHWAYS, ONTARIO  
ON  
SITE INVESTIGATION  
RAMP "C"  
PROPOSED CHEDOKE EXPRESSWAY  
HAMILTON ONTARIO

Distribution:

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

July 27th, 1960

**GEOCON**

# GEOCON LTD

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1425 WEST PENDER ST.  
VANCOUVER 5, B.C.  
TEL. MU. 1-8926

Rexdale, Ontario,  
July 27th, 1960.

Department of Highways, Ontario,  
Downsview, Ontario.

Attention: Mr. L. G. Soderman, P. Eng.,  
Principal Foundation Engineer.

Re: Site Investigation,  
Ramp "G",  
Proposed Chedoke Expressway,  
Hamilton, Ontario.

Dear Sirs:

This letter reports the factual information derived from the above investigation carried out in accordance with your letter of authorization dated May 19th, 1960.

### PROCEDURE

One borehole was put down to a depth of 48 feet at Station 15 on the centreline of Ramp "G" of the proposed Chedoke Expressway using a Swedish Steel Foil Sampler. The field work was commenced on May 31st, 1960 and completed on June 2nd, 1960. The foil sample tubes were returned to our laboratory in Toronto where they were extruded and wrapped for storage.

Laboratory testing as specified by Dr. H. Q. Golder, Consultant to the Department of Highways, Ontario, was then carried out.

PROCEDURE (continued)

A detailed log of the borehole is shown on an Office Report on Soil Exploration in Appendix I. The results of laboratory testing are plotted on the Office Report and on the Figures and Tables of the succeeding Appendices.

SOIL CONDITIONS

The following soil strata were encountered in the borehole:

Fill

In the top 6 feet of the borehole was encountered a heterogeneous brown to black fill consisting largely of fine to medium sand, pebbles and cinders. The relative density of the stratum was estimated to be loose.

Organic Silty Clay

Beneath the fill was a stratum of grey-brown organic silty clay extending to a depth of about 32 feet. The organic matter took the form of both finely divided material mixed with the clay and randomly distributed bits of wood ranging in size from small twigs to fragments of wood about an inch thick. The pieces of wood in several instances caused considerable disturbance of the samples. Occasional shell fragments were also encountered.

Minor amounts of sand were sometimes observed to be mixed with the clay, and two layers of grey silty fine to medium sand were encountered within the stratum. These were encountered at depths of about 20 feet and 26 feet and were roughly 2 feet and 1 foot thick respectively.

SOIL CONDITIONS (continued)

Organic Silty Clay (continued)

The Atterberg limits and natural moisture contents for the clay reflect its organic content, the liquid limits varying randomly from 42 to 66 with plastic limits of from 22 to 38. Indication of the effect of the organic matter is given by two sets of limits run in one case on the material in its natural condition, and, in the other, after oven drying. The "natural" liquid limit was found to be 64, but dropped to 42 after oven drying. Similarly, the plastic limit dropped from 35 to 25. Natural moisture contents varied from about 29 to 95 per cent.

Wet unit weights for the clay ranged from 86 to 125 pounds per cubic foot with an average of about 109 pounds per cubic foot.

Two specific gravity determinations run on samples from depths of about 15 and 28 feet showed a specific gravity of 2.60 in each case. The results of mechanical analyses run on these samples are given in Appendix II.

Undrained triaxial tests on samples of the silty clay indicated that the shear strengths range around 600 pounds per square foot. One exception to this pattern was a value of 150 pounds per square foot for which no reasonable explanation can be given other than possible sample disturbance. The results of these tests are plotted on the Office Report in Appendix I and the stress-strain curves are given in Appendix II.

SOIL CONDITIONS (continued)

Organic Silty Clay (continued)

Consolidation tests were run on samples from depths of 8, 25, and 28 feet; a fourth test was to be carried out at about 15 feet depth, but no sufficiently undisturbed samples were available from this depth. Compression indices obtained from these tests ranged from 0.38 to about unity with perhaps slight overconsolidation indicated in each case. Coefficients of consolidation varied between 0.02 and 0.05 square inches per minute. The results of these tests are plotted on the Figures of Appendix III.

Three sets of consolidated undrained triaxial tests were carried out on samples of the clay from various depths. Deviator stress and pore pressure are plotted versus axial strain on the Figures of Appendix IV. From the Mohr diagrams which are also given in Appendix IV, it is indicated that the effective angles of shearing resistance are 27, 29, and 31 degrees. These tests were strain-controlled with a rate of about one per cent of axial strain per hour. A summary of the pertinent index properties and other data are included with the Figures in Appendix IV.

From the results of the undrained strength tests carried out on the organic silty clay, it is indicated that the consistency of the stratum is generally firm.

Clayey Till

Underlying the organic silty clay is a stratum of grey very silty clay with a trace of sand which was penetrated for a depth of 16 feet. From its foliated structure, its composition, and

SOIL CONDITIONS (continued)

Clayey Till (continued)

its stiff consistency, it is considered that the stratum is probably a glacial till.

Liquid limits of 28, 33, and 34 with respective plastic limits of 16, 20, and 19 were measured for samples of this material. The corresponding natural moisture contents were 21, 17, and 16 per cent with wet unit weights of 131, 119 and 120 pounds per cubic foot.

Three unconfined compressive tests were carried out and the results indicate that the shear strength of the material ranges from about 1000 to 1300 pounds per square foot. Axial strains at failure were of the order of 10 per cent, indicating possible sample disturbance.

We trust that this information will adequately fulfill your requirements. However, if further details are required, or if you have any questions concerning the subject matter of this report, please call us.

Yours very truly,

GEOCON LTD

A.A. Gass *per MS*

A. A. Gass, P. Eng.,  
Senior Soils Engineer.

AAG/dw  
S7087

**GEOCON**

APPENDIX I

OFFICE REPORT ON SOIL EXPLORATION

GEOCON



# EXPLANATION OF THE FORM "OFFICE REPORT ON SOIL EXPLORATION"

The object of this form is to enable a comprehensive study of the soil to be made by combining on one sheet all of the information obtained from the boring. An explanation of the various columns of the report follows.

## ELEVATION AND DEPTH

This column gives the elevation and depth of boundaries between the various soil strata. The elevation is referred to the datum shown in the general heading.

## WATER CONDITIONS

In this column the water level in the casing at the time of boring or the water table in the ground, determined by a series of observations in a piezometer or standpipe, is indicated to scale by a horizontal line with the symbol W.L. or W.T. above the line. A notation of any complicated groundwater conditions will be made in this column.

## DESCRIPTION

A description of the soil, using standard terminology, is contained in this column. The consistency of cohesive soils and the relative density of non-cohesive soils are described by the following terms:

Consistency	U-Strength Tons/sq. ft.	Relative Density	Standard Penetration Resistance, Blows/ft.
Very soft	0.03 to 0.25	Very loose	0 to 4
Soft	0.25 to 0.5	Loose	4 to 10
Firm	0.5 to 1.0	Compact	10 to 30
Stiff	1.0 to 2.0	Dense	30 to 50
Very stiff	2.0 to 4.0	Very dense	over 50
Hard	over 4.0		

## STRATIGRAPHIC PLOT

The stratigraphic plot follows the standard symbols of the National Research Council, Canada.

## ELEVATION SCALE

The information in all columns is plotted to a true elevation scale which is shown in this column.

## GRAPHS

The main body of the report forms a graph which is used to plot to correct elevation the important soil properties which are obtained through field and laboratory tests. The scales and symbols for the plotting are shown at the head of the column.

## OTHER TESTS

In this column are shown, by symbol, the other field or laboratory tests which have been performed on the soil and for which the results have not been plotted on the above graph.

## SAMPLES

The first three columns describe the condition, type and number of each sample obtained from the boring. The location and extent of each sample is plotted to scale.

In the last column is shown the penetration resistance in blows of 4200 inch-pounds required to drive one foot of the sampler into the ground. When a 2 inch Drive Sampler is used the result obtained is termed the "Standard Penetration Resistance".

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## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT STO 87 BORING # 1 DATUM GEODETIC CASING FOIL  
 BORING DATE JUNE 1 & 2, 1960 REPORT DATE JULY 19, 1960 COMPILED BY M.V.V. CHECKED BY PPS  
 SAMPLER HAMMER WT. - LBS. DROP - INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

## SAMPLE CONDITION

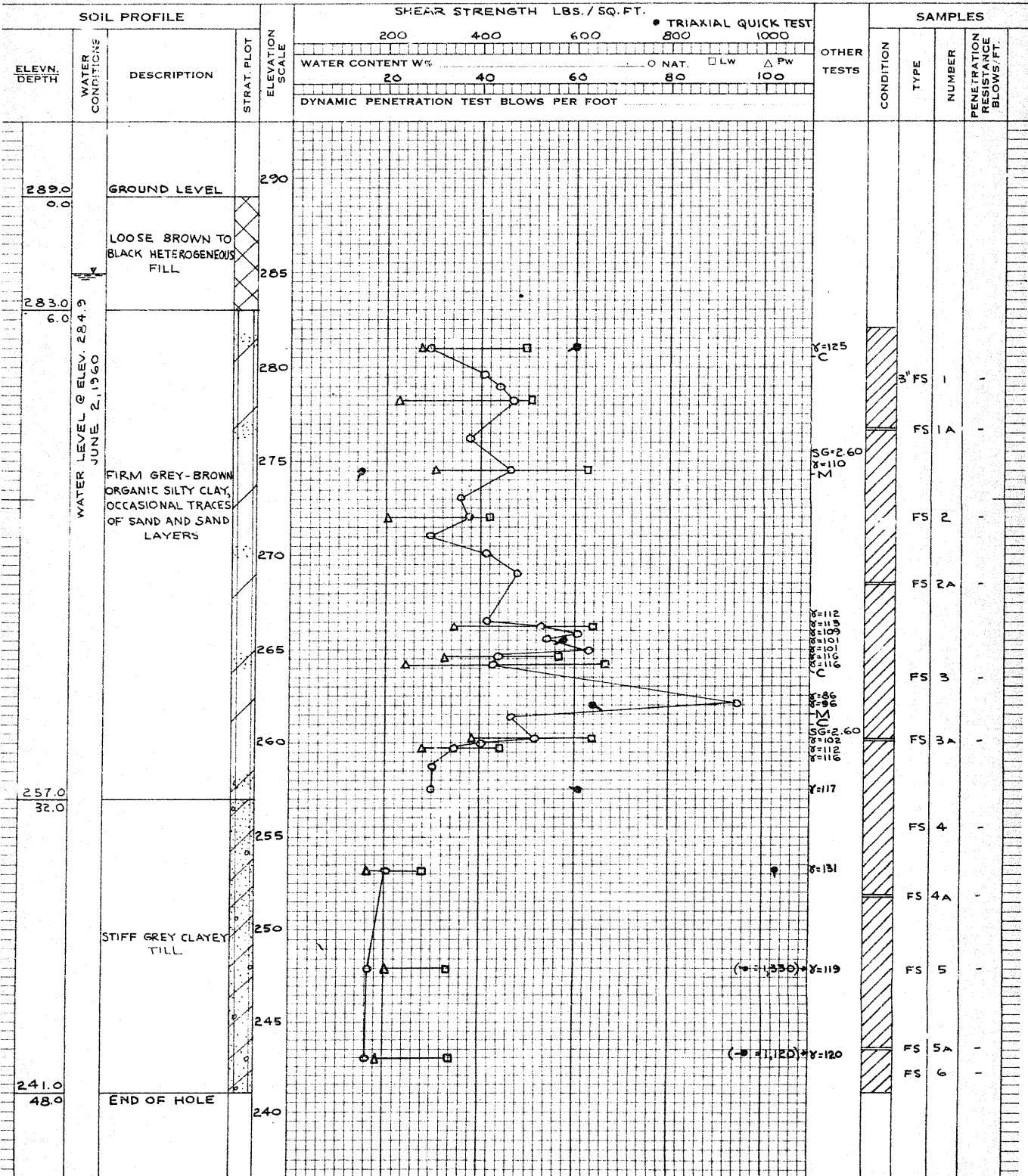
DISTURBED  
 FAIR  
 GOOD  
 LOST

## 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

## 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



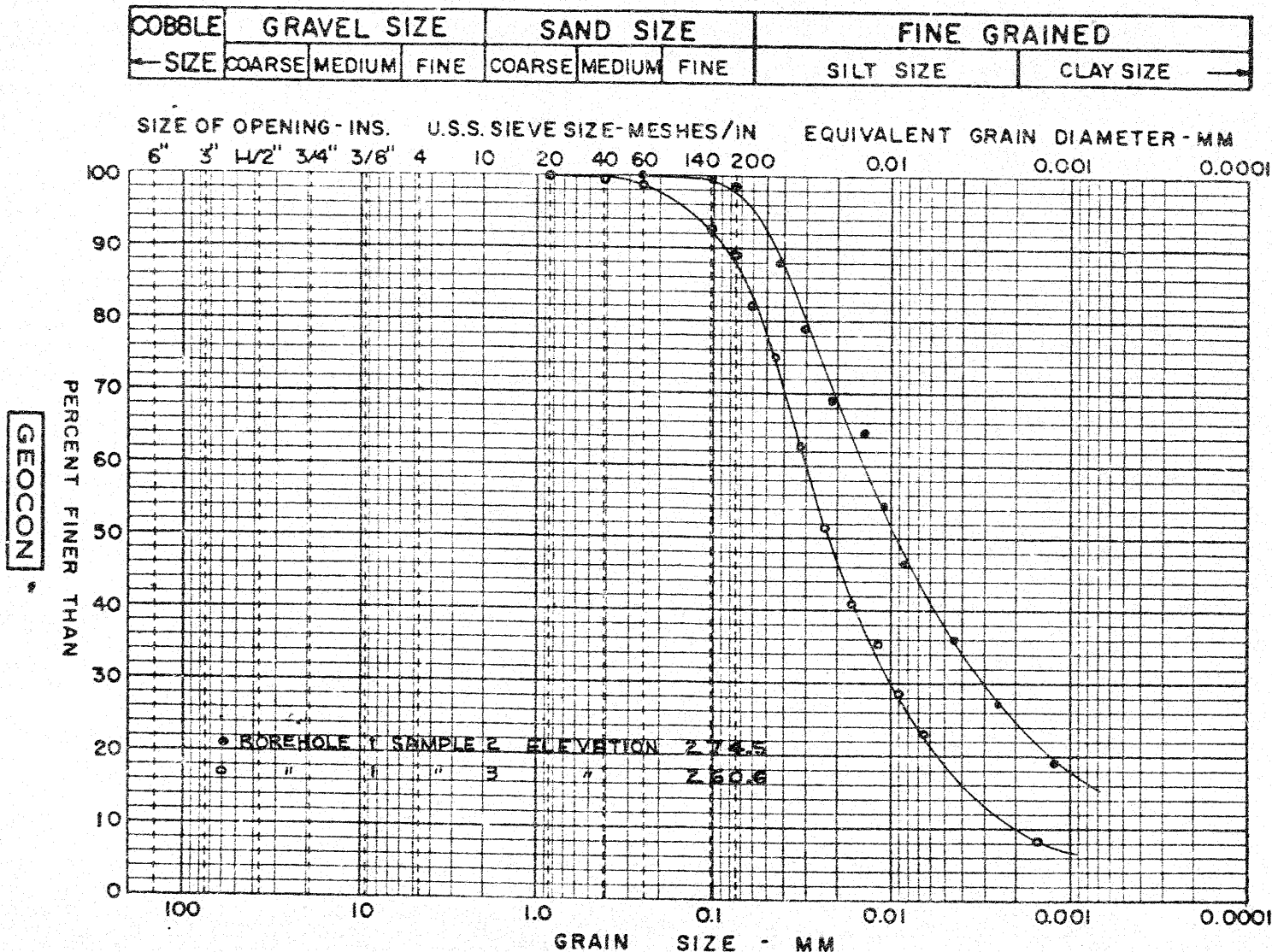
APPENDIX II

FIGURES - LABORATORY TESTING

Grain Size Distribution  
Stress Strain Curves

# GRAIN SIZE DISTRIBUTION

APPENDIX II  
FIGURE 1  
PROJECT 57087

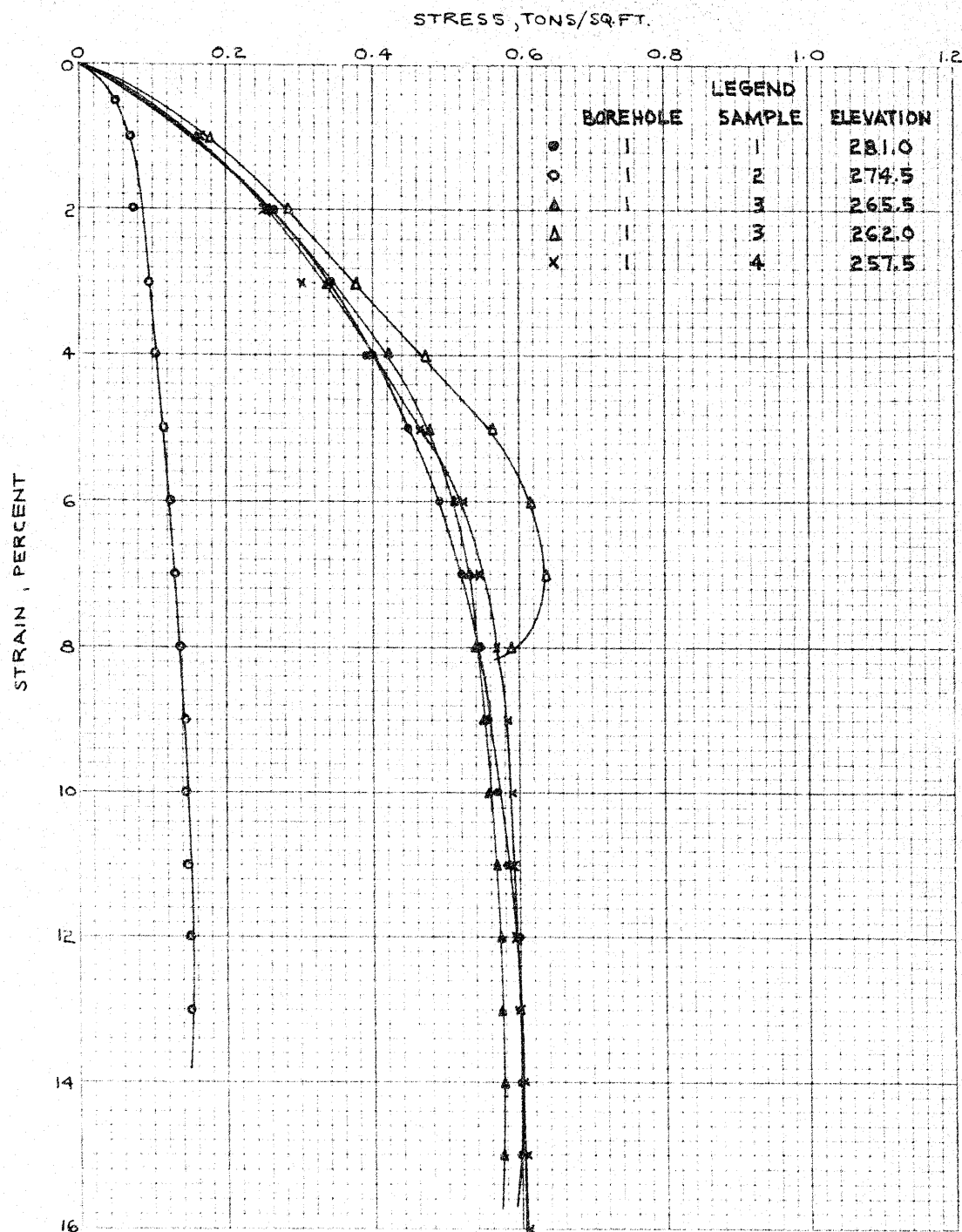


M.I.T. GRAIN SIZE SCALE

# QUICK TRIAXIAL TESTS

STRESS-STRAIN CURVES  
ORGANIC SILTY CLAY

APPENDIX II  
FIGURE 2  
PROJECT S7087



GEOCON

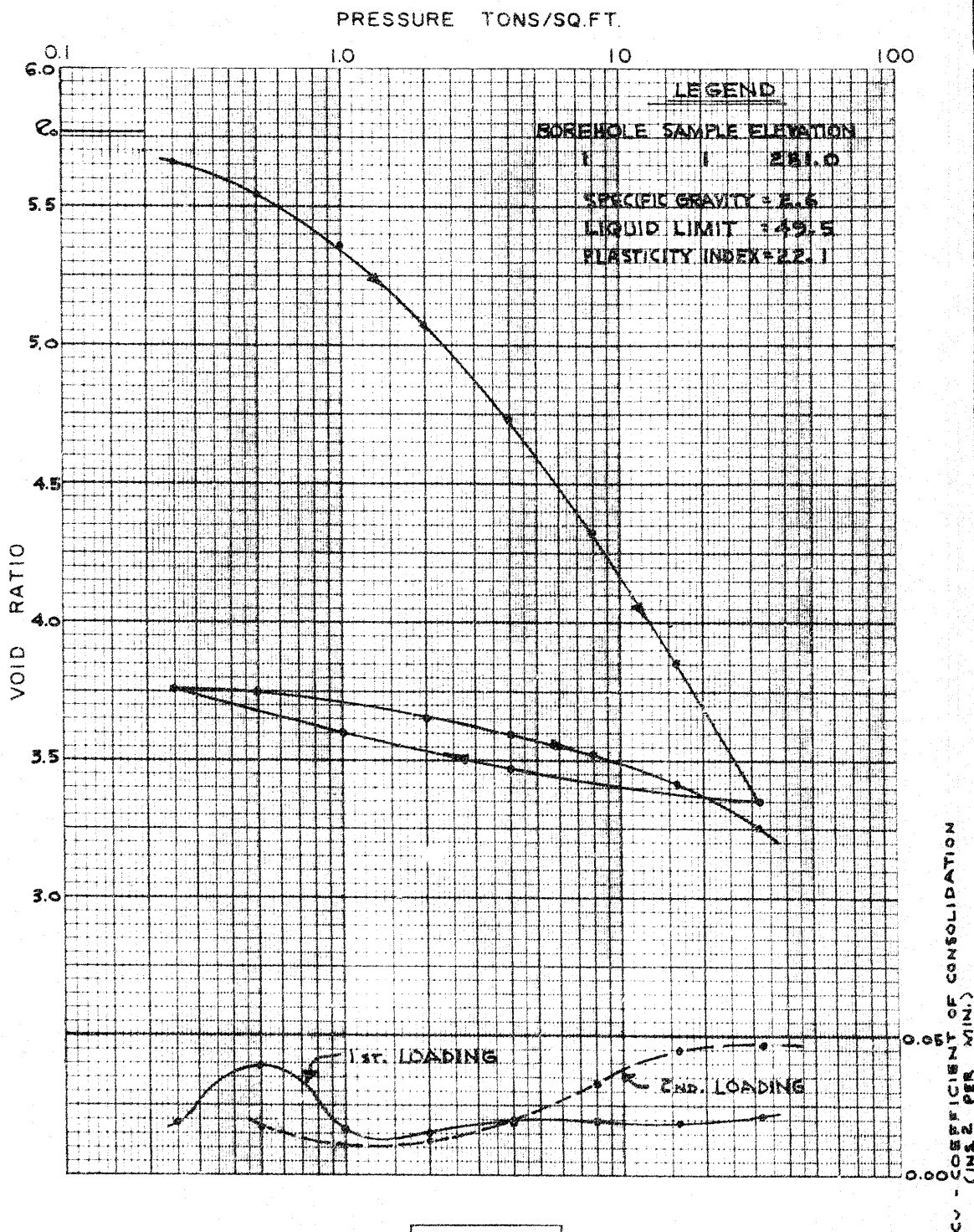
### APPENDIX III

#### FIGURES - LABORATORY TESTING

##### Void Ratio-Pressure Curves

# VOID RATIO-PRESSURE CURVES CONSOLIDATION TEST

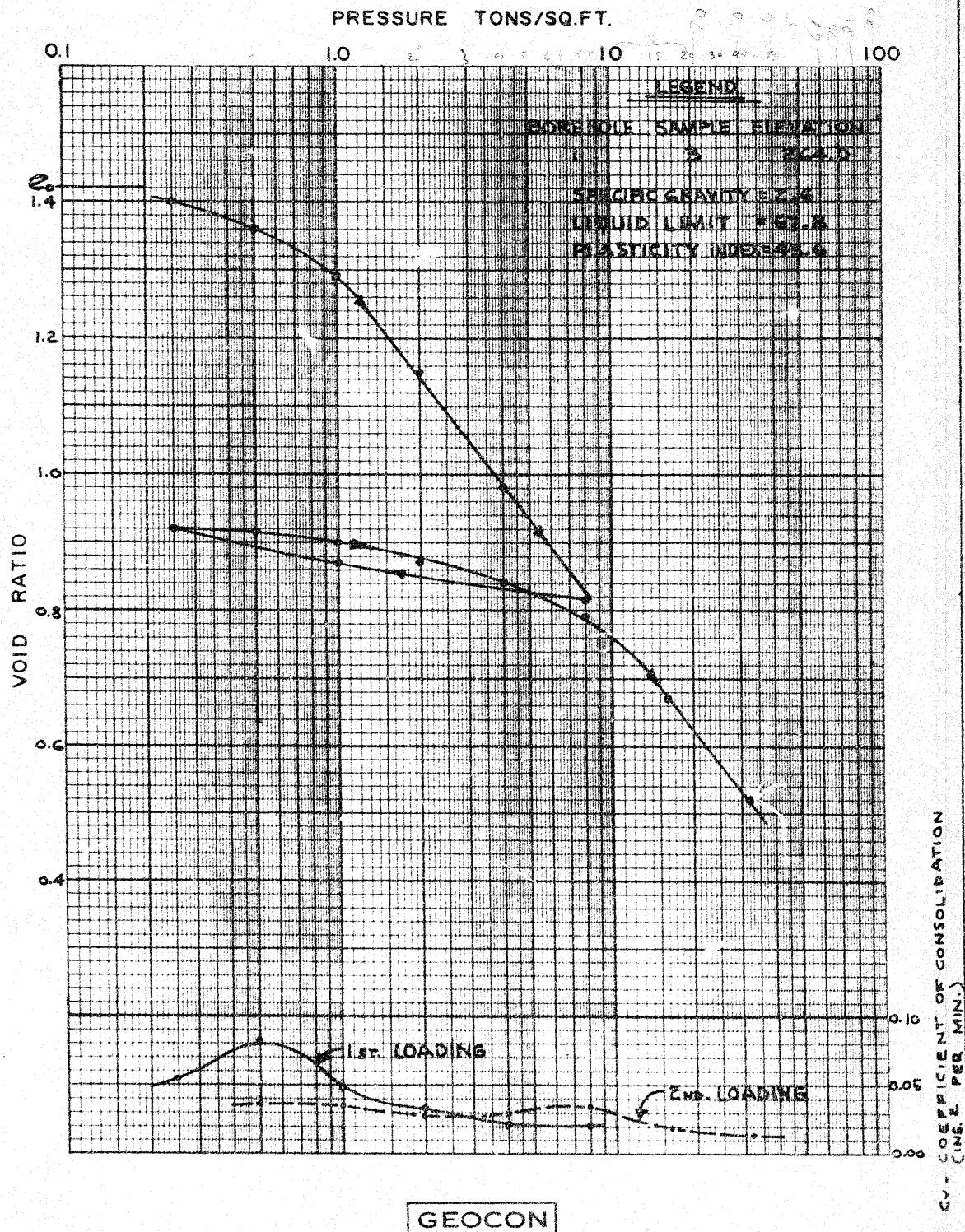
APPENDIX III  
FIGURE I  
PROJECT S7087





# VOID RATIO-PRESSURE CURVES CONSOLIDATION TEST

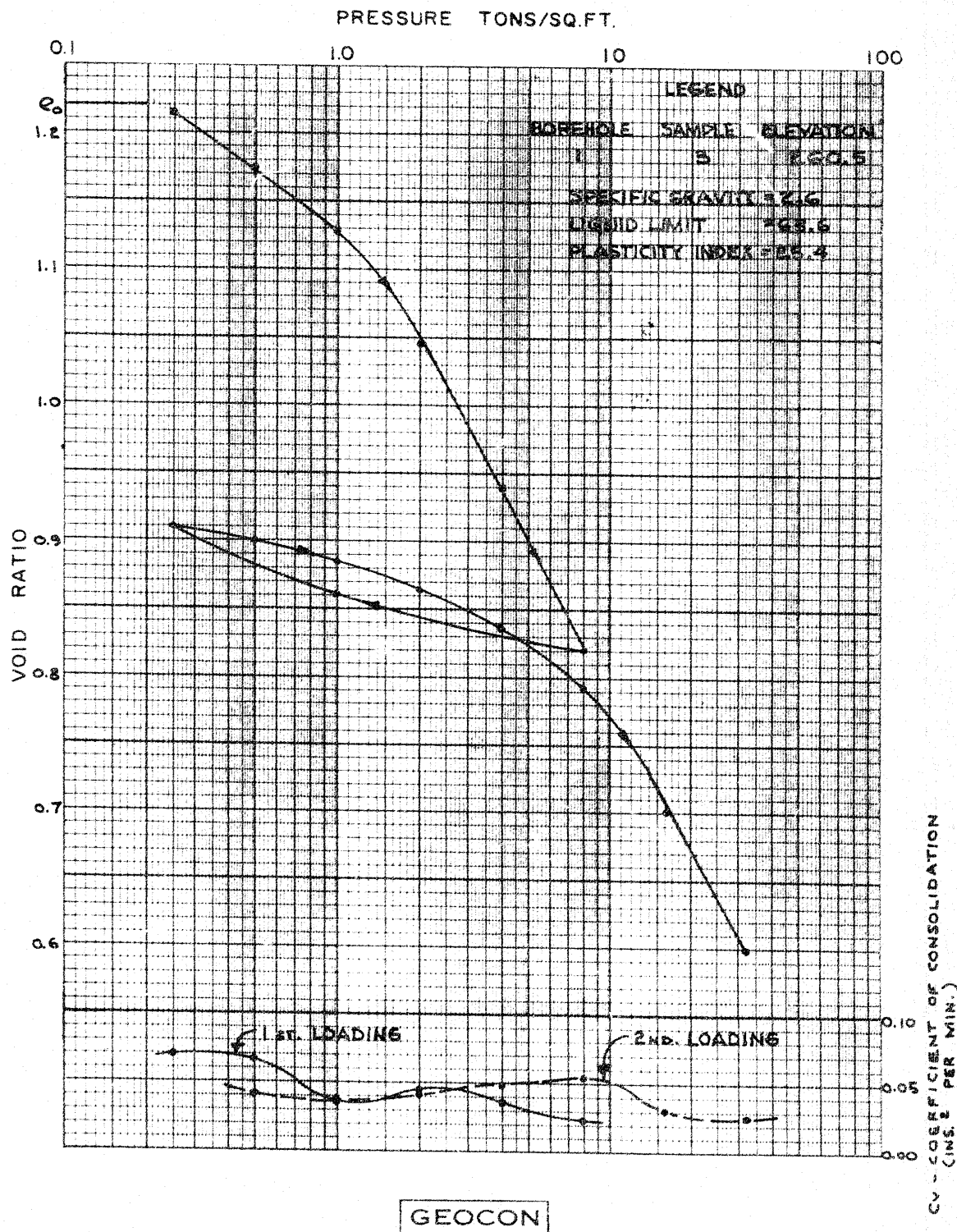
APPENDIX III  
FIGURE 2  
PROJECT S7087





# VOID RATIO-PRESSURE CURVES CONSOLIDATION TEST

APPENDIX III  
FIGURE 3  
PROJECT 57087



## APPENDIX IV

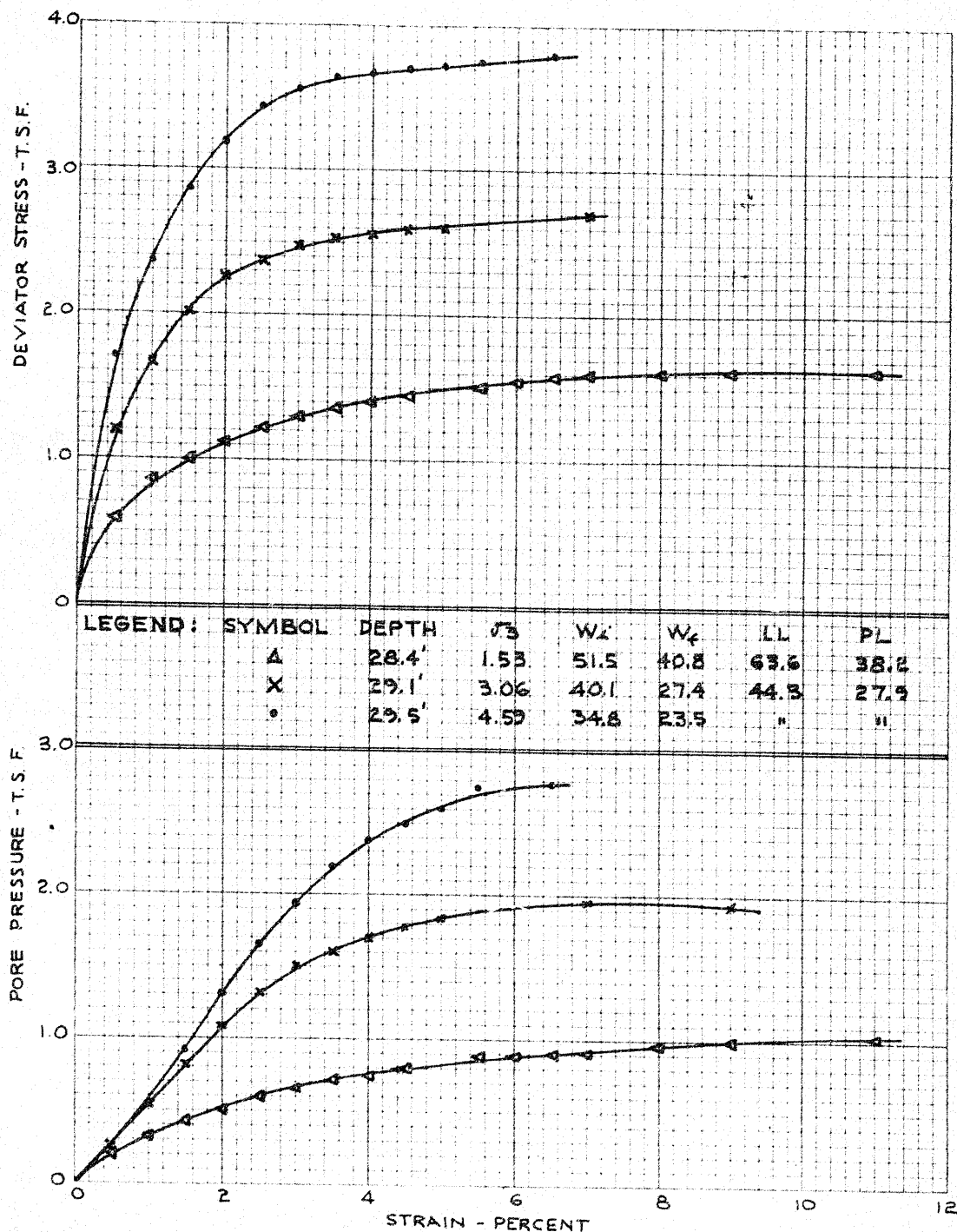
### FIGURES - LABORATORY TESTING

#### Consolidated Undrained Triaxial Tests

# CONSOLIDATED UNDRAINED TRIAXIAL TESTS

ORGANIC SILTY CLAY, SET # 1

APPENDIX IV  
FIGURE I  
PROJECT S7087



GEOCON

# CONSOLIDATED UNDRAINED TRIAXIAL TESTS

ORGANIC SILTY CLAY, SET # 1

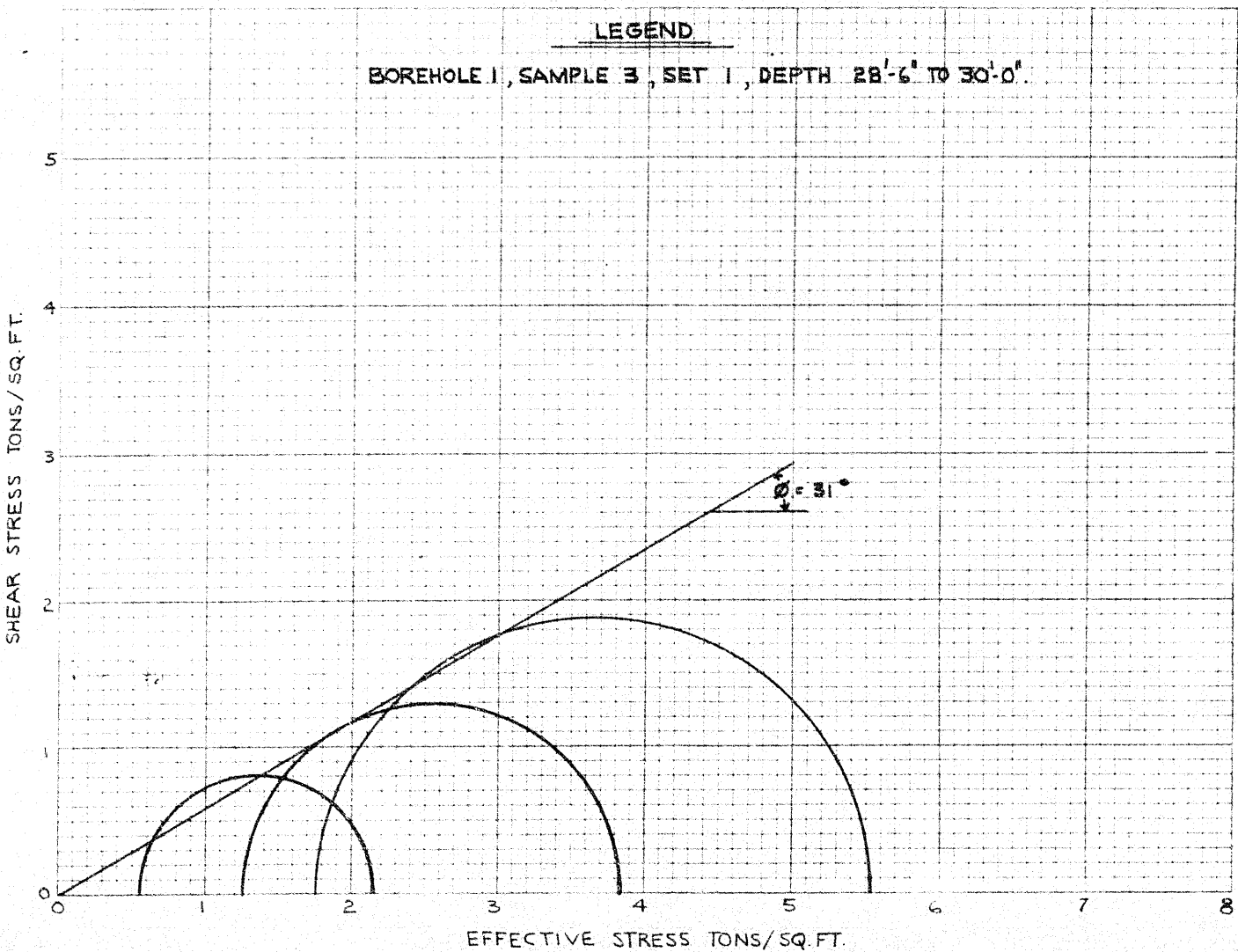
MOHR'S CIRCLES

APPENDIX IV

FIGURE 2

PROJECT S7087

LEGEND  
BOREHOLE 1, SAMPLE 3, SET 1, DEPTH 28'-6" TO 30'-0"



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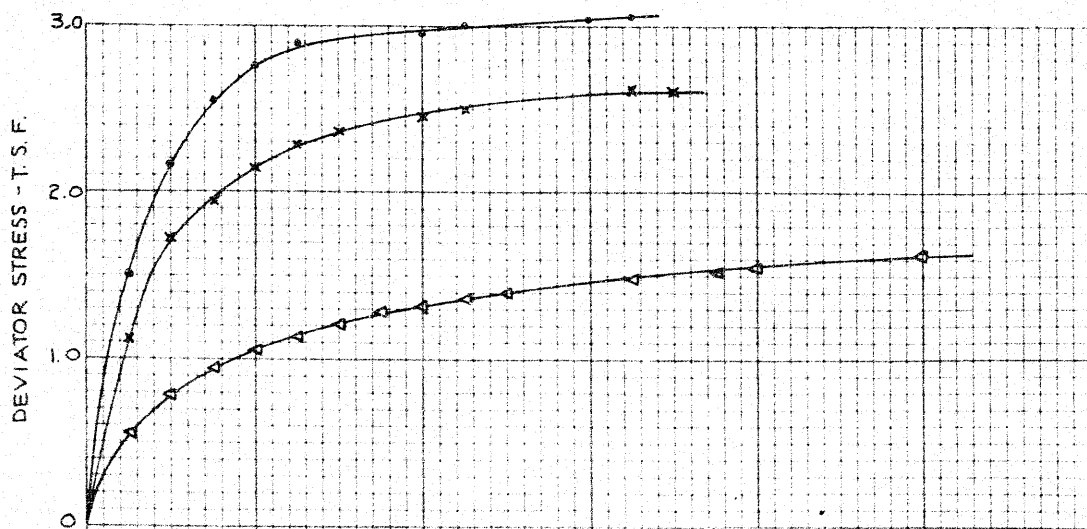
# CONSOLIDATED UNDRAINED TRIAXIAL TESTS

ORGANIC SILTY CLAY, SET# 2

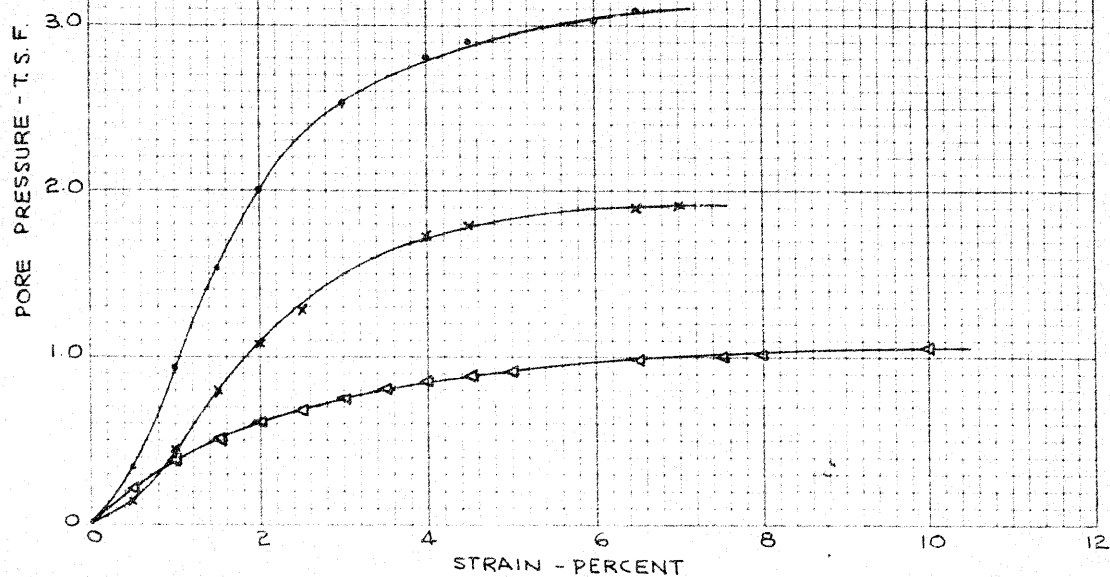
APPENDIX IV

FIGURE 3

PROJECT S7087



LEGEND	SYMBOL	DEPTH	$\bar{\sigma}_3$	$W_L$	$W_P$	LL	PL
	$\Delta$	24.0'	1.53	63.0	50.2	56.8	32%
	X	24.2'	3.06	43.9	29.5	-	-
	•	24.6'	4.59	43.1	25.9	-	-



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CONSOLIDATED UNDRAINED TRIAXIAL TESTS

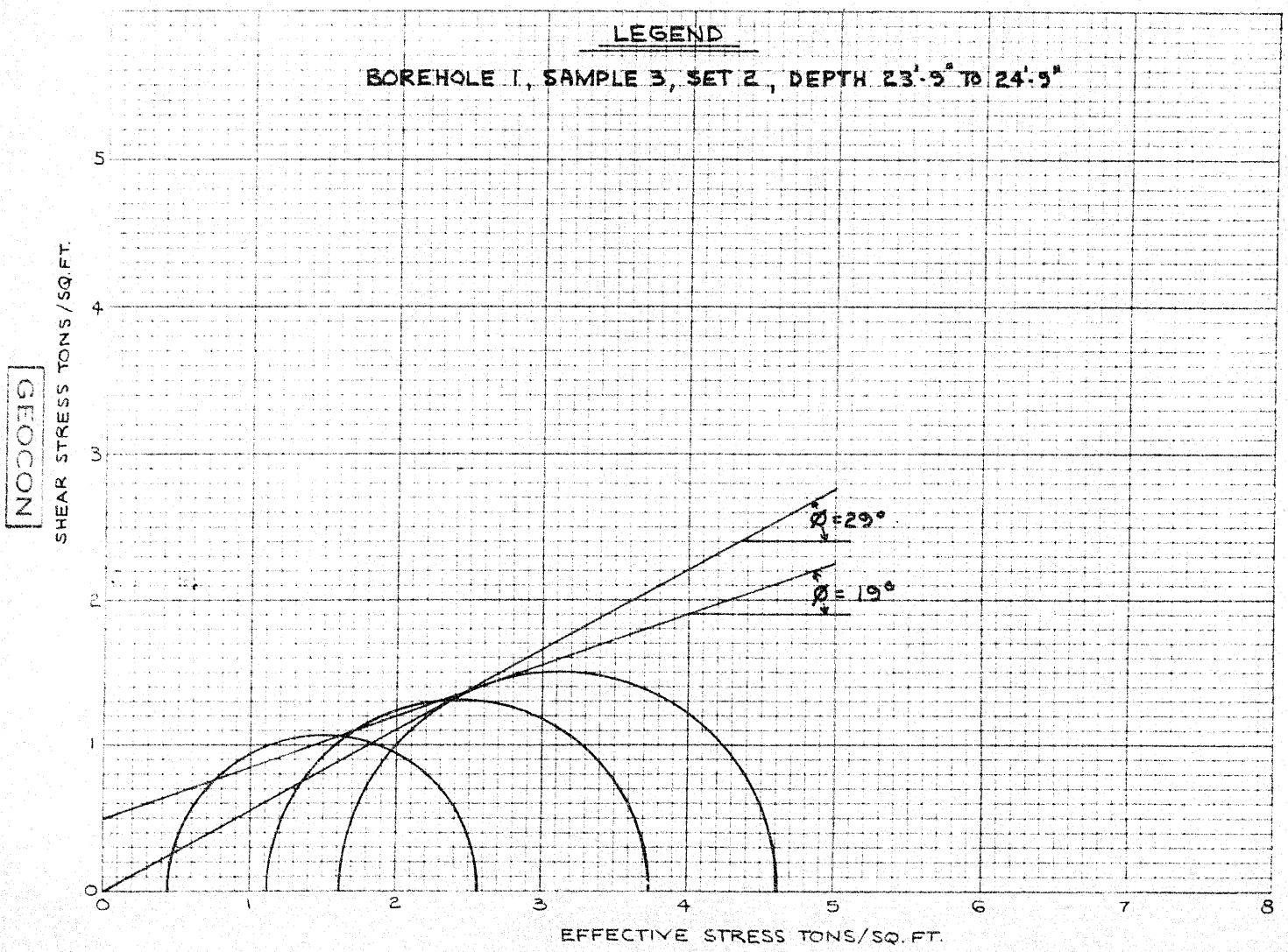
ORGANIC SILTY CLAY, SET #2

MOHR'S CIRCLES

APPENDIX IV

FIGURE 4

PROJECT S7087



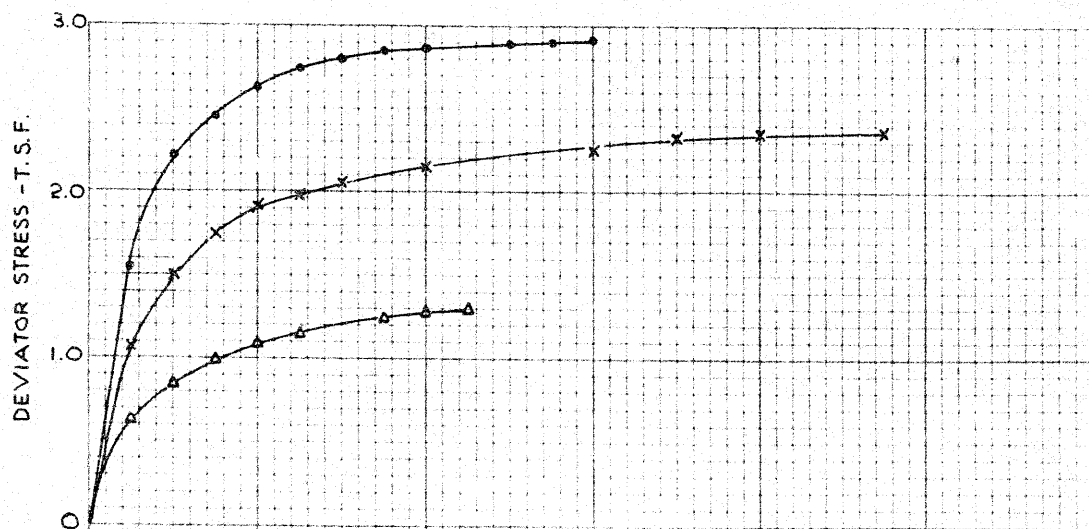
# CONSOLIDATED UNDRAINED TRIAXIAL TESTS

ORGANIC SILTY CLAY, SET #3

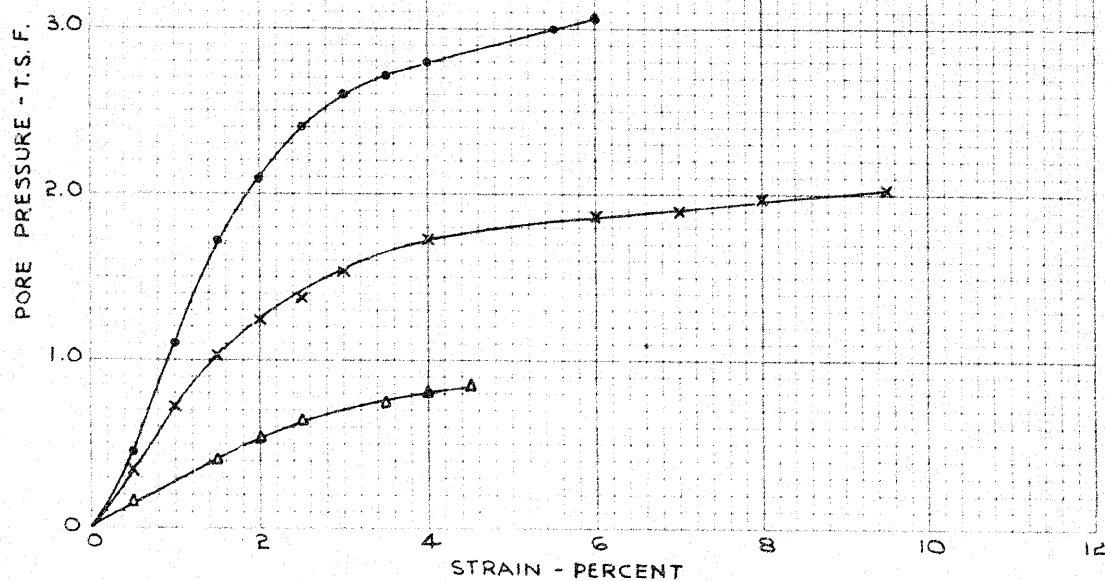
APPENDIX IV

FIGURE 5

PROJECT 57087



LEGEND:	SYMBOL	DEPTH	$\sigma_3$	W <sub>L</sub>	W <sub>p</sub>	LL	PL
	Δ	22.5'	1.53	41.3	30.2	63.5	34.6
	X	22.8'	3.06	52.7	32.1	-	-
	•	23.1'	4.59	60.8	31.2	-	-



GEOCON

# CONSOLIDATED UNDRAINED TRIAXIAL TESTS

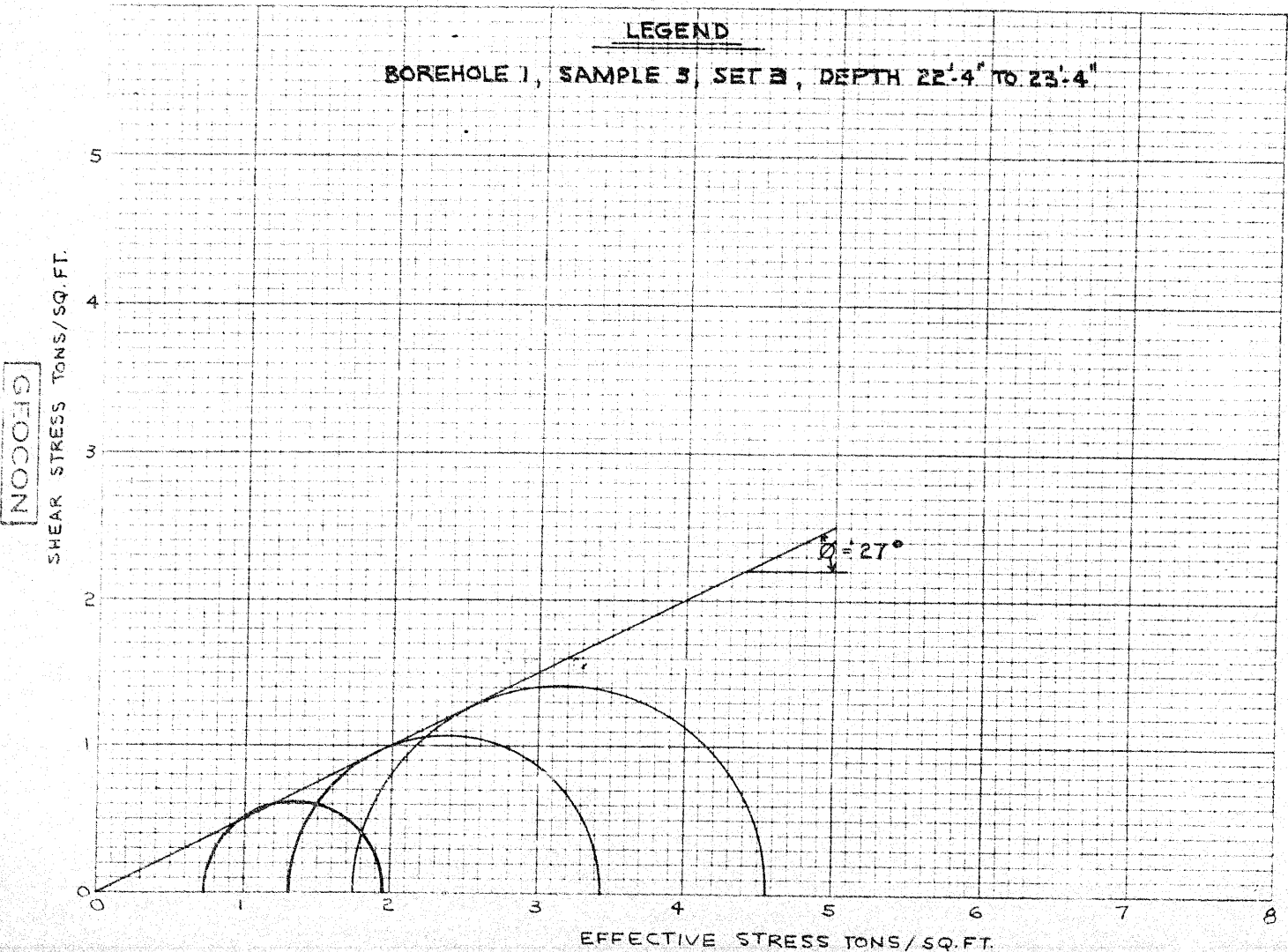
ORGANIC SILTY CLAY, SET #3

MOHR'S CIRCLES

APPENDIX IV

FIGURE 6

PROJECT S7087





# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETIN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	S1	5'-6.5'	Silty sand with rubble & decayed refuse.	5	-	-	-	-	-	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>30M5 - 30</b>            GEORES No.         </div>
	S2	10'-11.5'	Sand, gravel & ashes with decayed refuse.	10	-	-	-	-	-	
	S3	15'-16.5'	"	10	-	-	-	-	-	
	S4	20-21.5'	Grey-brown silty clay with decayed refuse.	26	14.5	-	-	-	-	
	S5	25'-26.5'	Grey-brown silty clay with decayed wood.	45	22.0	-	-	-	-	
	S6	30'-31.5'	Grey silty clay.	43	20.9	-	-	-	-	
	S7	30'-31.5'	"	58	-	-	-	-	-	
	S8	35'-36.5'	"	17	-	-	-	-	-	
	T9	40'-41.5'	"	P	-	-	-	-	-	
	vane	44'	"	-	-	-	-	>2000	-	
	T10	45'-46.5'	"	P	-	-	-	-	-	
	T11	50'-50.5'	"	P	-	-	-	-	-	
	S12	50.5-51.5	"	92	-	-	-	-	-	
	S13	55'-56.5'	"	63	-	-	-	-	-	
	T14	60'-61.5'	"	40-60	-	-	-	-	-	
	S15	70'-70.3'	Red Shale	56-3	-	-	-	-	-	Sample lost.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
	S1	5'-6.5'	Sand, gravel, ashes & decayed refuse.	5	-	-	-	-	-	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>30M5-30</b>            GEOCRETS No.         </div>
	S2	10'-11.5'	Grey-brown clayey silt.	32	7.5	-	-	-	-	
	S3	15'-16.5'	Grey silty clay.	23	24.3	-	-	-	-	
	S4	20'-21.5'	"	13	21.7	-	-	-	-	
	vane	23'	"	-	-	-	-	1520	-	Sens: 3.5
	S5	25'-26.5'	"	16	-	-	-	-	-	Sample lost.
	S6	30'-31.5'	"	30	-	-	-	-	-	
	T7	30'-31.5'	"	P	-	-	-	-	-	Sens: > 1.6
	vane	33'	"	-	-	-	-	>2000	-	
	vane	36.5'	"	-	-	-	-	2000	-	Sens: 2.5
	T8	40'-41.5'	"	P	-	-	-	-	-	Sens: 1.4
	vane	43'	"	-	-	-	-	1560	-	
	vane	46.5'	"	-	-	-	-	>2000	-	Sens: -
	T9	50'-51.5'	"	P	16.6	16.2	28.8	2840	137.2	
	S10	55'-56.5'	"	84	-	-	-	-	-	
	S11	60'-61.5'	"	46	-	-	-	-	-	
	S12	65'-65.3'	Grey silty clay with grey shale	70-3"	-	-	-	-	-	

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETIN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
S1	5'-6.5'	Grey-brown silty clay with fragments of decayed vegetation.	7	37.5	-	-	-	-	30M5-30 GEOGRES No.
vane	8'	"	-	-	-	-	1200	-	
S2	10'-11.5'	Brown silty clay with decayed vegetation.	9	34.2	-	-	-	-	Sens: 1.5
vane	13'	"	-	-	-	-	880	-	Sens: 4.4
S3	15-16.5'	"	7	23.8	-	-	-	-	Sens: 3.3
vane	18'	"	-	-	-	-	800	-	
S4	20-21.5'	Brown silty clay with decayed vegetation and shells.	5	25.3	-	-	-	-	Sens: 1.1
S5	25-26.5'	Brown silty clay with decayed vegetation.	5	25.1	-	-	-	-	
vane	28'	"	-	-	-	-	880	-	Sens: 1.6
S6	30-31.5'	Grey silty clay	10	21.7	-	-	-	-	
vane	33'	"	-	-	-	-	1120	-	Sens: 1.4
S7	35-36.5'	"	9	24.8	-	-	-	-	
vane	38'	"	-	-	-	-	1040	-	Sens: 1.6
T8	40-42'	"	P	26.6	19.1	36.2	363	93.5	
vane	43.5'	"	-	-	-	-	1120	-	Sens: 1.4
vane	46.5'	"	-	-	-	-	1120	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psf	UNIT WEIGHT pcf	REMARKS
	T9	50'-52'	Grey silty clay with fine sand and shale fragments.	P	-	-	-	-	-	<div>30M5-30</div> <div>GEOGRES No.</div>
	S10	55'-56.5'	Grey silty clay, grey clayey silt.	41	-	-	-	-	-	
	S11	60'-61.5'	Grey clayey silt.	32	-	-	-	-	-	
	S12	67.5-67.6'	Pink Shale	400	-	-	-	-	-	
	S1	5'-6.5'	Sand, gravel, ashes and clay.	4	25.8	-	-	-	-	Sens: 2.8
	S2	10-11.5'	Brown silty clay with organic matter.	6	33.6	-	-	-	-	
	vane	13'	"	-	-	-	-	1120	-	
	S3	15'-16.5'	Brown silty clay with fine sand, decayed organic matter and ashes.	P	36.0	-	-	-	-	
	vane	18'	"	-	-	-	-	800	-	Sens: 2.5
	S4	20'-21.5'	Brown sandy clay with ashes, organic matter. Gravel layer at 21'-0".	7	33.5	-	-	-	-	Sens: 1.5
	S5	27'-28'	Grey silty clay	10	24.5	-	-	-	-	
	T6	35'-36.5'	Grey silty clay.	P	23.8	16.8	31.8	-	-	
	vane	33.5'	"	-	-	-	-	1360	-	
	S7	35'-36.5'	"	9	-	-	-	-	-	

30M5-30

GEOCRESS No.

## SUMMARY OF FIELD &amp; LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
4	vane	38'	Grey silty clay.	-	-	-	-	1040	-	Sens: 2.6
	T8	40'-42'	"	P	20.0	17.5	32.3	1628	124.0	
	vane	43.5'	"	-	-	-	-	1280	-	Sens: 1.6
	S9	52'-53.5'	"	54	-	-	-	-	-	
	S10	61.5'-63'	Grey clayey silt with fine sand, then pink shale.	126	-	-	-	-	-	
5	S1	5'-6.5'	Ashes, sand, gravel & rubble	3	-	-	-	-	-	
	S2	10'-11.5'	Brown silty clay with fine sand.	4	33.4	-	-	-	-	
	vane	13'		-	-	-	-	880	-	Sens: 2.8
	vane	18.5'		-	-	-	-	960	-	Sens: 4.0
	S3	20'-21.5'	Brown silty clay with sand and decayed vegetation.	10	34.0	20.0	36.8	-	-	
	S4	25'-26.5'	Grey silty clay.	9	22.7	-	-	-	-	
	S5	30'-31.5'	"	20	18.4	-	-	-	-	
	S6	35'-36.5'	"	9	-	-	-	-	-	
	vane	38'	"	-	-	-	-	1280	-	Sens: 1.8
	S7	40'-41.5'	"	24	-	-	-	-	-	
	S8	49'-50.5'	"	57	-	-	-	-	-	

30M5-30

GEOCRES No.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

OLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
	S9	66'-66.3'	Pink Shale	60-3"	-	-	-	-	-	
6	S1	5'-6.5'	Brown clay with sand and gravel and decayed vegetation.	18	32.5	-	-	-	-	
	S2	10'-11.5'	"	14	22.5	-	-	-	-	
	S3	15'-16.5'	"	34	11.1	-	-	-	-	
	S4	20'-21.5'	"	20	9.0	-	-	-	-	
	S5	25'-26.5'	"	11	25.4	-	-	-	-	
	vane	33'		-	-	-	-	1340	-	Sens: 2.5
	S6	35'-36.5'	"	20	20.2	-	-	-	-	
	S7	40'-41.5'	Grey silty clay.	13	20.6	-	-	-	-	
	vane	48.5'		-	-	-	-	1440	-	Sens: 1.4
7	S1	3'-4.5'	Brown clay with sand, gravel and rubble.	67	12.4	-	-	-	-	
	S2	6'-7.5'	Gravelly sand and rubble.	22	14.9	-	-	-	-	
	S3	9'-10.5'	Gravelly sand & rubble.	7	13.4	-	-	-	-	
	S4	15'-16.5'	"	18	16.2	-	-	-	-	
	S5	20'-21.5'	"	13	13.7	-	-	-	-	
	S6	25'-26.5'	Dark brown sandy clay with decayed vegetation.	8	24.9	-	-	-	-	
	vane	20'	"	-	-	-	-	1640	-	Sens: 2.1

3045-30

GEOTECH. NO.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
7	T7	30'-31.5'	Dark brown sandy clay with decayed vegetation.	P	29.5	-	-	-	-	
	vane	33'	"	-	-	-	-	1440	-	Sens: 3.0
8	S1	5'-6.5'	Ashes, rubble, newspaper etc.	13	-	-	-	-	-	
	S2	10'-11.5'	"	4	-	-	-	-	-	
	S3	15'-16.5'	"	14	42.0	-	-	-	-	
	T4	20'-22'	Brown silty clay.	-	22.5	19.0	34.0	3575	129.0	Sample hammered.
	T5	34'-36'	Grey silty clay.	P	23.6	15.6	30.6	1055	126.5	
	vane	40'	"	-	-	-	-	1360	-	Sens: 1.9
	T6	45'-46.5'	"	P	30.9	19.6	39.8	1525	117.0	
	vane	50'	"	-	-	-	-	1200	-	Sens: 3.0
	T7	60'-61.5'	"	-	11.9 19.6	-	-	3422	131.5	Sample hammered.
	RC8	64.6-73.6	Shale	-	-	-	-	-	-	
	RC9	73.6-78.6	Shale	-	-	-	-	-	-	
9	S1	5'-6.5'	Brown-black sandy clay with ashes.	6	-	-	-	-	-	
	S2	10'-11.5'	Black peat with decayed wood.	4	-	-	-	-	-	

3045-30

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125

W.P. 231-58-3

SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETIN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
S3	15'-16.5'	Loose ashes, stones and sanitary fill.	5	46.0	-	-	-	-	Sample lost.  Sens: 3.1  Sens: 3.0
S4	20'-21.5'	Soft Sandy clay with decayed wood.	2	43.4	-	-	-	-	
S5	25'-27.5'		36	-	-	-	-	-	
T6	30'-31.5'	Grey silty clay.	P	23.3	16.1	29.3	1200	127.5	
vane	36.5'		-	-	-	-	-2000	-	
T7	40'-41.5'	Grey silty clay	P	31.2	19.5	35.1	1354	119.2	
vane	46.5'		-	-	-	-	960	-	
T8	50'-51.5'		P	24.6	-	-	1170	119.3	
T9	60'-61.5'	"	11	24.2	15.0	22.0	-	-	
RC10	62.4-72.4	"	-	-	-	-	-	-	
S1	5'-6.5'		4	48.0	-	-	-	-	Sample lost.
T2	15'-16.5'	Clay with ashes and organic matter.	P	-	-	-	-	-	-
T 3	20'-21.5'	"	11	-	-	-	-	-	
S4	25'-26.5'	Grey silty clay.	10	21.7	-	-	-	-	
T5	30' - 31.5'	"	P	21.6	17.1	27.7	1245	130.0	
	36.5'		-	-	-	-	2000	-	Sens: 2.1



30M5-30

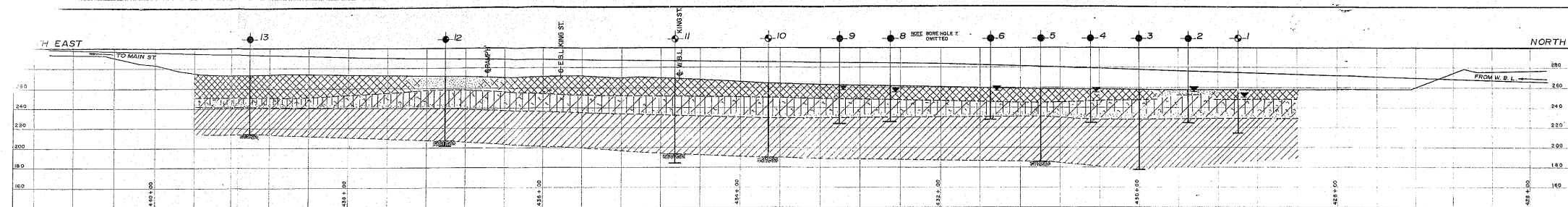
## SUMMARY OF FIELD & LABORATORY TESTS

JOB 59-F-125  
W.P. 231-58-3

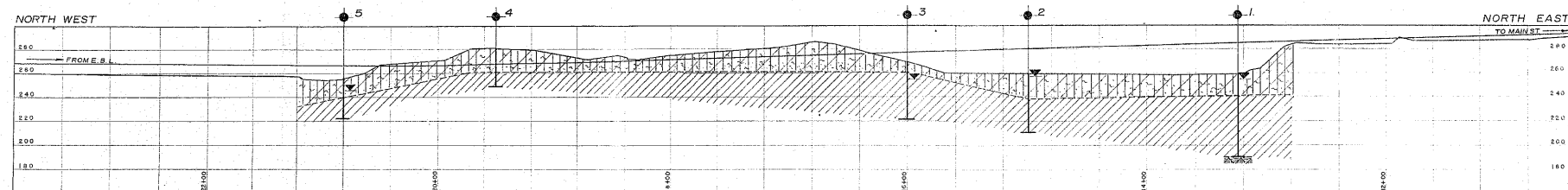
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#59-F-125  
W.P. #231-58-3  
CHEDOKE  
EXPRESSWAY  
KING-MAIN  
INTERCHANGE  
RAMPS G, J,  
H & K

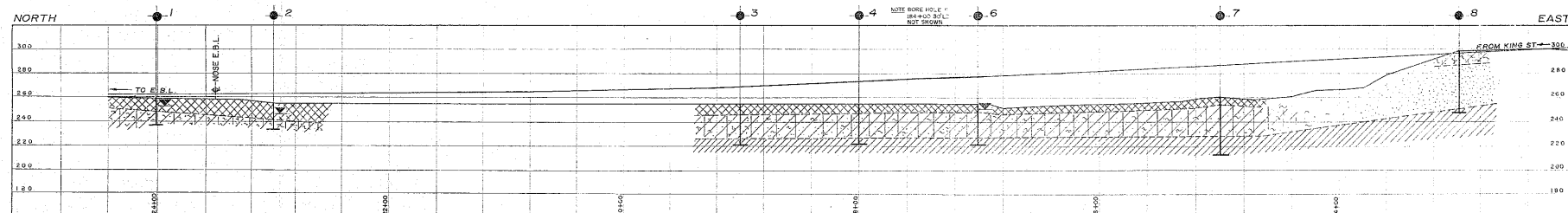




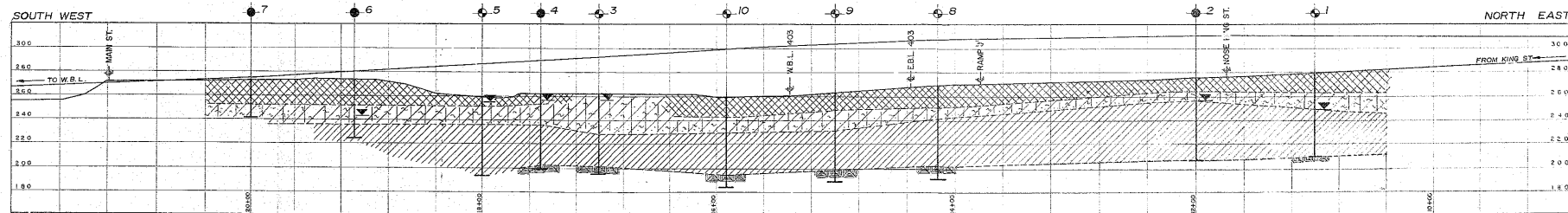
RAMP 'J'



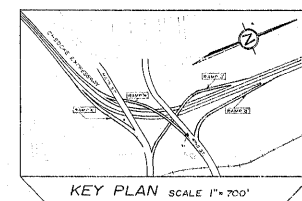
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RAMP 'L'



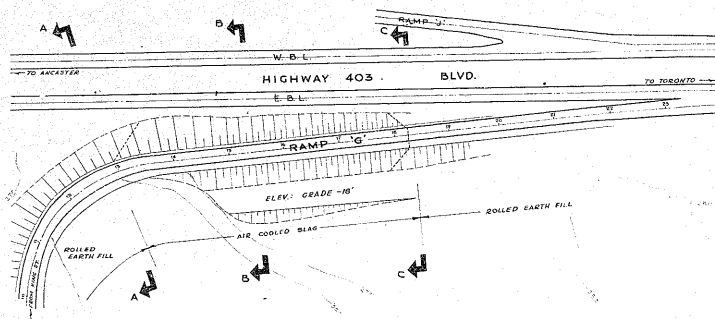
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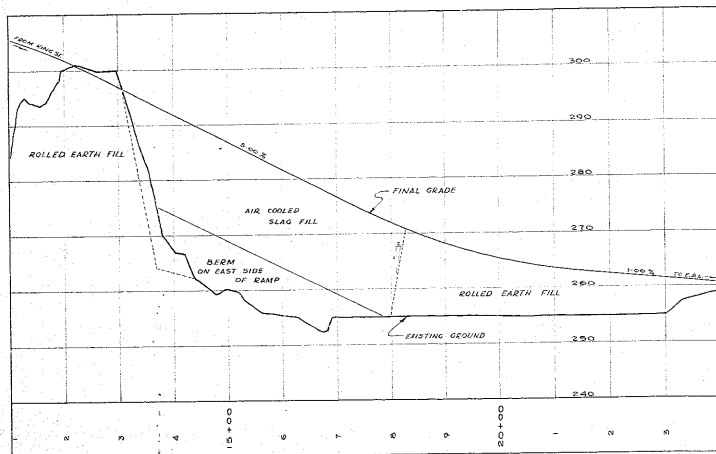
LEGEND	
	BORE AND PENETRATION HOLE
	BORE HOLE
	GROUND WATER LEVEL
	HETEROGENEOUS MIXTURE OF ASH RUBBLE & LOCALLY GRAVEL SAND ETCETERA
	SILTY CLAY WITH VARIABLE AMOUNTS OF ORGANIC MATTER
	GREY SILTY CLAY
	BEDROCK

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
CHEDOKE EXPRESSWAY			
PROFILES SHOWING SOIL CONDITIONS BELOW			
RAMPS AT KING MAIN INTERCHANGE			
ORIGINATOR J. BROWN	DISTRICT NO. 4	DATE 17 MARCH 1961	
DESIGNER J. BROWN	BY NO. 231-23-3	JOB NO. 59-F-125	
CHECKED J. BROWN	SCALE 1"=40'	DRAWING NO.	
APPROVED			59-F-125 B

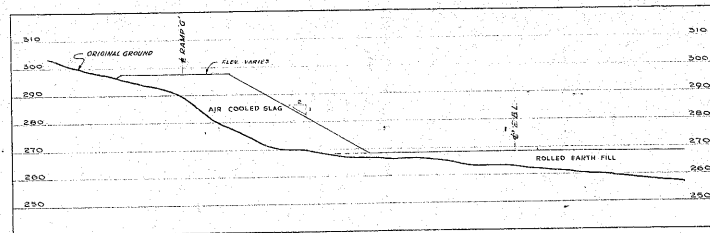
RAMP 'H' REVISED 18 JULY 1961



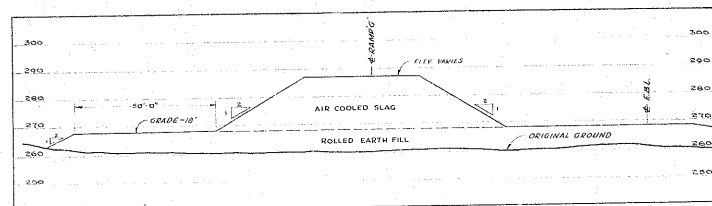
**PLAN**  
SCALE - 1" = 100'-0"



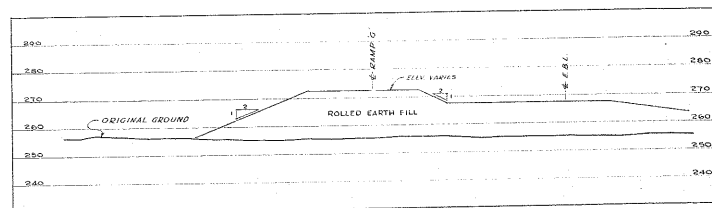
**PROFILE**  
SCALE - VERT. - 1" = 10'-0"  
SCALE - HORIZ. - 1" = 100'-0"



**A-A**  
SCALE - 1" = 20'-0"



**B-B**  
SCALE - 1" = 20'-0"



**C-C**  
SCALE - 1" = 20'-0"

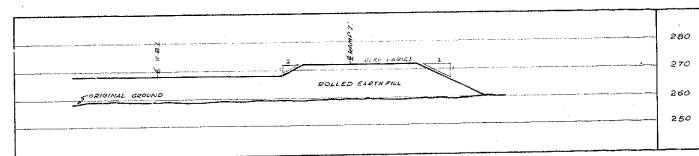
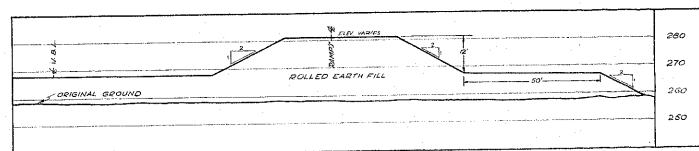
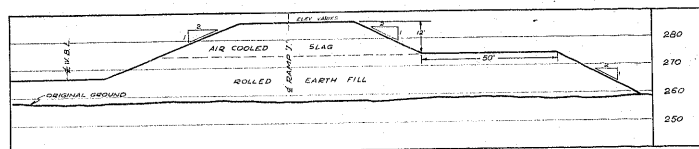
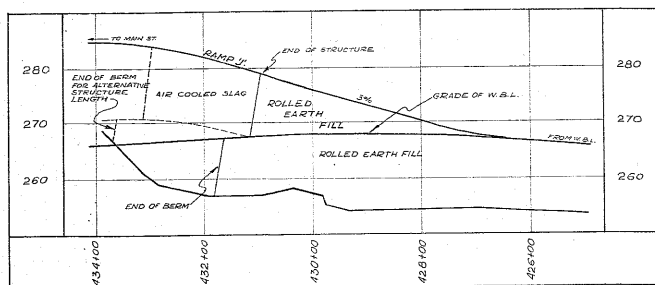
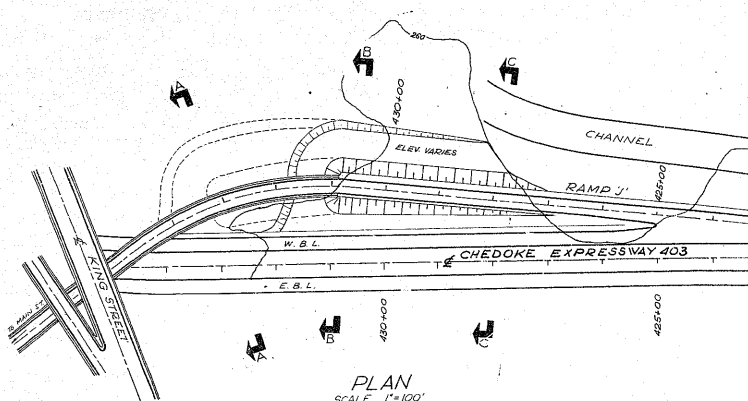
**NOTES:**

- Sections A-A and B-B apply from 13+00 to 18+30.
- Section C-C applies from 18+30 to the E.B.L.
- Berm elevations is 18' less than grade elevation at any section.

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION

**CHEDOK EXPRESSWAY  
PLAN, PROFILE & SECTIONS  
SHOWING TREATMENT OF RAMP 'G'**

DESIGNED BY J. BROWN	DISTRICT NO. 4	DATE 12 MARCH 1961
CHECKED BY H. D. SEED	W.D. NO. 231-58-3	WORKING 58-F-185
APPROVED BY [Signature]	SCALE AS SHOWN	DRAWING NO. 59-F-125 C



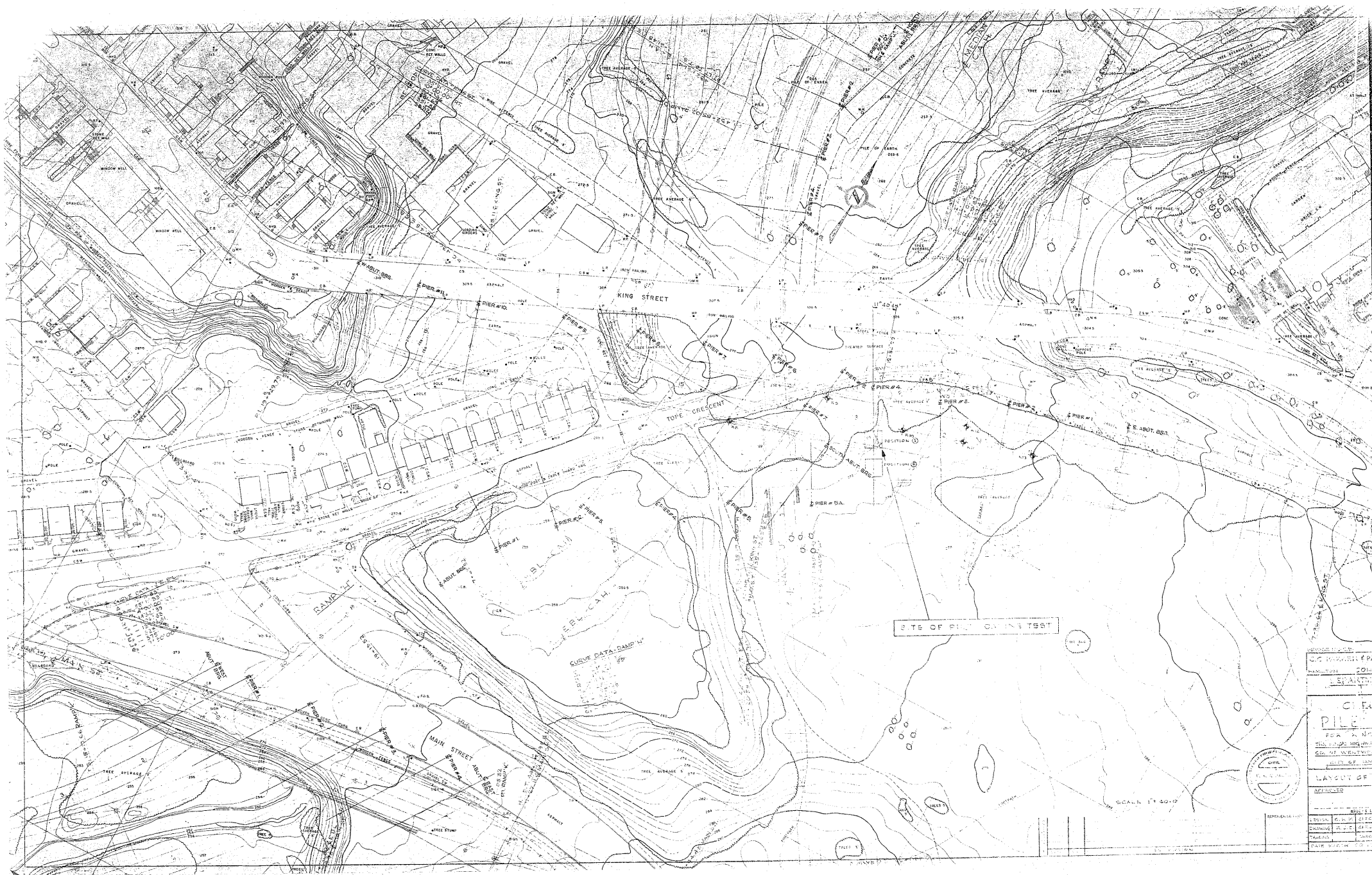
#### NOTES

1. SECTION A-A APPLIES FROM STA. 431+00 TO 431+00
2. SECTION B-B APPLIES FROM STA. 431+00 TO 427+70
3. SECTION C-C APPLIES FROM STA. 427+70 TO W.B.L.
4. BACK FILL FOR NORTH ABUTMENT TO BE SLAG.

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION

#### CHEDOKE EXPRESSWAY PLAN & SECTION SHOWING TREATMENT of RAMP J'

ORIGINATED BY <b>BROWN</b>	DISTRICT NO. <b>4</b>	DATE <b>17 MARCH 1961</b>
DESIGNED BY <b>7/2/61</b>	W.P. NO. <b>236-B-58</b>	FORM NO. <b>59-F-125</b>
CHECKED BY <b>7/2/61</b>	SCALE <b>AS SHOWN</b>	DRAWING NO.
APPROVED BY <b>7/2/61</b>		<b>59-F-125D</b>



PROJECT NO. 1000	
DATE 10/1/50	
DRAWN BY J. H. HARRIS	
CHECKED BY J. H. HARRIS	
APPROVED BY J. H. HARRIS	
SCALE 1" = 40'-0"	
SHEET NO. 1	
TOTAL SHEETS 1	
PROJECT TITLE	
SUBJECT	
LOCATION	
DATE OF SURVEY	
BY	
CHECKED	
APPROVED	
REVISIONS	
REVISION NO.	
DATE	
BY	
CHECKED	
APPROVED	

